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EPA CONTRACT NO. 68-W6-0042
EPA WORK ASSIGNMENT NO. 107-RICO-0146

EPA Project Officer: Diana King
EPA Remedial Project Manager: Joseph LeMay

BASELINE HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT REPORT

Wells G&H Superfund Site
Aberjona River Study
Operable Unit 3
Woburn, Massachusetts

Volume VI
Appendices D, E, and F

September 2004

Prepared By:

Metcalf & Eddy
701 Edgewater Drive
Wakefield, Massachusetts

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APPENDIX D

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TRIAD SAMPLING LOCATIONS

Table D.1-1. Wells G&H, 2001Sediment Triad Sampling Locations and Habitat Types

TTNUS Sampling Number, June 2001	Sample ID	Station Name	Location	Habitat Type[1]	Date Sampled	Depth (ft)	Comment
IPSD-WH07-061801	SD-WH-07-TR	WH	23-acre wetland, near well H	wetland	6/18/01	1.2	PFO
IPSD-TT2201-061801	SD-22-01-TR	22	23-acre wetland, near rifle range	wetland	6/18/01	0.2	PFO
IPSD-TT1203-061901	SD-12-03-TR	12	23-acre wetland	stream	6/19/01	4.5	
IPSD-TT2903-061901	SD-TT-29-03-TR	TT-29	23-acre wetland	stream	6/19/01	1.0	
IPSD-TT1901-061901	SD-19-0-TR	19	23-acre wetland	wetland	6/19/01	0.8	PEM
IPSD-TT3302-062001	SD-TT-33-02-TR	TT-33	Cranberry Bog	wetland	6/20/01	0.5	PEM
IPSD-TT3202-062001	SD-TT-32-02-TR	TT-32	Cranberry Bog	wetland	6/20/01	0.6	PEM
IPSD-WW06-062101	SD-WW-06-TR	WW	23-acre wetland, near Wildwood	wetland	6/21/01	0.8	PFO
IPSD-TT1802-062101	SD-18-02-TR	18	23-acre wetland	stream	6/21/01	1.1	
IPSD-TT1002-062201	SD-10-01-TR	10	North of Salem Street	stream	6/22/01	1.4	
IPSD-TT1301-062201	SD-13-01-TR	13	23-acre wetland	wetland	6/22/01	0.3	PEM
IPSD-TT3001-062201	SD-TT-30-01-TR	TT-30	Cranberry bog	stream	6/22/01	0.6	
IPSD-PP03-062501	SD-MC-03-TR	03-IP	Phillips Pond	reference pond	6/25/01	13	
IPSD-TTSA01-062501	SD-SA-01-TR	SA	S. Branch Aberjona River, Arcadia Rd.	reference wetland	6/25/01	0.7	PFO
IPSD-TTSD01-062501	SD-MC-01-TR	01-IP	S. Branch Aberjona River, Willow St.	reference stream	6/25/01	0.3	
IPSD-TT04-062601	SD-MC-04-TR	04-IP	Hall's Brook, Third Road	reference stream	6/26/01	0.4	
IPSD-HB00-062601	SD-HB-00-TR	HB	Hall's Brook, Danforth St.	reference wetland	6/26/01	0.8	PEM
IPSD-TT0603-062601	SD-06-03-TR	06	Judkins Pond	pond	6/26/01	3.8	
IPSD-TTUF02-062701	SD-UF-02-TR	UF	Upper Forebay, Mystic Lake	pond	6/27/01	7.1	
IPSD-TTAO03-062701	SD-AO-03-TR	04	Upper Forebay, Mystic Lake	pond	6/27/01	5	

[1] PFO - Palustrine forested wetland, PEM - Palustrine emergent wetland

APPENDIX D.2

FIELD NOTES FOR JUNE 2001 TRIAD SAMPLING

FIELD NOTES FOR JUNE 2001 WELLS G&H TRIAD SAMPLING

The following field notes were compiles in order to detail the sampling activities in support of the triad sampling at Wells G&H between June 18 and June 27, 2001. These notes are organized in chronological order. Physical Characterization and Habitat Assessment Field Data Sheets for each of these locations were also completed for each station.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: WH
Sample Location:SD-WH-07-TR
Date: June 18, 2001
Time: 11:10 am
Weather: Sunny, 80°F, light breeze

Sampling team met at the MA Rifle Association parking log, at the end of Rifle Range Road in Woburn, at 9:15 am. The first station sampled, west of the rifle range, was the TTNUS sample location WH07. The station is located at the edge of the red maple swamp along the eastern border of the Well G& H 23-acre wetland. There had been heavy rains (estimated at 2.5 inches) in the last 24-hours. Water levels in the wetland were high for June due to this rain event, as evidenced by the depth of water around emergent vegetation including sensitive ferns. The site appears to be a seasonally inundated palustrine forested wetland. The open emergent marsh, dominated by common reed (*Phragmites australis*) is located approximately 50 ft to the west.

The sediment samples were collected in 1.2 ft of water, just west of the WH07 stake. The sediment was dark muck with a high content of coarse particulate organic matter. The three samples sieved for benthic community analysis were composed predominantly of leaf litter. A layer of moss was present floating just above the sediment surface. There was no observable flow of water at the site.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: 22
Sample Location: SD-22-01-TR
Date: June 18, 2001
Time: 3:30 pm
Weather: Sunny, 85°F, light breeze

Station SD-22-01 was access through the northern fence of the Rifle Association property. The former stake marking TTNUS's sampling location was located. The area in the vicinity of the sample site is a palustrine forested wetland, dominated by red maple (*Acer rubrum*), swamp azalea (*Rhododendron viscosum*), and skunk cabbage (*Symplocarpus foetidus*).

The sample was collected within a small channel (2 ft wide) with slow, but detectable flow, through the red maple swamp. The banks were densely vegetated with maples, shrubs, and a herb layer dominated by skunk cabbage, cinnamon fern (*Osmunda cinnamomea*), jewelweed (*Impatiens capensis*) and lurid sedge (*Carex lurida*). In the channel itself, emergent and

submersed aquatic vegetation was absent. The sediment was composed of dark highly organic muck with a high content of coarse particulate organic matter. In the samples sieved for benthic community analysis, small beads, presumed to be lead shot from historic rifle range activity were found. The access road, which parallels the wetland to the east was covered in buck shot.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: 12
Sample Location: SD-12-03-TR
Date: June 19, 2001
Time: 9:30 am
Weather: Sunny, 80°F, light breeze

Station SD-12-03 along the secondary channel of the Aberjona River near Well H in the 23-acre wetland. This location was characterized as a stream habitat and was collected in a depositional area of a side channel along the edge of the emergent marsh. The marsh vegetation was dominated by narrow-leaved cattail (*Typha angustifolia*), purple loosestrife (*Lythrum salicaria*) and tussock sedge. A few shrubs adjacent to the sampling location included button-bush and elderberry (*Sambucus canadensis*), although the area was generally open emergent marsh.

The sediment was composed of dark organic muck, with a high proportion of coarse particulate organic matter consisting mainly of cattail fragments. The main channel of the stream at this location was approximately 5-8 feet wide with moderate flow and 4 ft deep at the center. The small side channel where the sample was collected was 0.8 to 1.2 feet deep. The emergent marsh adjacent to the sample area is covered in dense vegetation and pockets of water.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: TT-29
Sample Location:SD-TT-29-03-TR
Date: June 19, 2001
Time: 11:50 am
Weather: Sunny, 85°F, light breeze

SD-TT-29-03 is south of Well H on the east branch of the river within the 23-acre wetland. This location was characterized as a stream habitat, and was collected adjacent to a small inlet in the wetland which forms a pool bordered by emergent wetland. The stream channel is distinct, deeper and wider than at SD-12-03. There is no canopy and few shrubs. The wetland vegetation is dominated by tussock sedge (*Carex stricta*), purple loosestrife and some cattails. The sediment was collected at a depth of 0.8 to 1.2 feet of water. The sediment was composed of dark organic muck with fine roots and slightly less undecomposed cattail fragments.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: 19
Sample Location: SD-19-01-TR

Date: June 19, 2001
Time: 2:30 pm
Weather: Sunny, 90°F, light breeze

Station SD-19-01 is in the 23-acre wetland west of Well G. This wetland sediment sample was located in a isolated pocket or channel in the emergent wetland among tussock sedge. This open channel in the emergent wetland is not directly connected to the main channel of the river. The sediment samples were collected at a depth of 0.8 feet. Sediment consisted of dark organic muck with a higher content of fine particulate organic matter. Some orange floc was noted on the surface of the sediment. There was no tree or shrub cover. A dense stand of *Phragmites* is located to the north, but in the vicinity of the sample, the vegetation was primarily sedges. The original Foster-Wheeler sample was taken near this location. The M&E (1997) sample was collected closer to the forested wetland to the east.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: TT-33
Sample Location: SD-TT-33-02-TR
Date: June 20, 2001
Time: 11:20 am
Weather: Sunny, 80°F, light breeze

Sample site SD-TT-33-02 is just off the main channel of the Aberjona River near the southern end of the former Cranberry Bog, south of Salem Street. This wetland habitat was located along a minor side channel (east-west). The substrate was difficult to sample with the dredge because of the fibrous roots and particulate organic matter. The sediment was black organic muck with a higher sand component than many of the wetland samples. The dominant vegetation in the vicinity of the sample station included tussock sedge and purple loosestrife. The emergent marsh was mainly open in this area, but a few shrubs, mainly silky dogwood (*Cornus amomum*) were located adjacent to the sample location.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: TT-32
Sample Location: SD-TT-32-02-TR
Date: June 20, 2001
Time: 2:00 pm
Weather: Sunny, 90°F, light breeze

Sample station TT-32 was also located within the former Cranberry Bog, north of TT-33 The station was very similar in character to the wetland sample collected at SD-TT-33-02-TR. The sediment was collected at the mouth of one of the small side channels to the main stream. There was almost no flow in the channel and the sediment was collected in a depositional area 0.4-0.8 ft of water depth. The vegetation bordering the sampling location was dominated by emergent, hummock-forming grass, and purple loosestrife. The sediment consisted of organic muck and

some sand. The organic content and fine root fraction was also high, making dredging difficult. The dredge pressed in 6 inches into the substrate and frequently recovered only 2-3 inches of material for the chemistry and toxicity samples.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: WW
Sample Location: SD-WW-06-TR
Date: June 21, 2001
Time: 8:55 am
Weather: Cloudy, 70°F, light breeze

Station WW-06 is located along the eastern edge of the Wildwood Property. The station is at the out edge of the narrow forested wetland that borders the gravel cap for the treatment system at Wildwood. The sample was collected among clumps of emergent wetland plants including sensitive fern (*Onoclea sensibilis*) and purple loosestrife. The location is partially shaded by red maple trees and a few shrubs (norther arrowwood) were located adjacent to the sampling area.

The sediment was black organic sediment with many fine roots and cohesive structure. In order to get a sample, the jaws of the dredge had to be manually pushed closed. Water depth was 0.5 - 1.0 feet. The area appears to be a seasonally inundated location.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: 18
Sample Location: SD-18-02-TR
Date: June 21, 2001
Time: 2:30 pm
Weather: Cloudy, 75°F, light breeze

The sample station was located on the east side of the Aberjona River and determined by the GPS co-ordinates for SD-18-02 recorded by M&E. The station was accessed by launching a boat from Wildwood. The location is a small inlet along the main river channel. The vegetation along the bank was dominated by tussock sedge and purple loosestrife. The banks of the stream are emergent marsh with a few red maple saplings present. The sediment was black organic muck, with a high content of fine particulate organic matter. Samples were collected in water 1.1 ft deep.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: 10
Sample Location: SD-10-02-TR
Date: June 22, 2001

Time: 8:45 am
Weather: Cloudy, 75°F, light breeze

Sampling station10 is located on the Aberjona River, just upstream of the bridge at Salem Street. This location is at the southern end of the 23-acre wetland and upstream of the Cranberry bog. Access was obtained through the backyard of a residence on Salem street to the west. A boat was used to collect the sample. GPS was used to locate the M&E co-ordinates for SD-10-03. This area is a wide point in the river with slow flow. The sample was collected in 1.4 feet of water at the northeast edge of a patch of water lilies (*Nuphar luteum*). The sediment was composed of black organic muck with a high content of coarse particulate organic matter. The riparian vegetative zone was limited on the western bank to a narrow shrub/tree border sloping up to a mowed residential lawn. The remainder of the surrounding banks were dominated by emergent vegetation including cattails and purple loosestrife.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: 13
Sample Location: SD-13-01-TR
Date: June 22, 2001
Time: 10:45 am
Weather: Cloudy, 70°F, light breeze

The location of the stake for station SD13-01 (Foster Wheeler) was determined with GPS co-ordinates. The location of the former SD13-01 was in an area of a scoured channel at the western edge of the 23-acre wetland, north of Wildwood. The area was inundated with water, but a location about 15 feet to the east was selected to sample. This location was a small channel into the adjacent to the emergent wetland. The sample was collected in the open water, 0.3 - 0.4 feet deep, adjacent to clumps of purple loosestrife and jewelweed.

The western bank, about 100 feet from the railroad tracks, consisted of a disturbed forest, dominated by oak. Shrubs, including northern arrowwood (*Viburnum recognitum*), were prevalent along the bank. The open water channel was about 20 feet wide and up to 2 feet deep. The sediment consisted of black organic muck, with some of the dredge samples with a higher content of peaty material.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: TT-30
Sample Location: SD-TT-30-01-TR
Date: June 22, 2001
Time: 1:20 pm
Weather: Partly cloudy, 75°F

The sample was collected in a very small inlet on the east side of the stream channel south of Salem Street. The station was accessed from a parking lot off the south side of Salem Street.

There was moderate flow in the channel and slow flow at the sampling location behind a small clump of purple loosestrife. The western shoreline was a narrow band of forest including willow, red maple and gray birch . The sample was collected in an open are of emergent marsh dominated by purple loosestrife, tussock sedge and sensitive fern at a depth of 3-10 inches. The sediment was composed of back organic muck, fibrous roots, and some peat.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: 03-IP
Sample Location: SD-MC-03-TR
Date: June 25, 2001
Time:10:10 am
Weather: Partly cloudy, 76°F

Phillips Pond was a reference location located on the South Branch of the Aberjona River between Commercial Way and Route 93. Access was obtained from road behind the Marshall's loading docks. The pond was sampled using an Ekman dredge from a boat. Station 03-IP is located off the southern shore about halfway up the pond. The sediment was collected at a depth of about 13 feet. Soft black organic muck was collected at the location determined from GPS co-ordinates provided in Menzie-Cura's data. While anchored at the same location, in some areas there was little recovery in the dredge and it felt like it was hitting hard bottom.

The pond was created in the mid-1970's. There is an active beaver dam at the outlet, and the water levels appeared to be quite high. The bordering vegetated buffer is a narrow forest (red maple gray birch, glossy buckthorn (*Rhamnus frangula*) and dogwood), with the exception of the west side, with is *Phragmites* and a bank up to the roadway. Beaver activity, muskrat and Great Blue Heron were observed at the pond. Ken Munney reported that a large number of bass were collected from this pond during the fish sampling.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: SA
Sample Location: SD-SA-01-TR
Date: June 25, 2001
Time: 2:00 pm
Weather: Mostly sunny, 85°F

A new wetland reference station was selected in the Town of Reading, at the end of Arcadia Road. The station is located off the north side of the cul-de-sac at the edge of the forested wetland in a small open channel (no flow) in the emergent wetland. At the time of sampling the water depth was 0.7 ft. At the sampling location there was no canopy cover, however, to the south and west (upstream), a mix of shrub and forested wetland was dominated by red maple, and northern arrowwood. Vegetation at SA-01 included broad-leaved cattail, skunk cabbage, jewel weed, purple loosestrife and sensitive fern. This vegetative community was characteristic of the emergent marsh along the edges of the open channel in the wetland where the sample was

taken. There was no rooted aquatic vegetation where the sediment was collected. The sediment consisted of black organic muck, on top of a sandier layer. There was a fairly high content of coarse particulate organic matter in the samples.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: 01-IP
Sample Location: SD-MC-01-TR
Date: June 25, 2001
Time: 4:00 pm
Weather: Mostly sunny, 85°F

Station 01-IP is a stream reference location on the South Branch of the Aberjona River. The station is located behind residences on Willow Street in Reading. Access to the site was obtained through the back yard of #118 Willow Road. The stream is 8-10 feet wide, with forested wetland along the east bank and emergent/shrub wetland along the west bank. Shrubs along both banks included silky dogwood and glossy buckthorn. Trees were predominately red maple. Along the banks, the dominant herbaceous species included jewelweed and sensitive fern.

The substrate on west side of the stream channel was scoured and sandy. The sample was collected in the depositional area on the east side of the channel. The sediment was black organic muck, with some sand, and a high content of coarse organic matter. There were numerous sticks and woody debris. A few rooted macrophytes (*Ludwigia palustris*) were observed in the area of the sample collection.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: 04-IP
Sample Location: SD-MC-04-TR
Date: 6/26/01
Time: 9:30 am
Weather: Sunny, 85°F

This station was a reference stream location, on Hall's Brook accessed from a dead-end street (Third Road). This station was used by Menzie-Cura for a reference stream for the Industri-Plex triad sampling. There is a distinct stream channel present through a wide emergent marsh dominated by reed canary grass. The sample was taken on the western end of the marsh in an area where the stream is bordered by a few shrubs and then flows into a forested wetland.

The sediment was collected along the reed-canary grass bank and consisted of a black organic muck. The substrate toward the center of the channel (not sampled) was sandy. Dogwood, speckled alder (*Alnus rugosa*) and elderberry were present along the northern bank. Other emergent wetland species present in the area included purple loosestrife and broad-leaved cattail (*Typha latifolia*).

Project name: Wells G&H Sediment Triad Sampling 2001
Station: HB
Sample Location: SD-HB-00-TR
Date: June 26, 01
Time: 11:50 am
Weather: Sunny, 90°F

This reference wetland, along Hall's Brook, was accessed from a dead-end street (Danforth) off of School Street in Woburn. The wetland was reached by going down a steep bank from the residential area and west along the bank, out to a peninsula that runs north into the wetland. The station is on the west side of the wetland adjacent to an scrub/shrub wetland dominated by speckled alder. The sample was taken in a channel in the wetland with no flow, among cattails. The water depth at the sampling location was 0.5 to 1.0 feet. The sediment was deep (approximately 2 ft) dark organic muck with coarse organic matter. The was duckweed (*Lemna* sp.) on the surface of the water among the cattails, and other emergent vegetation included purple loosestrife and for-get-me-nots (*Myosotis scorpoides*).

Project name: Wells G&H Sediment Triad Sampling 2001
Station: 06
Sample Location: SD-06-03-TR
Date: June 26, 2001
Time: 3:00 pm
Weather: Sunny, 90°F

The sample location for Judkins Pond was located using co-ordinates for the M&E SD-06-03 station. Judkins Pond is a small pond in the center of Winchester. The sampling location is on the east side of the pond near a patch of water lilies (*Nuphar luteum*). The sample was collected at a depth of 3.5 - 4 feet. The sediment consisted of dark black organic muck with many fine roots and some sand in the sieved benthic community samples. Undisturbed vegetation grows along the bank in a narrow buffer, but the majority of the riparian zone consists of mowed grass, buildings and roadways.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: UF
Sample Location: SD-UF-02-TR
Date: June 27, 2001
Time: 9:30 am
Weather: Sunny, 75°F

This was one of two samples collected in the Upper Forebay of Upper Mystic Lake. The eastern shore of the pond is bordered by a park, and the western shore is residential. The samples were collected by boat, launched from the park on Mystic Valley Parkway. The first sample was collected in a bay on the western shore. Many of the residences on the shoreline have seawalls.

The water depth at the station was 7.1 feet. The sediment consisted of black orgainc muck with little coarse organic matter. There was a patch of water lilies (*Nymphea odorata*) approximately 6 ft from the sample location. Lilies were prevalent elsewhere on the pond. Cormorants and geese were present on the pond. Bluegills were noted along the eastern shore, and larger fish were jumping near the center of the lake.

Project name: Wells G&H Sediment Triad Sampling 2001
Station: 04
Sample Location: SD-AO-03-TR
Date: June 27, 2001
Time: 11:30 am
Weather: Sunny, 85°F

The second station in the Upper Forebay was located closer to the inlet of the Aberjona River. The sample was collected at a water depth of 5 ft. The sediment was similar with some leaf matter in the samples.

APPENDIX D.3

HABITAT ASSESSMENT

WELLS G&H TRIAD SAMPLING
June 2001
Habitat Assessment Field Data Sheets -
Low Gradient Stream Forms

Habitat Assessment Field Data Sheets- Low Gradient Stream Forms (HAFDS) were filled out at each station used as a sampling location for the June 2001 sediment triad sampling. In addition, a Physical Characterization/Water Quality Field Data Sheet (PC/WQFDS) and a Sample Log Sheet (TTNUS) were also completed for each station and are provided in Appendix A.5. Field notes were recorded in the field by D. Roberts and were summarized in Appendix D.2.

The HAFDS forms (*Rapid Bioassessment Protocols for Use in Streams and Wadeble Rivers: Periphyton, Benthic Macroinvertebrates, and Fish, Second Editions - Form 3*, See attached blank form) were filled out based on consensus of the professional judgement of three biologists. Team members participating included: D. Roberts (M&E), K. O'Neill (TTNUS), and either Bart Hoskins (Lockheed-Martin/ESAT) or Cornell Rosiu (EPA).

To try to achieve consistency in the numeric rankings given (0-20) for each of the 10 habitat parameters, some assumptions or interpretations were applied to the assessments. These assumptions are presented below. A summary of the assessments for each of the 20 Triad sampling stations sampled in June 2001 are presented in Table D.1-1.

Habitat Parameters: Habitat Assessment Field Data Sheets -Low Gradient Stream Forms

1. Epifaunal Substrate/ Available Cover
It was assumed for this parameter to rank in the optimal (16-20) category, there would be a mix a of substrate types present. In the majority of the depositional stations the substrate was 100% soft muck and the did not show evidence of the substrate being frequently disturbed or removed (marginal, 6-10). IF woody debris or undercut banks were present, the station was rated as higher sub-optimal.

2. Pool Substrate Characterization
The selected stations generally did not have a mixture of substrate materials and were therefore rated as less than optimal (<16). Depending on the presence or absence of root mats and submerged vegetation the stations were rated as marginal (6-10) or sub-optimal (11-16).

3. Pool Variability
The majority of the sampling locations were in areas of consistent depth, and were formed essentially in one small or large pool. Pool variability was consequently ranked consistently marginal (6-10) or poor (1-5), based on the depth of the pools. The parameter was assigned a value of NA (not applicable) in the pond locations.

4. Sediment Deposition
The sample locations were selected to be in areas of higher deposition of fine material. The stations were ranked as poor (0-5) unless deposition of sand was present, and a ranking of marginal (6-10).

5. Channel Flow Status

Since depositional areas and wetland locations were selected, most of the stations had little or no detectable water flow. This parameter was interpreted to mean that channel flow would be poor if water levels were very low and only found in isolated pool in a channel. Since the June sampling was conducted during a period of relatively high water levels, all of the locations had water reaching the base of both lower banks, with a minium of substrate exposed (optimal, 16-20). The ranking for this parameter may vary depending on the season during which the survey was conducted. Slightly lower rankings were given at locations where there was evidence of higher water levels than the existing water elevation at the time of sampling.

6. Channel Alteration

Channel alteration characterized how much the stream reach has been channelized or disrupted. Except in a few areas, such ass the Cranberry Bog and the forebay of Upper Mystic Lake, bank evidence of bank alteration was minimal or absent (Optimal, 16-20). In areas with historic dredging (Cranberry Bog, Phillips Pond, Judkins Pond), a ranking of sub-optimal was applied.

7. Channel Sinuosity

For the stream locations, channel sinuosity was evaluated based on the proportion of bends in the stream in the reach where the sample was taken. This parameter was not easily applied to wetland and pond locations. For the pond locations, values between 0 and 5 were assigned (poor) because all of the ponds represented impoundments in the river. At the wetland locations channel sinuosity only applied to locations where the adjacent channel could be rated. To be consistent, all of the values were converted to N/A (not applicable) because the condition of the adjacent channel was not relevant to habitat at the sampling station in the wetland. This results in essentially assigning the channel sinuosity a value of 0 for the wetland in the over-all score.

8. Bank Stability

Bank stability was generally rated as optimal (9-10) if the banks werer natural and fully vegetated. In areas where human disturbance resulted in small areas of erosion, values of 6-8 (sub-optimal) were assigned.

9. Vegetative Protection

The value of the bank stability was closely related to the bank stability parameter. The majority of the sites had banks that were more than 90% vegetated, with the exception of the pond locations. At the pond locations were vegetation had been removed or mowed, the vegetation protection was rated as sub-optimal or marginal.

10. Riparian Vegetative Zone Width

The riparian vegetative zone width was evaluated as optimal (9-10) if there was an undisturbed buffer of at least 18 m in width. Based on the thresholds in the condition categories, the width of undisturbed buffer was used to evaluate the condition of the riparian zone. Where mowing or pavement came within 6 m of the edge of water, the condition rating of poor was assigned.

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (FRONT)

STREAM NAME	LOCATION	
STATION #_____ RIVERMILE_____	STREAM CLASS	
LAT _____ LONG _____	RIVER BASIN	
STORET #	AGENCY	
INVESTIGATORS		
FORM COMPLETED BY	DATE _____ TIME _____ AM PM	REASON FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 50% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	30-50% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	10-30% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 10% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE				
2. Pool Substrate Characterization	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged vegetation common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged vegetation present.	All mud or clay or sand bottom; little or no root mat; no submerged vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE				
3. Pool Variability	Even mix of large-shallow, large-deep, small-shallow, small-deep pools present.	Majority of pools large-deep; very few shallow.	Shallow pools much more prevalent than deep pools.	Majority of pools small-shallow or pools absent.
SCORE				
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than <20% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 20-50% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 50-80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE				
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE				

HABITAT ASSESSMENT FIELD DATA SHEET—LOW GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE				
7. Channel Sinuosity	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line. (Note - channel braiding is considered normal in coastal plains and other low-lying areas. This parameter is not easily rated in these areas.)	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	The bends in the stream increase the stream length 1 to 2 times longer than if it was in a straight line.	Channel straight; waterway has been channelized for a long distance.
SCORE				
8. Bank Stability (score each bank)	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)				
SCORE ___ (RB)				
9. Vegetative Protection (score each bank) Note: determine left or right side by facing downstream.	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)				
SCORE ___ (RB)				
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)				
SCORE ___ (RB)				

Total Score _____

Table D.3-1. Low Gradient Stream Habitat Assessment Scores for Wells G&H, Woburn, Massachusetts

Station:	WH	22	12	TT-29	19	TT-33	TT-32	WW	18	10	13	TT-30	03-IP	SA	01-IP	04-IP	HB	06	UF	04
1. Epifaunal Substrate/ Available Cover	11	12	14	14	14	11	11	13	15	13	13	11	11	13	16	13	15	11	11	11
2. Pool Substrate Characterization	13	10	12	11	12	14	12	14	6	14	10	14	8	10	11	14	10	8	8	8
3. Pool Variability	5	4	0	5	6	2	2	5	5	11	5	6	N/A	5	8	6	3	N/A	N/A	N/A
4. Sediment Deposition	2	3	5	5	5	8	8	5	8	5	4	5	2	5	10	8	5	2	3	3
5. Channel Flow Status	18	16	20	20	20	16	17	17	20	17	18	18	20	19	16	19	20	20	18	18
6. Channel Alteration	20	20	20	20	20	13	13	20	20	16	15	17	15	19	18	19	20	15	12	12
7. Channel Sinuosity	N/A	N/A	18	15	N/A	N/A	N/A	N/A	16	6	N/A	15	5	N/A	10	10	N/A	2	2	2
8. Bank Stability (Left Bank)	10	10	10	10	10	9	10	10	10	10	6	9	8	10	9	10	10	7	8	8
Bank Stability (Right Bank)	10	10	10	10	10	9	10	10	10	7	7	9	8	10	9	10	10	7	8	8
9. Vegetative Protection (Left Bank)	9	10	10	10	10	10	10	10	10	10	9	10	9	10	9	10	10	5	8	6
Vegetative Protection (Right Bank)	9	10	10	10	10	10	10	10	10	6	7	10	9	10	9	10	10	5	7	7
10. Riparian Vegetative Zone Width (Left Bank)	10	10	10	10	10	10	10	10	10	7	9	6	3	5	9	10	10	1	5	5
Riparian Vegetative Zone Width (Right Bank)	10	10	10	10	10	10	10	4	10	6	5	10	4	10	9	10	10	1	5	5
TOTAL SCORE	127	125	149	150	137	122	123	128	150	128	108	140	102	126	143	149	133	84	95	93

APPENDIX D.4

TRIAD CHEMISTRY DATA

TABLE D.4-1
SUMMARY OF TRIAD CHEMISTRY DATA - SD-HB-00-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	15
1,1,2,2-Tetrachloroethane						0 / 1	15
1,1,2-Trichloro-1,2,2-trifluoroethane						0 / 1	15
1,1,2-Trichloroethane						0 / 1	15
1,1-Dichloroethane						0 / 1	15
1,1-Dichloroethene						0 / 1	15
1,2,4-Trichlorobenzene						0 / 1	15
1,2-Dibromo-3-chloropropane						0 / 1	15
1,2-Dibromoethane						0 / 1	15
1,2-Dichlorobenzene						0 / 1	15
1,2-Dichloroethane						0 / 1	15
1,2-Dichloropropane						0 / 1	15
1,3-Dichlorobenzene						0 / 1	15
1,4-Dichlorobenzene						0 / 1	15
2-Butanone						0 / 1	15
2-Hexanone						0 / 1	15
4-Methyl-2-Pentanone						0 / 1	15
Acetone						0 / 1	60
Benzene						0 / 1	15
Bromodichloromethane						0 / 1	15
Bromoform						0 / 1	15
Bromomethane						0 / 1	15
Carbon Disulfide						0 / 1	15
Carbon Tetrachloride						0 / 1	15
Chlorobenzene						0 / 1	15
Chloroethane						0 / 1	15
Chloroform						0 / 1	15
Chloromethane						0 / 1	15
cis-1,2-Dichloroethene						0 / 1	15
cis-1,3-Dichloropropene						0 / 1	15
Cyclohexane						0 / 1	15
Dibromochloromethane						0 / 1	15
Dichlorodifluoromethane						0 / 1	15
Ethylbenzene						0 / 1	15
Isopropylbenzene						0 / 1	15
m&p-Xylene						0 / 1	15
Methyl Acetate	58		58		SD-HB-00-TR	1 / 1	58
Methyl tert-Butyl Ether						0 / 1	15
Methylcyclohexane						0 / 1	15
Methylene Chloride						0 / 1	15
o-Xylene						0 / 1	15
Styrene						0 / 1	15
Tetrachloroethene						0 / 1	15
Toluene						0 / 1	15
trans-1,2-Dichloroethene						0 / 1	15
trans-1,3-Dichloropropene						0 / 1	15
Trichloroethene						0 / 1	15
Trichlorofluoromethane						0 / 1	15
Vinyl Chloride						0 / 1	15
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	230
2,2'-oxybis(1-Chloropropane)						0 / 1	230
2,4,5-Trichlorophenol						0 / 1	550
2,4,6-Trichlorophenol						0 / 1	230
2,4-Dichlorophenol						0 / 1	230
2,4-Dimethylphenol						0 / 1	230
2,4-Dinitrophenol						0 / 1	550
2,4-Dinitrotoluene						0 / 1	230
2,6-Dinitrotoluene						0 / 1	230
2-Chloronaphthalene						0 / 1	230

TABLE D.4-1
SUMMARY OF TRIAD CHEMISTRY DATA - SD-HB-00-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
2-Chlorophenol						0 / 1	230
2-Methylnaphthalene						0 / 1	230
2-Methylphenol						0 / 1	230
2-Nitroaniline						0 / 1	550
2-Nitrophenol						0 / 1	230
3,3'-Dichlorobenzidine						0 / 1	230
3+4-Methylphenols						0 / 1	230
3-Nitroaniline						0 / 1	230
4,6-Dinitro-2-methylphenol						0 / 1	550
4-Bromophenyl-phenylether						0 / 1	230
4-Chloro-3-methylphenol						0 / 1	230
4-Chloroaniline						0 / 1	230
4-Chlorophenyl-phenylether						0 / 1	230
4-Nitroaniline						0 / 1	550
4-Nitrophenol						0 / 1	550
Acenaphthene						0 / 1	230
Acenaphthylene						0 / 1	230
Acetophenone						0 / 1	230
Anthracene						0 / 1	230
Atrazine						0 / 1	230
Benzaldehyde						0 / 1	230
Benzo(a)anthracene						0 / 1	230
Benzo(a)pyrene						0 / 1	230
Benzo(b)fluoranthene						0 / 1	230
Benzo(g,h,i)perylene						0 / 1	230
Benzo(k)fluoranthene						0 / 1	230
Bis(2-Chloroethoxy)methane						0 / 1	230
Bis(2-Chloroethyl)ether						0 / 1	230
bis(2-Ethylhexyl)phthalate						0 / 1	230
Butylbenzylphthalate						0 / 1	230
Caprolactam						0 / 1	230
Carbazole						0 / 1	230
Chrysene						0 / 1	230
Dibenzo(a,h)anthracene						0 / 1	230
Dibenzofuran						0 / 1	230
Diethylphthalate						0 / 1	230
Dimethylphthalate						0 / 1	230
Di-n-Butylphthalate						0 / 1	230
Di-n-octylphthalate						0 / 1	230
Fluoranthene						0 / 1	230
Fluorene						0 / 1	230
Hexachlorobenzene						0 / 1	230
Hexachlorobutadiene						0 / 1	230
Hexachlorocyclopentadiene						0 / 1	230
Hexachloroethane						0 / 1	230
Indeno(1,2,3-cd)pyrene						0 / 1	230
Isophorone						0 / 1	230
Naphthalene						0 / 1	230
Nitrobenzene						0 / 1	230
N-Nitroso-di-n-propylamine						0 / 1	230
N-Nitroso-diphenylamine						0 / 1	230
Pentachlorophenol						0 / 1	550
Phenanthrene						0 / 1	230
Phenol						0 / 1	230
Pyrene						0 / 1	230
PCBs/Pesticides - ug/Kg							
4,4'-DDD						0 / 1	1.8
4,4'-DDE						0 / 1	1.8
4,4'-DDT						0 / 1	1.8
Aldrin						0 / 1	0.90
alpha-BHC						0 / 1	0.90

TABLE D.4-1
SUMMARY OF TRIAD CHEMISTRY DATA - SD-HB-00-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
alpha-Chlordane						0 / 1	0.90
Aroclor-1016						0 / 1	18
Aroclor-1221						0 / 1	36
Aroclor-1232						0 / 1	18
Aroclor-1242						0 / 1	18
Aroclor-1248						0 / 1	18
Aroclor-1254						0 / 1	18
Aroclor-1260						0 / 1	18
beta-BHC						0 / 1	0.90
delta-BHC						0 / 1	0.90
Dieldrin						0 / 1	1.8
Endosulfan I						0 / 1	0.90
Endosulfan II						0 / 1	1.8
Endosulfan Sulfate						0 / 1	1.8
Endrin						0 / 1	1.8
Endrin Aldehyde						0 / 1	1.8
Endrin Ketone						0 / 1	1.8
gamma-BHC						0 / 1	0.90
gamma-Chlordane						0 / 1	0.90
Heptachlor						0 / 1	0.90
Heptachlor Epoxide						0 / 1	0.90
Methoxychlor						0 / 1	9.0
Toxaphene						0 / 1	90
Metals - mg/Kg							
Aluminum	6150		6150		SD-HB-00-TR	1 / 1	6150
Antimony	0.77	J	0.77	J	SD-HB-00-TR	1 / 1	0.77
Arsenic	16.2		16.2		SD-HB-00-TR	1 / 1	16
Barium	59.4		59.4		SD-HB-00-TR	1 / 1	59
Beryllium	0.73	J	0.73	J	SD-HB-00-TR	1 / 1	0.73
Cadmium	2.9		2.9		SD-HB-00-TR	1 / 1	2.9
Calcium	9160		9160		SD-HB-00-TR	1 / 1	9160
Chromium	18.2		18.2		SD-HB-00-TR	1 / 1	18
Cobalt	12.2	J	12.2	J	SD-HB-00-TR	1 / 1	12
Copper	37.5		37.5		SD-HB-00-TR	1 / 1	38
Iron	23300		23300		SD-HB-00-TR	1 / 1	23300
Lead	233		233		SD-HB-00-TR	1 / 1	233
Magnesium	1910		1910		SD-HB-00-TR	1 / 1	1910
Manganese	58.1		58.1		SD-HB-00-TR	1 / 1	58
Mercury						0 / 1	0.010
Nickel	27.3		27.3		SD-HB-00-TR	1 / 1	27
Potassium	395	J	395	J	SD-HB-00-TR	1 / 1	395
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium	400		400		SD-HB-00-TR	1 / 1	400
Thallium						0 / 1	0.55
Vanadium	33.2		33.2		SD-HB-00-TR	1 / 1	33
Zinc	207	J	207	J	SD-HB-00-TR	1 / 1	207
AVS/SEM - umol/g							
Acid Volatile Sulfide						0 / 1	0.070
Simultaneously Extracted Metal	2.9839		2.9839		SD-HB-00-TR	1 / 1	3.0
Cadmium	0.0147		0.0147		SD-HB-00-TR	1 / 1	0.015
Copper	0.1221		0.1221		SD-HB-00-TR	1 / 1	0.12
Lead	0.6693		0.6693		SD-HB-00-TR	1 / 1	0.67
Mercury	0.0001	J	0.0001	J	SD-HB-00-TR	1 / 1	0.00010
Nickel	0.0999		0.0999		SD-HB-00-TR	1 / 1	0.10
Zinc	2.0778	J	2.0778	J	SD-HB-00-TR	1 / 1	2.1
SEM/AVS	21.3		21.3		SD-HB-00-TR	1 / 1	21
Total Organic Carbon	250000		250000		SD-HB-00-TR	1 / 1	250000

J = Estimated Value

TABLE D.4-2
SUMMARY OF TRIAD CHEMISTRY DATA - SD-MC-03-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane	100	J	100	J	SD-MC-03-TR	1 / 1	100
1,1,2-Trichloro-1,2,2-trifluoroethane	52	J	52	J	SD-MC-03-TR	1 / 1	52
Acetone	400	J	400	J	SD-MC-03-TR	1 / 1	400
Methyl Acetate	350	J	350	J	SD-MC-03-TR	1 / 1	350
Methylene Chloride						0 / 1	80
Toluene	73	J	73	J	SD-MC-03-TR	1 / 1	73
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	185
2,2'-oxybis(1-Chloropropane)						0 / 1	185
2,4,5-Trichlorophenol						0 / 1	460
2,4,6-Trichlorophenol						0 / 1	185
2,4-Dichlorophenol						0 / 1	185
2,4-Dimethylphenol						0 / 1	185
2,4-Dinitrophenol						0 / 1	460
2,4-Dinitrotoluene						0 / 1	185
2,6-Dinitrotoluene						0 / 1	185
2-Chloronaphthalene						0 / 1	185
2-Chlorophenol						0 / 1	185
2-Methylnaphthalene						0 / 1	185
2-Methylphenol						0 / 1	185
2-Nitroaniline						0 / 1	460
2-Nitrophenol						0 / 1	185
3,3'-Dichlorobenzidine						0 / 1	185
3+4-Methylphenols						0 / 1	185
3-Nitroaniline						0 / 1	185
4,6-Dinitro-2-methylphenol						0 / 1	460
4-Bromophenyl-phenylether						0 / 1	185
4-Chloro-3-methylphenol						0 / 1	185
4-Chloroaniline						0 / 1	185
4-Chlorophenyl-phenylether						0 / 1	185
4-Nitroaniline						0 / 1	460
4-Nitrophenol						0 / 1	460
Acenaphthene						0 / 1	185
Acenaphthylene						0 / 1	185
Acetophenone						0 / 1	185
Anthracene						0 / 1	185
Atrazine						0 / 1	185
Benzaldehyde						0 / 1	185
Benzo(a)anthracene						0 / 1	185
Benzo(a)pyrene						0 / 1	185
Benzo(b)fluoranthene	180	J	180	J	SD-MC-03-TR	1 / 1	180
Benzo(g,h,i)perylene						0 / 1	185
Benzo(k)fluoranthene						0 / 1	185
Bis(2-Chloroethoxy)methane						0 / 1	185
Bis(2-Chloroethyl)ether						0 / 1	185
bis(2-Ethylhexyl)phthalate						0 / 1	185
Butylbenzylphthalate						0 / 1	185
Caprolactam						0 / 1	185
Carbazole						0 / 1	185
Chrysene						0 / 1	185
Dibenzo(a,h)anthracene						0 / 1	185
Dibenzofuran						0 / 1	185
Diethylphthalate						0 / 1	185
Dimethylphthalate						0 / 1	185
Di-n-Butylphthalate						0 / 1	185
Di-n-octylphthalate						0 / 1	185
Fluoranthene	220	J	220	J	SD-MC-03-TR	1 / 1	220

TABLE D.4-2
SUMMARY OF TRIAD CHEMISTRY DATA - SD-MC-03-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Fluorene						0 / 1	185
Hexachlorobenzene						0 / 1	185
Hexachlorobutadiene						0 / 1	185
Hexachlorocyclopentadiene						0 / 1	185
Hexachloroethane						0 / 1	185
Indeno(1,2,3-cd)pyrene						0 / 1	185
Isophorone						0 / 1	185
Naphthalene						0 / 1	185
Nitrobenzene						0 / 1	185
N-Nitroso-di-n-propylamine						0 / 1	185
N-Nitroso-diphenylamine						0 / 1	185
Pentachlorophenol						0 / 1	460
Phenanthrene						0 / 1	185
Phenol						0 / 1	185
Pyrene	230	J	230	J	SD-MC-03-TR	1 / 1	230
PCBs/Pesticides - ug/Kg							
4,4'-DDD	1.1	J	1.1	J	SD-MC-03-TR	1 / 1	1.1
4,4'-DDE	1.6	J	1.6	J	SD-MC-03-TR	1 / 1	1.6
4,4'-DDT						0 / 1	1.5
Aldrin						0 / 1	0.75
alpha-BHC						0 / 1	0.75
alpha-Chlordane						0 / 1	0.75
Aroclor-1016						0 / 1	15
Aroclor-1221						0 / 1	30
Aroclor-1232						0 / 1	15
Aroclor-1242						0 / 1	15
Aroclor-1248						0 / 1	15
Aroclor-1254						0 / 1	15
Aroclor-1260						0 / 1	15
beta-BHC						0 / 1	0.75
delta-BHC						0 / 1	0.75
Dieldrin						0 / 1	1.5
Endosulfan I						0 / 1	0.75
Endosulfan II						0 / 1	1.5
Endosulfan Sulfate						0 / 1	1.5
Endrin						0 / 1	1.5
Endrin Aldehyde						0 / 1	1.5
Endrin Ketone						0 / 1	1.5
gamma-BHC						0 / 1	0.75
gamma-Chlordane						0 / 1	0.75
Heptachlor						0 / 1	0.75
Heptachlor Epoxide						0 / 1	0.75
Methoxychlor						0 / 1	7.5
Toxaphene						0 / 1	75
Metals - mg/Kg							
Aluminum	20200		20200		SD-MC-03-TR	1 / 1	20200
Antimony	1.5		1.5		SD-MC-03-TR	1 / 1	1.5
Arsenic	34.4		34.4		SD-MC-03-TR	1 / 1	34
Barium	155		155		SD-MC-03-TR	1 / 1	155
Beryllium	1.3	J	1.3	J	SD-MC-03-TR	1 / 1	1.3
Cadmium	4.1		4.1		SD-MC-03-TR	1 / 1	4.1
Calcium	6570		6570		SD-MC-03-TR	1 / 1	6570
Chromium	71.1		71.1		SD-MC-03-TR	1 / 1	71
Cobalt	19.2	J	19.2	J	SD-MC-03-TR	1 / 1	19
Copper	125		125		SD-MC-03-TR	1 / 1	125
Iron	27700		27700		SD-MC-03-TR	1 / 1	27700
Lead	259		259		SD-MC-03-TR	1 / 1	259
Magnesium	5810		5810		SD-MC-03-TR	1 / 1	5810
Manganese	423		423		SD-MC-03-TR	1 / 1	423
Mercury	0.09	J	0.09	J	SD-MC-03-TR	1 / 1	0.090

TABLE D.4-2
SUMMARY OF TRIAD CHEMISTRY DATA - SD-MC-03-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Nickel	32.1		32.1		SD-MC-03-TR	1 / 1	32
Potassium	2330	J	2330	J	SD-MC-03-TR	1 / 1	2330
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium	5400		5400		SD-MC-03-TR	1 / 1	5400
Thallium						0 / 1	0.55
Vanadium	56		56		SD-MC-03-TR	1 / 1	56
Zinc	645	J	645	J	SD-MC-03-TR	1 / 1	645
AVS/SEM - umol/g							
Acid Volatile Sulfide	0.14	J	0.14	J	SD-MC-03-TR	1 / 1	0.14
Simultaneously Extracted Metal	8.3679		8.3679		SD-MC-03-TR	1 / 1	8.4
Cadmium	0.0238		0.0238		SD-MC-03-TR	1 / 1	0.024
Copper	1.1141		1.1141		SD-MC-03-TR	1 / 1	1.1
Lead	0.8143		0.8143		SD-MC-03-TR	1 / 1	0.81
Mercury	0.0004	J	0.0004	J	SD-MC-03-TR	1 / 1	0.00040
Nickel	0.2967		0.2967		SD-MC-03-TR	1 / 1	0.30
Zinc	6.1186	J	6.1186	J	SD-MC-03-TR	1 / 1	6.1
SEM/AVS	59.8		59.8		SD-MC-03-TR	1 / 1	60
Total Organic Carbon	330000		330000		SD-MC-03-TR	1 / 1	330000

J = Estimated Value

TABLE D.4-3
SUMMARY OF TRIAD CHEMISTRY DATA - SD-MC-04-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	16
1,1,2,2-Tetrachloroethane						0 / 1	16
1,1,2-Trichloro-1,2,2-trifluoroethane						0 / 1	16
1,1,2-Trichloroethane						0 / 1	16
1,1-Dichloroethane						0 / 1	16
1,1-Dichloroethene						0 / 1	16
1,2,4-Trichlorobenzene						0 / 1	16
1,2-Dibromo-3-chloropropane						0 / 1	16
1,2-Dibromoethane						0 / 1	16
1,2-Dichlorobenzene						0 / 1	16
1,2-Dichloroethane						0 / 1	16
1,2-Dichloropropane						0 / 1	16
1,3-Dichlorobenzene						0 / 1	16
1,4-Dichlorobenzene						0 / 1	16
2-Butanone						0 / 1	16
2-Hexanone						0 / 1	16
4-Methyl-2-Pentanone						0 / 1	16
Acetone						0 / 1	90
Benzene						0 / 1	16
Bromodichloromethane						0 / 1	16
Bromoform						0 / 1	16
Bromomethane						0 / 1	16
Carbon Disulfide						0 / 1	16
Carbon Tetrachloride						0 / 1	16
Chlorobenzene						0 / 1	16
Chloroethane						0 / 1	16
Chloroform						0 / 1	16
Chloromethane						0 / 1	16
cis-1,2-Dichloroethene						0 / 1	16
cis-1,3-Dichloropropene						0 / 1	16
Cyclohexane						0 / 1	16
Dibromochloromethane						0 / 1	16
Dichlorodifluoromethane						0 / 1	16
Ethylbenzene						0 / 1	16
Isopropylbenzene						0 / 1	16
m&p-Xylene						0 / 1	16
Methyl Acetate	36		36		SD-MC-04-TR	1 / 1	36
Methyl tert-Butyl Ether						0 / 1	16
Methylcyclohexane						0 / 1	16
Methylene Chloride						0 / 1	16
o-Xylene						0 / 1	16
Styrene						0 / 1	16
Tetrachloroethene						0 / 1	16
Toluene						0 / 1	16
trans-1,2-Dichloroethene						0 / 1	16
trans-1,3-Dichloropropene						0 / 1	16
Trichloroethene						0 / 1	16
Trichlorofluoromethane						0 / 1	16
Vinyl Chloride						0 / 1	16
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	215
2,2'-oxybis(1-Chloropropane)						0 / 1	215
2,4,5-Trichlorophenol						0 / 1	550
2,4,6-Trichlorophenol						0 / 1	215
2,4-Dichlorophenol						0 / 1	215
2,4-Dimethylphenol						0 / 1	215
2,4-Dinitrophenol						0 / 1	550
2,4-Dinitrotoluene						0 / 1	215
2,6-Dinitrotoluene						0 / 1	215
2-Chloronaphthalene						0 / 1	215

TABLE D.4-3
SUMMARY OF TRIAD CHEMISTRY DATA - SD-MC-04-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
2-Chlorophenol						0 / 1	215
2-Methylnaphthalene						0 / 1	215
2-Methylphenol						0 / 1	215
2-Nitroaniline						0 / 1	550
2-Nitrophenol						0 / 1	215
3,3'-Dichlorobenzidine						0 / 1	215
3+4-Methylphenols						0 / 1	215
3-Nitroaniline						0 / 1	215
4,6-Dinitro-2-methylphenol						0 / 1	550
4-Bromophenyl-phenylether						0 / 1	215
4-Chloro-3-methylphenol						0 / 1	215
4-Chloroaniline						0 / 1	215
4-Chlorophenyl-phenylether						0 / 1	215
4-Nitroaniline						0 / 1	550
4-Nitrophenol						0 / 1	550
Acenaphthene						0 / 1	215
Acenaphthylene						0 / 1	215
Acetophenone						0 / 1	215
Anthracene						0 / 1	215
Atrazine						0 / 1	215
Benzaldehyde						0 / 1	215
Benzo(a)anthracene						0 / 1	215
Benzo(a)pyrene						0 / 1	215
Benzo(b)fluoranthene	210	J	210	J	SD-MC-04-TR	1 / 1	210
Benzo(g,h,i)perylene						0 / 1	215
Benzo(k)fluoranthene						0 / 1	215
Bis(2-Chloroethoxy)methane						0 / 1	215
Bis(2-Chloroethyl)ether						0 / 1	215
bis(2-Ethylhexyl)phthalate						0 / 1	215
Butylbenzylphthalate						0 / 1	215
Caprolactam						0 / 1	215
Carbazole						0 / 1	215
Chrysene						0 / 1	215
Dibenzo(a,h)anthracene						0 / 1	215
Dibenzofuran						0 / 1	215
Diethylphthalate						0 / 1	215
Dimethylphthalate						0 / 1	215
Di-n-Butylphthalate						0 / 1	215
Di-n-octylphthalate						0 / 1	215
Fluoranthene	230	J	230	J	SD-MC-04-TR	1 / 1	230
Fluorene						0 / 1	215
Hexachlorobenzene						0 / 1	215
Hexachlorobutadiene						0 / 1	215
Hexachlorocyclopentadiene						0 / 1	215
Hexachloroethane						0 / 1	215
Indeno(1,2,3-cd)pyrene						0 / 1	215
Isophorone						0 / 1	215
Naphthalene						0 / 1	215
Nitrobenzene						0 / 1	215
N-Nitroso-di-n-propylamine						0 / 1	215
N-Nitroso-diphenylamine						0 / 1	215
Pentachlorophenol						0 / 1	550
Phenanthrene						0 / 1	215
Phenol						0 / 1	215
Pyrene	220	J	220	J	SD-MC-04-TR	1 / 1	220
PCBs/Pesticides - ug/Kg							
4,4'-DDD						0 / 1	1.7
4,4'-DDE						0 / 1	1.7
4,4'-DDT						0 / 1	1.7
Aldrin						0 / 1	0.85
alpha-BHC						0 / 1	0.85

TABLE D.4-3
SUMMARY OF TRIAD CHEMISTRY DATA - SD-MC-04-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
alpha-Chlordane						0 / 1	0.85
Aroclor-1016						0 / 1	17
Aroclor-1221						0 / 1	34
Aroclor-1232						0 / 1	17
Aroclor-1242						0 / 1	17
Aroclor-1248						0 / 1	17
Aroclor-1254						0 / 1	17
Aroclor-1260						0 / 1	17
beta-BHC						0 / 1	0.85
delta-BHC						0 / 1	0.85
Dieldrin						0 / 1	1.7
Endosulfan I						0 / 1	0.85
Endosulfan II						0 / 1	1.7
Endosulfan Sulfate						0 / 1	1.7
Endrin						0 / 1	1.7
Endrin Aldehyde						0 / 1	1.7
Endrin Ketone						0 / 1	1.7
gamma-BHC						0 / 1	0.85
gamma-Chlordane						0 / 1	0.85
Heptachlor						0 / 1	0.85
Heptachlor Epoxide						0 / 1	0.85
Methoxychlor						0 / 1	8.5
Toxaphene						0 / 1	85
Metals - mg/Kg							
Aluminum	11600		11600		SD-MC-04-TR	1 / 1	11600
Antimony	5.6		5.6		SD-MC-04-TR	1 / 1	5.6
Arsenic	44.5		44.5		SD-MC-04-TR	1 / 1	45
Barium	173		173		SD-MC-04-TR	1 / 1	173
Beryllium	0.87	J	0.87	J	SD-MC-04-TR	1 / 1	0.87
Cadmium	5.2		5.2		SD-MC-04-TR	1 / 1	5.2
Calcium	9640		9640		SD-MC-04-TR	1 / 1	9640
Chromium	512		512		SD-MC-04-TR	1 / 1	512
Cobalt	21.8	J	21.8	J	SD-MC-04-TR	1 / 1	22
Copper	344		344		SD-MC-04-TR	1 / 1	344
Iron	51600		51600		SD-MC-04-TR	1 / 1	51600
Lead	369		369		SD-MC-04-TR	1 / 1	369
Magnesium	2890		2890		SD-MC-04-TR	1 / 1	2890
Manganese	1980		1980		SD-MC-04-TR	1 / 1	1980
Mercury	0.08	J	0.08	J	SD-MC-04-TR	1 / 1	0.080
Nickel	25.6		25.6		SD-MC-04-TR	1 / 1	26
Potassium	724	J	724	J	SD-MC-04-TR	1 / 1	724
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium	402		402		SD-MC-04-TR	1 / 1	402
Thallium						0 / 1	0.55
Vanadium	53.8		53.8		SD-MC-04-TR	1 / 1	54
Zinc	611	J	611	J	SD-MC-04-TR	1 / 1	611
AVS/SEM - umol/g							
Acid Volatile Sulfide						0 / 1	0.065
Simultaneously Extracted Metal	8.3724		8.3724		SD-MC-04-TR	1 / 1	8.4
Cadmium	0.0251		0.0251		SD-MC-04-TR	1 / 1	0.025
Copper	2.5826		2.5826		SD-MC-04-TR	1 / 1	2.6
Lead	0.9334		0.9334		SD-MC-04-TR	1 / 1	0.93
Mercury	0.0005	J	0.0005	J	SD-MC-04-TR	1 / 1	0.00050
Nickel	0.1701		0.1701		SD-MC-04-TR	1 / 1	0.17
Zinc	4.6607	J	4.6607	J	SD-MC-04-TR	1 / 1	4.7
SEM/AVS	64.4		64.4		SD-MC-04-TR	1 / 1	64
Total Organic Carbon	290000		290000		SD-MC-04-TR	1 / 1	290000

J = Estimated Value

TABLE D.4-4
SUMMARY OF TRIAD CHEMISTRY DATA - SD-06-03-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	13
1,1,2-Trichloro-1,2,2-trifluoroethane						0 / 1	13
Acetone						0 / 1	95
Methyl Acetate	35	J	35	J	SD-06-03-TR	1 / 1	35
Methylene Chloride						0 / 1	15
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	315
2,2'-oxybis(1-Chloropropane)						0 / 1	315
2,4,5-Trichlorophenol						0 / 1	800
2,4,6-Trichlorophenol						0 / 1	315
2,4-Dichlorophenol						0 / 1	315
2,4-Dimethylphenol						0 / 1	315
2,4-Dinitrophenol						0 / 1	800
2,4-Dinitrotoluene						0 / 1	315
2,6-Dinitrotoluene						0 / 1	315
2-Chloronaphthalene						0 / 1	315
2-Chlorophenol						0 / 1	315
2-Methylnaphthalene						0 / 1	315
2-Methylphenol						0 / 1	315
2-Nitroaniline						0 / 1	800
2-Nitrophenol						0 / 1	315
3,3'-Dichlorobenzidine						0 / 1	315
3+4-Methylphenols						0 / 1	315
3-Nitroaniline						0 / 1	800
4,6-Dinitro-2-methylphenol						0 / 1	800
4-Bromophenyl-phenylether						0 / 1	315
4-Chloro-3-methylphenol						0 / 1	315
4-Chloroaniline						0 / 1	315
4-Chlorophenyl-phenylether						0 / 1	315
4-Nitroaniline						0 / 1	800
4-Nitrophenol						0 / 1	800
Acenaphthene						0 / 1	315
Acenaphthylene						0 / 1	315
Acetophenone						0 / 1	315
Anthracene	64	J	64	J	SD-06-03-TR	1 / 1	64
Atrazine						0 / 1	315
Benzaldehyde						0 / 1	315
Benzo(a)anthracene	310	J	310	J	SD-06-03-TR	1 / 1	310
Benzo(a)pyrene	370	J	370	J	SD-06-03-TR	1 / 1	370
Benzo(b)fluoranthene	610	J	610	J	SD-06-03-TR	1 / 1	610
Benzo(g,h,i)perylene	150	J	150	J	SD-06-03-TR	1 / 1	150
Benzo(k)fluoranthene	160	J	160	J	SD-06-03-TR	1 / 1	160
Bis(2-Chloroethoxy)methane						0 / 1	315
Bis(2-Chloroethyl)ether						0 / 1	315
bis(2-Ethylhexyl)phthalate	430	J	430	J	SD-06-03-TR	1 / 1	430
Butylbenzylphthalate						0 / 1	315
Caprolactam						0 / 1	315
Carbazole						0 / 1	315
Chrysene	450	J	450	J	SD-06-03-TR	1 / 1	450
Dibenzo(a,h)anthracene						0 / 1	315
Dibenzofuran						0 / 1	315
Diethylphthalate						0 / 1	315
Dimethylphthalate						0 / 1	315
Di-n-Butylphthalate						0 / 1	315
Di-n-octylphthalate						0 / 1	315
Fluoranthene	780		780		SD-06-03-TR	1 / 1	780
Fluorene						0 / 1	315
Hexachlorobenzene						0 / 1	315
Hexachlorobutadiene						0 / 1	315
Hexachlorocyclopentadiene						0 / 1	315
Hexachloroethane						0 / 1	315

TABLE D.4-4
SUMMARY OF TRIAD CHEMISTRY DATA - SD-06-03-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Indeno(1,2,3-cd)pyrene	150	J	150	J	SD-06-03-TR	1 / 1	150
Isophorone						0 / 1	315
Naphthalene						0 / 1	315
Nitrobenzene						0 / 1	315
N-Nitroso-di-n-propylamine						0 / 1	315
N-Nitroso-diphenylamine						0 / 1	315
Pentachlorophenol						0 / 1	800
Phenanthrene	340	J	340	J	SD-06-03-TR	1 / 1	340
Phenol						0 / 1	315
Pyrene	600	J	600	J	SD-06-03-TR	1 / 1	600
PCBs/Pesticides - ug/Kg							
4,4'-DDD	2.2		2.2		SD-06-03-TR	1 / 1	2.2
4,4'-DDE	2.6		2.6		SD-06-03-TR	1 / 1	2.6
4,4'-DDT						0 / 1	0.7
Aldrin						0 / 1	0.32
alpha-BHC						0 / 1	0.32
alpha-Chlordane						0 / 1	0.32
Aroclor-1016						0 / 1	7
Aroclor-1221						0 / 1	13
Aroclor-1232						0 / 1	7
Aroclor-1242						0 / 1	7
Aroclor-1248						0 / 1	7
Aroclor-1254						0 / 1	7
Aroclor-1260						0 / 1	7
beta-BHC						0 / 1	0.32
delta-BHC						0 / 1	0.32
Dieldrin						0 / 1	0.7
Endosulfan I						0 / 1	0.32
Endosulfan II						0 / 1	0.7
Endosulfan Sulfate						0 / 1	0.7
Endrin						0 / 1	0.7
Endrin Aldehyde						0 / 1	0.7
Endrin Ketone						0 / 1	0.7
gamma-BHC						0 / 1	0.32
gamma-Chlordane						0 / 1	0.32
Heptachlor						0 / 1	0.32
Heptachlor Epoxide						0 / 1	0.32
Methoxychlor						0 / 1	3.2
Toxaphene						0 / 1	32
Metals - mg/Kg							
Aluminum	8800		8800		SD-06-03-TR	1 / 1	8800
Antimony	2.7		2.7		SD-06-03-TR	1 / 1	2.7
Arsenic	67.3		67.3		SD-06-03-TR	1 / 1	67
Barium	82.6		82.6		SD-06-03-TR	1 / 1	83
Beryllium	0.6	J	0.6	J	SD-06-03-TR	1 / 1	0.60
Cadmium	5.5		5.5		SD-06-03-TR	1 / 1	5.5
Calcium	3600		3600		SD-06-03-TR	1 / 1	3600
Chromium	197		197		SD-06-03-TR	1 / 1	197
Cobalt	13.7	J	13.7	J	SD-06-03-TR	1 / 1	14
Copper	219		219		SD-06-03-TR	1 / 1	219
Iron	20900		20900		SD-06-03-TR	1 / 1	20900
Lead	354		354		SD-06-03-TR	1 / 1	354
Magnesium	2930		2930		SD-06-03-TR	1 / 1	2930
Manganese	628		628		SD-06-03-TR	1 / 1	628
Mercury	0.69	J	0.69	J	SD-06-03-TR	1 / 1	0.69
Nickel	19.5		19.5		SD-06-03-TR	1 / 1	20
Potassium	837	J	837	J	SD-06-03-TR	1 / 1	837
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium	214		214		SD-06-03-TR	1 / 1	214

TABLE D.4-4
SUMMARY OF TRIAD CHEMISTRY DATA - SD-06-03-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Thallium						0 / 1	0.55
Vanadium	29.9		29.9		SD-06-03-TR	1 / 1	30
Zinc	971	J	971	J	SD-06-03-TR	1 / 1	971
AVS/SEM - umol/g							
Acid Volatile Sulfide	0.66	J	0.66	J	SD-06-03-TR	1 / 1	0.66
Simultaneously Extracted Metal	14.3865		14.3865		SD-06-03-TR	1 / 1	14
Cadmium	0.0434		0.0434		SD-06-03-TR	1 / 1	0.043
Copper	2.4454		2.4454		SD-06-03-TR	1 / 1	2.4
Lead	1.2966		1.2966		SD-06-03-TR	1 / 1	1.3
Mercury	0.0005	J	0.0005	J	SD-06-03-TR	1 / 1	0.00050
Nickel	0.1996		0.1996		SD-06-03-TR	1 / 1	0.20
Zinc	10.401	J	10.401	J	SD-06-03-TR	1 / 1	10
SEM/AVS	21.8		21.8		SD-06-03-TR	1 / 1	22
Total Organic Carbon	100000		100000		SD-06-03-TR	1 / 1	100000

J = Estimated Value

TABLE D.4-5
SUMMARY OF TRIAD CHEMISTRY DATA - SD-10-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	18
1,1,2,2-Tetrachloroethane						0 / 1	18
1,1,2-Trichloro-1,2,2-trifluoroethane						0 / 1	18
1,1,2-Trichloroethane						0 / 1	18
1,1-Dichloroethane						0 / 1	18
1,1-Dichloroethene						0 / 1	18
1,2,4-Trichlorobenzene						0 / 1	18
1,2-Dibromo-3-chloropropane						0 / 1	18
1,2-Dibromoethane						0 / 1	18
1,2-Dichlorobenzene						0 / 1	18
1,2-Dichloroethane						0 / 1	18
1,2-Dichloropropane						0 / 1	18
1,3-Dichlorobenzene						0 / 1	18
1,4-Dichlorobenzene						0 / 1	18
2-Butanone						0 / 1	18
2-Hexanone						0 / 1	18
4-Methyl-2-Pentanone						0 / 1	18
Acetone						0 / 1	125
Benzene						0 / 1	18
Bromodichloromethane						0 / 1	18
Bromoform						0 / 1	18
Bromomethane						0 / 1	18
Carbon Disulfide	29	J	29	J	SD-10-02-TR	1 / 1	29
Carbon Tetrachloride						0 / 1	18
Chlorobenzene						0 / 1	18
Chloroethane						0 / 1	18
Chloroform						0 / 1	18
Chloromethane						0 / 1	18
cis-1,2-Dichloroethene						0 / 1	18
cis-1,3-Dichloropropene						0 / 1	18
Cyclohexane						0 / 1	18
Dibromochloromethane						0 / 1	18
Dichlorodifluoromethane						0 / 1	18
Ethylbenzene						0 / 1	18
Isopropylbenzene						0 / 1	18
m&p-Xylene						0 / 1	18
Methyl Acetate						0 / 1	18
Methyl tert-Butyl Ether						0 / 1	18
Methylcyclohexane						0 / 1	18
Methylene Chloride						0 / 1	18
o-Xylene						0 / 1	18
Styrene						0 / 1	18
Tetrachloroethene						0 / 1	18
Toluene						0 / 1	18
trans-1,2-Dichloroethene						0 / 1	18
trans-1,3-Dichloropropene						0 / 1	18
Trichloroethene						0 / 1	18
Trichlorofluoromethane						0 / 1	18
Vinyl Chloride						0 / 1	18
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	270
2,2'-oxybis(1-Chloropropane)						0 / 1	270
2,4,5-Trichlorophenol						0 / 1	650
2,4,6-Trichlorophenol						0 / 1	270
2,4-Dichlorophenol						0 / 1	270
2,4-Dimethylphenol						0 / 1	270
2,4-Dinitrophenol						0 / 1	650
2,4-Dinitrotoluene						0 / 1	270
2,6-Dinitrotoluene						0 / 1	270
2-Chloronaphthalene						0 / 1	270

TABLE D.4-5
SUMMARY OF TRIAD CHEMISTRY DATA - SD-10-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
2-Chlorophenol						0 / 1	270
2-Methylnaphthalene						0 / 1	270
2-Methylphenol						0 / 1	270
2-Nitroaniline						0 / 1	650
2-Nitrophenol						0 / 1	270
3,3'-Dichlorobenzidine						0 / 1	270
3+4-Methylphenols						0 / 1	270
3-Nitroaniline						0 / 1	270
4,6-Dinitro-2-methylphenol						0 / 1	650
4-Bromophenyl-phenylether						0 / 1	270
4-Chloro-3-methylphenol						0 / 1	270
4-Chloroaniline						0 / 1	270
4-Chlorophenyl-phenylether						0 / 1	270
4-Nitroaniline						0 / 1	650
4-Nitrophenol						0 / 1	650
Acenaphthene						0 / 1	270
Acenaphthylene						0 / 1	270
Acetophenone						0 / 1	270
Anthracene						0 / 1	270
Atrazine						0 / 1	270
Benzaldehyde						0 / 1	270
Benzo(a)anthracene						0 / 1	270
Benzo(a)pyrene						0 / 1	270
Benzo(b)fluoranthene						0 / 1	270
Benzo(g,h,i)perylene						0 / 1	270
Benzo(k)fluoranthene						0 / 1	270
Bis(2-Chloroethoxy)methane						0 / 1	270
Bis(2-Chloroethyl)ether						0 / 1	270
bis(2-Ethylhexyl)phthalate						0 / 1	270
Butylbenzylphthalate						0 / 1	270
Caprolactam						0 / 1	270
Carbazole						0 / 1	270
Chrysene						0 / 1	270
Dibenzo(a,h)anthracene						0 / 1	270
Dibenzofuran						0 / 1	270
Diethylphthalate						0 / 1	270
Dimethylphthalate						0 / 1	270
Di-n-Butylphthalate						0 / 1	270
Di-n-octylphthalate						0 / 1	270
Fluoranthene						0 / 1	270
Fluorene						0 / 1	270
Hexachlorobenzene						0 / 1	270
Hexachlorobutadiene						0 / 1	270
Hexachlorocyclopentadiene						0 / 1	270
Hexachloroethane						0 / 1	270
Indeno(1,2,3-cd)pyrene						0 / 1	270
Isophorone						0 / 1	270
Naphthalene						0 / 1	270
Nitrobenzene						0 / 1	270
N-Nitroso-di-n-propylamine						0 / 1	270
N-Nitroso-diphenylamine						0 / 1	270
Pentachlorophenol						0 / 1	650
Phenanthrene						0 / 1	270
Phenol						0 / 1	270
Pyrene						0 / 1	270
PCBs/Pesticides - ug/Kg							
4,4'-DDD						0 / 1	2.1
4,4'-DDE						0 / 1	2.1
4,4'-DDT						0 / 1	2.1
Aldrin						0 / 1	1.1
alpha-BHC						0 / 1	1.1

TABLE D.4-5
SUMMARY OF TRIAD CHEMISTRY DATA - SD-10-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
alpha-Chlordane						0 / 1	1.1
Aroclor-1016						0 / 1	21
Aroclor-1221						0 / 1	42
Aroclor-1232						0 / 1	21
Aroclor-1242						0 / 1	21
Aroclor-1248						0 / 1	21
Aroclor-1254						0 / 1	21
Aroclor-1260						0 / 1	21
beta-BHC						0 / 1	1.1
delta-BHC						0 / 1	1.1
Dieldrin						0 / 1	2.1
Endosulfan I						0 / 1	1.1
Endosulfan II						0 / 1	2.1
Endosulfan Sulfate						0 / 1	2.1
Endrin						0 / 1	2.1
Endrin Aldehyde						0 / 1	2.1
Endrin Ketone						0 / 1	2.1
gamma-BHC						0 / 1	1.1
gamma-Chlordane						0 / 1	1.1
Heptachlor						0 / 1	1.1
Heptachlor Epoxide						0 / 1	1.1
Methoxychlor						0 / 1	11
Toxaphene						0 / 1	105
Metals - mg/Kg							
Aluminum	28600		28600		SD-10-02-TR	1 / 1	28600
Antimony	39.7		39.7		SD-10-02-TR	1 / 1	40
Arsenic	2180		2180		SD-10-02-TR	1 / 1	2180
Barium	102		102		SD-10-02-TR	1 / 1	102
Beryllium	1.7	J	1.7	J	SD-10-02-TR	1 / 1	1.7
Cadmium	13.9		13.9		SD-10-02-TR	1 / 1	14
Calcium	10400		10400		SD-10-02-TR	1 / 1	10400
Chromium	1570		1570		SD-10-02-TR	1 / 1	1570
Cobalt	28.6	J	28.6	J	SD-10-02-TR	1 / 1	29
Copper	2030		2030		SD-10-02-TR	1 / 1	2030
Iron	46700		46700		SD-10-02-TR	1 / 1	46700
Lead	837		837		SD-10-02-TR	1 / 1	837
Magnesium	1880		1880		SD-10-02-TR	1 / 1	1880
Manganese	727		727		SD-10-02-TR	1 / 1	727
Mercury	0.19	J	0.19	J	SD-10-02-TR	1 / 1	0.19
Nickel	26.2		26.2		SD-10-02-TR	1 / 1	26
Potassium	533	J	533	J	SD-10-02-TR	1 / 1	533
Selenium	1.9	J	1.9	J	SD-10-02-TR	1 / 1	1.9
Silver						0 / 1	0.50
Sodium	1300		1300		SD-10-02-TR	1 / 1	1300
Thallium						0 / 1	0.55
Vanadium	68.6		68.6		SD-10-02-TR	1 / 1	69
Zinc	2420	J	2420	J	SD-10-02-TR	1 / 1	2420
AVS/SEM - umol/g							
Acid Volatile Sulfide	5.97	J	5.97	J	SD-10-02-TR	1 / 1	6.0
Simultaneously Extracted Metal	42.5591		42.5591		SD-10-02-TR	1 / 1	43
Cadmium	0.0899		0.0899		SD-10-02-TR	1 / 1	0.090
Copper	14.7738		14.7738		SD-10-02-TR	1 / 1	15
Lead	2.7329		2.7329		SD-10-02-TR	1 / 1	2.7
Mercury	0.006	J	0.006	J	SD-10-02-TR	1 / 1	0.0060
Nickel	0.2412		0.2412		SD-10-02-TR	1 / 1	0.24
Zinc	24.7153	J	24.7153	J	SD-10-02-TR	1 / 1	25
SEM/AVS	7.1		7.1		SD-10-02-TR	1 / 1	7.1
Total Organic Carbon	680000		680000		SD-10-02-TR	1 / 1	680000

J = Estimated Value

TABLE D.4-6
SUMMARY OF TRIAD CHEMISTRY DATA - SD-12-03-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	45
Acetone	370	J	370	J	SD-12-03-TR	1 / 1	370
Methylene Chloride						0 / 1	45
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	195
2,2'-oxybis(1-Chloropropane)						0 / 1	195
2,4,5-Trichlorophenol						0 / 1	490
2,4,6-Trichlorophenol						0 / 1	195
2,4-Dichlorophenol						0 / 1	195
2,4-Dimethylphenol						0 / 1	195
2,4-Dinitrophenol						0 / 1	490
2,4-Dinitrotoluene						0 / 1	195
2,6-Dinitrotoluene						0 / 1	195
2-Chloronaphthalene						0 / 1	195
2-Chlorophenol						0 / 1	195
2-Methylnaphthalene						0 / 1	195
2-Methylphenol						0 / 1	195
2-Nitroaniline						0 / 1	490
2-Nitrophenol						0 / 1	195
3,3'-Dichlorobenzidine						0 / 1	195
3-Nitroaniline						0 / 1	195
4,6-Dinitro-2-methylphenol						0 / 1	490
4-Bromophenyl-phenylether						0 / 1	195
4-Chloro-3-methylphenol						0 / 1	195
4-Chloroaniline						0 / 1	195
4-Chlorophenyl-phenylether						0 / 1	195
4-Nitroaniline						0 / 1	490
4-Nitrophenol						0 / 1	490
Acenaphthene						0 / 1	195
Acenaphthylene						0 / 1	195
Acetophenone						0 / 1	195
Anthracene						0 / 1	195
Atrazine						0 / 1	195
Benzaldehyde						0 / 1	195
Benzo(a)anthracene	290	J	290	J	SD-12-03-TR	1 / 1	290
Benzo(a)pyrene	520	J	520	J	SD-12-03-TR	1 / 1	520
Benzo(b)fluoranthene	960		960		SD-12-03-TR	1 / 1	960
Benzo(g,h,i)perylene	280	J	280	J	SD-12-03-TR	1 / 1	280
Benzo(k)fluoranthene	360	J	360	J	SD-12-03-TR	1 / 1	360
Bis(2-Chloroethoxy)methane						0 / 1	195
Bis(2-Chloroethyl)ether						0 / 1	195
bis(2-Ethylhexyl)phthalate	260	J	260	J	SD-12-03-TR	1 / 1	260
Butylbenzylphthalate						0 / 1	195
Caprolactam						0 / 1	195
Carbazole						0 / 1	195
Chrysene	510		510		SD-12-03-TR	1 / 1	510
Dibenzo(a,h)anthracene						0 / 1	195
Dibenzofuran						0 / 1	195
Diethylphthalate						0 / 1	195
Dimethylphthalate						0 / 1	195
Di-n-Butylphthalate						0 / 1	195
Di-n-octylphthalate						0 / 1	195
Fluoranthene	730		730		SD-12-03-TR	1 / 1	730
Fluorene						0 / 1	195
Hexachlorobenzene						0 / 1	195
Hexachlorobutadiene						0 / 1	195
Hexachlorocyclopentadiene						0 / 1	195
Hexachloroethane						0 / 1	195

TABLE D.4-6
SUMMARY OF TRIAD CHEMISTRY DATA - SD-12-03-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Indeno(1,2,3-cd)pyrene	260	J	260	J	SD-12-03-TR	1 / 1	260
Isophorone						0 / 1	195
Naphthalene						0 / 1	195
Nitrobenzene						0 / 1	195
N-Nitroso-di-n-propylamine						0 / 1	195
N-Nitroso-diphenylamine						0 / 1	195
Pentachlorophenol						0 / 1	490
Phenanthrene	230	J	230	J	SD-12-03-TR	1 / 1	230
Phenol						0 / 1	195
Pyrene	670		670		SD-12-03-TR	1 / 1	670
PCBs/Pesticides - ug/Kg							
4,4'-DDD						0 / 1	1.6
4,4'-DDE	1.3	J	1.3	J	SD-12-03-TR	1 / 1	1.3
4,4'-DDT						0 / 1	1.6
Aldrin						0 / 1	0.80
alpha-BHC						0 / 1	0.80
alpha-Chlordane						0 / 1	0.80
Aroclor-1016						0 / 1	16
Aroclor-1221						0 / 1	32
Aroclor-1232						0 / 1	16
Aroclor-1242						0 / 1	16
Aroclor-1248						0 / 1	16
Aroclor-1254						0 / 1	16
Aroclor-1260						0 / 1	16
beta-BHC						0 / 1	0.80
delta-BHC						0 / 1	0.80
Dieldrin						0 / 1	1.6
Endosulfan I						0 / 1	0.80
Endosulfan II						0 / 1	1.6
Endosulfan Sulfate						0 / 1	1.6
Endrin						0 / 1	1.6
Endrin Aldehyde						0 / 1	1.6
Endrin Ketone						0 / 1	1.6
gamma-BHC						0 / 1	0.80
gamma-Chlordane						0 / 1	0.80
Heptachlor						0 / 1	0.80
Heptachlor Epoxide						0 / 1	0.80
Methoxychlor						0 / 1	8.0
Toxaphene						0 / 1	80
Metals - mg/Kg							
Aluminum	16500		16500		SD-12-03-TR	1 / 1	16500
Antimony	19.2		19.2		SD-12-03-TR	1 / 1	19
Arsenic	958		958		SD-12-03-TR	1 / 1	958
Barium	121		121		SD-12-03-TR	1 / 1	121
Beryllium	1.3	J	1.3	J	SD-12-03-TR	1 / 1	1.3
Cadmium	13.5		13.5		SD-12-03-TR	1 / 1	14
Calcium	5340		5340		SD-12-03-TR	1 / 1	5340
Chromium	1310		1310		SD-12-03-TR	1 / 1	1310
Cobalt	37.9	J	37.9	J	SD-12-03-TR	1 / 1	38
Copper	718		718		SD-12-03-TR	1 / 1	718
Iron	94600		94600		SD-12-03-TR	1 / 1	94600
Lead	459		459		SD-12-03-TR	1 / 1	459
Magnesium	3070		3070		SD-12-03-TR	1 / 1	3070
Manganese	1180		1180		SD-12-03-TR	1 / 1	1180
Mercury						0 / 1	0.085
Nickel	28.1		28.1		SD-12-03-TR	1 / 1	28
Potassium	837	J	837	J	SD-12-03-TR	1 / 1	837
Selenium						0 / 1	0.50
Silver	1.8		1.8		SD-12-03-TR	1 / 1	1.8
Sodium	793	J	793	J	SD-12-03-TR	1 / 1	793

TABLE D.4-6
SUMMARY OF TRIAD CHEMISTRY DATA - SD-12-03-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Thallium						0 / 1	0.55
Vanadium	60.6	J	60.6	J	SD-12-03-TR	1 / 1	61
Zinc	2680	J	2680	J	SD-12-03-TR	1 / 1	2680
AVS/SEM - umol/g							
Acid Volatile Sulfide	24.09		24.09		SD-12-03-TR	1 / 1	24
Simultaneously Extracted Metal	27.517		27.517		SD-12-03-TR	1 / 1	28
Cadmium	0.694		0.694		SD-12-03-TR	1 / 1	0.69
Copper	5.217		5.217		SD-12-03-TR	1 / 1	5.2
Lead	1.1493		1.1493		SD-12-03-TR	1 / 1	1.1
Mercury	0.0008	J	0.0008	J	SD-12-03-TR	1 / 1	0.00080
Nickel	0.22		0.22		SD-12-03-TR	1 / 1	0.22
Zinc	22.0096		22.0096		SD-12-03-TR	1 / 1	22
SEM/AVS	1.14		1.14		SD-12-03-TR	1 / 1	1.1
Total Organic Carbon	150000	J	150000	J	SD-12-03-TR	1 / 1	150000

J = Estimated Value

TABLE D.4-7
SUMMARY OF TRIAD CHEMISTRY DATA - SD-13-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane	59	J	59	J	SD-13-01-TR	1 / 1	59
1,1,2,2-Tetrachloroethane						0 / 1	11
1,1,2-Trichloro-1,2,2-trifluoroethane						0 / 1	11
1,1,2-Trichloroethane						0 / 1	11
1,1-Dichloroethane						0 / 1	11
1,1-Dichloroethene						0 / 1	11
1,2,4-Trichlorobenzene						0 / 1	11
1,2-Dibromo-3-chloropropane						0 / 1	11
1,2-Dibromoethane						0 / 1	11
1,2-Dichlorobenzene						0 / 1	11
1,2-Dichloroethane						0 / 1	11
1,2-Dichloropropane						0 / 1	11
1,3-Dichlorobenzene						0 / 1	11
1,4-Dichlorobenzene						0 / 1	11
2-Butanone						0 / 1	11
2-Hexanone						0 / 1	11
4-Methyl-2-Pentanone						0 / 1	11
Acetone						0 / 1	4300
Benzene						0 / 1	11
Bromodichloromethane						0 / 1	11
Bromoform						0 / 1	11
Bromomethane						0 / 1	11
Carbon Disulfide						0 / 1	11
Carbon Tetrachloride						0 / 1	11
Chlorobenzene						0 / 1	11
Chloroethane						0 / 1	11
Chloroform						0 / 1	11
Chloromethane						0 / 1	11
cis-1,2-Dichloroethene						0 / 1	11
cis-1,3-Dichloropropene						0 / 1	11
Cyclohexane						0 / 1	11
Dibromochloromethane						0 / 1	11
Dichlorodifluoromethane						0 / 1	11
Ethylbenzene						0 / 1	11
Isopropylbenzene						0 / 1	11
m&p-Xylene						0 / 1	11
Methyl Acetate						0 / 1	11
Methyl tert-Butyl Ether						0 / 1	11
Methylcyclohexane						0 / 1	11
Methylene Chloride						0 / 1	11
o-Xylene						0 / 1	11
Styrene						0 / 1	11
Tetrachloroethene						0 / 1	11
Toluene						0 / 1	11
trans-1,2-Dichloroethene						0 / 1	11
trans-1,3-Dichloropropene						0 / 1	11
Trichloroethene						0 / 1	11
Trichlorofluoromethane						0 / 1	11
Vinyl Chloride						0 / 1	11
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	140
2,2'-oxybis(1-Chloropropane)						0 / 1	140
2,4,5-Trichlorophenol						0 / 1	345
2,4,6-Trichlorophenol						0 / 1	140
2,4-Dichlorophenol						0 / 1	140
2,4-Dimethylphenol						0 / 1	140
2,4-Dinitrophenol						0 / 1	345
2,4-Dinitrotoluene						0 / 1	140
2,6-Dinitrotoluene						0 / 1	140
2-Chloronaphthalene						0 / 1	140

TABLE D.4-7
SUMMARY OF TRIAD CHEMISTRY DATA - SD-13-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
2-Chlorophenol						0 / 1	140
2-Methylnaphthalene						0 / 1	140
2-Methylphenol						0 / 1	140
2-Nitroaniline						0 / 1	345
2-Nitrophenol						0 / 1	140
3,3'-Dichlorobenzidine						0 / 1	140
3+4-Methylphenols						0 / 1	140
3-Nitroaniline						0 / 1	140
4,6-Dinitro-2-methylphenol						0 / 1	345
4-Bromophenyl-phenylether						0 / 1	140
4-Chloro-3-methylphenol						0 / 1	140
4-Chloroaniline						0 / 1	140
4-Chlorophenyl-phenylether						0 / 1	140
4-Nitroaniline						0 / 1	345
4-Nitrophenol						0 / 1	345
Acenaphthene						0 / 1	140
Acenaphthylene						0 / 1	140
Acetophenone						0 / 1	140
Anthracene						0 / 1	140
Atrazine						0 / 1	140
Benzaldehyde						0 / 1	140
Benzo(a)anthracene	110	J	110	J	SD-13-01-TR	1 / 1	110
Benzo(a)pyrene	150	J	150	J	SD-13-01-TR	1 / 1	150
Benzo(b)fluoranthene	270	J	270	J	SD-13-01-TR	1 / 1	270
Benzo(g,h,i)perylene						0 / 1	140
Benzo(k)fluoranthene						0 / 1	140
Bis(2-Chloroethoxy)methane						0 / 1	140
Bis(2-Chloroethyl)ether						0 / 1	140
bis(2-Ethylhexyl)phthalate	140	J	140	J	SD-13-01-TR	1 / 1	140
Butylbenzylphthalate						0 / 1	140
Caprolactam						0 / 1	140
Carbazole						0 / 1	140
Chrysene	150	J	150	J	SD-13-01-TR	1 / 1	150
Dibenzo(a,h)anthracene						0 / 1	140
Dibenzofuran						0 / 1	140
Diethylphthalate						0 / 1	140
Dimethylphthalate						0 / 1	140
Di-n-Butylphthalate						0 / 1	140
Di-n-octylphthalate						0 / 1	140
Fluoranthene	230	J	230	J	SD-13-01-TR	1 / 1	230
Fluorene						0 / 1	140
Hexachlorobenzene						0 / 1	140
Hexachlorobutadiene						0 / 1	140
Hexachlorocyclopentadiene						0 / 1	140
Hexachloroethane						0 / 1	140
Indeno(1,2,3-cd)pyrene						0 / 1	140
Isophorone						0 / 1	140
Naphthalene						0 / 1	140
Nitrobenzene						0 / 1	140
N-Nitroso-di-n-propylamine						0 / 1	140
N-Nitroso-diphenylamine						0 / 1	140
Pentachlorophenol						0 / 1	345
Phenanthrene						0 / 1	140
Phenol						0 / 1	140
Pyrene	230	J	230	J	SD-13-01-TR	1 / 1	230
PCBs/Pesticides - ug/Kg							
4,4'-DDD	4.4		4.4		SD-13-01-TR	1 / 1	4.4
4,4'-DDE	2.9		2.9		SD-13-01-TR	1 / 1	2.9
4,4'-DDT						0 / 1	1.1
Aldrin						0 / 1	0.55
alpha-BHC						0 / 1	0.55

TABLE D.4-7
SUMMARY OF TRIAD CHEMISTRY DATA - SD-13-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
alpha-Chlordane						0 / 1	0.55
Aroclor-1016						0 / 1	11
Aroclor-1221						0 / 1	23
Aroclor-1232						0 / 1	11
Aroclor-1242						0 / 1	11
Aroclor-1248						0 / 1	11
Aroclor-1254	45		45		SD-13-01-TR	1 / 1	45
Aroclor-1260						0 / 1	11
beta-BHC						0 / 1	0.55
delta-BHC						0 / 1	0.55
Dieldrin						0 / 1	1.1
Endosulfan I						0 / 1	0.55
Endosulfan II						0 / 1	1.1
Endosulfan Sulfate						0 / 1	1.1
Endrin						0 / 1	1.1
Endrin Aldehyde						0 / 1	1.1
Endrin Ketone						0 / 1	1.1
gamma-BHC						0 / 1	0.55
gamma-Chlordane						0 / 1	0.55
Heptachlor						0 / 1	0.55
Heptachlor Epoxide						0 / 1	0.55
Methoxychlor						0 / 1	5.5
Toxaphene						0 / 1	55
Metals - mg/Kg							
Aluminum	17000		17000		SD-13-01-TR	1 / 1	17000
Antimony	6.6		6.6		SD-13-01-TR	1 / 1	6.6
Arsenic	353		353		SD-13-01-TR	1 / 1	353
Barium	128		128		SD-13-01-TR	1 / 1	128
Beryllium	1.2	J	1.2	J	SD-13-01-TR	1 / 1	1.2
Cadmium	7.8		7.8		SD-13-01-TR	1 / 1	7.8
Calcium	6190		6190		SD-13-01-TR	1 / 1	6190
Chromium	494		494		SD-13-01-TR	1 / 1	494
Cobalt	21.6	J	21.6	J	SD-13-01-TR	1 / 1	22
Copper	474		474		SD-13-01-TR	1 / 1	474
Iron	50900		50900		SD-13-01-TR	1 / 1	50900
Lead	756		756		SD-13-01-TR	1 / 1	756
Magnesium	4440		4440		SD-13-01-TR	1 / 1	4440
Manganese	607		607		SD-13-01-TR	1 / 1	607
Mercury	0.48	J	0.48	J	SD-13-01-TR	1 / 1	0.48
Nickel	27.9		27.9		SD-13-01-TR	1 / 1	28
Potassium	1370	J	1370	J	SD-13-01-TR	1 / 1	1370
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium	570		570		SD-13-01-TR	1 / 1	570
Thallium						0 / 1	0.55
Vanadium	61		61		SD-13-01-TR	1 / 1	61
Zinc	1420	J	1420	J	SD-13-01-TR	1 / 1	1420
AVS/SEM - umol/g							
Acid Volatile Sulfide	0.68	J	0.68	J	SD-13-01-TR	1 / 1	0.68
Simultaneously Extracted Metal	18.8356		18.8356		SD-13-01-TR	1 / 1	19
Cadmium	0.0451		0.0451		SD-13-01-TR	1 / 1	0.045
Copper	3.9998		3.9998		SD-13-01-TR	1 / 1	4.0
Lead	2.2561		2.2561		SD-13-01-TR	1 / 1	2.3
Mercury	0.0027	J	0.0027	J	SD-13-01-TR	1 / 1	0.0027
Nickel	0.2421		0.2421		SD-13-01-TR	1 / 1	0.24
Zinc	12.2898	J	12.2898	J	SD-13-01-TR	1 / 1	12
SEM/AVS	27.7		27.7		SD-13-01-TR	1 / 1	28
Total Organic Carbon	300000		300000		SD-13-01-TR	1 / 1	300000

J = Estimated Value

TABLE D.4-8
SUMMARY OF TRIAD CHEMISTRY DATA - SD-18-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	35
Acetone	385	J	385	J	SD-18-02-TR	1 / 1	385
Methylene Chloride						0 / 1	28
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	205
2,2'-oxybis(1-Chloropropane)						0 / 1	205
2,4,5-Trichlorophenol						0 / 1	500
2,4,6-Trichlorophenol						0 / 1	205
2,4-Dichlorophenol						0 / 1	205
2,4-Dimethylphenol						0 / 1	205
2,4-Dinitrophenol						0 / 1	500
2,4-Dinitrotoluene						0 / 1	205
2,6-Dinitrotoluene						0 / 1	205
2-Chloronaphthalene						0 / 1	205
2-Chlorophenol						0 / 1	205
2-Methylnaphthalene						0 / 1	205
2-Methylphenol						0 / 1	205
2-Nitroaniline						0 / 1	500
2-Nitrophenol						0 / 1	205
3,3'-Dichlorobenzidine						0 / 1	205
3-Nitroaniline						0 / 1	205
4,6-Dinitro-2-methylphenol						0 / 1	500
4-Bromophenyl-phenylether						0 / 1	205
4-Chloro-3-methylphenol						0 / 1	205
4-Chloroaniline						0 / 1	205
4-Chlorophenyl-phenylether						0 / 1	205
4-Nitroaniline						0 / 1	500
4-Nitrophenol						0 / 1	500
Acenaphthene						0 / 1	205
Acenaphthylene						0 / 1	205
Acetophenone						0 / 1	205
Anthracene						0 / 1	205
Atrazine						0 / 1	205
Benzaldehyde						0 / 1	205
Benzo(a)anthracene						0 / 1	205
Benzo(b)fluoranthene	180	J	180	J	SD-18-02-TR	1 / 1	180
Benzo(g,h,i)perylene						0 / 1	205
Benzo(k)fluoranthene	410	J	410	J	SD-18-02-TR	1 / 1	410
Bis(2-Chloroethoxy)methane						0 / 1	205
Bis(2-Chloroethyl)ether						0 / 1	205
bis(2-Ethylhexyl)phthalate						0 / 1	205
Butylbenzylphthalate						0 / 1	205
Caprolactam						0 / 1	205
Carbazole						0 / 1	205
Chrysene						0 / 1	205
Dibenzo(a,h)anthracene						0 / 1	205
Dibenzofuran						0 / 1	205
Diethylphthalate						0 / 1	205
Dimethylphthalate						0 / 1	205
Di-n-Butylphthalate						0 / 1	205
Di-n-octylphthalate						0 / 1	205
Fluoranthene	220	J	220	J	SD-18-02-TR	1 / 1	220
Fluorene						0 / 1	205
Hexachlorobenzene						0 / 1	205
Hexachlorobutadiene						0 / 1	205
Hexachlorocyclopentadiene						0 / 1	205
Hexachloroethane						0 / 1	205
Indeno(1,2,3-cd)pyrene						0 / 1	205
Isophorone						0 / 1	205

TABLE D.4-8
SUMMARY OF TRIAD CHEMISTRY DATA - SD-18-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Naphthalene						0 / 1	205
Nitrobenzene						0 / 1	205
N-Nitroso-di-n-propylamine						0 / 1	205
N-Nitroso-diphenylamine						0 / 1	205
Pentachlorophenol						0 / 1	500
Phenanthrene						0 / 1	205
Phenol						0 / 1	205
Pyrene	200	J	200	J	SD-18-02-TR	1 / 1	200
PCBs/Pesticides - ug/Kg							
4,4'-DDD						0 / 1	1.6
4,4'-DDE						0 / 1	1.6
4,4'-DDT						0 / 1	1.6
Aldrin						0 / 1	0.80
alpha-BHC						0 / 1	0.80
alpha-Chlordane						0 / 1	0.80
Aroclor-1016						0 / 1	16
Aroclor-1221						0 / 1	32
Aroclor-1232						0 / 1	16
Aroclor-1242						0 / 1	16
Aroclor-1248						0 / 1	16
Aroclor-1254						0 / 1	16
Aroclor-1260						0 / 1	16
beta-BHC						0 / 1	0.80
delta-BHC						0 / 1	0.80
Dieldrin						0 / 1	1.6
Endosulfan I						0 / 1	0.80
Endosulfan II						0 / 1	1.6
Endosulfan Sulfate						0 / 1	1.6
Endrin						0 / 1	1.6
Endrin Aldehyde						0 / 1	1.6
Endrin Ketone						0 / 1	1.6
gamma-BHC						0 / 1	0.80
gamma-Chlordane						0 / 1	0.80
Heptachlor						0 / 1	0.80
Heptachlor Epoxide						0 / 1	0.80
Methoxychlor						0 / 1	8.0
Toxaphene						0 / 1	80
Metals - mg/Kg							
Aluminum	16200		16200		SD-18-02-TR	1 / 1	16200
Antimony	26.9		26.9		SD-18-02-TR	1 / 1	27
Arsenic	1490		1490		SD-18-02-TR	1 / 1	1490
Barium	147		147		SD-18-02-TR	1 / 1	147
Beryllium	1.4	J	1.4	J	SD-18-02-TR	1 / 1	1.4
Cadmium	13		13		SD-18-02-TR	1 / 1	13
Calcium	7850		7850		SD-18-02-TR	1 / 1	7850
Chromium	2140		2140		SD-18-02-TR	1 / 1	2140
Cobalt	37.8	J	37.8	J	SD-18-02-TR	1 / 1	38
Copper	854		854		SD-18-02-TR	1 / 1	854
Iron	120000		120000		SD-18-02-TR	1 / 1	120000
Lead	440		440		SD-18-02-TR	1 / 1	440
Magnesium	2460		2460		SD-18-02-TR	1 / 1	2460
Manganese	1740		1740		SD-18-02-TR	1 / 1	1740
Mercury	0.35		0.35		SD-18-02-TR	1 / 1	0.35
Nickel	24.3		24.3		SD-18-02-TR	1 / 1	24
Potassium	694	J	694	J	SD-18-02-TR	1 / 1	694
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium	592	J	592	J	SD-18-02-TR	1 / 1	592
Thallium						0 / 1	0.55
Vanadium	56	J	56	J	SD-18-02-TR	1 / 1	56
Zinc	2400	J	2400	J	SD-18-02-TR	1 / 1	2400

TABLE D.4-8
SUMMARY OF TRIAD CHEMISTRY DATA - SD-18-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
AVS/SEM - umol/g							
Acid Volatile Sulfide	4.78		4.78		SD-18-02-TR	1 / 1	4.8
Simultaneously Extracted Metal	29.255		29.255		SD-18-02-TR	1 / 1	29
Cadmium	0.0696		0.0696		SD-18-02-TR	1 / 1	0.070
Copper	7.3627		7.3627		SD-18-02-TR	1 / 1	7.4
Lead	1.3371		1.3371		SD-18-02-TR	1 / 1	1.3
Mercury	0.0095	J	0.0095	J	SD-18-02-TR	1 / 1	0.0095
Nickel	0.2345		0.2345		SD-18-02-TR	1 / 1	0.23
Zinc	21.5788		21.5788		SD-18-02-TR	1 / 1	22
SEM/AVS	6.12		6.12		SD-18-02-TR	1 / 1	6.1
Total Organic Carbon	300000	J	300000	J	SD-18-02-TR	1 / 1	300000

J = Estimated Value

TABLE D.4-9
SUMMARY OF TRIAD CHEMISTRY DATA - SD-19-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	26
Acetone	310	J	310	J	SD-19-01-TR	1 / 1	310
Methylene Chloride						0 / 1	26
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	200
2,2'-oxybis(1-Chloropropane)						0 / 1	200
2,4,5-Trichlorophenol						0 / 1	500
2,4,6-Trichlorophenol						0 / 1	200
2,4-Dichlorophenol						0 / 1	200
2,4-Dimethylphenol						0 / 1	200
2,4-Dinitrophenol						0 / 1	500
2,4-Dinitrotoluene						0 / 1	200
2,6-Dinitrotoluene						0 / 1	200
2-Chloronaphthalene						0 / 1	200
2-Chlorophenol						0 / 1	200
2-Methylnaphthalene						0 / 1	200
2-Methylphenol						0 / 1	200
2-Nitroaniline						0 / 1	500
2-Nitrophenol						0 / 1	200
3,3'-Dichlorobenzidine						0 / 1	200
3-Nitroaniline						0 / 1	200
4,6-Dinitro-2-methylphenol						0 / 1	500
4-Bromophenyl-phenylether						0 / 1	200
4-Chloro-3-methylphenol						0 / 1	200
4-Chloroaniline						0 / 1	200
4-Chlorophenyl-phenylether						0 / 1	200
4-Nitroaniline						0 / 1	500
4-Nitrophenol						0 / 1	500
Acenaphthene						0 / 1	200
Acenaphthylene						0 / 1	200
Acetophenone						0 / 1	200
Anthracene						0 / 1	200
Atrazine						0 / 1	200
Benzaldehyde						0 / 1	200
Benzo(a)anthracene						0 / 1	200
Benzo(a)pyrene	210	J	210	J	SD-19-01-TR	1 / 1	210
Benzo(b)fluoranthene	410		410		SD-19-01-TR	1 / 1	410
Benzo(g,h,i)perylene						0 / 1	200
Benzo(k)fluoranthene	400	J	400	J	SD-19-01-TR	1 / 1	400
Bis(2-Chloroethoxy)methane						0 / 1	200
Bis(2-Chloroethyl)ether						0 / 1	200
bis(2-Ethylhexyl)phthalate						0 / 1	200
Butylbenzylphthalate						0 / 1	200
Caprolactam						0 / 1	200
Carbazole						0 / 1	200
Chrysene	210	J	210	J	SD-19-01-TR	1 / 1	210
Dibenzo(a,h)anthracene						0 / 1	200
Dibenzofuran						0 / 1	200
Diethylphthalate						0 / 1	200
Dimethylphthalate						0 / 1	200
Di-n-Butylphthalate						0 / 1	200
Di-n-octylphthalate						0 / 1	200
Fluoranthene	280	J	280	J	SD-19-01-TR	1 / 1	280
Fluorene						0 / 1	200
Hexachlorobenzene						0 / 1	200
Hexachlorobutadiene						0 / 1	200
Hexachlorocyclopentadiene						0 / 1	200
Hexachloroethane						0 / 1	200

TABLE D.4-9
SUMMARY OF TRIAD CHEMISTRY DATA - SD-19-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Indeno(1,2,3-cd)pyrene						0 / 1	200
Isophorone						0 / 1	200
Naphthalene						0 / 1	200
Nitrobenzene						0 / 1	200
N-Nitroso-di-n-propylamine						0 / 1	200
N-Nitroso-diphenylamine						0 / 1	200
Pentachlorophenol						0 / 1	500
Phenanthrene						0 / 1	200
Phenol						0 / 1	200
Pyrene	270	J	270	J	SD-19-01-TR	1 / 1	270
PCBs/Pesticides - ug/Kg							
4,4'-DDD						0 / 1	1.6
4,4'-DDE	1.6	J	1.6	J	SD-19-01-TR	1 / 1	1.6
4,4'-DDT						0 / 1	1.6
Aldrin						0 / 1	0.80
alpha-BHC						0 / 1	0.80
alpha-Chlordane						0 / 1	0.80
Aroclor-1016						0 / 1	16
Aroclor-1221						0 / 1	32
Aroclor-1232						0 / 1	16
Aroclor-1242						0 / 1	16
Aroclor-1248						0 / 1	16
Aroclor-1254						0 / 1	16
Aroclor-1260						0 / 1	16
beta-BHC						0 / 1	0.80
delta-BHC						0 / 1	0.80
Dieldrin						0 / 1	1.6
Endosulfan I						0 / 1	0.80
Endosulfan II						0 / 1	1.6
Endosulfan Sulfate						0 / 1	1.6
Endrin						0 / 1	1.6
Endrin Aldehyde						0 / 1	1.6
Endrin Ketone						0 / 1	1.6
gamma-BHC						0 / 1	0.80
gamma-Chlordane						0 / 1	0.80
Heptachlor						0 / 1	0.80
Heptachlor Epoxide						0 / 1	0.80
Methoxychlor						0 / 1	8.0
Toxaphene						0 / 1	80
Metals - mg/Kg							
Aluminum	7060		7060		SD-19-01-TR	1 / 1	7060
Antimony	16.4		16.4		SD-19-01-TR	1 / 1	16
Arsenic	4250		4250		SD-19-01-TR	1 / 1	4250
Barium	205		205		SD-19-01-TR	1 / 1	205
Beryllium	0.68	J	0.68	J	SD-19-01-TR	1 / 1	0.68
Cadmium	8.3		8.3		SD-19-01-TR	1 / 1	8.3
Calcium	4120		4120		SD-19-01-TR	1 / 1	4120
Chromium	866		866		SD-19-01-TR	1 / 1	866
Cobalt	37.3	J	37.3	J	SD-19-01-TR	1 / 1	37
Copper	354		354		SD-19-01-TR	1 / 1	354
Iron	258000		258000		SD-19-01-TR	1 / 1	258000
Lead	206		206		SD-19-01-TR	1 / 1	206
Magnesium	1280		1280		SD-19-01-TR	1 / 1	1280
Manganese	2020		2020		SD-19-01-TR	1 / 1	2020
Mercury						0 / 1	0.055
Nickel						0 / 1	0.40
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium						0 / 1	183
Thallium						0 / 1	0.55

TABLE D.4-9
SUMMARY OF TRIAD CHEMISTRY DATA - SD-19-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Vanadium	32.4	J	32.4	J	SD-19-01-TR	1 / 1	32
Zinc	1600	J	1600	J	SD-19-01-TR	1 / 1	1600
AVS/SEM - umol/g							
Acid Volatile Sulfide	5.63		5.63		SD-19-01-TR	1 / 1	5.6
Simultaneously Extracted Metal	22.551		22.551		SD-19-01-TR	1 / 1	23
Cadmium	0.0658		0.0658		SD-19-01-TR	1 / 1	0.066
Copper	4.2687		4.2687		SD-19-01-TR	1 / 1	4.3
Lead	0.8486		0.8486		SD-19-01-TR	1 / 1	0.85
Mercury	0.0001	J	0.0001	J	SD-19-01-TR	1 / 1	0.00010
Nickel	0.0137		0.0137		SD-19-01-TR	1 / 1	0.014
Zinc	18.203		18.203		SD-19-01-TR	1 / 1	18
SEM/AVS	4.01		4.01		SD-19-01-TR	1 / 1	4.0
Total Organic Carbon	290000	J	290000	J	SD-19-01-TR	1 / 1	290000

J = Estimated Value

TABLE D.4-10
SUMMARY OF TRIAD CHEMISTRY DATA - SD-22-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	75
Acetone	2400	J	2400	J	SD-22-01-TR	1 / 1	2400
Methylene Chloride						0 / 1	75
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	270
2,2'-oxybis(1-Chloropropane)						0 / 1	270
2,4,5-Trichlorophenol						0 / 1	700
2,4,6-Trichlorophenol						0 / 1	270
2,4-Dichlorophenol						0 / 1	270
2,4-Dimethylphenol						0 / 1	270
2,4-Dinitrophenol						0 / 1	700
2,4-Dinitrotoluene						0 / 1	270
2,6-Dinitrotoluene						0 / 1	270
2-Chloronaphthalene						0 / 1	270
2-Chlorophenol						0 / 1	270
2-Methylnaphthalene						0 / 1	270
2-Methylphenol						0 / 1	270
2-Nitroaniline						0 / 1	700
2-Nitrophenol						0 / 1	270
3,3'-Dichlorobenzidine						0 / 1	270
3-Nitroaniline						0 / 1	270
4,6-Dinitro-2-methylphenol						0 / 1	700
4-Bromophenyl-phenylether						0 / 1	270
4-Chloro-3-methylphenol						0 / 1	270
4-Chloroaniline						0 / 1	270
4-Chlorophenyl-phenylether						0 / 1	270
4-Nitroaniline						0 / 1	700
4-Nitrophenol						0 / 1	700
Acenaphthene						0 / 1	270
Acenaphthylene						0 / 1	270
Acetophenone						0 / 1	270
Anthracene						0 / 1	270
Atrazine						0 / 1	270
Benzaldehyde						0 / 1	270
Benzo(a)anthracene						0 / 1	270
Benzo(b)fluoranthene						0 / 1	270
Benzo(g,h,i)perylene						0 / 1	270
Benzo(k)fluoranthene	540	J	540	J	SD-22-01-TR	1 / 1	540
Bis(2-Chloroethoxy)methane						0 / 1	270
Bis(2-Chloroethyl)ether						0 / 1	270
bis(2-Ethylhexyl)phthalate						0 / 1	270
Butylbenzylphthalate						0 / 1	270
Caprolactam						0 / 1	270
Carbazole						0 / 1	270
Chrysene						0 / 1	270
Dibenzo(a,h)anthracene						0 / 1	270
Dibenzofuran						0 / 1	270
Diethylphthalate						0 / 1	270
Dimethylphthalate						0 / 1	270
Di-n-Butylphthalate						0 / 1	270
Di-n-octylphthalate						0 / 1	270
Fluoranthene						0 / 1	270
Fluorene						0 / 1	270
Hexachlorobenzene						0 / 1	270
Hexachlorobutadiene						0 / 1	270
Hexachlorocyclopentadiene						0 / 1	270
Hexachloroethane						0 / 1	270

TABLE D.4-10
SUMMARY OF TRIAD CHEMISTRY DATA - SD-22-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Indeno(1,2,3-cd)pyrene						0 / 1	270
Isophorone						0 / 1	270
Naphthalene						0 / 1	270
Nitrobenzene						0 / 1	270
N-Nitroso-di-n-propylamine						0 / 1	270
N-Nitroso-diphenylamine						0 / 1	270
Pentachlorophenol						0 / 1	700
Phenanthrene						0 / 1	270
Phenol						0 / 1	270
Pyrene						0 / 1	270
PCBs/Pesticides - ug/Kg							
4,4'-DDD						0 / 1	2.3
4,4'-DDE						0 / 1	2.3
4,4'-DDT						0 / 1	2.3
Aldrin						0 / 1	1.2
alpha-BHC						0 / 1	1.2
alpha-Chlordane						0 / 1	1.2
Aroclor-1016						0 / 1	23
Aroclor-1221						0 / 1	46
Aroclor-1232						0 / 1	23
Aroclor-1242						0 / 1	23
Aroclor-1248						0 / 1	23
Aroclor-1254						0 / 1	23
Aroclor-1260						0 / 1	23
beta-BHC						0 / 1	1.2
delta-BHC						0 / 1	1.2
Dieldrin						0 / 1	2.3
Endosulfan I						0 / 1	1.2
Endosulfan II						0 / 1	2.3
Endosulfan Sulfate						0 / 1	2.3
Endrin						0 / 1	2.3
Endrin Aldehyde						0 / 1	2.3
Endrin Ketone						0 / 1	2.3
gamma-BHC						0 / 1	1.2
gamma-Chlordane						0 / 1	1.2
Heptachlor						0 / 1	1.2
Heptachlor Epoxide						0 / 1	1.2
Methoxychlor						0 / 1	12
Toxaphene						0 / 1	115
Metals - mg/Kg							
Aluminum	3010		3010		SD-22-01-TR	1 / 1	3010
Antimony	38.2		38.2		SD-22-01-TR	1 / 1	38
Arsenic	12.6		12.6		SD-22-01-TR	1 / 1	13
Barium	48.1		48.1		SD-22-01-TR	1 / 1	48
Beryllium	0.31	J	0.31	J	SD-22-01-TR	1 / 1	0.31
Cadmium	1		1		SD-22-01-TR	1 / 1	1.0
Calcium	19300		19300		SD-22-01-TR	1 / 1	19300
Chromium	10.6		10.6		SD-22-01-TR	1 / 1	11
Cobalt	2.5		2.5		SD-22-01-TR	1 / 1	2.5
Copper	29.5		29.5		SD-22-01-TR	1 / 1	30
Iron	3310		3310		SD-22-01-TR	1 / 1	3310
Lead	3880		3880		SD-22-01-TR	1 / 1	3880
Magnesium	1510		1510		SD-22-01-TR	1 / 1	1510
Manganese	51.8		51.8		SD-22-01-TR	1 / 1	52
Mercury						0 / 1	0.015
Nickel	7.4		7.4		SD-22-01-TR	1 / 1	7.4
Potassium	303	J	303	J	SD-22-01-TR	1 / 1	303
Selenium	1.9	J	1.9	J	SD-22-01-TR	1 / 1	1.9
Silver						0 / 1	0.50
Sodium	1320		1320		SD-22-01-TR	1 / 1	1320

TABLE D.4-10
SUMMARY OF TRIAD CHEMISTRY DATA - SD-22-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Thallium						0 / 1	0.55
Vanadium	41.6		41.6		SD-22-01-TR	1 / 1	42
Zinc	111	J	111	J	SD-22-01-TR	1 / 1	111
AVS/SEM - umol/g							
Acid Volatile Sulfide	0.29		0.29		SD-22-01-TR	1 / 1	0.29
Simultaneously Extracted Metal	1.4		1.4		SD-22-01-TR	1 / 1	1.4
Cadmium	0.0053	J	0.0053	J	SD-22-01-TR	1 / 1	0.0053
Copper	0.1908		0.1908		SD-22-01-TR	1 / 1	0.19
Lead	7.8262		7.8262		SD-22-01-TR	1 / 1	7.8
Mercury	0.0022	J	0.0022	J	SD-22-01-TR	1 / 1	0.0022
Nickel	0.0928		0.0928		SD-22-01-TR	1 / 1	0.093
Zinc	1.1092		1.1092		SD-22-01-TR	1 / 1	1.1
SEM/AVS	4.82		4.82		SD-22-01-TR	1 / 1	4.8
Total Organic Carbon	430000	J	430000	J	SD-22-01-TR	1 / 1	430000

J = Estimated Value

TABLE D.4-11
SUMMARY OF TRIAD CHEMISTRY DATA - SD-TT-29-03-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	35
Acetone	1100	J	1100	J	SD-TT-29-03-TR	1 / 1	1100
Methylene Chloride						0 / 1	29

J = Estimated Value

TABLE D.4-12
SUMMARY OF TRIAD CHEMISTRY DATA - SD-TT-30-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane	110	J	110	J	SD-TT-30-01-TR	1 / 1	110
Acetone						0 / 1	7300
Methyl Acetate						0 / 1	530
Methylene Chloride						0 / 1	24
Toluene	22	J	22	J	SD-TT-30-01-TR	1 / 1	22
SVOCs - ug/Kg							
Benzo(a)pyrene	33	J	33	J	SD-TT-30-01-TR	1 / 1	33
Benzo(b)fluoranthene	47	J	47	J	SD-TT-30-01-TR	1 / 1	47
Chrysene	40	J	40	J	SD-TT-30-01-TR	1 / 1	40
Fluoranthene	71	J	71	J	SD-TT-30-01-TR	1 / 1	71
Pyrene	55	J	55	J	SD-TT-30-01-TR	1 / 1	55
Metals - mg/Kg							
Aluminum	17900		17900		SD-TT-30-01-TR	1 / 1	17900
Antimony	23.6	J	23.6	J	SD-TT-30-01-TR	1 / 1	24
Arsenic	541		541		SD-TT-30-01-TR	1 / 1	541
Barium	85		85		SD-TT-30-01-TR	1 / 1	85
Beryllium	1.3	J	1.3	J	SD-TT-30-01-TR	1 / 1	1.3
Cadmium	5.2		5.2		SD-TT-30-01-TR	1 / 1	5.2
Calcium	5960		5960		SD-TT-30-01-TR	1 / 1	5960
Chromium	2290		2290		SD-TT-30-01-TR	1 / 1	2290
Cobalt	22.9	J	22.9	J	SD-TT-30-01-TR	1 / 1	23
Copper	835		835		SD-TT-30-01-TR	1 / 1	835
Iron	51500		51500		SD-TT-30-01-TR	1 / 1	51500
Lead	664		664		SD-TT-30-01-TR	1 / 1	664
Magnesium	3280		3280		SD-TT-30-01-TR	1 / 1	3280
Manganese	980		980		SD-TT-30-01-TR	1 / 1	980
Mercury	1.7	J	1.7	J	SD-TT-30-01-TR	1 / 1	1.7
Nickel	26.9		26.9		SD-TT-30-01-TR	1 / 1	27
Potassium	784	J	784	J	SD-TT-30-01-TR	1 / 1	784
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium	468		468		SD-TT-30-01-TR	1 / 1	468
Thallium						0 / 1	0.55
Vanadium	66.2		66.2		SD-TT-30-01-TR	1 / 1	66
Zinc	1370	J	1370	J	SD-TT-30-01-TR	1 / 1	1370
AVS/SEM - umol/g							
Acid Volatile Sulfide						0 / 1	0.040
Simultaneously Extracted Metal	20.5874		20.5874		SD-TT-30-01-TR	1 / 1	21
Cadmium	0.0303		0.0303		SD-TT-30-01-TR	1 / 1	0.030
Copper	6.8404		6.8404		SD-TT-30-01-TR	1 / 1	6.8
Lead	1.7625		1.7625		SD-TT-30-01-TR	1 / 1	1.8
Mercury	0.0059	J	0.0059	J	SD-TT-30-01-TR	1 / 1	0.0059
Nickel	0.2229		0.2229		SD-TT-30-01-TR	1 / 1	0.22
Zinc	11.7254	J	11.7254	J	SD-TT-30-01-TR	1 / 1	12
SEM/AVS	260.6		260.6		SD-TT-30-01-TR	1 / 1	261
Total Organic Carbon	240000		240000		SD-TT-30-01-TR	1 / 1	240000

J = Estimated Value

TABLE D.4-13
SUMMARY OF TRIAD CHEMISTRY DATA - SD-TT-32-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	35
Acetone						0 / 1	260
Methylene Chloride						0 / 1	24
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	120
2,2'-oxybis(1-Chloropropane)						0 / 1	120
2,4,5-Trichlorophenol						0 / 1	295
2,4,6-Trichlorophenol						0 / 1	120
2,4-Dichlorophenol						0 / 1	120
2,4-Dimethylphenol						0 / 1	120
2,4-Dinitrophenol						0 / 1	295
2,4-Dinitrotoluene						0 / 1	120
2,6-Dinitrotoluene						0 / 1	120
2-Chloronaphthalene						0 / 1	120
2-Chlorophenol						0 / 1	120
2-Methylnaphthalene						0 / 1	120
2-Methylphenol						0 / 1	120
2-Nitroaniline						0 / 1	295
2-Nitrophenol						0 / 1	120
3,3'-Dichlorobenzidine						0 / 1	120
3-Nitroaniline						0 / 1	120
4,6-Dinitro-2-methylphenol						0 / 1	295
4-Bromophenyl-phenylether						0 / 1	120
4-Chloro-3-methylphenol						0 / 1	120
4-Chloroaniline						0 / 1	120
4-Chlorophenyl-phenylether						0 / 1	120
4-Nitroaniline						0 / 1	295
4-Nitrophenol						0 / 1	295
Acenaphthene						0 / 1	120
Acenaphthylene						0 / 1	120
Acetophenone						0 / 1	120
Anthracene						0 / 1	120
Atrazine						0 / 1	120
Benzaldehyde						0 / 1	120
Benzo(a)anthracene	400		400		SD-TT-32-02-TR	1 / 1	400
Benzo(a)pyrene	470	J	470	J	SD-TT-32-02-TR	1 / 1	470
Benzo(b)fluoranthene	810		810		SD-TT-32-02-TR	1 / 1	810
Benzo(g,h,i)perylene	230	J	230	J	SD-TT-32-02-TR	1 / 1	230
Benzo(k)fluoranthene	180	J	180	J	SD-TT-32-02-TR	1 / 1	180
Bis(2-Chloroethoxy)methane						0 / 1	120
Bis(2-Chloroethyl)ether						0 / 1	120
bis(2-Ethylhexyl)phthalate	370		370		SD-TT-32-02-TR	1 / 1	370
Butylbenzylphthalate	130	J	130	J	SD-TT-32-02-TR	1 / 1	130
Caprolactam						0 / 1	120
Carbazole						0 / 1	120
Chrysene	460		460		SD-TT-32-02-TR	1 / 1	460
Dibenzo(a,h)anthracene						0 / 1	120
Dibenzofuran						0 / 1	120
Diethylphthalate						0 / 1	120
Dimethylphthalate						0 / 1	120
Di-n-Butylphthalate						0 / 1	120
Di-n-octylphthalate						0 / 1	120
Fluoranthene	1000		1000		SD-TT-32-02-TR	1 / 1	1000
Fluorene						0 / 1	120
Hexachlorobenzene						0 / 1	120
Hexachlorobutadiene						0 / 1	120
Hexachlorocyclopentadiene						0 / 1	120
Hexachloroethane						0 / 1	120

TABLE D.4-13
SUMMARY OF TRIAD CHEMISTRY DATA - SD-TT-32-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Indeno(1,2,3-cd)pyrene	210	J	210	J	SD-TT-32-02-TR	1 / 1	210
Isophorone						0 / 1	120
Naphthalene						0 / 1	120
Nitrobenzene						0 / 1	120
N-Nitroso-di-n-propylamine						0 / 1	120
N-Nitroso-diphenylamine						0 / 1	120
Pentachlorophenol						0 / 1	295
Phenanthrene	450		450		SD-TT-32-02-TR	1 / 1	450
Phenol						0 / 1	120
Pyrene	860		860		SD-TT-32-02-TR	1 / 1	860
PCBs/Pesticides - ug/Kg							
4,4'-DDD						0 / 1	0.47
4,4'-DDE	0.78	J	0.78	J	SD-TT-32-02-TR	1 / 1	0.78
4,4'-DDT						0 / 1	0.47
Aldrin						0 / 1	0.24
alpha-BHC						0 / 1	0.24
alpha-Chlordane						0 / 1	0.24
Aroclor-1016						0 / 1	4.7
Aroclor-1221						0 / 1	10
Aroclor-1232						0 / 1	4.7
Aroclor-1242						0 / 1	4.7
Aroclor-1248						0 / 1	4.7
Aroclor-1254						0 / 1	4.7
Aroclor-1260						0 / 1	4.7
beta-BHC						0 / 1	0.24
delta-BHC						0 / 1	0.24
Dieldrin						0 / 1	0.47
Endosulfan I						0 / 1	0.24
Endosulfan II						0 / 1	0.47
Endosulfan Sulfate						0 / 1	0.47
Endrin						0 / 1	0.47
Endrin Aldehyde						0 / 1	0.47
Endrin Ketone						0 / 1	0.47
gamma-BHC						0 / 1	0.24
gamma-Chlordane						0 / 1	0.24
Heptachlor						0 / 1	0.24
Heptachlor Epoxide						0 / 1	0.24
Methoxychlor						0 / 1	2.4
Toxaphene						0 / 1	24
Metals - mg/Kg							
Aluminum	11500		11500		SD-TT-32-02-TR	1 / 1	11500
Antimony	9.1	J	9.1	J	SD-TT-32-02-TR	1 / 1	9.1
Arsenic	313		313		SD-TT-32-02-TR	1 / 1	313
Barium	87.2		87.2		SD-TT-32-02-TR	1 / 1	87
Beryllium	0.82	J	0.82	J	SD-TT-32-02-TR	1 / 1	0.82
Cadmium	5.7		5.7		SD-TT-32-02-TR	1 / 1	5.7
Calcium	4880		4880		SD-TT-32-02-TR	1 / 1	4880
Chromium	699		699		SD-TT-32-02-TR	1 / 1	699
Cobalt	26.4	J	26.4	J	SD-TT-32-02-TR	1 / 1	26
Copper	403		403		SD-TT-32-02-TR	1 / 1	403
Iron	33300		33300		SD-TT-32-02-TR	1 / 1	33300
Lead	288		288		SD-TT-32-02-TR	1 / 1	288
Magnesium	2890		2890		SD-TT-32-02-TR	1 / 1	2890
Manganese	372		372		SD-TT-32-02-TR	1 / 1	372
Mercury	0.44		0.44		SD-TT-32-02-TR	1 / 1	0.44
Nickel	21.3		21.3		SD-TT-32-02-TR	1 / 1	21
Potassium	646	J	646	J	SD-TT-32-02-TR	1 / 1	646
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium						0 / 1	200

TABLE D.4-13
SUMMARY OF TRIAD CHEMISTRY DATA - SD-TT-32-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Thallium						0 / 1	0.55
Vanadium	38.1	J	38.1	J	SD-TT-32-02-TR	1 / 1	38
Zinc	1250	J	1250	J	SD-TT-32-02-TR	1 / 1	1250
AVS/SEM - umol/g							
Acid Volatile Sulfide	2.79		2.79		SD-TT-32-02-TR	1 / 1	2.8
Simultaneously Extracted Metal	14.513		14.513		SD-TT-32-02-TR	1 / 1	15
Cadmium	0.0318		0.0318		SD-TT-32-02-TR	1 / 1	0.032
Copper	3.1821		3.1821		SD-TT-32-02-TR	1 / 1	3.2
Lead	0.7762		0.7762		SD-TT-32-02-TR	1 / 1	0.78
Mercury	0.0041	J	0.0041	J	SD-TT-32-02-TR	1 / 1	0.0041
Nickel	0.1968		0.1968		SD-TT-32-02-TR	1 / 1	0.20
Zinc	11.0978		11.0978		SD-TT-32-02-TR	1 / 1	11
SEM/AVS	5.2		5.2		SD-TT-32-02-TR	1 / 1	5.2
Total Organic Carbon	150000	J	150000	J	SD-TT-32-02-TR	1 / 1	150000

J = Estimated Value

TABLE D.4-14
SUMMARY OF TRIAD CHEMISTRY DATA - SD-TT-33-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	14
Acetone	200	J	200	J	SD-TT-33-02-TR	1 / 1	200
Methylene Chloride						0 / 1	12
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	65
2,2'-oxybis(1-Chloropropane)						0 / 1	65
2,4,5-Trichlorophenol						0 / 1	165
2,4,6-Trichlorophenol						0 / 1	65
2,4-Dichlorophenol						0 / 1	65
2,4-Dimethylphenol						0 / 1	65
2,4-Dinitrophenol						0 / 1	165
2,4-Dinitrotoluene						0 / 1	65
2,6-Dinitrotoluene						0 / 1	65
2-Chloronaphthalene						0 / 1	65
2-Chlorophenol						0 / 1	65
2-Methylnaphthalene						0 / 1	65
2-Methylphenol						0 / 1	65
2-Nitroaniline						0 / 1	165
2-Nitrophenol						0 / 1	65
3,3'-Dichlorobenzidine						0 / 1	65
3-Nitroaniline						0 / 1	65
4,6-Dinitro-2-methylphenol						0 / 1	165
4-Bromophenyl-phenylether						0 / 1	65
4-Chloro-3-methylphenol						0 / 1	65
4-Chloroaniline						0 / 1	65
4-Chlorophenyl-phenylether						0 / 1	65
4-Nitroaniline						0 / 1	165
4-Nitrophenol						0 / 1	165
Acenaphthene						0 / 1	65
Acenaphthylene						0 / 1	65
Acetophenone						0 / 1	65
Anthracene						0 / 1	65
Atrazine						0 / 1	65
Benzaldehyde						0 / 1	65
Benzo(a)anthracene	110	J	110	J	SD-TT-33-02-TR	1 / 1	110
Benzo(a)pyrene	140	J	140	J	SD-TT-33-02-TR	1 / 1	140
Benzo(b)fluoranthene	260		260		SD-TT-33-02-TR	1 / 1	260
Benzo(g,h,i)perylene	60	J	60	J	SD-TT-33-02-TR	1 / 1	60
Benzo(k)fluoranthene	99	J	99	J	SD-TT-33-02-TR	1 / 1	99
Bis(2-Chloroethoxy)methane						0 / 1	65
Bis(2-Chloroethyl)ether						0 / 1	65
bis(2-Ethylhexyl)phthalate	81	J	81	J	SD-TT-33-02-TR	1 / 1	81
Butylbenzylphthalate						0 / 1	65
Caprolactam						0 / 1	65
Carbazole						0 / 1	65
Chrysene	160		160		SD-TT-33-02-TR	1 / 1	160
Dibenzo(a,h)anthracene						0 / 1	65
Dibenzofuran						0 / 1	65
Diethylphthalate						0 / 1	65
Dimethylphthalate						0 / 1	65
Di-n-Butylphthalate						0 / 1	65
Di-n-octylphthalate						0 / 1	65
Fluoranthene	290		290		SD-TT-33-02-TR	1 / 1	290
Fluorene						0 / 1	65
Hexachlorobenzene						0 / 1	65
Hexachlorobutadiene						0 / 1	65
Hexachlorocyclopentadiene						0 / 1	65
Hexachloroethane						0 / 1	65

TABLE D.4-14
SUMMARY OF TRIAD CHEMISTRY DATA - SD-TT-33-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Indeno(1,2,3-cd)pyrene	60	J	60	J	SD-TT-33-02-TR	1 / 1	60
Isophorone						0 / 1	65
Naphthalene						0 / 1	65
Nitrobenzene						0 / 1	65
N-Nitroso-di-n-propylamine						0 / 1	65
N-Nitroso-diphenylamine						0 / 1	65
Pentachlorophenol						0 / 1	165
Phenanthrene	130	J	130	J	SD-TT-33-02-TR	1 / 1	130
Phenol						0 / 1	65
Pyrene	270		270		SD-TT-33-02-TR	1 / 1	270
PCBs/Pesticides - ug/Kg							
4,4'-DDD	1.2		1.2		SD-TT-33-02-TR	1 / 1	1.2
4,4'-DDE	1.7		1.7		SD-TT-33-02-TR	1 / 1	1.7
4,4'-DDT						0 / 1	0.55
Aldrin						0 / 1	0.27
alpha-BHC						0 / 1	0.27
alpha-Chlordane						0 / 1	0.27
Aroclor-1016						0 / 1	5.5
Aroclor-1221						0 / 1	11
Aroclor-1232						0 / 1	5.5
Aroclor-1242						0 / 1	5.5
Aroclor-1248						0 / 1	5.5
Aroclor-1254						0 / 1	5.5
Aroclor-1260						0 / 1	5.5
beta-BHC						0 / 1	0.27
delta-BHC						0 / 1	0.27
Dieldrin						0 / 1	0.55
Endosulfan I						0 / 1	0.27
Endosulfan II						0 / 1	0.55
Endosulfan Sulfate						0 / 1	0.55
Endrin						0 / 1	0.55
Endrin Aldehyde						0 / 1	0.55
Endrin Ketone						0 / 1	0.55
gamma-BHC						0 / 1	0.27
gamma-Chlordane						0 / 1	0.27
Heptachlor						0 / 1	0.27
Heptachlor Epoxide						0 / 1	0.27
Methoxychlor						0 / 1	2.7
Toxaphene						0 / 1	27
Metals - mg/Kg							
Aluminum	6640		6640		SD-TT-33-02-TR	1 / 1	6640
Antimony	6	J	6	J	SD-TT-33-02-TR	1 / 1	6.0
Arsenic	221		221		SD-TT-33-02-TR	1 / 1	221
Barium	56.8		56.8		SD-TT-33-02-TR	1 / 1	57
Beryllium	0.48	J	0.48	J	SD-TT-33-02-TR	1 / 1	0.48
Cadmium	2.8		2.8		SD-TT-33-02-TR	1 / 1	2.8
Calcium	2370		2370		SD-TT-33-02-TR	1 / 1	2370
Chromium	420		420		SD-TT-33-02-TR	1 / 1	420
Cobalt	14.1	J	14.1	J	SD-TT-33-02-TR	1 / 1	14
Copper	270		270		SD-TT-33-02-TR	1 / 1	270
Iron	34600		34600		SD-TT-33-02-TR	1 / 1	34600
Lead	141		141		SD-TT-33-02-TR	1 / 1	141
Magnesium	1380		1380		SD-TT-33-02-TR	1 / 1	1380
Manganese	776		776		SD-TT-33-02-TR	1 / 1	776
Mercury	1.2		1.2		SD-TT-33-02-TR	1 / 1	1.2
Nickel	9.2		9.2		SD-TT-33-02-TR	1 / 1	9.2
Potassium	315	J	315	J	SD-TT-33-02-TR	1 / 1	315
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium						0 / 1	49

TABLE D.4-14
SUMMARY OF TRIAD CHEMISTRY DATA - SD-TT-33-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Thallium						0 / 1	0.55
Vanadium	19.3		19.3		SD-TT-33-02-TR	1 / 1	19
Zinc	581	J	581	J	SD-TT-33-02-TR	1 / 1	581
AVS/SEM - umol/g							
Acid Volatile Sulfide	1.95		1.95		SD-TT-33-02-TR	1 / 1	2.0
Simultaneously Extracted Metal	9.053		9.053		SD-TT-33-02-TR	1 / 1	9.1
Cadmium	0.0197		0.0197		SD-TT-33-02-TR	1 / 1	0.020
Copper	2.7992		2.7992		SD-TT-33-02-TR	1 / 1	2.8
Lead	0.5021		0.5021		SD-TT-33-02-TR	1 / 1	0.50
Mercury	0.0057	J	0.0057	J	SD-TT-33-02-TR	1 / 1	0.0057
Nickel	0.1033		0.1033		SD-TT-33-02-TR	1 / 1	0.10
Zinc	6.1247		6.1247		SD-TT-33-02-TR	1 / 1	6.1
SEM/AVS	4.64		4.64		SD-TT-33-02-TR	1 / 1	4.6
Total Organic Carbon	86000	J	86000	J	SD-TT-33-02-TR	1 / 1	86000

J = Estimated Value

TABLE D.4-15
SUMMARY OF TRIAD CHEMISTRY DATA - SD-AO-03-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	25
1,1,2-Trichloro-1,2,2-trifluoroethane						0 / 1	25
2-Butanone	99	J	99	J	SD-AO-03-TR	1 / 1	99
Acetone	340	J	340	J	SD-AO-03-TR	1 / 1	340
Methyl Acetate	140	J	140	J	SD-AO-03-TR	1 / 1	140
Methylene Chloride						0 / 1	25
Toluene	17	J	17	J	SD-AO-03-TR	1 / 1	17
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	175
2,2'-oxybis(1-Chloropropane)						0 / 1	175
2,4,5-Trichlorophenol						0 / 1	435
2,4,6-Trichlorophenol						0 / 1	175
2,4-Dichlorophenol						0 / 1	175
2,4-Dimethylphenol						0 / 1	175
2,4-Dinitrophenol						0 / 1	435
2,4-Dinitrotoluene						0 / 1	175
2,6-Dinitrotoluene						0 / 1	175
2-Chloronaphthalene						0 / 1	175
2-Chlorophenol						0 / 1	175
2-Methylnaphthalene						0 / 1	175
2-Methylphenol						0 / 1	175
2-Nitroaniline						0 / 1	435
2-Nitrophenol						0 / 1	175
3,3'-Dichlorobenzidine						0 / 1	175
3+4-Methylphenols						0 / 1	175
3-Nitroaniline						0 / 1	175
4,6-Dinitro-2-methylphenol						0 / 1	435
4-Bromophenyl-phenylether						0 / 1	175
4-Chloro-3-methylphenol						0 / 1	175
4-Chloroaniline						0 / 1	175
4-Chlorophenyl-phenylether						0 / 1	175
4-Nitroaniline						0 / 1	435
4-Nitrophenol						0 / 1	435
Acenaphthene						0 / 1	175
Acenaphthylene						0 / 1	175
Acetophenone						0 / 1	175
Anthracene						0 / 1	175
Atrazine						0 / 1	175
Benzaldehyde						0 / 1	175
Benzo(a)anthracene	240	J	240	J	SD-AO-03-TR	1 / 1	240
Benzo(a)pyrene	290	J	290	J	SD-AO-03-TR	1 / 1	290
Benzo(b)fluoranthene	520		520		SD-AO-03-TR	1 / 1	520
Benzo(g,h,i)perylene						0 / 1	175
Benzo(k)fluoranthene						0 / 1	175
Bis(2-Chloroethoxy)methane						0 / 1	175
Bis(2-Chloroethyl)ether						0 / 1	175
bis(2-Ethylhexyl)phthalate	230	J	230	J	SD-AO-03-TR	1 / 1	230
Butylbenzylphthalate						0 / 1	175
Caprolactam						0 / 1	175
Carbazole						0 / 1	175
Chrysene	290	J	290	J	SD-AO-03-TR	1 / 1	290
Dibenzo(a,h)anthracene						0 / 1	175
Dibenzofuran						0 / 1	175
Diethylphthalate						0 / 1	175
Dimethylphthalate						0 / 1	175
Di-n-Butylphthalate						0 / 1	175
Di-n-octylphthalate						0 / 1	175
Fluoranthene	540		540		SD-AO-03-TR	1 / 1	540

TABLE D.4-15
SUMMARY OF TRIAD CHEMISTRY DATA - SD-AO-03-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Fluorene						0 / 1	175
Hexachlorobenzene						0 / 1	175
Hexachlorobutadiene						0 / 1	175
Hexachlorocyclopentadiene						0 / 1	175
Hexachloroethane						0 / 1	175
Indeno(1,2,3-cd)pyrene						0 / 1	175
Isophorone						0 / 1	175
Naphthalene						0 / 1	175
Nitrobenzene						0 / 1	175
N-Nitroso-di-n-propylamine						0 / 1	175
N-Nitroso-diphenylamine						0 / 1	175
Pentachlorophenol						0 / 1	435
Phenanthrene	200	J	200	J	SD-AO-03-TR	1 / 1	200
Phenol						0 / 1	175
Pyrene	500		500		SD-AO-03-TR	1 / 1	500
PCBs/Pesticides - ug/Kg							
4,4'-DDD						0 / 1	1.4
4,4'-DDE	2.4	J	2.4	J	SD-AO-03-TR	1 / 1	2.4
4,4'-DDT						0 / 1	1.4
Aldrin						0 / 1	0.70
alpha-BHC						0 / 1	0.70
alpha-Chlordane						0 / 1	0.70
Aroclor-1016						0 / 1	14
Aroclor-1221						0 / 1	28
Aroclor-1232						0 / 1	14
Aroclor-1242						0 / 1	14
Aroclor-1248						0 / 1	14
Aroclor-1254						0 / 1	14
Aroclor-1260						0 / 1	14
beta-BHC						0 / 1	0.70
delta-BHC						0 / 1	0.70
Dieldrin						0 / 1	1.4
Endosulfan I						0 / 1	0.70
Endosulfan II						0 / 1	1.4
Endosulfan Sulfate						0 / 1	1.4
Endrin						0 / 1	1.4
Endrin Aldehyde						0 / 1	1.4
Endrin Ketone						0 / 1	1.4
gamma-BHC						0 / 1	0.70
gamma-Chlordane						0 / 1	0.70
Heptachlor						0 / 1	0.70
Heptachlor Epoxide						0 / 1	0.70
Methoxychlor						0 / 1	7.0
Toxaphene						0 / 1	70
Metals - mg/Kg							
Aluminum	18400		18400		SD-AO-03-TR	1 / 1	18400
Antimony	5.1		5.1		SD-AO-03-TR	1 / 1	5.1
Arsenic	128		128		SD-AO-03-TR	1 / 1	128
Barium	189		189		SD-AO-03-TR	1 / 1	189
Beryllium	1.1	J	1.1	J	SD-AO-03-TR	1 / 1	1.1
Cadmium	10		10		SD-AO-03-TR	1 / 1	10
Calcium	9840		9840		SD-AO-03-TR	1 / 1	9840
Chromium	317		317		SD-AO-03-TR	1 / 1	317
Cobalt	26.6	J	26.6	J	SD-AO-03-TR	1 / 1	27
Copper	403		403		SD-AO-03-TR	1 / 1	403
Iron	43400		43400		SD-AO-03-TR	1 / 1	43400
Lead	553		553		SD-AO-03-TR	1 / 1	553
Magnesium	5830		5830		SD-AO-03-TR	1 / 1	5830
Manganese	1210		1210		SD-AO-03-TR	1 / 1	1210
Mercury	0.29	J	0.29	J	SD-AO-03-TR	1 / 1	0.29

TABLE D.4-15
SUMMARY OF TRIAD CHEMISTRY DATA - SD-AO-03-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Nickel	36.4		36.4		SD-AO-03-TR	1 / 1	36
Potassium	1840	J	1840	J	SD-AO-03-TR	1 / 1	1840
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium	732		732		SD-AO-03-TR	1 / 1	732
Thallium						0 / 1	0.55
Vanadium	65.7		65.7		SD-AO-03-TR	1 / 1	66
Zinc	1860	J	1860	J	SD-AO-03-TR	1 / 1	1860
AVS/SEM - umol/g							
Acid Volatile Sulfide	0.1275	J	0.1275	J	SD-AO-03-TR	1 / 1	0.13
Simultaneously Extracted Metal	21.358		21.358		SD-AO-03-TR	1 / 1	21
Cadmium	0.0568		0.0568		SD-AO-03-TR	1 / 1	0.057
Copper	3.29435		3.29435		SD-AO-03-TR	1 / 1	3.3
Lead	1.679		1.679		SD-AO-03-TR	1 / 1	1.7
Mercury	0.00055	J	0.00055	J	SD-AO-03-TR	1 / 1	0.00055
Nickel	0.28545		0.28545		SD-AO-03-TR	1 / 1	0.29
Zinc	16.04185	J	16.04185	J	SD-AO-03-TR	1 / 1	16
SEM/AVS	179.35		179.35		SD-AO-03-TR	1 / 1	179
Total Organic Carbon	210000		210000		SD-AO-03-TR	1 / 1	210000

J = Estimated Value

TABLE D.4-16
SUMMARY OF TRIAD CHEMISTRY DATA - SD-SA-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	8.0
1,1,2,2-Tetrachloroethane						0 / 1	8.0
1,1,2-Trichloro-1,2,2-trifluoroethane						0 / 1	8.0
1,1,2-Trichloroethane						0 / 1	8.0
1,1-Dichloroethane						0 / 1	8.0
1,1-Dichloroethene						0 / 1	8.0
1,2,4-Trichlorobenzene						0 / 1	8.0
1,2-Dibromo-3-chloropropane						0 / 1	8.0
1,2-Dibromoethane						0 / 1	8.0
1,2-Dichlorobenzene						0 / 1	8.0
1,2-Dichloroethane						0 / 1	8.0
1,2-Dichloropropane						0 / 1	8.0
1,3-Dichlorobenzene						0 / 1	8.0
1,4-Dichlorobenzene						0 / 1	8.0
2-Butanone						0 / 1	8.0
2-Hexanone						0 / 1	8.0
4-Methyl-2-Pentanone						0 / 1	8.0
Acetone						0 / 1	90
Benzene						0 / 1	8.0
Bromodichloromethane						0 / 1	8.0
Bromoform						0 / 1	8.0
Bromomethane						0 / 1	8.0
Carbon Disulfide						0 / 1	8.0
Carbon Tetrachloride						0 / 1	8.0
Chlorobenzene						0 / 1	8.0
Chloroethane						0 / 1	8.0
Chloroform						0 / 1	8.0
Chloromethane						0 / 1	8.0
cis-1,2-Dichloroethene						0 / 1	8.0
cis-1,3-Dichloropropene						0 / 1	8.0
Cyclohexane						0 / 1	8.0
Dibromochloromethane						0 / 1	8.0
Dichlorodifluoromethane						0 / 1	8.0
Ethylbenzene						0 / 1	8.0
Isopropylbenzene						0 / 1	8.0
m&p-Xylene						0 / 1	8.0
Methyl Acetate	24		24		SD-SA-01-TR	1 / 1	24
Methyl tert-Butyl Ether						0 / 1	8.0
Methylcyclohexane						0 / 1	8.0
Methylene Chloride						0 / 1	25
o-Xylene						0 / 1	8.0
Styrene						0 / 1	8.0
Tetrachloroethene						0 / 1	8.0
Toluene	13	J	13	J	SD-SA-01-TR	1 / 1	13
trans-1,2-Dichloroethene						0 / 1	8.0
trans-1,3-Dichloropropene						0 / 1	8.0
Trichloroethene						0 / 1	8.0
Trichlorofluoromethane						0 / 1	8.0
Vinyl Chloride						0 / 1	8.0
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	115
2,2'-oxybis(1-Chloropropane)						0 / 1	115
2,4,5-Trichlorophenol						0 / 1	285
2,4,6-Trichlorophenol						0 / 1	115
2,4-Dichlorophenol						0 / 1	115
2,4-Dimethylphenol						0 / 1	115
2,4-Dinitrophenol						0 / 1	285
2,4-Dinitrotoluene						0 / 1	115
2,6-Dinitrotoluene						0 / 1	115
2-Chloronaphthalene						0 / 1	115

TABLE D.4-16
SUMMARY OF TRIAD CHEMISTRY DATA - SD-SA-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
2-Chlorophenol						0 / 1	115
2-Methylnaphthalene						0 / 1	115
2-Methylphenol						0 / 1	115
2-Nitroaniline						0 / 1	285
2-Nitrophenol						0 / 1	115
3,3'-Dichlorobenzidine						0 / 1	115
3+4-Methylphenols						0 / 1	115
3-Nitroaniline						0 / 1	115
4,6-Dinitro-2-methylphenol						0 / 1	285
4-Bromophenyl-phenylether						0 / 1	115
4-Chloro-3-methylphenol						0 / 1	115
4-Chloroaniline						0 / 1	115
4-Chlorophenyl-phenylether						0 / 1	115
4-Nitroaniline						0 / 1	285
4-Nitrophenol						0 / 1	285
Acenaphthene						0 / 1	115
Acenaphthylene						0 / 1	115
Acetophenone						0 / 1	115
Anthracene						0 / 1	115
Atrazine						0 / 1	115
Benzaldehyde						0 / 1	115
Benzo(a)anthracene	110	J	110	J	SD-SA-01-TR	1 / 1	110
Benzo(a)pyrene	130	J	130	J	SD-SA-01-TR	1 / 1	130
Benzo(b)fluoranthene	180	J	180	J	SD-SA-01-TR	1 / 1	180
Benzo(g,h,i)perylene						0 / 1	115
Benzo(k)fluoranthene						0 / 1	115
Bis(2-Chloroethoxy)methane						0 / 1	115
Bis(2-Chloroethyl)ether						0 / 1	115
bis(2-Ethylhexyl)phthalate						0 / 1	115
Butylbenzylphthalate						0 / 1	115
Caprolactam						0 / 1	115
Carbazole						0 / 1	115
Chrysene	140	J	140	J	SD-SA-01-TR	1 / 1	140
Dibenzo(a,h)anthracene						0 / 1	115
Dibenzofuran						0 / 1	115
Diethylphthalate						0 / 1	115
Dimethylphthalate						0 / 1	115
Di-n-Butylphthalate						0 / 1	115
Di-n-octylphthalate						0 / 1	115
Fluoranthene	210	J	210	J	SD-SA-01-TR	1 / 1	210
Fluorene						0 / 1	115
Hexachlorobenzene						0 / 1	115
Hexachlorobutadiene						0 / 1	115
Hexachlorocyclopentadiene						0 / 1	115
Hexachloroethane						0 / 1	115
Indeno(1,2,3-cd)pyrene						0 / 1	115
Isophorone						0 / 1	115
Naphthalene						0 / 1	115
Nitrobenzene						0 / 1	115
N-Nitroso-di-n-propylamine						0 / 1	115
N-Nitroso-diphenylamine						0 / 1	115
Pentachlorophenol						0 / 1	285
Phenanthrene	170	J	170	J	SD-SA-01-TR	1 / 1	170
Phenol						0 / 1	115
Pyrene	280		280		SD-SA-01-TR	1 / 1	280
PCBs/Pesticides - ug/Kg							
4,4'-DDD	4.5		4.5		SD-SA-01-TR	1 / 1	4.5
4,4'-DDE	3.9		3.9		SD-SA-01-TR	1 / 1	3.9
4,4'-DDT	2.2		2.2		SD-SA-01-TR	1 / 1	2.2
Aldrin						0 / 1	0.47
alpha-BHC						0 / 1	0.47

TABLE D.4-16
SUMMARY OF TRIAD CHEMISTRY DATA - SD-SA-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
alpha-Chlordane						0 / 1	0.47
Aroclor-1016						0 / 1	9.5
Aroclor-1221						0 / 1	19
Aroclor-1232						0 / 1	9.5
Aroclor-1242						0 / 1	9.5
Aroclor-1248						0 / 1	9.5
Aroclor-1254						0 / 1	9.5
Aroclor-1260						0 / 1	9.5
beta-BHC						0 / 1	0.47
delta-BHC						0 / 1	0.47
Dieldrin						0 / 1	1.0
Endosulfan I						0 / 1	0.47
Endosulfan II						0 / 1	1.0
Endosulfan Sulfate						0 / 1	1.0
Endrin						0 / 1	1.0
Endrin Aldehyde						0 / 1	1.0
Endrin Ketone						0 / 1	1.0
gamma-BHC						0 / 1	0.47
gamma-Chlordane						0 / 1	0.47
Heptachlor						0 / 1	0.47
Heptachlor Epoxide						0 / 1	0.47
Methoxychlor						0 / 1	4.7
Toxaphene						0 / 1	47
Metals - mg/Kg							
Aluminum	14300		14300		SD-SA-01-TR	1 / 1	14300
Antimony	1.1	J	1.1	J	SD-SA-01-TR	1 / 1	1.1
Arsenic	27.2		27.2		SD-SA-01-TR	1 / 1	27
Barium	87.5		87.5		SD-SA-01-TR	1 / 1	88
Beryllium	1	J	1	J	SD-SA-01-TR	1 / 1	1.0
Cadmium	1.5		1.5		SD-SA-01-TR	1 / 1	1.5
Calcium	5500		5500		SD-SA-01-TR	1 / 1	5500
Chromium	42.3		42.3		SD-SA-01-TR	1 / 1	42
Cobalt	13.2	J	13.2	J	SD-SA-01-TR	1 / 1	13
Copper	57.6		57.6		SD-SA-01-TR	1 / 1	58
Iron	24200		24200		SD-SA-01-TR	1 / 1	24200
Lead	456		456		SD-SA-01-TR	1 / 1	456
Magnesium	4090		4090		SD-SA-01-TR	1 / 1	4090
Manganese	263		263		SD-SA-01-TR	1 / 1	263
Mercury	0.2	J	0.2	J	SD-SA-01-TR	1 / 1	0.20
Nickel	23.2		23.2		SD-SA-01-TR	1 / 1	23
Potassium	819	J	819	J	SD-SA-01-TR	1 / 1	819
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium	262		262		SD-SA-01-TR	1 / 1	262
Thallium						0 / 1	0.55
Vanadium	52.7		52.7		SD-SA-01-TR	1 / 1	53
Zinc	246	J	246	J	SD-SA-01-TR	1 / 1	246
AVS/SEM - umol/g							
Acid Volatile Sulfide	0.16	J	0.16	J	SD-SA-01-TR	1 / 1	0.16
Simultaneously Extracted Metal	3.8836		3.8836		SD-SA-01-TR	1 / 1	3.9
Cadmium	0.0091		0.0091		SD-SA-01-TR	1 / 1	0.0091
Copper	0.4567		0.4567		SD-SA-01-TR	1 / 1	0.46
Lead	1.2745		1.2745		SD-SA-01-TR	1 / 1	1.3
Mercury	0.0003	J	0.0003	J	SD-SA-01-TR	1 / 1	0.00030
Nickel	0.1736		0.1736		SD-SA-01-TR	1 / 1	0.17
Zinc	1.9694	J	1.9694	J	SD-SA-01-TR	1 / 1	2.0
SEM/AVS	24.3		24.3		SD-SA-01-TR	1 / 1	24
Total Organic Carbon	170000		170000		SD-SA-01-TR	1 / 1	170000

J = Estimated Value

TABLE D.4-17
SUMMARY OF TRIAD CHEMISTRY DATA - SD-MC-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	28
1,1,2-Trichloro-1,2,2-trifluoroethane						0 / 1	28
Acetone						0 / 1	110
Methyl Acetate	210		210		SD-MC-01-TR	1 / 1	210
Methylene Chloride						0 / 1	32
Toluene	7.9	J	7.9	J	SD-MC-01-TR	1 / 1	7.9
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	190
2,2'-oxybis(1-Chloropropane)						0 / 1	190
2,4,5-Trichlorophenol						0 / 1	475
2,4,6-Trichlorophenol						0 / 1	190
2,4-Dichlorophenol						0 / 1	190
2,4-Dimethylphenol						0 / 1	190
2,4-Dinitrophenol						0 / 1	475
2,4-Dinitrotoluene						0 / 1	190
2,6-Dinitrotoluene						0 / 1	190
2-Chloronaphthalene						0 / 1	190
2-Chlorophenol						0 / 1	190
2-Methylnaphthalene						0 / 1	190
2-Methylphenol						0 / 1	190
2-Nitroaniline						0 / 1	475
2-Nitrophenol						0 / 1	190
3,3'-Dichlorobenzidine						0 / 1	190
3+4-Methylphenols						0 / 1	190
3-Nitroaniline						0 / 1	190
4,6-Dinitro-2-methylphenol						0 / 1	475
4-Bromophenyl-phenylether						0 / 1	190
4-Chloro-3-methylphenol						0 / 1	190
4-Chloroaniline						0 / 1	190
4-Chlorophenyl-phenylether						0 / 1	190
4-Nitroaniline						0 / 1	475
4-Nitrophenol						0 / 1	475
Acenaphthene						0 / 1	190
Acenaphthylene						0 / 1	190
Acetophenone						0 / 1	190
Anthracene						0 / 1	190
Atrazine						0 / 1	190
Benzaldehyde						0 / 1	190
Benzo(a)anthracene	210	J	210	J	SD-MC-01-TR	1 / 1	210
Benzo(a)pyrene	250	J	250	J	SD-MC-01-TR	1 / 1	250
Benzo(b)fluoranthene	310	J	310	J	SD-MC-01-TR	1 / 1	310
Benzo(g,h,i)perylene						0 / 1	190
Benzo(k)fluoranthene						0 / 1	190
Bis(2-Chloroethoxy)methane						0 / 1	190
Bis(2-Chloroethyl)ether						0 / 1	190
bis(2-Ethylhexyl)phthalate						0 / 1	190
Butylbenzylphthalate						0 / 1	190
Caprolactam						0 / 1	190
Carbazole						0 / 1	190
Chrysene	250	J	250	J	SD-MC-01-TR	1 / 1	250
Dibenzo(a,h)anthracene						0 / 1	190
Dibenzofuran						0 / 1	190
Diethylphthalate						0 / 1	190
Dimethylphthalate						0 / 1	190
Di-n-Butylphthalate						0 / 1	190
Di-n-octylphthalate						0 / 1	190
Fluoranthene	400		400		SD-MC-01-TR	1 / 1	400

TABLE D.4-17
SUMMARY OF TRIAD CHEMISTRY DATA - SD-MC-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Fluorene						0 / 1	190
Hexachlorobenzene						0 / 1	190
Hexachlorobutadiene						0 / 1	190
Hexachlorocyclopentadiene						0 / 1	190
Hexachloroethane						0 / 1	190
Indeno(1,2,3-cd)pyrene						0 / 1	190
Isophorone						0 / 1	190
Naphthalene						0 / 1	190
Nitrobenzene						0 / 1	190
N-Nitroso-di-n-propylamine						0 / 1	190
N-Nitroso-diphenylamine						0 / 1	190
Pentachlorophenol						0 / 1	475
Phenanthrene	220	J	220	J	SD-MC-01-TR	1 / 1	220
Phenol						0 / 1	190
Pyrene	440		440		SD-MC-01-TR	1 / 1	440
PCBs/Pesticides - ug/Kg							
4,4'-DDD	5.7		5.7		SD-MC-01-TR	1 / 1	5.7
4,4'-DDE	11		11		SD-MC-01-TR	1 / 1	11
4,4'-DDT	3	J	3	J	SD-MC-01-TR	1 / 1	3.0
Aldrin						0 / 1	0.80
alpha-BHC						0 / 1	0.80
alpha-Chlordane						0 / 1	0.80
Aroclor-1016						0 / 1	16
Aroclor-1221						0 / 1	32
Aroclor-1232						0 / 1	16
Aroclor-1242						0 / 1	16
Aroclor-1248						0 / 1	16
Aroclor-1254						0 / 1	16
Aroclor-1260						0 / 1	16
beta-BHC						0 / 1	0.80
delta-BHC						0 / 1	0.80
Dieldrin						0 / 1	1.6
Endosulfan I						0 / 1	0.80
Endosulfan II						0 / 1	1.6
Endosulfan Sulfate						0 / 1	1.6
Endrin						0 / 1	1.6
Endrin Aldehyde						0 / 1	1.6
Endrin Ketone						0 / 1	1.6
gamma-BHC						0 / 1	0.80
gamma-Chlordane						0 / 1	0.80
Heptachlor						0 / 1	0.80
Heptachlor Epoxide						0 / 1	0.80
Methoxychlor						0 / 1	8.0
Toxaphene						0 / 1	80
Metals - mg/Kg							
Aluminum	8560		8560		SD-MC-01-TR	1 / 1	8560
Antimony	1.4	J	1.4	J	SD-MC-01-TR	1 / 1	1.4
Arsenic	27.8		27.8		SD-MC-01-TR	1 / 1	28
Barium	95.7		95.7		SD-MC-01-TR	1 / 1	96
Beryllium	0.71	J	0.71	J	SD-MC-01-TR	1 / 1	0.71
Cadmium	2.2		2.2		SD-MC-01-TR	1 / 1	2.2
Calcium	10900		10900		SD-MC-01-TR	1 / 1	10900
Chromium	28.4		28.4		SD-MC-01-TR	1 / 1	28
Cobalt	8.3	J	8.3	J	SD-MC-01-TR	1 / 1	8.3
Copper	70.8		70.8		SD-MC-01-TR	1 / 1	71
Iron	19400		19400		SD-MC-01-TR	1 / 1	19400
Lead	252		252		SD-MC-01-TR	1 / 1	252
Magnesium	2570		2570		SD-MC-01-TR	1 / 1	2570
Manganese	225		225		SD-MC-01-TR	1 / 1	225
Mercury	0.03	J	0.03	J	SD-MC-01-TR	1 / 1	0.030

TABLE D.4-17
SUMMARY OF TRIAD CHEMISTRY DATA - SD-MC-01-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Nickel	16.6		16.6		SD-MC-01-TR	1 / 1	17
Potassium	547	J	547	J	SD-MC-01-TR	1 / 1	547
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium	334		334		SD-MC-01-TR	1 / 1	334
Thallium						0 / 1	0.55
Vanadium	38.2		38.2		SD-MC-01-TR	1 / 1	38
Zinc	282	J	282	J	SD-MC-01-TR	1 / 1	282
AVS/SEM - umol/g							
Acid Volatile Sulfide	0.8	J	0.8	J	SD-MC-01-TR	1 / 1	0.80
Simultaneously Extracted Metal	3.459		3.459		SD-MC-01-TR	1 / 1	3.5
Cadmium	0.01		0.01		SD-MC-01-TR	1 / 1	0.010
Copper	0.5085		0.5085		SD-MC-01-TR	1 / 1	0.51
Lead	0.6017		0.6017		SD-MC-01-TR	1 / 1	0.60
Mercury	0.0002	J	0.0002	J	SD-MC-01-TR	1 / 1	0.00020
Nickel	0.1389		0.1389		SD-MC-01-TR	1 / 1	0.14
Zinc	2.1997	J	2.1997	J	SD-MC-01-TR	1 / 1	2.2
SEM/AVS	4.3		4.3		SD-MC-01-TR	1 / 1	4.3
Total Organic Carbon	270000		270000		SD-MC-01-TR	1 / 1	270000

J = Estimated Value

TABLE D.4-18
SUMMARY OF TRIAD CHEMISTRY DATA - SD-UF-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane	79.5	J	79.5	J	SD-UF-02-TR	1 / 1	80
1,1,2-Trichloro-1,2,2-trifluoroethane	37.5	J	37.5	J	SD-UF-02-TR	1 / 1	38
Acetone	565	J	565	J	SD-UF-02-TR	1 / 1	565
Methyl Acetate	150	J	150	J	SD-UF-02-TR	1 / 1	150
Methylene Chloride						0 / 1	37
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	255
2,2'-oxybis(1-Chloropropane)						0 / 1	255
2,4,5-Trichlorophenol						0 / 1	650
2,4,6-Trichlorophenol						0 / 1	255
2,4-Dichlorophenol						0 / 1	255
2,4-Dimethylphenol						0 / 1	255
2,4-Dinitrophenol						0 / 1	650
2,4-Dinitrotoluene						0 / 1	255
2,6-Dinitrotoluene						0 / 1	255
2-Chloronaphthalene						0 / 1	255
2-Chlorophenol						0 / 1	255
2-Methylnaphthalene						0 / 1	255
2-Methylphenol						0 / 1	255
2-Nitroaniline						0 / 1	650
2-Nitrophenol						0 / 1	255
3,3'-Dichlorobenzidine						0 / 1	255
3+4-Methylphenols						0 / 1	255
3-Nitroaniline						0 / 1	255
4,6-Dinitro-2-methylphenol						0 / 1	650
4-Bromophenyl-phenylether						0 / 1	255
4-Chloro-3-methylphenol						0 / 1	255
4-Chloroaniline						0 / 1	255
4-Chlorophenyl-phenylether						0 / 1	255
4-Nitroaniline						0 / 1	650
4-Nitrophenol						0 / 1	650
Acenaphthene						0 / 1	255
Acenaphthylene						0 / 1	255
Acetophenone						0 / 1	255
Anthracene						0 / 1	255
Atrazine						0 / 1	255
Benzaldehyde						0 / 1	255
Benzo(a)anthracene						0 / 1	255
Benzo(a)pyrene						0 / 1	255
Benzo(b)fluoranthene	290	J	290	J	SD-UF-02-TR	1 / 1	290
Benzo(g,h,i)perylene						0 / 1	255
Benzo(k)fluoranthene						0 / 1	255
Bis(2-Chloroethoxy)methane						0 / 1	255
Bis(2-Chloroethyl)ether						0 / 1	255
bis(2-Ethylhexyl)phthalate						0 / 1	255
Butylbenzylphthalate						0 / 1	255
Caprolactam						0 / 1	255
Carbazole						0 / 1	255
Chrysene						0 / 1	255
Dibenzo(a,h)anthracene						0 / 1	255
Dibenzofuran						0 / 1	255
Diethylphthalate						0 / 1	255
Dimethylphthalate						0 / 1	255
Di-n-Butylphthalate						0 / 1	255
Di-n-octylphthalate						0 / 1	255
Fluoranthene	270	J	270	J	SD-UF-02-TR	1 / 1	270
Fluorene						0 / 1	255
Hexachlorobenzene						0 / 1	255
Hexachlorobutadiene						0 / 1	255
Hexachlorocyclopentadiene						0 / 1	255
Hexachloroethane						0 / 1	255

TABLE D.4-18
SUMMARY OF TRIAD CHEMISTRY DATA - SD-UF-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Indeno(1,2,3-cd)pyrene						0 / 1	255
Isophorone						0 / 1	255
Naphthalene						0 / 1	255
Nitrobenzene						0 / 1	255
N-Nitroso-di-n-propylamine						0 / 1	255
N-Nitroso-diphenylamine						0 / 1	255
Pentachlorophenol						0 / 1	650
Phenanthrene						0 / 1	255
Phenol						0 / 1	255
Pyrene	270	J	270	J	SD-UF-02-TR	1 / 1	270
PCBs/Pesticides - ug/Kg							
4,4'-DDD						0 / 1	2.1
4,4'-DDE	3.05	J	3.05	J	SD-UF-02-TR	1 / 1	3.1
4,4'-DDT						0 / 1	2.1
Aldrin						0 / 1	1.1
alpha-BHC						0 / 1	1.1
alpha-Chlordane						0 / 1	1.1
Aroclor-1016						0 / 1	21
Aroclor-1221						0 / 1	42
Aroclor-1232						0 / 1	21
Aroclor-1242						0 / 1	21
Aroclor-1248						0 / 1	21
Aroclor-1254						0 / 1	21
Aroclor-1260						0 / 1	21
beta-BHC						0 / 1	1.1
delta-BHC						0 / 1	1.1
Dieldrin						0 / 1	2.1
Endosulfan I						0 / 1	1.1
Endosulfan II						0 / 1	2.1
Endosulfan Sulfate						0 / 1	2.1
Endrin						0 / 1	2.1
Endrin Aldehyde						0 / 1	2.1
Endrin Ketone						0 / 1	2.1
gamma-BHC						0 / 1	1.1
gamma-Chlordane						0 / 1	1.1
Heptachlor						0 / 1	1.1
Heptachlor Epoxide						0 / 1	1.1
Methoxychlor						0 / 1	11
Toxaphene						0 / 1	105
Metals - mg/Kg							
Aluminum	23350		23350		SD-UF-02-TR	1 / 1	23350
Antimony	8.15		8.15		SD-UF-02-TR	1 / 1	8.2
Arsenic	177.5		177.5		SD-UF-02-TR	1 / 1	178
Barium	174		174		SD-UF-02-TR	1 / 1	174
Beryllium	1.6	J	1.6	J	SD-UF-02-TR	1 / 1	1.6
Cadmium	19.15		19.15		SD-UF-02-TR	1 / 1	19
Calcium	8300		8300		SD-UF-02-TR	1 / 1	8300
Chromium	805.5		805.5		SD-UF-02-TR	1 / 1	806
Cobalt	32.15	J	32.15	J	SD-UF-02-TR	1 / 1	32
Copper	681.5		681.5		SD-UF-02-TR	1 / 1	682
Iron	47100		47100		SD-UF-02-TR	1 / 1	47100
Lead	1070		1070		SD-UF-02-TR	1 / 1	1070
Magnesium	6045		6045		SD-UF-02-TR	1 / 1	6045
Manganese	568.5		568.5		SD-UF-02-TR	1 / 1	569
Mercury	0.3	J	0.3	J	SD-UF-02-TR	1 / 1	0.30
Nickel	46.95		46.95		SD-UF-02-TR	1 / 1	47
Potassium	1975	J	1975	J	SD-UF-02-TR	1 / 1	1975
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium	1165		1165		SD-UF-02-TR	1 / 1	1165

TABLE D.4-18
SUMMARY OF TRIAD CHEMISTRY DATA - SD-UF-02-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Thallium						0 / 1	0.55
Vanadium	95.3		95.3		SD-UF-02-TR	1 / 1	95
Zinc	3035	J	3035	J	SD-UF-02-TR	1 / 1	3035
AVS/SEM - umol/g							
Acid Volatile Sulfide	15.71	J	15.71	J	SD-UF-02-TR	1 / 1	16
Simultaneously Extracted Metal	35.80895		35.80895		SD-UF-02-TR	1 / 1	36
Cadmium	0.1023		0.1023		SD-UF-02-TR	1 / 1	0.10
Copper	4.97725		4.97725		SD-UF-02-TR	1 / 1	5.0
Lead	3.17175		3.17175		SD-UF-02-TR	1 / 1	3.2
Mercury	0.0003	J	0.0003	J	SD-UF-02-TR	1 / 1	0.00030
Nickel	0.33375		0.33375		SD-UF-02-TR	1 / 1	0.33
Zinc	27.2236	J	27.2236	J	SD-UF-02-TR	1 / 1	27
SEM/AVS	2.45		2.45		SD-UF-02-TR	1 / 1	2.5
Total Organic Carbon	360000		360000		SD-UF-02-TR	1 / 1	360000

J = Estimated Value

TABLE D.4-19
SUMMARY OF TRIAD CHEMISTRY DATA - SD-WH-07-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	70
Acetone	2700	J	2700	J	SD-WH-07-TR	1 / 1	2700
Methylene Chloride						0 / 1	70
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	300
2,2'-oxybis(1-Chloropropane)						0 / 1	300
2,4,5-Trichlorophenol						0 / 1	750
2,4,6-Trichlorophenol						0 / 1	300
2,4-Dichlorophenol						0 / 1	300
2,4-Dimethylphenol						0 / 1	300
2,4-Dinitrophenol						0 / 1	750
2,4-Dinitrotoluene						0 / 1	300
2,6-Dinitrotoluene						0 / 1	300
2-Chloronaphthalene						0 / 1	300
2-Chlorophenol						0 / 1	300
2-Methylnaphthalene						0 / 1	300
2-Methylphenol						0 / 1	300
2-Nitroaniline						0 / 1	750
2-Nitrophenol						0 / 1	300
3,3'-Dichlorobenzidine						0 / 1	300
3-Nitroaniline						0 / 1	300
4,6-Dinitro-2-methylphenol						0 / 1	750
4-Bromophenyl-phenylether						0 / 1	300
4-Chloro-3-methylphenol						0 / 1	300
4-Chloroaniline						0 / 1	300
4-Chlorophenyl-phenylether						0 / 1	300
4-Nitroaniline						0 / 1	750
4-Nitrophenol						0 / 1	750
Acenaphthene						0 / 1	300
Acenaphthylene						0 / 1	300
Acetophenone						0 / 1	300
Anthracene						0 / 1	300
Atrazine						0 / 1	300
Benzaldehyde						0 / 1	300
Benzo(a)anthracene						0 / 1	300
Benzo(b)fluoranthene						0 / 1	300
Benzo(g,h,i)perylene						0 / 1	300
Benzo(k)fluoranthene	660	J	660	J	SD-WH-07-TR	1 / 1	660
Bis(2-Chloroethoxy)methane						0 / 1	300
Bis(2-Chloroethyl)ether						0 / 1	300
bis(2-Ethylhexyl)phthalate						0 / 1	300
Butylbenzylphthalate						0 / 1	300
Caprolactam						0 / 1	300
Carbazole						0 / 1	300
Chrysene						0 / 1	300
Dibenzo(a,h)anthracene						0 / 1	300
Dibenzofuran						0 / 1	300
Diethylphthalate						0 / 1	300
Dimethylphthalate						0 / 1	300
Di-n-Butylphthalate						0 / 1	300
Di-n-octylphthalate						0 / 1	300
Fluoranthene						0 / 1	300
Fluorene						0 / 1	300
Hexachlorobenzene						0 / 1	300
Hexachlorobutadiene						0 / 1	300
Hexachlorocyclopentadiene						0 / 1	300
Hexachloroethane						0 / 1	300

TABLE D.4-19
SUMMARY OF TRIAD CHEMISTRY DATA - SD-WH-07-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Indeno(1,2,3-cd)pyrene						0 / 1	300
Isophorone						0 / 1	300
Naphthalene						0 / 1	300
Nitrobenzene						0 / 1	300
N-Nitroso-di-n-propylamine						0 / 1	300
N-Nitroso-diphenylamine						0 / 1	300
Pentachlorophenol						0 / 1	750
Phenanthrene						0 / 1	300
Phenol						0 / 1	300
Pyrene						0 / 1	300
PCBs/Pesticides - ug/Kg							
4,4'-DDD						0 / 1	2.5
4,4'-DDE						0 / 1	2.5
4,4'-DDT						0 / 1	2.5
Aldrin						0 / 1	1.3
alpha-BHC						0 / 1	1.3
alpha-Chlordane						0 / 1	1.3
Aroclor-1016						0 / 1	25
Aroclor-1221						0 / 1	50
Aroclor-1232						0 / 1	25
Aroclor-1242						0 / 1	25
Aroclor-1248						0 / 1	25
Aroclor-1254						0 / 1	25
Aroclor-1260						0 / 1	25
beta-BHC						0 / 1	1.3
delta-BHC						0 / 1	1.3
Dieldrin						0 / 1	2.5
Endosulfan I						0 / 1	1.3
Endosulfan II						0 / 1	2.5
Endosulfan Sulfate						0 / 1	2.5
Endrin						0 / 1	2.5
Endrin Aldehyde						0 / 1	2.5
Endrin Ketone						0 / 1	2.5
gamma-BHC						0 / 1	1.3
gamma-Chlordane						0 / 1	1.3
Heptachlor						0 / 1	1.3
Heptachlor Epoxide						0 / 1	1.3
Methoxychlor						0 / 1	13
Toxaphene						0 / 1	125
Metals - mg/Kg							
Aluminum	6705		6705		SD-WH-07-TR	1 / 1	6705
Antimony	24.35		24.35		SD-WH-07-TR	1 / 1	24
Arsenic	24.2		24.2		SD-WH-07-TR	1 / 1	24
Barium	75.85		75.85		SD-WH-07-TR	1 / 1	76
Beryllium	0.685	J	0.685	J	SD-WH-07-TR	1 / 1	0.69
Cadmium	3		3		SD-WH-07-TR	1 / 1	3.0
Calcium	14350		14350		SD-WH-07-TR	1 / 1	14350
Chromium	45.85		45.85		SD-WH-07-TR	1 / 1	46
Cobalt	8.15		8.15		SD-WH-07-TR	1 / 1	8.2
Copper	66.55		66.55		SD-WH-07-TR	1 / 1	67
Iron	12400		12400		SD-WH-07-TR	1 / 1	12400
Lead	1900		1900		SD-WH-07-TR	1 / 1	1900
Magnesium	1380		1380		SD-WH-07-TR	1 / 1	1380
Manganese	101.2		101.2		SD-WH-07-TR	1 / 1	101
Mercury						0 / 1	0.010
Nickel	14.5		14.5		SD-WH-07-TR	1 / 1	15
Potassium	227	J	227	J	SD-WH-07-TR	1 / 1	227
Selenium	1.55	J	1.55	J	SD-WH-07-TR	1 / 1	1.6
Silver						0 / 1	0.50
Sodium	939.5		939.5		SD-WH-07-TR	1 / 1	940

TABLE D.4-19
SUMMARY OF TRIAD CHEMISTRY DATA - SD-WH-07-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Thallium						0 / 1	0.55
Vanadium	57.1		57.1		SD-WH-07-TR	1 / 1	57
Zinc	543	J	543	J	SD-WH-07-TR	1 / 1	543
AVS/SEM - umol/g							
Acid Volatile Sulfide	4.955		4.955		SD-WH-07-TR	1 / 1	5.0
Simultaneously Extracted Metal	10.4925		10.4925		SD-WH-07-TR	1 / 1	10
Cadmium	0.0319		0.0319		SD-WH-07-TR	1 / 1	0.032
Copper	0.9057		0.9057		SD-WH-07-TR	1 / 1	0.91
Lead	6.5611		6.5611		SD-WH-07-TR	1 / 1	6.6
Mercury	0.00395	J	0.00395	J	SD-WH-07-TR	1 / 1	0.0040
Nickel	0.3042		0.3042		SD-WH-07-TR	1 / 1	0.30
Zinc	9.2467		9.2467		SD-WH-07-TR	1 / 1	9.2
SEM/AVS	3.31		3.31		SD-WH-07-TR	1 / 1	3.3
Total Organic Carbon	815000	J	815000	J	SD-WH-07-TR	1 / 1	815000

J = Estimated Value

TABLE D.4-20
SUMMARY OF TRIAD CHEMISTRY DATA - SD-WW-06-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
VOCs - ug/Kg							
1,1,1-Trichloroethane						0 / 1	55
Acetone	410	J	410	J	SD-WW-06-TR	1 / 1	410
Methylene Chloride						0 / 1	30
SVOCs - ug/Kg							
1,1'-Biphenyl						0 / 1	305
2,2'-oxybis(1-Chloropropane)						0 / 1	305
2,4,5-Trichlorophenol						0 / 1	750
2,4,6-Trichlorophenol						0 / 1	305
2,4-Dichlorophenol						0 / 1	305
2,4-Dimethylphenol						0 / 1	305
2,4-Dinitrophenol						0 / 1	750
2,4-Dinitrotoluene						0 / 1	305
2,6-Dinitrotoluene						0 / 1	305
2-Chloronaphthalene						0 / 1	305
2-Chlorophenol						0 / 1	305
2-Methylnaphthalene						0 / 1	305
2-Methylphenol						0 / 1	305
2-Nitroaniline						0 / 1	750
2-Nitrophenol						0 / 1	305
3,3'-Dichlorobenzidine						0 / 1	305
3-Nitroaniline						0 / 1	305
4,6-Dinitro-2-methylphenol						0 / 1	750
4-Bromophenyl-phenylether						0 / 1	305
4-Chloro-3-methylphenol						0 / 1	305
4-Chloroaniline						0 / 1	305
4-Chlorophenyl-phenylether						0 / 1	305
4-Nitroaniline						0 / 1	750
4-Nitrophenol						0 / 1	750
Acenaphthene						0 / 1	305
Acenaphthylene						0 / 1	305
Acetophenone						0 / 1	305
Anthracene						0 / 1	305
Atrazine						0 / 1	305
Benzaldehyde						0 / 1	305
Benzo(a)anthracene						0 / 1	305
Benzo(b)fluoranthene	330	J	330	J	SD-WW-06-TR	1 / 1	330
Benzo(g,h,i)perylene						0 / 1	305
Benzo(k)fluoranthene	610	J	610	J	SD-WW-06-TR	1 / 1	610
Bis(2-Chloroethoxy)methane						0 / 1	305
Bis(2-Chloroethyl)ether						0 / 1	305
bis(2-Ethylhexyl)phthalate						0 / 1	305
Butylbenzylphthalate						0 / 1	305
Caprolactam						0 / 1	305
Carbazole						0 / 1	305
Chrysene	300	J	300	J	SD-WW-06-TR	1 / 1	300
Dibenzo(a,h)anthracene						0 / 1	305
Dibenzofuran						0 / 1	305
Diethylphthalate						0 / 1	305
Dimethylphthalate						0 / 1	305
Di-n-Butylphthalate						0 / 1	305
Di-n-octylphthalate						0 / 1	305
Fluoranthene	500	J	500	J	SD-WW-06-TR	1 / 1	500
Fluorene						0 / 1	305
Hexachlorobenzene						0 / 1	305
Hexachlorobutadiene						0 / 1	305
Hexachlorocyclopentadiene						0 / 1	305
Hexachloroethane						0 / 1	305

TABLE D.4-20
SUMMARY OF TRIAD CHEMISTRY DATA - SD-WW-06-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Indeno(1,2,3-cd)pyrene						0 / 1	305
Isophorone						0 / 1	305
Naphthalene						0 / 1	305
Nitrobenzene						0 / 1	305
N-Nitroso-di-n-propylamine						0 / 1	305
N-Nitroso-diphenylamine						0 / 1	305
Pentachlorophenol						0 / 1	750
Phenanthrene						0 / 1	305
Phenol						0 / 1	305
Pyrene	480	J	480	J	SD-WW-06-TR	1 / 1	480
PCBs/Pesticides - ug/Kg							
4,4'-DDD						0 / 1	2.5
4,4'-DDE	2.1	J	2.1	J	SD-WW-06-TR	1 / 1	2.1
4,4'-DDT						0 / 1	2.5
Aldrin						0 / 1	1.3
alpha-BHC						0 / 1	1.3
alpha-Chlordane						0 / 1	1.3
Aroclor-1016						0 / 1	25
Aroclor-1221						0 / 1	50
Aroclor-1232						0 / 1	25
Aroclor-1242						0 / 1	25
Aroclor-1248						0 / 1	25
Aroclor-1254						0 / 1	25
Aroclor-1260						0 / 1	25
beta-BHC						0 / 1	1.3
delta-BHC						0 / 1	1.3
Dieldrin						0 / 1	2.5
Endosulfan I						0 / 1	1.3
Endosulfan II						0 / 1	2.5
Endosulfan Sulfate						0 / 1	2.5
Endrin						0 / 1	2.5
Endrin Aldehyde						0 / 1	2.5
Endrin Ketone						0 / 1	2.5
gamma-BHC						0 / 1	1.3
gamma-Chlordane						0 / 1	1.3
Heptachlor						0 / 1	1.3
Heptachlor Epoxide						0 / 1	1.3
Methoxychlor						0 / 1	13
Toxaphene						0 / 1	125
Metals - mg/Kg							
Aluminum	8280		8280		SD-WW-06-TR	1 / 1	8280
Antimony	57.3	J	57.3	J	SD-WW-06-TR	1 / 1	57
Arsenic	4.4	J	4.4	J	SD-WW-06-TR	1 / 1	4.4
Barium	125		125		SD-WW-06-TR	1 / 1	125
Beryllium	0.77	J	0.77	J	SD-WW-06-TR	1 / 1	0.77
Cadmium	3.2		3.2		SD-WW-06-TR	1 / 1	3.2
Calcium	16200		16200		SD-WW-06-TR	1 / 1	16200
Chromium	6550		6550		SD-WW-06-TR	1 / 1	6550
Cobalt	6.8		6.8		SD-WW-06-TR	1 / 1	6.8
Copper	210		210		SD-WW-06-TR	1 / 1	210
Iron	8430		8430		SD-WW-06-TR	1 / 1	8430
Lead	369		369		SD-WW-06-TR	1 / 1	369
Magnesium	2520		2520		SD-WW-06-TR	1 / 1	2520
Manganese	186		186		SD-WW-06-TR	1 / 1	186
Mercury						0 / 1	0.045
Nickel	21.9		21.9		SD-WW-06-TR	1 / 1	22
Potassium	372	J	372	J	SD-WW-06-TR	1 / 1	372
Selenium						0 / 1	0.50
Silver						0 / 1	0.50
Sodium						0 / 1	290

TABLE D.4-20
SUMMARY OF TRIAD CHEMISTRY DATA - SD-WW-06-TR
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Average Concentration
Thallium						0 / 1	0.55
Vanadium	56.9		56.9		SD-WW-06-TR	1 / 1	57
Zinc	888	J	888	J	SD-WW-06-TR	1 / 1	888
AVS/SEM - umol/g							
Acid Volatile Sulfide	0.65		0.65		SD-WW-06-TR	1 / 1	0.65
Simultaneously Extracted Metal	15.435		15.435		SD-WW-06-TR	1 / 1	15
Cadmium	0.0287		0.0287		SD-WW-06-TR	1 / 1	0.029
Copper	1.3047		1.3047		SD-WW-06-TR	1 / 1	1.3
Lead	1.1423		1.1423		SD-WW-06-TR	1 / 1	1.1
Mercury	0.0078	J	0.0078	J	SD-WW-06-TR	1 / 1	0.0078
Nickel	0.2361		0.2361		SD-WW-06-TR	1 / 1	0.24
Zinc	13.8565		13.8565		SD-WW-06-TR	1 / 1	14
SEM/AVS	23.75		23.75		SD-WW-06-TR	1 / 1	24
Total Organic Carbon	760000	J	760000	J	SD-WW-06-TR	1 / 1	760000

J = Estimated Value

APPENDIX D.5

HYALELLA AZTECA, 10-DAY ACUTE TOXICITY TESTS

Method 100.1HA

Amphipod, Hyalella azteca, 10 Day Survival and Growth for Sediments

Associated Protocol:

Hyalella azteca 10-d Survival Test for Sediments. EPA/600/R-94/024

	Parameter	Conditions
1.	Test type:	Whole-sediment toxicity test with overlying water renewal
2.	Temperature:	23 +/- 1 C
3.	Light Quality:	Wide-spectrum fluorescent lights
4.	Illuminance:	~100 to 1000 lux
5.	Photoperiod	16L:8D
6.	Test chamber:	300-mL beaker
7.	Sediment Volume	100mL
8.	Overlying water volume:	175mL
9.	Renewal of overlying water:	2 volume additions/d
10.	Age of organisms	7 to 14-d at test start (1 to 2mm size range)
11.	Number of organisms/chamber:	10
12.	Replicates/sample:	8
13.	Feeding:	Daily 1.0 mL YCT/replicate chamber
14.	Aeration:	None, unless DO <2.5 mg/l
15.	Overlying water:	Reconstituted water
16.	Test chamber cleaning:	When screens clogged outside of screen brushed
17.	Overlying water quality:	Hardness, alkalinity, conductivity, pH and ammonia at the beginning and end of test (day 9 or 10). Water bath temperatures and sample replicate DO daily
18.	Test duration	10-d
19.	Endpoints:	Survival and dry weight growth
20.	Test acceptability:	Minimum mean control survival of 80% and measurable growth in control sediment
21.	Data Interpretation:	Hypothesis test vs. the control or reference sediment. Samples with responses quantitatively equal to or higher than the control responses are excluded from the statistical (and assumed to be non-significant)

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Toxicity Summary Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/6/01
Project: 01032
SDG 5286
Site: N0564-0322

Method: 100.1HA Species: *Hyalella azteca*

Sample ID	Sample Name	Control Group	Mean Proportion Surviving	Mean Weight Growth (mg)
019971	D03193	A	0.95	0.114
019972	D03198	A	0.84	0.120
019981	D03201	A	0.94	0.097
019982	D03206	A	0.95	0.102
019983	D03211	A	1.00	0.103
020001	D03387	A	0.96	0.106
020002	D03392	A	0.98	0.096
020012	D03396	A	1.00	0.113
020013	D03401	A	1.00	0.108
020024	D03407	A	0.99	0.120
020025	D03412	A	0.89	0.098
020026	D03417	A	1.00	0.119
020038	Control	A	0.89	0.099
020039	D03424	B	0.78	0.130
020040	D03429	B	1.00	0.157
020041	D03476	B	0.95	0.140
020072	D03486	B	0.98	0.122

273 Commerce Street, Williston, VT 05495 Tel: 802.860.1638 Fax: 802.658.3189

Toxicity Summary Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/6/01
Project: 01032
SDG 5286
Site: N0564-0322

Method: 100.1HA Species: *Hyalella azteca*

Sample ID	Sample Name	Control Group	Mean Proportion Surviving	Mean Weight Growth (mg)
020073	D03491	B	0.98	0.138
020074	D03496	B	0.98	0.106
020118	D03504	B	0.99	0.133
020119	D03510	B	0.94	0.129
020182	Control	B	0.94	0.109

* Indicates a statistically significant reduction ($P<0.05$) in the response relative to the corresponding response in the laboratory control sample.

Toxicity Summary Report

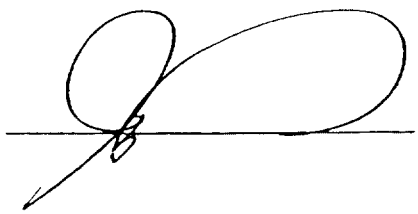
Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/6/01
Project: 01032
SDG 5286
Site: N0564-322

Samples Received

Number	Sample Name	Date Time and Collected		Type
019971	D03193 IPSD-WHO7-06180	6/18/01	11:30:00 AM	sediment
019972	D03198 IPSD-TT2201-0618	6/18/01	3:30:00 PM	sediment
019981	D03201 IPSD-TT1203-0619	6/19/01	9:45:00 AM	Sediment
019982	D03206 IPSD-TT2903-0619	6/19/01	11:30:00 AM	Sediment
019983	D03211 IPSD-TT1901-0619	6/19/01	2:30:00 PM	Sediment
020001	D03387 IPSD-TT3302-0620	6/20/01	11:20:00 AM	Sediment
020002	D03392 IPSD-TT3202-0620	6/20/01	2:10:00 PM	Sediment
020012	D03396 IPSD-WW06-06210	6/21/01	9:12:00 AM	Sediment
020013	D03401 IPSD-TT1802-0621	6/21/01	2:30:00 PM	Sediment
020024	D03407 IPSD-TT1002-0622	6/22/01	8:45:00 AM	Sediment
020025	D03412 IPSD-TT1301-0622	6/22/01	10:46:00 AM	Sediment
020026	D03417 IPSD-TT3001-0622	6/22/01	1:25:00 PM	Sediment
020039	D03424 IPSD-PPO3-062501	6/25/01	10:10:00 AM	Sediment
020040	D03429 IPSD-TTSA01-0625	6/25/01	1:50:00 PM	Sediment
020041	D03476 IPSD-TTSD01-0625	6/25/01	4:30:00 PM	Sediment
020072	D03486 IPSD-TT04-062601	6/26/01	9:15:00 AM	Sediment
020073	D03491 IPSD-HB00-062601	6/26/01	11:55:00 AM	Sediment
020074	D03496 IPSD-TT0603-0626	6/26/01	2:50:00 PM	Sediment
020118	D03504 IPSD-TTUF02-0627	6/27/01	9:50:00 AM	Sediment
020119	D03510 IPSD-TTUF03-0627	6/27/01	11:25:00 AM	Sediment

Submitted By: 

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/6/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019971 Sample Name: D03193 IPSD-WHO7-061 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	40.43	41.54	10	0.111
B	10	10	1.00	34.31	35.47	10	0.116
C	10	8	0.80	28.22	29.07	8	0.106
D	10	10	1.00	34.14	34.95	10	0.081
E	10	10	1.00	34.00	35.27	10	0.127
F	10	10	1.00	34.28	35.33	10	0.105
G	10	9	0.90	35.48	36.74	9	0.140
H	10	9	0.90	40.11	41.27	9	0.129
		Mean Surviving:	0.95			Mean Weight:	0.114

Sample ID: 019972 Sample Name: D03198 IPSD-TT2201-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	9	0.90	40.72	42.21	9	0.166
B	10	9	0.90	38.99	40.12	9	0.126
C	10	8	0.80	31.12	32.00	8	0.110
D	10	9	0.90	28.00	29.16	9	0.129
E	10	8	0.80	36.58	37.44	8	0.107
F	10	9	0.90	37.15	38.16	9	0.112
G	10	5	0.50	36.99	37.36	5	0.074
H	10	10	1.00	37.68	39.07	10	0.139
		Mean Surviving:	0.84			Mean Weight:	0.120

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/6/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019981 Sample Name: D03201 IPSD-TT1203-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	37.74	38.91	10	0.117
B	10	10	1.00	34.30	35.31	10	0.101
C	10	8	0.80	35.04	35.72	8	0.085
D	10	10	1.00	38.97	39.85	10	0.088
E	10	10	1.00	32.50	33.48	10	0.098
F	10	10	1.00	32.22	33.47	10	0.125
G	10	7	0.70	38.45	38.92	7	0.067
H	10	10	1.00	39.29	40.21	10	0.092
		Mean Surviving:	0.94			Mean Weight:	0.097

Sample ID: 019982 Sample Name: D03206 IPSD-TT2903-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	40.96	41.90	10	0.094
B	10	10	1.00	36.21	37.38	10	0.117
C	10	7	0.70	36.44	37.13	7	0.099
D	10	10	1.00	37.18	38.17	10	0.099
E	10	10	1.00	43.03	44.26	10	0.123
F	10	10	1.00	39.71	40.61	10	0.090
G	10	10	1.00	42.73	43.81	10	0.108
H	10	9	0.90	35.80	36.59	9	0.088
		Mean Surviving:	0.95			Mean Weight:	0.102

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/6/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019983 Sample Name: D03211 IPSD-TT1901-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	36.86	37.89	10	0.103
B	10	10	1.00	38.02	38.97	10	0.095
C	10	10	1.00	34.45	35.54	10	0.109
D	10	10	1.00	37.44	38.31	10	0.087
E	10	10	1.00	40.67	41.93	10	0.126
F	10	10	1.00	40.40	41.42	10	0.102
G	10	10	1.00	43.33	44.35	10	0.102
H	10	10	1.00	37.94	38.91	10	0.097
		Mean Surviving:	1.00			Mean Weight:	0.103

Sample ID: 020001 Sample Name: D03387 IPSD-TT3302-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	9	0.90	37.71	38.78	9	0.119
B	10	10	1.00	34.43	35.66	10	0.123
C	10	10	1.00	30.55	31.53	10	0.098
D	10	10	1.00	31.09	32.04	10	0.095
E	10	9	0.90	32.57	33.52	9	0.106
F	10	10	1.00	30.61	31.78	10	0.117
G	10	9	0.90	33.02	33.79	9	0.086
H	10	10	1.00	32.17	33.23	10	0.106
		Mean Surviving:	0.96			Mean Weight:	0.106

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/6/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020002 Sample Name: D03392 IPSD-TT3202-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	35.79	36.65	10	0.086
B	10	10	1.00	35.43	36.57	10	0.114
C	10	10	1.00	34.38	35.40	10	0.102
D	10	10	1.00	40.54	41.52	10	0.098
E	10	10	1.00	38.31	39.38	10	0.107
F	10	10	1.00	33.38	34.10	10	0.072
G	10	9	0.90	43.02	43.77	9	0.083
H	10	9	0.90	33.87	34.79	9	0.102
		Mean Surviving:	0.98			Mean Weight:	0.096

Sample ID: 020012 Sample Name: D03396 IPSD-WW06-062 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	35.14	36.32	10	0.118
B	10	10	1.00	34.94	35.98	10	0.104
C	11	11	1.00	37.05	38.34	11	0.117
D	10	10	1.00	31.36	32.58	10	0.122
E	10	10	1.00	32.29	33.36	10	0.107
F	10	10	1.00	38.86	39.89	10	0.103
G	10	10	1.00	33.52	34.62	10	0.110
H	10	10	1.00	32.82	34.02	10	0.120
		Mean Surviving:	1.00			Mean Weight:	0.113

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/6/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020013 Sample Name: D03401 IPSD-TT1802-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	39.19	40.25	10	0.106
B	10	10	1.00	34.08	35.36	10	0.128
C	10	10	1.00	39.56	40.62	10	0.106
D	10	10	1.00	36.78	37.87	10	0.109
E	10	10	1.00	34.52	35.68	10	0.116
F	10	10	1.00	26.11	27.10	10	0.099
G	10	10	1.00	23.34	24.35	10	0.101
H	10	10	1.00	37.39	38.40	10	0.101
		Mean Surviving:	1.00			Mean Weight:	0.108

Sample ID: 020024 Sample Name: D03407 IPSD-TT1002-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	38.37	39.54	10	0.117
B	10	10	1.00	36.90	38.47	10	0.157
C	10	10	1.00	34.80	36.32	10	0.152
D	10	10	1.00	37.44	38.43	10	0.099
E	10	10	1.00	37.41	38.55	10	0.114
F	10	10	1.00	37.44	38.51	10	0.107
G	10	10	1.00	36.11	37.11	10	0.100
H	10	9	0.90	37.52	38.53	9	0.112
		Mean Surviving:	0.99			Mean Weight:	0.120

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/6/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020025 Sample Name: D03412 IPSD-TT1301-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	36.34	37.38	10	0.104
B	10	4	0.40	26.65	27.00	4	0.088
C	10	10	1.00	36.41	37.40	10	0.099
D	10	10	1.00	38.91	39.93	10	0.102
E	10	9	0.90	37.18	38.06	9	0.098
F	10	10	1.00	37.86	38.94	10	0.108
G	10	8	0.80	33.59	34.29	8	0.088
H	10	10	1.00	27.05	28.05	10	0.100
		Mean Surviving:	0.89			Mean Weight:	0.098

Sample ID: 020026 Sample Name: D03417 IPSD-TT3001-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	34.66	35.82	10	0.116
B	10	10	1.00	31.33	32.72	10	0.139
C	10	10	1.00	33.59	35.04	10	0.145
D	10	10	1.00	35.40	36.80	10	0.140
E	10	10	1.00	41.68	42.70	10	0.102
F	10	10	1.00	45.38	46.47	10	0.109
G	10	10	1.00	43.13	44.14	10	0.101
H	10	10	1.00	34.44	35.41	10	0.097
		Mean Surviving:	1.00			Mean Weight:	0.119

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/6/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020038 Sample Name: Control Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	39.63	40.92	10	0.129
B	10	10	1.00	39.34	40.44	10	0.110
C	10	10	1.00	30.66	31.74	10	0.108
D	10	10	1.00	35.14	36.07	10	0.093
E	10	8	0.80	38.07	38.64	8	0.071
F	10	8	0.80	38.58	39.32	8	0.092
G	10	10	1.00	37.53	38.37	10	0.084
H	10	5	0.50	34.47	34.98	5	0.102 * overlooked
		Mean Surviving:	0.89			Mean Weight:	0.099

Sample ID: 020039 Sample Name: D03424 IPSD-PPO3-062 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	8	0.80	34.74	35.73	8	0.124
B	10	8	0.80	34.58	35.56	8	0.122
C	10	5	0.50	32.68	33.23	5	0.110
D	10	10	1.00	34.07	35.88	10	0.181
E	10	9	0.90	40.07	41.29	9	0.136
F	10	8	0.80	38.59	39.52	8	0.116
G	10	5	0.50	37.00	37.60	5	0.120
H	10	9	0.90	35.40	36.58	9	0.131
		Mean Surviving:	0.78			Mean Weight:	0.130

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/6/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020040 Sample Name: D03429 IPSD-TTSA01-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	36.34	38.12	10	0.178
B	10	10	1.00	32.44	33.61	10	0.117
C	10	10	1.00	35.23	37.20	10	0.197
D	10	10	1.00	33.60	34.98	10	0.138
E	10	10	1.00	33.68	35.53	10	0.185
F	10	10	1.00	38.23	39.62	10	0.139
G	10	10	1.00	37.11	38.51	10	0.140
H	10	10	1.00	32.71	34.36	10	0.165
		Mean Surviving:	1.00			Mean Weight:	0.157

Sample ID: 020041 Sample Name: D03476 IPSD-TTSD01-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	30.56	32.23	10	0.167
B	10	10	1.00	34.34	35.89	10	0.155
C	10	9	0.90	36.61	37.62	9	0.112
D	10	10	1.00	32.86	33.97	10	0.111
E	10	10	1.00	32.81	34.44	10	0.163
F	10	7	0.70	33.89	34.71	7	0.117
G	10	10	1.00	35.45	36.94	10	0.149
H	10	10	1.00	31.93	33.36	10	0.143
		Mean Surviving:	0.95			Mean Weight:	0.140

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/6/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020072 Sample Name: D03486 IPSD-TT04-0626 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	35.13	36.05	10	0.092
B	10	10	1.00	35.21	36.62	10	0.141
C	10	10	1.00	32.30	33.55	10	0.125
D	10	10	1.00	37.81	38.96	10	0.115
E	10	10	1.00	36.66	37.75	10	0.109
F	10	9	0.90	37.25	38.60	9	0.150
G	10	9	0.90	35.52	36.63	9	0.123
H	10	10	1.00	29.87	31.09	10	0.122
		Mean Surviving:	0.98			Mean Weight:	0.122

Sample ID: 020073 Sample Name: D03491 IPSD-HB00-0626 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	38.36	39.75	10	0.139
B	10	9	0.90	36.58	37.86	9	0.142
C	10	10	1.00	35.92	37.22	10	0.130
D	10	10	1.00	34.48	35.67	10	0.119
E	10	10	1.00	34.79	36.23	10	0.144
F	10	10	1.00	37.81	38.99	10	0.118
G	10	10	1.00	33.67	35.13	10	0.146
H	10	9	0.90	34.85	36.36	9	0.168
		Mean Surviving:	0.98			Mean Weight:	0.138

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/6/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020074 Sample Name: D03496 IPSD-TT0603-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	32.75	33.78	10	0.103
B	10	10	1.00	42.08	43.01	10	0.093
C	10	10	1.00	34.38	35.61	10	0.123
D	10	10	1.00	30.21	31.27	10	0.106
E	10	9	0.90	35.22	36.14	9	0.102
F	10	10	1.00	31.97	33.12	10	0.115
G	10	9	0.90	35.18	36.13	9	0.106
H	10	10	1.00	35.95	36.97	10	0.102
		Mean Surviving:	0.98			Mean Weight:	0.106

Sample ID: 020118 Sample Name: D03504 IPSD-TTUF02-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	37.24	38.59	10	0.135
B	10	10	1.00	33.27	34.46	10	0.119
C	10	10	1.00	34.27	35.52	10	0.125
D	10	9	0.90	29.85	30.96	9	0.123
E	10	10	1.00	38.07	39.08	10	0.101
F	10	10	1.00	33.67	35.09	10	0.142
G	10	10	1.00	37.98	39.68	10	0.170
H	10	10	1.00	27.20	28.68	10	0.148
		Mean Surviving:	0.99			Mean Weight:	0.133

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/6/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020119 Sample Name: D03510 IPSD-TTUF03-06 Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	32.98	34.06	10	0.108
B	10	10	1.00	31.73	32.90	10	0.117
C	10	8	0.80	30.13	31.28	8	0.144
D	10	9	0.90	33.13	34.85	9	0.191
E	10	10	1.00	36.05	37.06	10	0.101
F	10	10	1.00	27.16	28.07	10	0.091
G	10	10	1.00	30.33	31.61	10	0.128
H	10	8	0.80	25.00	26.20	8	0.150
		Mean Surviving:	0.94			Mean Weight:	0.129

Sample ID: 020182 Sample Name: Control Method: 100.1HA

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Final Weight	Weighed	Mean Replicate Weight
A	10	9	0.90	26.35	27.43	9	0.120
B	10	10	1.00	28.57	29.68	10	0.111
C	10	9	0.90	33.61	34.43	9	0.091
D	10	10	1.00	29.93	31.10	10	0.117
E	10	10	1.00	33.41	34.56	10	0.115
F	10	9	0.90	30.83	31.64	9	0.090
G	10	10	1.00	26.18	27.09	10	0.091
H	10	8	0.80	30.72	31.82	8	0.138
		Mean Surviving:	0.94			Mean Weight:	0.109

Aquatec Biological Sciences

Ecology | Environmental Toxicology | Natural Resource Assessments | Microbiology

Quality Assurance Report

Tetra Tech NUS Inc		Date:	8/7/01
55 Jonspin Road		Project:	01032
		SDG	5286
Wilmington, MA	01887-1062	Site:	N0564-0322

Qualifiers and Special Conditions

Replicate H of sample 20038 (Control) overflowed on July 1, 2002, Day 2 of the test, resulting in the possible loss of some of the test organisms. Five amphipods were recovered from this replicate at the end of the test and the proportion surviving was based on the original number of 10 amphipods (survival 0.5).

Replicate G of sample 19981 (D03201) spilled on July 4, 2001, Day 6 of the test, resulting in the possible loss of some of the test organisms. Seven amphipods were recovered from this replicate at the end of the test and the proportion surviving was based on the original number of 10 amphipods (survival 0.7).

Replicate G of sample 20024 (D03407) had 9 surviving amphipods recorded when the test was ended. When the organisms were submitted for dry weight analysis, 10 amphipods were present. The number surviving (10) was based on the number weighed.

The hardness measurement for sample 20119 (D03510) on Day 0 resulted in a value of "0" because the titration endpoint (color change) occurred immediately. The hardness of the overlying water for this sample should be considered as "undetermined" due to unexplained interference for the analysis.

273 Commerce Street, Williston, VT 05495 Tel: 802.860.1638 Fax: 802.658.3189

APPENDIX D.6

CHIRONOMUS TENTANS, 10-DAY ACUTE TOXICITY TESTS

Method 100.2CT

Midge, Chironomus tentans 10-Day Survival and Growth Test for Sediment

Associated Protocol:

Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates (EPA/600/R-99/064)

	Parameter	Conditions
1.	Test type:	Whole-sediment toxicity test with renewal of overlying water
2.	Temperature:	Average 23 +/- 1 C; Instanteneous temperature 23+/- 3 C
3.	Light quality:	Wide-spectrum fluorescent lights
4.	Illuminance:	~100 to 1000 lux
5.	Photoperiod	16L:8D
6.	Test chamber:	300mL beaker
7.	Sediment volume	100mL
8.	Overlying water volume:	175mL
9.	Renewal of overlying water:	2 volume addiitions/d
10.	Life stage of organisms:	Second or third instar (50% or more in third instar)
11.	Organisms/test chamber:	10
12.	Replicates/sample:	8
13.	Feeding:	Tetrafin slurry, 1.5 mL daily to each test chamber
14.	Aeration:	None, unless D.O. drops below 2.5mg/L
15.	Overlying water:	Reconstituted water
16.	Test chamber cleaning:	When screen clogs, gently brush the outside of the screen
17.	Overlying water quality:	Hardness, alkalinity, conductivity, pH, and ammonia in the overlying water at the beginning and end of test. Incubator temperature daily and DO in one replicate per sample daily.
18.	Test duration:	10-d
19.	Endpoints:	Survival and Ash-Free-Dry-Weight growth
20.	Test acceptability:	Minimum mean control survival of 70% and minimum control mean AFDW of 0.48mg/surviving control
21.	Data Interpretation:	Hypothesis testing (e.g., t-test) versus laboratory control and/or reference site control. Samples with responses quantitatively equal to or higher than the control responses are excluded from the statistical analyses and assumed non-significant.

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/7/01
Project: 01032
SDG 5286
Site: N0564-0322

Method: 100.2CT Species: *Chironomus tentans*

Number	Client Identifier	Control Group	Mean Proportion Surviving	Mean Weight Growth (mg)
019971	D03193	A	0.89	1.06
019972	D03198	A	0.84	1.01
019981	D03201	A	0.93	0.67 *
019982	D03206	A	0.90	0.95
019983	D03211	A	0.80	0.97
020001	D03387	A	0.88	0.99
020002	D03392	A	0.94	0.89
020012	D03396	A	0.94	1.16
020013	D03401	A	0.93	0.90
020024	D03407	A	0.59	0.81
020025	D03412	A	0.91	0.55 *
020026	D03417	A	0.80	0.85
020038	Control	A	0.76	0.92
020039	D03424	B	0.94	1.37
020040	D03429	B	0.76	1.40
020041	D03476	B	0.94	1.35
020072	D03486	B	0.96	1.14
020073	D03491	B	0.25 *	1.73
020074	D03496	B	0.95	1.04

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Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/7/01
Project: 01032
SDG 5286
Site: N0564-322

Method: 100.2CT Species: *Chironomus tentans*

Number	Client Identifier	Control Group	Mean Proportion Surviving	Mean Weight Growth (mg)	
020118	D03504	B	0.86	1.24	
020119	D03510	B	0.95	0.91	*
020182	Control	B	0.94	1.13	

* Indicates a statistically significant reduction (P<0.05) in the response relative to the corresponding response in the laboratory control sample.

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/8/01
Project: 01032
SDG 5286
Site: N0564-322

Samples Received

Number	Sample Name	Date Time and Collected		Type
019971	D03193 IPSD-WHO7-06180	6/18/01	11:30:00 AM	sediment
019972	D03198 IPSD-TT2201-0618	6/18/01	3:30:00 PM	sediment
019981	D03201 IPSD-TT1203-0619	6/19/01	9:45:00 AM	Sediment
019982	D03206 IPSD-TT2903-0619	6/19/01	11:30:00 AM	Sediment
019983	D03211 IPSD-TT1901-0619	6/19/01	2:30:00 PM	Sediment
020001	D03387 IPSD-TT3302-0620	6/20/01	11:20:00 AM	Sediment
020002	D03392 IPSD-TT3202-0620	6/20/01	2:10:00 PM	Sediment
020012	D03396 IPSD-WW06-06210	6/21/01	9:12:00 AM	Sediment
020013	D03401 IPSD-TT1802-0621	6/21/01	2:30:00 PM	Sediment
020024	D03407 IPSD-TT1002-0622	6/22/01	8:45:00 AM	Sediment
020025	D03412 IPSD-TT1301-0622	6/22/01	10:46:00 AM	Sediment
020026	D03417 IPSD-TT3001-0622	6/22/01	1:25:00 PM	Sediment
020039	D03424 IPSD-PPO3-062501	6/25/01	10:10:00 AM	Sediment
020040	D03429 IPSD-TTSA01-0625	6/25/01	1:50:00 PM	Sediment
020041	D03476 IPSD-TTSD01-0625	6/25/01	4:30:00 PM	Sediment
020072	D03486 IPSD-TT04-062601	6/26/01	9:15:00 AM	Sediment
020073	D03491 IPSD-HB00-062601	6/26/01	11:55:00 AM	Sediment
020074	D03496 IPSD-TT0603-0626	6/26/01	2:50:00 PM	Sediment
020118	D03504 IPSD-TTUF02-0627	6/27/01	9:50:00 AM	Sediment
020119	D03510 IPSD-TTUF03-0627	6/27/01	11:25:00 AM	Sediment

Submitted By:

Aquatec Biological Sciences

Ecology | Environmental Toxicology | Natural Resource Assessments | Microbiology

Quality Assurance Report

Tetra Tech NUS Inc	Date:	8/9/01
55 Jonspin Road	Project:	01032
	SDG	5286
Wilmington, MA 01887-1062	Site:	N0564-0322

Qualifiers and Special Conditions

For the group of samples tested beginning on June 26, 2001, there were insufficient larvae to measure initial (pre-test) ash-free dry weights. Larval development stage for this batch of organisms was determined by head capsule measurement. For the group of samples tested beginning on June 30, 2001, both initial ash-free dry weights and head capsule measurements were completed on a sub-set of the test organisms.

One test replicate had a discrepancies between the number of surviving larvae recorded and the number of larvae weighed: According to the test data, Sample 20012 (D03396) Replicate G had 11 surviving larvae, however only 10 larvae were weighed. The data were used as recorded.

Several test replicates may have received more than 10 larvae when the test was started: Sample 20025 (D03412) Replicate C and Sample 20072 (D03486) Replicates A, B, and C had 11 larvae recorded as surviving and weighed. Sample 20118 (D03504) Replicate D had 13 larvae recorded as surviving and weighed. The data were used as recorded.

Sample 20026 (D03417) Replicate F had no surviving larvae while the other seven replicates had 8-10 surviving larvae. Sample 20040 (D03429) Replicate C had no surviving larvae while the other seven replicates had 6-10 surviving larvae. The data were used as recorded.

Two possible weighing errors were detected during the data review. Sample 20039 (D03424) Replicate H had an ashed weight recorded that was less than the original crucible weight. Sample 20074 (D03496) Replicate G had a dry weight recorded which appeared to be 100 mg above the expected value. The weight data for these two replicates were excluded from the data tabulation and the statistical analysis.

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Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019971 Sample Name: D03193 IPSD-WHO7-061 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	8	0.80	42.25	50.69	43.29	8	0.92
B	10	9	0.90	35.91	48.8	37.73	9	1.23
C	10	6	0.60	45.54	52.95	46.41	6	1.09
D	10	10	1.00	41.74	50.11	42.88	10	0.72
E	10	10	1.00	43.27	57.37	45.46	10	1.19
F	10	10	1.00	43.58	54.02	44.89	10	0.91
G	10	10	1.00	45.60	56.25	46.91	10	0.93
H	10	8	0.80	43.23	56.48	44.85	8	1.45
	Mean Survival:		0.89			Mean Growth Weight:		1.06

Sample ID: 019972 Sample Name: D03198 IPSD-TT2201-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	9	0.90	41.56	50.33	42.39	9	0.88
B	10	9	0.90	43.12	53.87	44.18	9	1.08
C	10	9	0.90	41.83	49.67	42.63	9	0.78
D	10	9	0.90	45.28	52.39	46.07	9	0.70
E	10	6	0.60	44.67	54.98	45.69	6	1.55
F	10	10	1.00	45.38	59.8	46.83	10	1.30
G	10	8	0.80	45.73	53.66	46.53	8	0.89
H	10	7	0.70	43.69	50.98	44.48	7	0.93
	Mean Survival:		0.84			Mean Growth Weight:		1.01

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019981 Sample Name: D03201 IPSD-TT1203-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	46.20	57.54	49.53	10	0.80
B	10	10	1.00	41.81	51.14	44.29	10	0.68
C	10	10	1.00	49.63	59.49	53.43	10	0.61
D	10	10	1.00	43.43	55.52	47.55	10	0.80
E	10	6	0.60	45.00	50.74	47.43	6	0.55
F	10	9	0.90	46.73	54.34	50.03	9	0.48
G	10	10	1.00	48.90	60.65	54.21	10	0.64
H	10	9	0.90	51.73	63.25	56.15	9	0.79
	Mean Survival:		0.93			Mean Growth Weight:		0.67

Sample ID: 019982 Sample Name: D03206 IPSD-TT2903-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	9	0.90	54.48	62.99	55.73	9	0.81
B	10	8	0.80	53.04	64.63	55.07	8	1.19
C	10	10	1.00	49.86	59.47	51.41	10	0.81
D	10	10	1.00	55.15	66.5	56.84	10	0.97
E	10	9	0.90	50.25	60.85	51.58	9	1.03
F	10	6	0.60	47.68	55.68	48.95	6	1.12
G	10	10	1.00	53.84	63.96	55.56	10	0.84
H	10	10	1.00	49.08	58.86	50.58	10	0.83
	Mean Survival:		0.90			Mean Growth Weight:		0.95

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019983 Sample Name: D03211 IPSD-TT1901-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	50.77	60.57	51.78	10	0.88
B	10	8	0.80	51.31	59.18	52.11	8	0.88
C	10	9	0.90	49.90	58.15	50.86	9	0.81
D	10	7	0.70	45.81	53.83	46.46	7	1.05
E	10	7	0.70	45.23	54.99	46.34	7	1.24
F	10	10	1.00	45.48	58.12	47.06	10	1.11
G	10	6	0.60	46.45	53.06	47.20	6	0.98
H	10	7	0.70	42.03	48.5	42.61	7	0.84
	Mean Survival:		0.80			Mean Growth Weight:		0.97

Sample ID: 020001 Sample Name: D03387 IPSD-TT3302-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	9	0.90	42.19	53.44	43.89	9	1.06
B	10	10	1.00	42.24	51.1	43.39	10	0.77
C	10	8	0.80	42.32	52.91	43.98	8	1.12
D	10	10	1.00	42.42	52.66	43.80	10	0.89
E	10	7	0.70	40.36	49.36	41.55	7	1.12
F	10	8	0.80	46.96	55.66	48.14	8	0.94
G	10	9	0.90	46.52	55.26	47.93	9	0.81
H	10	9	0.90	43.93	56.46	45.61	9	1.21
	Mean Survival:		0.88			Mean Growth Weight:		0.99

000007

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020002 Sample Name: D03392 IPSD-TT3202-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	47.47	57.55	48.93	10	0.86
B	10	9	0.90	45.45	52.29	46.58	9	0.63
C	10	8	0.80	47.07	60.3	49.09	8	1.40
D	10	9	0.90	44.69	55.2	46.49	9	0.97
E	10	10	1.00	44.52	54.99	46.26	10	0.87
F	10	9	0.90	49.24	60.12	50.87	9	1.03
G	10	10	1.00	43.88	54.1	45.39	10	0.87
H	10	10	1.00	45.13	51.07	45.99	10	0.51
	Mean Survival:		0.94			Mean Growth Weight:		0.89

Sample ID: 020012 Sample Name: D03396 IPSD-WW06-062 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	45.50	58.91	47.22	10	1.17
B	10	9	0.90	47.41	60.35	48.92	9	1.27
C	10	10	1.00	40.81	53.84	42.29	10	1.15
D	10	7	0.70	46.58	57.99	47.99	7	1.43
E	10	9	0.90	48.90	59.7	50.05	9	1.07
F	10	10	1.00	37.79	49.27	39.05	10	1.02
G	11	11	1.00	46.29	57.92	47.50	10	1.04
H	10	10	1.00	43.91	56.34	45.25	10	1.11
	Mean Survival:		0.94			Mean Growth Weight:		1.16

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020013 Sample Name: D03401 IPSD-TT1802-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	8	0.80	44.76	53.3	45.94	8	0.92
B	10	9	0.90	54.40	61.39	55.25	9	0.68
C	10	9	0.90	48.97	59.12	50.26	9	0.98
D	10	9	0.90	51.64	61.08	52.51	9	0.95
E	10	9	0.90	46.78	58.05	48.37	9	1.08
F	10	10	1.00	48.82	61.46	50.93	10	1.05
G	10	10	1.00	46.94	54.57	47.93	10	0.66
H	10	10	1.00	42.72	52.96	43.92	10	0.90
	Mean Survival:		0.93			Mean Growth Weight:		0.90

Sample ID: 020024 Sample Name: D03407 IPSD-TT1002-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	6	0.60	45.75	52.86	47.67	6	0.87
B	10	9	0.90	51.07	60.45	53.11	9	0.82
C	10	9	0.90	42.38	53.59	44.85	9	0.97
D	10	3	0.30	49.49	51.25	49.95	3	0.43
E	10	2	0.20	46.13	49.66	47.16	2	1.25
F	10	6	0.60	45.24	49.97	46.72	6	0.54
G	10	4	0.40	43.56	48.07	44.89	4	0.80
H	10	8	0.80	43.07	52.61	46.44	8	0.77
	Mean Survival:		0.59			Mean Growth Weight:		0.81

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020025 Sample Name: D03412 IPSD-TT1301-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	9	0.90	52.55	60.53	56.20	9	0.48
B	10	10	1.00	52.67	64.77	58.45	10	0.63
C	11	11	1.00	50.63	62.19	55.99	11	0.56
D	10	9	0.90	42.44	49.97	45.97	9	0.44
E	10	9	0.90	50.13	62.64	57.01	9	0.63
F	10	8	0.80	45.70	55.41	51.08	8	0.54
G	10	9	0.90	48.26	58.36	53.39	9	0.55
H	10	9	0.90	44.91	55.9	50.84	9	0.56
	Mean Survival:		0.91			Mean Growth Weight:		0.55

Sample ID: 020026 Sample Name: D03417 IPSD-TT3001-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	9	0.90	35.33	51.14	40.40	9	1.19
B	10	8	0.80	47.02	55.14	49.56	8	0.70
C	10	10	1.00	46.27	57.14	50.54	10	0.66
D	10	9	0.90	48.95	63.81	54.15	9	1.07
E	10	9	0.90	46.44	57.69	49.61	9	0.90
F	10	0	0.00	40.76				
G	10	9	0.90	52.83	64.7	57.32	9	0.82
H	10	10	1.00	44.98	54.3	48.30	10	0.60
	Mean Survival:		0.80			Mean Growth Weight:		0.85

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020038 Sample Name: Control Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	35.29	48.14	40.90	10	0.72
B	10	7	0.70	49.94	61.77	55.12	7	0.95
C	10	9	0.90	43.39	60.36	51.92	9	0.94
D	10	6	0.60	46.01	55.7	49.28	6	1.07
E	10	8	0.80	40.77	52.81	45.69	8	0.89
F	10	7	0.70	43.92	56.36	48.29	7	1.15
G	10	6	0.60	44.39	50.76	47.15	6	0.60
H	10	8	0.80	43.54	56.21	48.00	8	1.03
	Mean Survival:		0.76			Mean Growth Weight:		0.92

Sample ID: 020039 Sample Name: D03424 IPSD-PPO3-062 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	8	0.80	2162.80	2176.61	2165.67	8	1.37
B	10	10	1.00	2148.41	2163.25	2151.02	10	1.22
C	10	10	1.00	2103.15	2118.02	2106.27	10	1.17
D	10	10	1.00	2186.94	2205.89	2191.01	10	1.49
E	10	10	1.00	2247.78	2265.42	2250.66	10	1.48
F	10	10	1.00	2138.83	2154.32	2141.60	10	1.27
G	10	9	0.90	2030.52	2047.65	2033.58	9	1.56
H	10	8	0.80					
	Mean Survival:		0.94			Mean Growth Weight:		1.37

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020040 Sample Name: D03429 IPSD-TTSA01-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	2157.60	2173.89	2161.22	10	1.27
B	10	10	1.00	2182.39	2198	2184.73	10	1.33
C	10	0	0.00	2058.03			0	
D	10	9	0.90	2194.86	2208.03	2197.29	9	1.19
E	10	9	0.90	2111.22	2128.37	2113.88	9	1.61
F	10	9	0.90	2194.07	2212.3	2197.73	9	1.62
G	10	9	0.90	2204.37	2211.74	2205.65	8	0.76
H	10	5	0.50	2219.10	2231.69	2221.44	5	2.05
	Mean Survival:		0.76			Mean Growth Weight:		1.40

Sample ID: 020041 Sample Name: D03476 IPSD-TTSD01-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	9	0.90	2116.49	2131.05	2118.86	9	1.35
B	10	10	1.00	2052.98	2066.76	2054.98	10	1.18
C	10	10	1.00	2183.70	2199.03	2186.00	10	1.30
D	10	8	0.80	2138.33	2151.81	2140.06	8	1.47
E	10	9	0.90	2204.69	2221.34	2206.83	9	1.61
F	10	9	0.90	2189.80	2203.82	2191.95	9	1.32
G	10	10	1.00	2218.66	2194.39	2182.65	10	1.17
H	10	10	1.00	2222.70	2238.7	2224.84	10	1.39
	Mean Survival:		0.94			Mean Growth Weight:		1.35

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020072 Sample Name: D03486 IPSD-TT04-0626 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	11	11	1.00	2175.18	2190.29	2177.70	11	1.14
B	11	11	1.00	2208.08	2224.94	2210.56	11	1.31
C	10	10	1.00	2165.63	2177.56	2167.24	10	1.03
D	10	9	0.90	2435.89	2467.08	2457.29	9	1.09
E	10	10	1.00	2142.72	2157.84	2144.74	10	1.31
F	10	10	1.00	2105.66	2118.35	2107.45	10	1.09
G	10	8	0.80	2110.92	2120.82	2112.04	8	1.10
H	11	11	1.00	2111.83	2125.39	2113.60	11	1.07
	Mean Survival:		0.96				Mean Growth Weight:	1.14

Sample ID: 020073 Sample Name: D03491 IPSD-HB00-0626 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	4	0.40	2018.82	2026.5	2019.73	4	1.69
B	10	3	0.30	2224.13	2229.84	2224.66	3	1.73
C	10	0	0.00	2226.59	0		0	
D	10	0	0.00	2111.01	0		0	
E	10	0	0.00	2125.10	0		0	
F	10	0	0.00	2099.83	0		0	
G	10	3	0.30	2180.49	2187.85	2181.25	3	2.20
H	10	10	1.00	2200.94	2216.04	2203.00	10	1.30
	Mean Survival:		0.25				Mean Growth Weight:	1.73

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020074 Sample Name: D03496 IPSD-TT0603-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	9	0.90	2140.49	2152.29	2142.71	9	1.06
B	10	10	1.00	2281.80	2296.65	2284.99	10	1.17
C	10	9	0.90	2063.02	2073.88	2065.46	9	0.94
D	10	9	0.90	2020.84	2032.64	2023.29	9	1.04
E	10	10	1.00	2193.22	2204.43	2195.20	10	0.92
F	10	10	1.00	2196.25	2207.79	2197.76	10	1.00
G	10	9	0.90					
H	10	10	1.00	2217.78	2232.79	2220.98	10	1.18
	Mean Survival:		0.95			Mean Growth Weight:		1.04

Sample ID: 020118 Sample Name: D03504 IPSD-TTUF02-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	8	0.80	2533.64	2549.31	2536.69	8	1.58
B	10	9	0.90	2137.66	2150.75	2140.56	9	1.13
C	10	8	0.80	2187.68	2199.55	2190.38	8	1.15
D	13	13	1.00	2241.83	2261.94	2246.05	13	1.22
E	10	10	1.00	2046.14	2062.48	2049.08	10	1.34
F	10	8	0.80	2119.30	2129.37	2120.96	8	1.05
G	10	10	1.00	2188.41	2203.55	2191.76	10	1.18
H	10	6	0.60	2119.59	2127.77	2121.25	5	1.30
	Mean Survival:		0.86			Mean Growth Weight:		1.24

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/8/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020119 Sample Name: D03510 IPSD-TTUF03-06 Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	2302.24	2316.83	2305.24	10	1.16
B	10	10	1.00	2158.78	2169.74	2161.10	10	0.86
C	10	10	1.00	2091.97	2102.5	2094.26	10	0.82
D	10	10	1.00	2145.41	2155.72	2147.75	10	0.80
E	10	10	1.00	2254.98	2263.57	2256.81	10	0.68
F	10	9	0.90	2068.60	2084.82	2072.60	9	1.36
G	10	9	0.90	2245.30	2253.48	2246.54	9	0.77
H	10	8	0.80	2207.91	2215.83	2209.35	8	0.81
	Mean Survival:		0.95			Mean Growth Weight:		0.91

Sample ID: 020182 Sample Name: Control Method: 100.2CT

Replicate	Start Count	Total Surviving	Proportion Surviving	Pan Weight	Dry Weight	Ash Weight	Weighed	Mean Replicate Weight
A	10	10	1.00	2101.24	2115.88	2105.74	10	1.01
B	10	9	0.90	2221.66	2236.03	2226.01	9	1.11
C	10	10	1.00	2195.63	2212.77	2200.87	10	1.19
D	10	10	1.00	2120.77	2135.83	2124.85	10	1.10
E	10	8	0.80	2291.98	2303.04	2294.19	8	1.11
F	10	9	0.90	2210.83	2228.95	2216.54	9	1.38
G	10	9	0.90	2158.14	2176.99	2165.99	9	1.22
H	10	10	1.00	2145.06	2156.84	2147.40	10	0.94
	Mean Survival:		0.94			Mean Growth Weight:		1.13

APPENDIX D.7

HYALELLA AZTECA, 42-DAY CHRONIC TOXICITY TESTS

Method 100.4HA

Amphipod, Hyalella azteca, 42-day Survival, Growth and Reproduction Test

Associated Protocol:

Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates (EPA/600/R-99/064)

	Parameter	Conditions
1.	Test Type:	Whole-sediment toxicity test with renewal of overlying water
2.	Temperature:	Average bath temperature 23 +/- 1 C; Instantenious temperature 23 +/- 3 C
3.	Light Quality:	Wide-spectrum fluorescent lights
4.	Illuminance:	~100 to 1000 lux
5.	Photoperiod:	16L:8D
6.	Test chamber:	300mL beaker
7.	Sediment volume:	100ml
8.	Overlying water volume:	175ml during sediment exposure (day 0 to day 28); 175-275ml during water exposure (day 29-42)
9.	Renewal of overlying water:	2 volume addiitions/d
10.	Life stage of organisms:	7- to 8-d old at test start
11.	Organisms/test chamber:	10
12.	Replicates/sample:	12 (4 for 28-d survival/growth; 8 for 35 and 42d survival, growth and reproduction)
13.	Feeding:	1ml of YCT daily to each test chamber
14.	Aeration:	None, unless DO drops below 2.5mg/l
15.	Overlying water:	Mixture of surface water and reconstituted water
16.	Test chamber cleaning:	When screen clogs, gently brush the outside of the screen
17.	Overlying water quality:	Hardness, alkalinity, conductivity, and ammonia on day 0 and day 28. Water bath temperature daily, conductivity weekly and DO and pH three times per week.
18.	Test duration:	42-d
19.	Endpoints:	28-d survival/growth; 35-d survival/reproduction; 42-d survival/growth/reproduction/adult sex composition
20.	Test acceptability:	28-d control survival 80% or more: Performance-based criteria

Aquatec Biological Sciences

Ecology | Environmental Toxicology | Natural Resource Assessments | Microbiology

Toxicity Summary Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Method: 100.4HA Species: *Hyalella azteca*

Number	Name	Control Group	Day:	Survival (Proportion) 28	35	42	Growth (mg) 28	42	Reproduction (Neonates/Female) 42
019971	D03193	A		0.96	0.91	0.89	0.37	0.52	7.45
019972	D03198	A		0.86	0.86	0.83	0.58	0.63	9.95
019981	D03201	A		0.83	0.89	0.89	0.30	0.45 *	5.00
019982	D03206	A		0.81	0.87	0.84	0.30	0.49	5.80
019983	D03211	A		0.92	0.91	0.90	0.40	0.49	4.00
020001	D03387	A		0.91	0.89	0.85	0.39	0.52	5.43
020002	D03392	A		0.79	0.79	0.76	0.36	0.55	5.68
020012	D03396	A		0.93	0.93	0.90	0.43	0.57	5.43
020013	D03401	A		0.91	0.84	0.83	0.28	0.53	3.29 *
020024	D03407	A		0.93	0.90	0.90	0.27	0.51	5.12
020025	D03412	A		0.74	0.73	0.70	0.29	0.56	4.81
020026	D03417	A		0.90	0.94	0.94	0.25	0.47	5.21
020038	Control	A		0.82	0.79	0.75	0.33	0.51	5.61
020039	D03424	B		0.92	0.86	0.84	0.43	0.53	8.46
020040	D03429	B		0.97	0.96	0.94	0.39	0.45	6.75
020041	D03476	B		0.87	0.85	0.80	0.30	0.44	3.23
020072	D03486	B		0.93	0.88	0.86	0.37	0.44	4.51
020073	D03491	B		0.89	0.93	0.88	0.47	0.50	8.16
020074	D03496	B		0.85	0.84	0.84	0.35	0.48	5.16
020118	D03504	B		0.98	0.88	0.88	0.32	0.44	5.40
020119	D03510	B		0.93	0.87	0.86	0.33	0.47	6.59
020182	Control	B		0.93	0.71	0.63	0.21	0.37	3.91

* Indicates a statistically significant reduction ($P<0.05$) in the response relative to the corresponding response in the laboratory control sample.

273 Commerce Street, Williston, VT 05495 Tel: 802.860.1638 Fax: 802.658.3189

Toxicity Summary Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-322

Sample Received

019971	D03193 IPSD-WHO7-061801	6/18/01	11:30:00 AM	sediment
019972	D03198 IPSD-TT2201-061801	6/18/01	3:30:00 PM	sediment
019981	D03201 IPSD-TT1203-061901	6/19/01	9:45:00 AM	Sediment
019982	D03206 IPSD-TT2903-061901	6/19/01	11:30:00 AM	Sediment
019983	D03211 IPSD-TT1901-061901	6/19/01	2:30:00 PM	Sediment
020001	D03387 IPSD-TT3302-062001	6/20/01	11:20:00 AM	Sediment
020002	D03392 IPSD-TT3202-062001	6/20/01	2:10:00 PM	Sediment
020012	D03396 IPSD-WW06-062101	6/21/01	9:12:00 AM	Sediment
020013	D03401 IPSD-TT1802-062101	6/21/01	2:30:00 PM	Sediment
020024	D03407 IPSD-TT1002-062201	6/22/01	8:45:00 AM	Sediment
020025	D03412 IPSD-TT1301-062201	6/22/01	10:46:00 AM	Sediment
020026	D03417 IPSD-TT3001-062201	6/22/01	1:25:00 PM	Sediment
020039	D03424 IPSD-PPO3-062501	6/25/01	10:10:00 AM	Sediment
020040	D03429 IPSD-TTSA01-062501	6/25/01	1:50:00 PM	Sediment
020041	D03476 IPSD-TTSD01-062501	6/25/01	4:30:00 PM	Sediment
020072	D03486 IPSD-TT04-062601	6/26/01	9:15:00 AM	Sediment
020073	D03491 IPSD-HB00-062601	6/26/01	11:55:00 AM	Sediment
020074	D03496 IPSD-TT0603-062601	6/26/01	2:50:00 PM	Sediment
020118	D03504 IPSD-TTUF02-062701	6/27/01	9:50:00 AM	Sediment
020119	D03510 IPSD-TTUF03-062701	6/27/01	11:25:00 AM	Sediment

Submitted By: _____

Aquatec Biological Sciences

Ecology | Environmental Toxicology | Natural Resource Assessments | Microbiology

Quality Assurance Report

Tetra Tech NUS Inc	Date:	8/31/01
55 Jonspin Road	Project:	01032
	SDG	5286
Wilmington, MA 01887-1062	Site:	N0564-0322

Qualifiers and Special Conditions

Renewal water:
Water used for the twice-daily renewal of overlying water was a 1:1 mixture of Lake Champlain water and laboratory-prepared reconstituted water, with the exception that on July 21 and July 22, 2001 the renewals were completed with a 1:3 mix and the midnight renewal of July 22 consisted of reconstituted water only.

Temperature monitoring:
The automated temperature monitoring system was not activated until July 11, 2001 for the Hyalella azteca chronic tests (Carts 8, 9, 10, 12, 13). Water bath temperature was monitored at least once, but usually twice daily with a hand-held thermometer throughout the duration of the tests – both before and during the operation of the automated system. The manual temperature measurements were recorded on the Daily Checklist included in the data package. The printout for the automated temperature data (July 11 – August 18, 2001) is also included in the data package. Four anomalous temperature events (19.3C on August 4; 18.7C on August 11; 18.3C and 20.0C on August 14, 2001) were believed to be artifacts of temporary movement of temperature sensors out of the testing system during days of biological monitoring (e.g. Days 28, 35, or 42) and they are not included in the range and average of automated temperature measurements.

Qualifiers regarding individual samples and test replicates:
Several test replicates apparently had one or more extra amphipods added when the test was started. The affected test replicates include: Sample 19971 (D03193) Replicate G (eleven amphipods); Sample19982 (D03201) Replicate B (eleven amphipods); Sample 20001 (D03387) Replicate D (eleven amphipods); 20012 (D03396) Replicate L (eleven amphipods); Sample 20013 (D03401) Replicate I (twelve amphipods); and, Sample 20041 (D03476) Replicate D (twenty amphipods). The data for these replicates were tabulated and reported as recorded.

273 Commerce Street, Williston, VT 05495 Tel: 802.860.1638 Fax: 802.658.3189

Quality Assurance Report

Tetra Tech NUS Inc		Date:	8/31/01
55 Jonspin Road		Project:	01032
		SDG	5286
Wilmington, MA	01887-1062	Site:	N0564-0322

Qualifiers and Special Conditions

In several instances a higher number of amphipods was recorded as surviving than was recorded on a previous observation. When this occurred it was assumed that a counting error might have occurred on the earlier assessment date. For data tabulation and reporting, the observation of number surviving at the earlier date was increased to equal the highest number surviving at a later observation date. The affected test replicates included Sample19982 (D03201) Replicate B; Sample 20001 (D03387) Replicate D; Sample 20013 (D03401) Replicate D; Sample 20025 (D03412) Replicate D; Sample 20026 (D03417) Replicate E; Sample 20026 Replicate G; Sample 20038 (Control) Replicate B; Sample 20041 (D03476) Replicate A; Sample 20072 (D03486) Replicate C; Sample 20072 (D03486) Replicate H; and, Sample 20119 (D03510) Replicate D.

Sample 19972 (D03198) – Some replicates of this sample exhibited a peculiarity whereby the sediment was observed to float. Possibly gases resulting from biological degradation within the sediment affected the buoyancy of the sediment mass. When this phenomenon was observed, the sediments were re-submerged.

Sample 19972 (D03198) Replicate E – This replicate was accidentally tipped over on Day 10 of the test, with the possible loss of test organisms. This test replicate was excluded from data analysis

Sample19981 (D03201) Replicate F and Sample 19982 (D03201) Replicate D – No surviving amphipods were recovered from these replicates. Possibly amphipods were inadvertently not distributed to these replicates on Day 0, however the data were tabulated and reported as recorded.

In two instances the number of surviving amphipods was higher (by one amphipod) than the number recorded for the dry weight determination. One amphipod for each of these replicates may have been lost during the transfer to holding cups or weigh pans. The affected replicates included Sample 19983 (D03211) Replicate L on Day 28 and Sample 20012 (D03396) Replicate I on Day 28. In these cases the data were used as recorded

Sample 20038 (Control) Replicate G – Eight amphipods were recovered on Day 28, however one amphipod was accidentally killed during transfer to a holding cup. Eight amphipods were reported as surviving on Day 28.

Quality Assurance Report

Tetra Tech NUS Inc		Date:	8/31/01
55 Jonspin Road		Project:	01032
		SDG	5286
Wilmington, MA	01887-1062	Site:	N0564-0322

Qualifiers and Special Conditions

Sample 20038 (Control) Replicate I – This test replicate was accidentally tipped over after adding organisms on Day 0, resulting in the possible loss of test organisms. An additional 10 amphipods were added to the replicate on Day 0. Sixteen amphipods were recovered on Day 28, however this replicate was excluded from data tabulation and data analysis because of uncertainty regarding the number of amphipods allocated to the replicate on Day 0.

Sample 20074 (D03496) Replicate A – On Day 35 the number of neonates was inadvertently not recorded. For data tabulation and reporting it was assumed that no neonates were present on Day 35.

Sample 20118 (D03504) Replicates E and F – On Day 42 Replicate E had eight amphipods recovered and Replicate F had nine recovered. When the amphipods were transferred for weighing, Replicate E had seven amphipods while Replicate F had 10 amphipods. It appears that an amphipod from Replicate E got transferred to Replicate F. The Day 42 survival and dry weight data were tabulated and reported as recorded.

Sample 20119 (D03510) Replicate A – Nine amphipods were recorded as surviving on Day 28, while no amphipods were recorded as surviving on Day 35. This replicate was excluded from data tabulation and reporting due to uncertainty regarding the loss of or possible mortality of the amphipods in this replicate.

A sample designated as 20204 on the data forms was a locally-collected experimental sediment sample that was not a part of the Tetra Tech NUS study. The data for this sample were not reported.

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019971 Sample Name: D03193 IPSD-WHO7-061 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	10					9	22	9	14	36	5	7.2	39.87	44.65	9	0.53
B	10	10					9	20	9	29	49	5	9.8	42.32	47.95	9	0.63
C	10	9					8	24	8	40	64	5	12.8	41.21	46.06	8	0.61
D	10	10					10	10	10	43	53	7	7.6	37.70	42.92	10	0.52
E	10	9					9	12	8	20	32	4	8.0	42.13	46.10	8	0.50
F	10	10					10	4	10	8	12	4	3.0	43.34	48.80	10	0.55
G	11	11					11	16	10	7	23	6	3.8	45.25	48.74	10	0.35
H	10	8					8	31	8	6	37	5	7.4	41.67	45.65	8	0.50
I	10	10	45.36	48.65	10	0.33											
J	10	10	41.31	45.41	10	0.41											
K	10	10	41.32	44.32	10	0.30											
L	10	9	39.19	43.07	9	0.43											

Mean Proportion Surviving on Day 28: 0.96
Mean Proportion Surviving on Day 35: 0.91
Mean Proportion Surviving on Day 42: 0.89

Mean Growth (mg) on Day 28: 0.37
Mean Growth (mg) on Day 42: 0.52

Mean Neonates Per Female on Days 35 and 42: 7.45

900006

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019972 Sample Name: D03198 IPSD-TT2201-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	8					8	21	8	37	58	3	19.3	43.98	48.97	8	0.62
B	10	10					10	2	10	32	34	7	4.9	41.38	46.76	10	0.54
C	10	9					9	16	9	7	23	2	11.5	38.34	44.07	9	0.64
D	10	8					7	13	7	7	20	3	6.7	46.32	50.84	7	0.65
F	10	9					9	21	9	21	42	4	10.5	39.85	46.74	9	0.77
G	10	7					7	12	7	8	20	2	10.0	41.66	46.61	7	0.71
H	10	10					10	12	8	22	34	5	6.8	40.31	44.05	8	0.47
I	10	7	47.53	51.99	7	0.64											
J	10	9	51.19	56.40	9	0.58											
K	10	9	43.70	48.36	9	0.52											
L	10	9	37.74	43.01	9	0.59											

Mean Proportion Surviving on Day 28: 0.86
Mean Proportion Surviving on Day 35: 0.86
Mean Proportion Surviving on Day 42: 0.83

Mean Growth (mg) on Day 28: 0.58
Mean Growth (mg) on Day 42: 0.63

Mean Neonates Per Female on Days 35 and 42: 9.95

000007

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019981 Sample Name: D03201 IPSD-TT1203-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	7					7	15	7	20	35	5	7.0	39.44	42.50	7	0.44
B	10	9					9	11	9	13	24	6	4.0	41.34	45.01	9	0.41
C	10	10					10	1	10	5	6	3	2.0	37.23	41.66	10	0.44
D	10	10					9	12	9	13	25	5	5.0	41.73	45.66	9	0.44
E	10	10					10	6	10	10	16	5	3.2	42.75	47.22	10	0.45
F	10	0															
G	10	10					10	19	10	14	33	6	5.5	42.28	46.93	10	0.47
H	10	7					7	15	7	10	25	3	8.3	40.17	43.97	7	0.54
I	10	10	46.88	49.75	10	0.29											
J	10	8	46.95	49.39	8	0.30											
K	10	10	53.20	56.12	10	0.29											
L	10	8	48.31	50.83	8	0.32											

Mean Proportion Surviving on Day 28: 0.83
Mean Proportion Surviving on Day 35: 0.89
Mean Proportion Surviving on Day 42: 0.89

Mean Growth (mg) on Day 28: 0.30
Mean Growth (mg) on Day 42: 0.45

Mean Neonates Per Female on Days 35 and 42: 5.00

800000

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019982 Sample Name: D03206 IPSD-TT2903-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	8					8	1	8	5	6	2	3.0	40.20	43.74	8	0.44
B	11	11					11	12	11	3	15	5	3.0	42.32	46.81	11	0.41
C	10	9					9	1	8	9	10	2	5.0	38.97	42.78	8	0.48
D	10	0							0								
E	10	8					7	24	7	14	38	4	9.5	38.49	42.57	7	0.58
F	10	8					8	10	8	4	14	2	7.0	39.94	44.26	8	0.54
G	10	9					9	12	9	16	28	5	5.6	38.41	42.79	9	0.49
H	10	10					10	11	9	34	45	6	7.5	39.71	44.19	9	0.50
I	10	9	43.45	46.20	9	0.31											
J	10	9	42.67	45.01	9	0.26											
K	10	8	41.05	43.88	8	0.35											
L	10	9	43.76	46.12	9	0.26											

Mean Proportion Surviving on Day 28: 0.81
Mean Proportion Surviving on Day 35: 0.87
Mean Proportion Surviving on Day 42: 0.84

Mean Growth (mg) on Day 28: 0.30
Mean Growth (mg) on Day 42: 0.49

Mean Neonates Per Female on Days 35 and 42: 5.80

600000

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019983 Sample Name: D03211 IPSD-TT1901-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	9					8	4	8	9	13	3	4.3	38.76	43.23	8	0.56
B	10	10					9	6	8	2	8	2	4.0	39.64	43.42	8	0.47
C	10	9					9	0	9	19	19	5	3.8	36.83	40.51	9	0.41
D	10	10					10	18	10	13	31	6	5.2	41.57	46.33	10	0.48
E	10	9					9	7	9	5	12	4	3.0	39.49	43.97	9	0.50
F	10	9					9	9	9	4	13	3	4.3	38.52	43.62	9	0.57
G	10	10					10	0	10	17	17	5	3.4	38.43	42.86	10	0.44
H	10	9					9	5	9	7	12	3	4.0	38.80	43.17	9	0.49
I	10	9	43.59	47.23	9	0.40											
J	10	8	50.05	53.03	8	0.37											
K	10	8	47.86	50.64	8	0.35											
L	10	10	46.59	50.98	9	0.49											

Mean Proportion Surviving on Day 28: 0.92
Mean Proportion Surviving on Day 35: 0.91
Mean Proportion Surviving on Day 42: 0.90

Mean Growth (mg) on Day 28: 0.40
Mean Growth (mg) on Day 42: 0.49

Mean Neonates Per Female on Days 35 and 42: 4.00

000010

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020001 Sample Name: D03387 IPSD-TT3302-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	10					10	18	9	17	35	5	7.0	39.73	44.20	9	0.50
B	10	9					8	7	8	14	21	5	4.2	41.59	45.45	8	0.48
C	10	9					9	5	9	6	11	3	3.7	40.75	44.99	9	0.47
D	11	11					11	8	11	11	19	5	3.8	42.68	48.36	11	0.52
E	10	9					9	9	7	4	13	4	3.3	41.95	45.34	7	0.48
F	10	6					6	4	6	10	14	2	7.0	42.33	46.22	6	0.65
G	10	9					9	9	9	10	19	3	6.3	41.42	46.08	9	0.52
H	10	10					10	10	10	39	49	6	8.2	42.41	47.74	10	0.53
I	10	9	43.85	47.09	9	0.36											
J	10	10	37.57	41.55	10	0.40											
K	10	9	37.07	40.98	9	0.43											
L	10	9	41.88	45.28	9	0.38											

Mean Proportion Surviving on Day 28: 0.91
Mean Proportion Surviving on Day 35: 0.89
Mean Proportion Surviving on Day 42: 0.85

Mean Growth (mg) on Day 28: 0.39
Mean Growth (mg) on Day 42: 0.52

Mean Neonates Per Female on Days 35 and 42: 5.43

000011

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020002 Sample Name: D03392 IPSD-TT3202-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	10					10	15	10	12	27	5	5.4	37.31	41.60	10	0.43
B	10	9					9	19	9	35	54	8	6.8	40.39	44.68	9	0.48
C	10	10					9	7	8	22	29	4	7.3	35.45	39.34	8	0.49
D	10	8					8	14	8	12	26	5	5.2	41.63	45.39	8	0.47
E	10	8					8	5	7	15	20	3	6.7	39.66	43.01	7	0.48
F	10	7					7	1	7	6	7	2	3.5	42.10	46.80	7	0.67
G	10	9					9	4	9	11	15	3	5.0	38.13	43.00	9	0.54
H	10	3					3		3					41.40	43.86	3	0.82
I	10	5	43.51	45.54	5	0.41											
J	10	7	48.59	51.75	7	0.45											
K	10	10	47.45	50.17	10	0.27											
L	10	9	44.75	47.44	9	0.30											

Mean Proportion Surviving on Day 28: 0.79
Mean Proportion Surviving on Day 35: 0.79
Mean Proportion Surviving on Day 42: 0.76

Mean Growth (mg) on Day 28: 0.36
Mean Growth (mg) on Day 42: 0.55

Mean Neonates Per Female on Days 35 and 42: 5.68

210000

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020012 Sample Name: D03396 IPSD-WW06-062 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	9					9	15	8	8	23	3	7.7	38.96	43.55	8	0.57
B	10	10					9	3	8	8	11	2	5.5	39.20	44.98	8	0.72
C	10	10					10	24	10	15	39	6	6.5	40.81	45.78	10	0.50
D	10	10					10	0	10	4	4	3	1.3	41.16	45.84	10	0.47
E	10	8					8	0	8	6	6	2	3.0	41.74	46.66	8	0.61
F	10	10					10	12	10	18	30	5	6.0	41.08	45.71	10	0.46
G	10	8					8	12	8	25	37	4	9.3	42.51	47.57	8	0.63
H	10	10					10	9	10	12	21	5	4.2	38.31	43.99	10	0.57
I	10	9	46.95	50.45	8	0.44											
J	10	9	46.32	50.68	9	0.48											
K	10	9	55.16	59.37	9	0.47											
L	11	11	46.53	50.36	11	0.35											

Mean Proportion Surviving on Day 28: 0.93
Mean Proportion Surviving on Day 35: 0.93
Mean Proportion Surviving on Day 42: 0.90

Mean Growth (mg) on Day 28: 0.43
Mean Growth (mg) on Day 42: 0.57

Mean Neonates Per Female on Days 35 and 42: 5.43

000013

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020013 Sample Name: D03401 IPSD-TT1802-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	7					6	8	6	16	24	4	6.0	42.21	45.88	6	0.61
B	10	8					8	1	8	3	4	4	1.0	43.83	47.63	8	0.47
C	10	10					9	2	9	4	6	3	2.0	40.82	45.31	9	0.50
D	10	10					8	6	8	9	15	3	5.0	40.97	45.46	8	0.56
E	10	9					9	11	9	10	21	5	4.2	38.74	43.40	9	0.52
F	10	10					10	6	10	12	18	5	3.6	36.37	40.77	10	0.44
G	10	7					7	2	7	10	12	4	3.0	37.87	41.83	7	0.57
H	10	10					10	2	9	1	3	2	1.5	39.05	44.49	9	0.60
I	12	12	40.73	43.19	12	0.20											
J	10	9	51.57	54.64	9	0.34											
K	10	9	43.56	46.20	9	0.29											
L	10	10	47.79	50.77	10	0.30											

Mean Proportion Surviving on Day 28: 0.91
Mean Proportion Surviving on Day 35: 0.84
Mean Proportion Surviving on Day 42: 0.83

Mean Growth (mg) on Day 28: 0.28
Mean Growth (mg) on Day 42: 0.53

Mean Neonates Per Female on Days 35 and 42: 3.29

000014

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020024 Sample Name: D03407 IPSD-TT1002-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	9					7	5	7	3	8	2	4.0	40.86	44.92	7	0.58
B	10	9					9	4	9	13	17	3	5.7	35.24	39.58	9	0.48
C	10	9					9	8	9	0	8	2	4.0	37.45	42.73	9	0.59
D	10	10					10	8	10	6	14	4	3.5	38.03	42.14	10	0.41
E	10	8					8	14	8	30	44	5	8.8	39.06	43.56	8	0.56
F	10	10					10	7	10	8	15	5	3.0	37.00	42.21	10	0.52
G	10	9					9	20	9	9	29	4	7.3	38.37	42.54	9	0.46
H	10	10					10	14	10	5	19	4	4.8	37.53	42.63	10	0.51
I	10	7	43.02	45.05	7	0.29											
J	10	10	46.16	48.77	10	0.26											
K	10	10	33.01	35.28	10	0.23											
L	10	10	37.11	40.28	10	0.32											

Mean Proportion Surviving on Day 28: 0.93
Mean Proportion Surviving on Day 35: 0.90
Mean Proportion Surviving on Day 42: 0.90

Mean Growth (mg) on Day 28: 0.27
Mean Growth (mg) on Day 42: 0.51

Mean Neonates Per Female on Days 35 and 42: 5.12

000015

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020025 Sample Name: D03412 IPSD-TT1301-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	9					8	3	8	5	8	3	2.7	45.70	49.79	8	0.51
B	10	5					5	0	5	9	9	1	9.0	46.19	49.76	5	0.71
C	10	8					7	11	7	13	24	4	6.0	49.57	53.68	7	0.59
D	10	7					7	4	7	3	7	4	1.8	45.73	49.50	7	0.54
E	10	9					8	19	6	9	28	3	9.3	43.08	46.20	6	0.52
F	10	7					7	4	7	5	9	2	4.5	37.52	41.18	7	0.52
G	10	8					8	5	8	8	13	4	3.3	39.61	43.92	8	0.54
H	10	8					8	6	8	4	10	5	2.0	47.56	51.62	8	0.51
I	10	4	44.77	46.07	4	0.32											
J	10	9	48.62	50.16	9	0.17											
K	10	5	45.54	47.96	5	0.48											
L	10	10	52.22	53.94	10	0.17											

Mean Proportion Surviving on Day 28: 0.74
Mean Proportion Surviving on Day 35: 0.73
Mean Proportion Surviving on Day 42: 0.70

Mean Growth (mg) on Day 28: 0.29
Mean Growth (mg) on Day 42: 0.56

Mean Neonates Per Female on Days 35 and 42: 4.81

000019

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020026 Sample Name: D03417 IPSD-TT3001-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	10					10	21	10	7	28	5	5.6	43.70	48.04	10	0.43
B	10	10					10	4	10	8	12	4	3.0	46.15	49.62	10	0.35
C	10	9					9	10	9	18	28	4	7.0	46.31	51.20	9	0.54
D	10	8					9	12	9	15	27	5	5.4	45.80	49.65	9	0.43
E	10	9					9	21	9	20	41	5	8.2	47.68	52.60	9	0.55
F	10	10					10	0	10	5	5	2	2.5	45.55	50.52	10	0.50
G	10	9					9	5	9	6	11	3	3.7	42.33	46.70	9	0.49
H	10	9					9	16	9	22	38	6	6.3	42.22	46.82	9	0.51
I	10	8	50.65	52.62	8	0.25											
J	10	8	41.76	44.98	8	0.40											
K	10	10	46.32	48.38	10	0.21											
L	10	8	42.71	44.03	8	0.16											

Mean Proportion Surviving on Day 28: 0.90
Mean Proportion Surviving on Day 35: 0.94
Mean Proportion Surviving on Day 42: 0.94

Mean Growth (mg) on Day 28: 0.25
Mean Growth (mg) on Day 42: 0.47

Mean Neonates Per Female on Days 35 and 42: 5.21

000017

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020038 Sample Name: Control Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	9					8	13	8	10	23	3	7.7	44.65	49.01	8	0.54
B	10	9					9	11	9	2	13	7	1.9	45.48	49.96	9	0.50
C	10	9					8	17	8	5	22	3	7.3	45.00	49.15	8	0.52
D	10	6					6	8	6	28	36	5	7.2	44.25	47.63	6	0.56
E	10	8					8	14	7	2	16	4	4.0	42.52	45.68	7	0.45
F	10	8					8	1	7	5	6	1	6.0	46.30	50.13	7	0.55
G	10	8					7	3	6	5	8	1	8.0	43.17	46.77	6	0.60
H	10	9					9	6	9	14	20	7	2.9	48.81	52.29	9	0.39
J	10	9	52.46	55.76	9	0.37											
K	10	6	45.07	47.19	6	0.35											
L	10	9	49.39	51.77	9	0.26											

Mean Proportion Surviving on Day 28: 0.82
Mean Proportion Surviving on Day 35: 0.79
Mean Proportion Surviving on Day 42: 0.75

Mean Growth (mg) on Day 28: 0.33
Mean Growth (mg) on Day 42: 0.51

Mean Neonates Per Female on Days 35 and 42: 5.61

000018

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020039 Sample Name: D03424 IPSD-PPO3-062 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	10					9	5	8	10	15	3	5.0	39.95	44.01	8	0.51
B	10	10					10	27	10	21	48	4	12.0	44.78	50.30	10	0.55
C	10	9					9	7	9	19	26	4	6.5	44.19	48.27	9	0.45
D	10	10					9	15	9	6	21	5	4.2	47.10	50.42	9	0.37
E	10	8					7	5	6	17	22	2	11.0	54.68	57.91	6	0.54
F	10	9					9	16	9	33	49	4	12.3	52.45	58.18	9	0.64
G	10	9					8	17	8	25	42	4	10.5	47.88	52.71	8	0.60
H	10	9					8	12	8	13	25	4	6.3	43.99	48.46	8	0.56
I	10	10	47.32	51.44	10	0.41											
J	10	9	49.19	53.57	9	0.49											
K	10	8	51.22	53.84	8	0.33											
L	10	9	56.30	60.69	9	0.49											

Mean Proportion Surviving on Day 28: 0.92
Mean Proportion Surviving on Day 35: 0.86
Mean Proportion Surviving on Day 42: 0.84

Mean Growth (mg) on Day 28: 0.43
Mean Growth (mg) on Day 42: 0.53

Mean Neonates Per Female on Days 35 and 42: 8.46

000019

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020040 Sample Name: D03429 IPSD-TTSA01-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	9					9	26	8	1	27	3	9.0	44.05	48.65	8	0.58
B	10	10					10	0	10	6	6	2	3.0	30.82	35.11	10	0.43
C	10	10					10	16	10	27	43	9	4.8	37.34	41.92	10	0.46
D	10	10					9	10	9	44	54	6	9.0	41.50	45.24	9	0.42
E	10	10					10	19	10	12	31	4	7.8	46.49	50.65	10	0.42
F	10	10					10	4	9	13	17	6	2.8	47.36	51.44	9	0.45
G	10	10					10	25	10	24	49	6	8.2	48.31	52.27	10	0.40
H	10	9					9	7	9	12	19	2	9.5	48.82	53.09	9	0.47
I	10	9	50.86	53.60	9	0.30											
J	10	10	51.99	55.86	10	0.39											
K	10	9	39.70	43.01	9	0.37											
L	10	10	43.24	48.16	10	0.49											

Mean Proportion Surviving on Day 28: 0.97
Mean Proportion Surviving on Day 35: 0.96
Mean Proportion Surviving on Day 42: 0.94

Mean Growth (mg) on Day 28: 0.39
Mean Growth (mg) on Day 42: 0.45

Mean Neonates Per Female on Days 35 and 42: 6.75

020000

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020041 Sample Name: D03476 IPSD-TTSD01-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	9					9	1	9	8	9	4	2.3	36.05	40.18	9	0.46
B	10	8					9	6	8	52	58	6	9.7	44.37	47.78	8	0.43
C	10	10					9	2	8	8	10	5	2.0	45.97	49.92	8	0.49
D	(20)	(20)					20	10	18	5	15	11	1.4	39.52	44.46	18	0.27
E	10	9					9	10	8	15	25	5	5.0	45.15	48.76	8	0.45
F	10	5					5	0	5	0	0	1	0.0	46.84	49.94	5	0.62
G	10	8					9	4	9	15	19	5	3.8	45.59	48.51	9	0.32
H	10	8					8	4	8	3	7	4	1.8	45.13	48.76	8	0.45
I	10	8	50.41	53.04	8	0.33											
J	10	10	56.58	59.08	10	0.25											
K	10	10	45.29	48.21	10	0.29											
L	10	9	43.73	46.84	9	0.35											

Mean Proportion Surviving on Day 28: 0.87
Mean Proportion Surviving on Day 35: 0.85
Mean Proportion Surviving on Day 42: 0.80

Mean Growth (mg) on Day 28: 0.30
Mean Growth (mg) on Day 42: 0.44

Mean Neonates Per Female on Days 35 and 42: 3.23

000091

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020072 Sample Name: D03486 IPSD-TT04-0626 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	10					10	11	9	34	45	8	5.6	42.11	46.46	9	0.48
B	10	10					10	6	10	11	17	4	4.3	43.29	48.55	10	0.53
C	10	10					10	8	10	31	39	7	5.6	37.82	41.40	10	0.36
D	10	7					7	3	7	3	6	1	6.0	40.82	44.56	7	0.53
E	10	9					8	2	8	6	8	3	2.7	42.38	45.98	8	0.45
F	10	9					7	2	7	1	3	1	3.0	40.69	43.62	7	0.42
G	10	10					8	18	8	6	24	7	3.4	42.66	45.73	8	0.38
H	10	10					10	15	10	18	33	6	5.5	40.60	44.58	10	0.40
I	10	8	50.03	52.89	8	0.36											
J	10	10	57.23	60.30	10	0.31											
K	10	9	46.79	50.62	9	0.43											
L	10	10	47.61	51.32	10	0.37											

Mean Proportion Surviving on Day 28: 0.93
Mean Proportion Surviving on Day 35: 0.88
Mean Proportion Surviving on Day 42: 0.86

Mean Growth (mg) on Day 28: 0.37
Mean Growth (mg) on Day 42: 0.44

Mean Neonates Per Female on Days 35 and 42: 4.51

220000

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020073 Sample Name: D03491 IPSD-HB00-0626 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	10					10	14	10	26	40	4	10.0	55.85	60.87	10	0.50
B	10	10					10	17	10	28	45	4	11.3	57.30	62.50	10	0.52
C	10	9					9	9	9	23	32	4	8.0	60.15	64.90	9	0.53
D	10	9					9	17	9	22	39	3	13.0	59.18	63.71	9	0.50
E	10	9					9	4	9	11	15	3	5.0	57.34	61.24	9	0.43
F	10	9					8	0	6	0	0	1	0.0	55.31	58.68	6	0.56
G	10	10					10	21	10	23	44	4	11.0	50.47	56.24	10	0.58
H	10	9					9	9	7	12	21	3	7.0	52.25	54.78	7	0.36
I	10	10	41.36	45.24	10	0.39											
J	10	3	39.22	41.27	3	0.68											
K	10	10	48.39	52.47	10	0.41											
L	10	9	41.54	45.08	9	0.39											

Mean Proportion Surviving on Day 28: 0.89
Mean Proportion Surviving on Day 35: 0.93
Mean Proportion Surviving on Day 42: 0.88

Mean Growth (mg) on Day 28: 0.47
Mean Growth (mg) on Day 42: 0.50

Mean Neonates Per Female on Days 35 and 42: 8.16

000023

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020074 Sample Name: D03496 IPSD-TT0603-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	9					9	0	9	8	8	6	1.3	44.05	48.00	9	0.44
B	10	7					7	3	7	1	4	3	1.3	52.48	55.94	7	0.49
C	10	10					9	13	9	19	32	6	5.3	53.76	57.66	9	0.43
D	10	9					9	11	9	4	15	2	7.5	42.07	45.95	9	0.43
E	10	6					6	16	6	42	58	5	11.6	44.91	49.70	6	0.80
F	10	7					7	5	7	5	10	2	5.0	43.00	45.81	7	0.40
G	10	10					10	24	10	3	27	6	4.5	42.23	46.65	10	0.44
H	10	10					10	13	10	20	33	7	4.7	46.57	50.72	10	0.42
I	10	6	34.50	36.30	6	0.30											
J	10	9	38.24	41.58	9	0.37											
K	10	10	37.21	40.22	10	0.30											
L	10	9	35.80	39.53	9	0.41											

Mean Proportion Surviving on Day 28: 0.85
Mean Proportion Surviving on Day 35: 0.84
Mean Proportion Surviving on Day 42: 0.84

Mean Growth (mg) on Day 28: 0.35
Mean Growth (mg) on Day 42: 0.48

Mean Neonates Per Female on Days 35 and 42: 5.16

000034

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020118 Sample Name: D03504 IPSD-TTUF02-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	10					9	20	9	19	39	6	6.5	44.55	48.49	9	0.44
B	10	9					8	7	8	16	23	6	3.8	40.17	43.44	8	0.41
C	10	10					9	8	9	7	15	3	5.0	47.17	51.18	9	0.45
D	10	10					10	14	10	29	43	9	4.8	45.66	49.53	10	0.39
E	10	10					8	11	8	10	21	3	7.0	45.70	48.58	7	0.41
F	10	10					9	18	9	7	25	3	8.3	50.01	54.97	10	0.50
G	10	10					9	13	9	2	15	4	3.8	43.21	47.33	9	0.46
H	10	9					8	5	8	3	8	2	4.0	46.24	49.93	8	0.46
I	10	10	32.58	36.47	10	0.39											
J	10	9	40.93	43.73	9	0,31											
K	10	10	31.55	34.86	10	0.33											
L	10	10	34.10	36.75	10	0.27											

Mean Proportion Surviving on Day 28: 0.98
Mean Proportion Surviving on Day 35: 0.88
Mean Proportion Surviving on Day 42: 0.88

Mean Growth (mg) on Day 28: 0.32
Mean Growth (mg) on Day 42: 0.44

Mean Neonates Per Female on Days 35 and 42: 5.40

520025

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020119 Sample Name: D03510 IPSD-TTUF03-06 Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	9															
B	10	9					9	20	9	9	29	4	7.3	45.72	50.48	9	0.53
C	10	8					7	3	7	9	12	3	4.0	43.40	46.54	7	0.45
D	10	9					9	11	8	18	29	3	9.7	44.94	48.79	8	0.48
E	10	10					8	14	8	23	37	4	9.3	46.87	51.13	8	0.53
F	10	10					9	13	9	20	33	5	6.6	45.60	49.73	9	0.46
G	10	10					10	0	10	7	7	3	2.3	49.32	53.21	10	0.39
H	10	9					9	2	9	12	14	2	7.0	47.81	51.58	9	0.42
I	10	9	57.47	61.70	9	0.47											
J	10	9	64.98	66.35	9	0.15											
K	10	10	58.69	62.12	10	0.34											
L	10	10	69.44	72.96	10	0.35											

Mean Proportion Surviving on Day 28: 0.93
Mean Proportion Surviving on Day 35: 0.87
Mean Proportion Surviving on Day 42: 0.86

Mean Growth (mg) on Day 28: 0.33
Mean Growth (mg) on Day 42: 0.47

Mean Neonates Per Female on Days 35 and 42: 6.59

000026

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 8/30/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020182 Sample Name: Control Method: 100.4HA Species: *Hyalella azteca*

Rep	Start Count	Total Surviving	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight	Total Surviving	Neonates	Total Surviving	Neonates	Total Neonates	Females	Neonates per Female	Initial Weight (mg)	Total Dry Weight (mg)	Weighed	Mean Replicate Weight
	0	28	28	28	28	28	35	35	42	42	35/42	42	42	42	42	42	42
A	10	8					5	0	5	2	2	3	0.7	44.61	46.82	5	0.44
B	10	10					7	9	6	15	24	3	8.0	60.69	62.74	6	0.34
C	10	10					9	17	7	9	26	4	6.5	58.37	60.75	7	0.34
D	10	9					8	7	5	6	13	3	4.3	48.57	50.24	5	0.33
E	10	7					5	3	5	2	5	1	5.0	59.80	61.92	5	0.42
F	10	9					9	3	8	6	9	2	4.5	56.04	59.08	8	0.38
G	10	9					5	5	5	2	7	4	1.8	44.41	46.22	5	0.36
H	10	10					9	0	9	2	2	4	0.5	44.88	47.78	9	0.32
I	10	10	53.22	55.52	10	0.23											
J	10	10	60.99	62.96	10	0.20											
K	10	10	59.19	61.21	10	0.20											
L	10	10	58.02	60.20	10	0.22											

Mean Proportion Surviving on Day 28: 0.93
Mean Proportion Surviving on Day 35: 0.71
Mean Proportion Surviving on Day 42: 0.63

Mean Growth (mg) on Day 28: 0.21
Mean Growth (mg) on Day 42: 0.37

Mean Neonates Per Female on Days 35 and 42: 3.91

000027

APPENDIX D.8

CHIRONOMUS TENTANS, LIFE CYCLE CHRONIC TOXICITY TESTS

Method 100.5SGR

Chironomus tentans chronic survival, growth, and reproduction

Associated Protocol:

Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates (EPA/600/R-99/064)

	Parameter	Conditions
1.	Test Type:	*Whole-sediment toxicity test with renewal of overlying water*
2.	Temperature:	Average bath temperature 23 +/- 1 C; Instantaneous temperature 23 +/- 3 C
3.	Light Quality:	Wide-spectrum fluorescent lights
4.	Illuminance:	~100 to 1000 lux
5.	Photoperiod:	16L:8D
6.	Test chamber:	300mL beaker
7.	Sediment volume:	100ml
8.	Overlying water volume:	175ml
9.	Renewal of overlying water:	2 volume addiitions/d
10.	Life stage of organisms:	<24-h-old larvae
11.	Organisms/test chamber:	12
12.	Replicates/sample:	16 (12 at day -1 and 4 for auxilary males on day 10)
13.	Feeding:	Tetrafin goldfish food, 1.5 ml daily to each chamber starting at day -1
14.	Aeration:	None, unless DO drops below 2.5mg/l
15.	Overlying water:	Reconstituted water
16.	Test chamber cleaning:	When screen clogs, gently brush the outside of the screen
17.	Overlying water quality:	Hardness, alkalinity, conductivity, and ammonia on day 0, day 20 and end of test. Water bath temperature daily. conductivity weekly and DO and pH three times per week.
18.	Test duration:	About 50 to 65d
19.	Endpoints:	20-d survival/growth; emergence, adult survival, eggs produced and hatching success
20.	Test acceptability:	Average size in the control on day 20 must be 0.48 gm AFDW/surviving organism

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Toxicity Summary Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/10/01
Project: 01032
SDG 5286
Site: N0564-0322

Method 100.5SGR Species: *Chironomus tentans*

Sample ID	Sample Name	Control Group	Mean Proportion Surviving		Mean Weight (mg) Growth
019971	D03193 IPSD-WHO7-061801	A	0.75		2.04
019972	D03198 IPSD-TT2201-061801	A	0.83		1.80
019981	D03201 IPSD-TT1203-061901	A	0.60		1.43
019982	D03206 IPSD-TT2903-061901	A	0.96		1.21
019983	D03211 IPSD-TT1901-061901	A	0.63		2.00
020001	D03387 IPSD-TT3302-062001	A	0.79		1.37
020002	D03392 IPSD-TT3202-062001	A	0.75		1.29
020012	D03396 IPSD-WW06-062101	A	0.96		1.70
020013	D03401 IPSD-TT1802-062101	A	0.65		1.90
020024	D03407 IPSD-TT1002-062201	A	0.42		2.47
020025	D03412 IPSD-TT1301-062201	A	0.56		1.71
020026	D03417 IPSD-TT3001-062201	A	0.85		1.66
020038	Control	A	0.65		1.35
020039	D03424 IPSD-PPO3-062501	B	0.56		3.04
020040	D03429 IPSD-TTSA01-062501	B	0.56		2.42
020041	D03476 IPSD-TTSD01-062501	B	0.58		2.40
020072	D03486 IPSD-TT04-062601	B	0.60		2.71
020073	D03491 IPSD-HB00-062601	B	0.06	*	2.96
020074	D03496 IPSD-TT0603-062601	B	0.15	*	2.64

000001

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Toxicity Summary Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/10/01
Project: 01032
SDG 5286
Site: N0564-322

Method 100.5SGR Species: *Chironomus tentans*

Sample ID	Sample Name	Control Group	Mean Proportion Surviving	Mean Weight (mg) Growth
020118	D03504 IPSD-TTUF02-062701	B	0.73	2.09
020119	D03510 IPSD-TTUF03-062701	B	0.54	2.69
020182	Control	B	0.58	1.96

* Indicates a statistically significant reduction (P<0.05) in the response relative to the corresponding response in the laboratory control sample.

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-322

Samples Received

Sample	Client Desciption	Date	Time	Matrix
019971	D03193 IPSD-WHO7-061801	6/18/01	11:30:00 AM	sediment
019972	D03198 IPSD-TT2201-061801	6/18/01	3:30:00 PM	sediment
019981	D03201 IPSD-TT1203-061901	6/19/01	9:45:00 AM	Sediment
019982	D03206 IPSD-TT2903-061901	6/19/01	11:30:00 AM	Sediment
019983	D03211 IPSD-TT1901-061901	6/19/01	2:30:00 PM	Sediment
020001	D03387 IPSD-TT3302-062001	6/20/01	11:20:00 AM	Sediment
020002	D03392 IPSD-TT3202-062001	6/20/01	2:10:00 PM	Sediment
020012	D03396 IPSD-WW06-062101	6/21/01	9:12:00 AM	Sediment
020013	D03401 IPSD-TT1802-062101	6/21/01	2:30:00 PM	Sediment
020024	D03407 IPSD-TT1002-062201	6/22/01	8:45:00 AM	Sediment
020025	D03412 IPSD-TT1301-062201	6/22/01	10:46:00 AM	Sediment
020026	D03417 IPSD-TT3001-062201	6/22/01	1:25:00 PM	Sediment
020039	D03424 IPSD-PPO3-062501	6/25/01	10:10:00 AM	Sediment
020040	D03429 IPSD-TTSA01-062501	6/25/01	1:50:00 PM	Sediment
020041	D03476 IPSD-TTSD01-062501	6/25/01	4:30:00 PM	Sediment
020072	D03486 IPSD-TT04-062601	6/26/01	9:15:00 AM	Sediment
020073	D03491 IPSD-HB00-062601	6/26/01	11:55:00 AM	Sediment
020074	D03496 IPSD-TT0603-062601	6/26/01	2:50:00 PM	Sediment
020118	D03504 IPSD-TTUF02-062701	6/27/01	9:50:00 AM	Sediment
020119	D03510 IPSD-TTUF03-062701	6/27/01	11:25:00 AM	Sediment

Submitted By: _____

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Toxicity Summary Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Method 100.5SGR Species: *Chironomus tentans*

Sample ID	Sample Name	Control Group	Mean Proportion Emerged		Mean Days to Emergence		MeanDays to Mortality
019971	D03193 IPSD-WHO7-061801	A	0.83		28.3		4.6
019972	D03198 IPSD-TT2201-061801	A	0.75		31.2		4.6
019981	D03201 IPSD-TT1203-061901	A	0.49		30.6		4.6
019982	D03206 IPSD-TT2903-061901	A	0.60		30.9		4.5
019983	D03211 IPSD-TT1901-061901	A	0.67		29.2		4.5
020001	D03387 IPSD-TT3302-062001	A	0.73		38.0	*	3.8
020002	D03392 IPSD-TT3202-062001	A	0.72		37.1	*	4.5
020012	D03396 IPSD-WW06-062101	A	0.81		29.5		4.9
020013	D03401 IPSD-TT1802-062101	A	0.63		35.5	*	4.6
020024	D03407 IPSD-TT1002-062201	A	0.40		27.3		4.4
020025	D03412 IPSD-TT1301-062201	A	0.70		37.6	*	4.5
020026	D03417 IPSD-TT3001-062201	A	0.60		29.3		5.1
020038	Control	A	0.21		29.3		3.5
020039	D03424 IPSD-PPO3-062501	B	0.38		21.8		2.7
020040	D03429 IPSD-TTSA01-062501	B	0.63		24.6		2.7
020041	D03476 IPSD-TTSD01-062501	B	0.54		25.0		2.8
020072	D03486 IPSD-TT04-062601	B	0.53		22.2		3.4
020073	D03491 IPSD-HB00-062601	B	0.15	*	21.7		2.9
020074	D03496 IPSD-TT0603-062601	B	0.09	*	25.6		3.4
020118	D03504 IPSD-TTUF02-062701	B	0.46		26.0		2.9
020119	D03510 IPSD-TTUF03-062701	B	0.26	*	26.8		3.0
020182	Control	B	0.44		24.6		3.2

* Indicates a statistically significant difference (P<0.05) in the response relative to the corresponding response in the laboratory control sample.

000004

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Toxicity Summary Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/10/01
Project: 01032
SDG 5286
Site: N0564-322

Samples Received

Sample	Client Desciption	Date	Time	Matrix
019971	D03193 IPSD-WHO7-061801	6/18/01	11:30:00 AM	sediment
019972	D03198 IPSD-TT2201-061801	6/18/01	3:30:00 PM	sediment
019981	D03201 IPSD-TT1203-061901	6/19/01	9:45:00 AM	Sediment
019982	D03206 IPSD-TT2903-061901	6/19/01	11:30:00 AM	Sediment
019983	D03211 IPSD-TT1901-061901	6/19/01	2:30:00 PM	Sediment
020001	D03387 IPSD-TT3302-062001	6/20/01	11:20:00 AM	Sediment
020002	D03392 IPSD-TT3202-062001	6/20/01	2:10:00 PM	Sediment
020012	D03396 IPSD-WW06-062101	6/21/01	9:12:00 AM	Sediment
020013	D03401 IPSD-TT1802-062101	6/21/01	2:30:00 PM	Sediment
020024	D03407 IPSD-TT1002-062201	6/22/01	8:45:00 AM	Sediment
020025	D03412 IPSD-TT1301-062201	6/22/01	10:46:00 AM	Sediment
020026	D03417 IPSD-TT3001-062201	6/22/01	1:25:00 PM	Sediment
020039	D03424 IPSD-PPO3-062501	6/25/01	10:10:00 AM	Sediment
020040	D03429 IPSD-TTSA01-062501	6/25/01	1:50:00 PM	Sediment
020041	D03476 IPSD-TTSD01-062501	6/25/01	4:30:00 PM	Sediment
020072	D03486 IPSD-TT04-062601	6/26/01	9:15:00 AM	Sediment
020073	D03491 IPSD-HB00-062601	6/26/01	11:55:00 AM	Sediment
020074	D03496 IPSD-TT0603-062601	6/26/01	2:50:00 PM	Sediment
020118	D03504 IPSD-TTUF02-062701	6/27/01	9:50:00 AM	Sediment
020119	D03510 IPSD-TTUF03-062701	6/27/01	11:25:00 AM	Sediment

Submitted By: _____

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Toxicity Summary Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/10/01
Project: 01032
SDG 5286
Site: N0564-0322

Method 100.5SGR Species: *Chironomus tentans*

Sample ID	Sample Name	Control Group	Mean Egg Count	Mean Egg Hatch Count	Mean Proportion Hatched	
019971	D03193 IPSD-WHO7-061801	A	1098	876	0.72	*
019972	D03198 IPSD-TT2201-061801	A	1153	1097	0.87	
019981	D03201 IPSD-TT1203-061901	A	1172	1287	0.88	
019982	D03206 IPSD-TT2903-061901	A	1208	1105	0.81	
019983	D03211 IPSD-TT1901-061901	A	1108	960	0.73	*
020001	D03387 IPSD-TT3302-062001	A	1128	895	0.70	*
020002	D03392 IPSD-TT3202-062001	A	1163	949	0.77	*
020012	D03396 IPSD-WW06-062101	A	1247	1126	0.90	
020013	D03401 IPSD-TT1802-062101	A	1248	1252	0.92	
020024	D03407 IPSD-TT1002-062201	A	880	661	0.84	
020025	D03412 IPSD-TT1301-062201	A	1098	946	0.74	
020026	D03417 IPSD-TT3001-062201	A	954	918	0.79	
020038	Control	A	919	866	0.94	
020039	D03424 IPSD-PPO3-062501	B	1128	1309	0.96	
020040	D03429 IPSD-TTSA01-062501	B	1208	1060	0.87	
020041	D03476 IPSD-TTSD01-062501	B	1570	1523	0.89	
020072	D03486 IPSD-TT04-062601	B	716	808	0.60	
020073	D03491 IPSD-HB00-062601	B	1440	1195	0.66	
020074	D03496 IPSD-TT0603-062601	B	995			
020118	D03504 IPSD-TTUF02-062701	B	1164	1263	0.87	
020119	D03510 IPSD-TTUF03-062701	B	1169	1420	0.98	
020182	Control	B	864	337	0.49	

* Indicates a statistically significan reduction ($P<0.05$) in the response relative to the corresponding response in the laboratory control sample.

000006

273 Commerce Street, Williston, VT 05495 Tel: 802.860.1638 Fax: 802.658.3189

Toxicity Summary Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-322

Samples Received

Sample	Client Desciption	Date	Time	Matrix
019971	D03193 IPSD-WHO7-061801	6/18/01	11:30:00 AM	sediment
019972	D03198 IPSD-TT2201-061801	6/18/01	3:30:00 PM	sediment
019981	D03201 IPSD-TT1203-061901	6/19/01	9:45:00 AM	Sediment
019982	D03206 IPSD-TT2903-061901	6/19/01	11:30:00 AM	Sediment
019983	D03211 IPSD-TT1901-061901	6/19/01	2:30:00 PM	Sediment
020001	D03387 IPSD-TT3302-062001	6/20/01	11:20:00 AM	Sediment
020002	D03392 IPSD-TT3202-062001	6/20/01	2:10:00 PM	Sediment
020012	D03396 IPSD-WW06-062101	6/21/01	9:12:00 AM	Sediment
020013	D03401 IPSD-TT1802-062101	6/21/01	2:30:00 PM	Sediment
020024	D03407 IPSD-TT1002-062201	6/22/01	8:45:00 AM	Sediment
020025	D03412 IPSD-TT1301-062201	6/22/01	10:46:00 AM	Sediment
020026	D03417 IPSD-TT3001-062201	6/22/01	1:25:00 PM	Sediment
020039	D03424 IPSD-PPO3-062501	6/25/01	10:10:00 AM	Sediment
020040	D03429 IPSD-TTSA01-062501	6/25/01	1:50:00 PM	Sediment
020041	D03476 IPSD-TTSD01-062501	6/25/01	4:30:00 PM	Sediment
020072	D03486 IPSD-TT04-062601	6/26/01	9:15:00 AM	Sediment
020073	D03491 IPSD-HB00-062601	6/26/01	11:55:00 AM	Sediment
020074	D03496 IPSD-TT0603-062601	6/26/01	2:50:00 PM	Sediment
020118	D03504 IPSD-TTUF02-062701	6/27/01	9:50:00 AM	Sediment
020119	D03510 IPSD-TTUF03-062701	6/27/01	11:25:00 AM	Sediment

Submitted By: _____

Qualifiers and Conditions

Tetra Tech NUS Inc	Date:	10/8/01
55 Jonspin Road	Project:	01032
	SDG:	5286
Wilmington, MA 01887-1062	Site:	N0564-0322

Method 100.5SGR Species: *Chironomus tentans*

Explanation of codes for Detail Report

Certain abbreviations (codes) were used for reporting results (Detail Reports)

Life stage: A=adult, P=pupa, L=larva, P=pupa;
Emergence status: C=complete emergence, E=early emergence or escaped, P=partial, L=larva (did not emerge), N=did not emerge;
Sex: M=male, F=female
Egg case preparation: R=ring count method, D=direct egg count, A=direct count of acidified eggs.

Testing groups

The *Chironomus tentans* chronic tests were conducted as two testing groups. Testing group "A" was conducted concurrently with Control A (Sample 20038) and included samples 19971 (D03193), 19972 D03198), 19981 (D03201), 19982 (D03206), 19983 (D03211), 20001 (D03387), 20002 (D03392), 20012, (D03396), 20013 (D03401), 20024(D03407), 20025 (D03412), and 20026 (D03417). Group A tests were started on June 27, 2001, and the last sample from this group was completed on August 30, 2001. Control A (Sample 20038) was ended with the last sample on August 30, 2001. Sample 20087 was experimental natural sediment, not included as part of the study.

Testing Group "B" was conducted concurrently with Control B (Sample 20182) and included samples 20039 (D03424), 20040 (D03429), 20041 (D03476), 20072 (D03486), 20074 (D03496), 20118 (D03504), and 20119 (D03496). Samples tested as Group B were started on July 11, 2001, and the last sample from this group was completed on September 5, 2001. Control B (Sample 20182) was ended with the last sample on September 5, 2001. Sample 20204 was experimental natural sediment, not included as part of the study.

Early emergence

Emergence traps were installed Day 20, as specified in the USEPA test protocol for Method 100.5. For the Group A tests, early emergence (before the Day 20 assessment) was observed for some replicates terminated on Day 20 for the survival and growth (ash-free-dry weight) assessment. In some replicates body casts of emerged flies were present, indicating that flies had emerged prior to the assessment on Day 20 even though test temperatures were within the range specified by the protocol. For those replicates where body casts were observed,

it was assumed that the larva had survived and it was included in the Day 20 survival count but it was not included the growth analysis. The affected replicates included 19972 J (D03198) (1 emergent), 19972 L (D03198) (1 emergent). Other replicates of group A had pupae present on Day 20. The pupae were scored as alive but were not included in the growth analysis. The affected replicates included 19983 I and L (D03211)) (1 pupa each), 20024 K (D03407) (1 pupa).

Emergence traps were placed on the Group B tests on Days 18 and 19 (1-2 days earlier than specified in the USEPA protocol), however some pupation and emergence had already occurred even though test temperatures were within the range specified by the protocol. The affected samples included 20039 (D03424) replicates I (4 pupae, 1 emergent), J (1 pupa, 2 emergent), K (3 emergent), and L (1 emergent); 20040 (D03429) J (2 pupae, 1 emergent), K (2 pupae, 2 emergent), L (1 emergent); 20041 (D03476) I (3 pupae), J (1 pupa), K (1 emergent), L (1 pupa); 20072 (D03486) I (1 pupa), J (1 pupa, 4 emergent), K (2 pupae, 1 emergent); L (2 pupae, 1 emergent); 20073 (D03491) I (1 emergent), L (1 emergent); 20118 I (1 pupa), J (1 emergent), K (1 pupa), L (1 pupa); 20119 (D03510) J (1 pupa), K (3 pupae), L (1 pupa): and, 20182 (Control) J (2 pupae, 1 emergent); K (3 pupae, 1 emergent), and L (2 pupae). Pupae and emergent flies were included in the Day 20 survival count but were not included in the ash-free dry weight determinations. It is possible that early emergence occurred in other replicates (Replicates A-H) that were continued for the life-cycle test. Some early-emerging larvae may not have been accounted for.

Controls not ended using 7-d criterion

The control replicates were allowed to continue until the last sample was ended, (using the 7-days with no emergence criterion for the last test sample).

End-of-test final chemistry

Sediments for samples 20024 (D03407), 20026 (D03412), and 20074 (D03496) were sieved on August 18, 2001, to recover larvae that had not emerged (no emergence for 7 successive days) at the end of the test. Sub-samples of overlying water for final chemistry parameters of pH, conductivity, alkalinity, hardness, and total ammonia were inadvertently not collected.

Standard reference toxicant tests

Standard reference toxicant (SRT) tests were performed with larvae from the culture batches used for testing. Larvae for the SRT tests were grown out for 8-9 days before SRT testing because LC50 data for the SRT control charts are based on organisms within the age range of 8-13 days. The LC50 for the sub-sample of larvae used to start the chronic tests on June 27, 2001 (Group A, SRT test date July 5, 2001) was within the control chart limits. The LC50 for the sub-sample of larvae used to start the chronic tests on July 11, 2001 (Group B, SRT test date July 19, 2001) was slightly below the control chart limits (LC50 3.16 g KCl, lower limit 3.51 g KCl). The control chart limits (two SD from the mean)

incorporate the statistical assumption that one in twenty tests will fall outside the control chart limits. It is possible that the larvae used to start the chronic toxicity tests on July 11, 2001 were more sensitive to the reference toxicant. Follow-up testing of another batch of organisms (larvae hatched on September 2, 2001, test date September 13, 2001) resulted in an LC50 within the control chart limits.

Extra renewals and suspension of feeding

Generally D.O. measurements were above 2.5 mg/L. In a few instances measurements of less than 2.5 mg/L were recorded. Periodic depressions below 2.5 mg/L (but not below 1.5 mg/L) are not likely to affect test results (EPA/600/R-99/064, page 89). The lowest recorded D.O. measurement for Group A was 1.9 mg/L. The lowest recorded D.O. measurement for Group B was 2.4 mg/L.

Extra daily overlying water renewals (3-4 renewals per day) and suspension of feeding were used to maintain D.O. at acceptable levels. Feeding was suspended on the following days: July 3 (Group A), July 10 (Group A), July 13 (Group A), July 18 (Group A/B), July 29 (Group A), August 4 (Group A/B), August 15 (Group A/B), August 17 (Group A/B), August 20 (Group A), August 29 (Group A/B), September 3 (Group B).

Generally D.O. measurements were above 2.5 mg/L. In a few instances measurements of less than 2.5 mg/L were recorded. Periodic depressions below 2.5 mg/L (but not below 1.5 mg/L) are not likely to affect test results (EPA/600/R-99/064, page 89). The lowest recorded D.O. measurement for Group A was 1.9 mg/L. The lowest recorded D.O. measurement for Group B was 2.4 mg/L.

End-of-test recovery of larvae

Group A: No additional larvae or pupa were recovered when replicates were sieved at the end of the test with the exception of sample 20025 (D03412) which had two surviving larvae that had not emerged.

Group B: No additional larvae or pupa were recovered with the exception of samples 20039 (D03424) (1 pupa), 20074 (D03496) (2 larvae), and 20182(Control) (2 larvae):

Emergence and fly mortality data

In some instances, recording errors or escaped flies apparently occurred during the collection, pairing, and monitoring of emerged flies. The following is a summary of known or suspected discrepancies and clarifications:

1) Even though emergence traps were placed on the Group B test replicates 1-2 days early, some flies escaped due to early emergence. Early emergence was detected by the presence of the residual body cast. These were included in the survival tabulation, however, mortality and reproduction data were not generated. The following test replicates were affected by early emergence: 20039 (D03424) A, C, E, F, G; 20040

(D03429) A, G; 20041 (D03476) C, G, H; 20072 (D03486) A, G; 20073 (D03491) H; and, 20119 (D03510) A.

2) Several flies escaped during collection or transfer to reproduction / holding chambers. These were included in the survival tabulation, however, mortality and reproduction data were not generated. The following test replicates were affected by escapement: 19971 (D03193) D; 19983 (D03211) A, C; 2001 (D03387) B; 20002 (D03392) D; 20012 (D03396) D, and, 20182 (Control) B.
3) In several instances, male/female pairings were not recorded. There may have been a lack of available males for pairing or early mortality of females (e.g., within one day) may have occurred before pairing could be accomplished. In some cases, the pairing information for paired flies was apparently not recorded. The following replicates were affected: 19972 (D03198) H; 19981 (D03201) G; 19982 (D03206) A, D; 20012 (D03396) D; 20024 (D03407) C, D; 20025 (D03412) C, G; 20026 (D03417) A; 20072 (D03486) E; 20074 (D03496) A, D, and, 20119 (D03510) H.
4) The date of mortality of some adults was inadvertently not recorded, therefore, time-to-mortality data were not generated. The following replicates were affected: 19971 (D03193) B; 20001 (D03387) E, G; and, 20118 (D03504) H.
5) The date of death was double recorded (with different dates) for several flies. In these instances either the first recorded date was used or the tracking tag information was used to assign our best judgment regarding the date of mortality. The following replicates were affected: 19981 (D03201) B; 19983 (D03211) A; and, 20118 (D03504) G.
6) Two replicates apparently had more than 12 larvae added when the test was started because 1-2 extra larvae/adults were recovered. The following replicates were affected: 19983 (D03211) B, D.
7) Flies were accidentally injured during transfers, therefore time-to-mortality data were not generated. The following replicates were affected: 20013 (D03401) F; and, 20041 (D03476) D; and, 20072 (D03486) F1.
8) Biomonitoring (fly collection) was inadvertently missed on two subsequent days (July 18, 19, 2001) for three test replicates. Flies that had emerged in these replicates were collected on July 20, 2001 and were assumed to have emerged on that day. The following replicates were affected: 19983 (D03211) H; 20001 (D03387) C; and, 20026 (D03417) D.
9) For Sample 20024 (D03407) Replicate H the emergence of fly #4 was apparently not recorded. A male fly labeled as 024H-4 died on August 4, 2001. It was assumed to have emerged on July 30, 2001, the same day as female fly #3 emerged.

Egg Data

Statistical analysis of egg data (number of eggs per egg case and proportion of eggs hatching) was based upon data from females yielding egg cases (i.e., females that did not produce an egg case were excluded).

In some instances, recording errors apparently occurred during the collection, preparation, and counting of eggs. The following is a summary of known or suspected discrepancies and clarification of some events:

1) Transcription or recording errors apparently occurred: For sample 19971 (D03193) A, female #9, a direct count of eggs was performed. The number of eggs recorded (4475) may have been incorrectly written. Direct egg counts were performed only on egg cases having a low number of eggs. In our best judgment, the number of eggs for this egg case was 475, which has been used for data analysis. For sample 19981 (D03201) B, female #4 the egg count data (deposit date 8/4/01) may have been misidentified on the Egg Count form as 19981 G4. 19981 G4 deposited an egg case on 7/31/01 (egg case data recorded) and died on 8/1/01. Data were re-assigned to 19981 B4. For sample 20002 (D03392) A6, egg count data was recorded for this fly, which was a male. The egg count data could not be traced to a female, therefore the data were not used.
2) The initial counts of eggs were apparently not recorded for some egg cases, therefore egg count and hatchability data were not used. The following replicate females were affected: 19971 (D03193) H7; 19972 (D03198) A7; 20025 (D03412) A5 and F5; and, 20039 (D03424) C2.
3) Egg counts may have been conducted on secondary egg cases because data for a preceding egg case had already been recorded. Data from egg cases believed to be secondary were not used. The following replicates were affected: 20002 (D03392) D8; and, 20024 (D03407) H3.
4) Egg hatching data were associated with a male rather than a female in three instances. For replicate 20002 (D03392) F5 egg hatching data were recorded on a note associated with 20002 D5, a male. It appears that the note was written in the wrong location. The data were re-assigned to female 20002 F5 that was missing egg-hatching data. For replicate 20013 (D03401) B2 egg case data was recorded for 20013 C2, a male. The data are believed to be associated with female 20013 B2 and have been re-assigned with the number of un-hatched eggs not recorded. This female was paired with 20013 C-2 on 7/29/01. For replicate 20025 (D03412) G7 egg count data were recorded for 20025 G6, a male paired with this female. The data were assumed to apply to female 20025 G7, deposited on 8/7/01.
5) Egg count data were apparently recorded twice for several flies: For replicate 19972 (D03198) F6/7 the data for 19972 F6 may have been misidentified. The direct count egg data recorded for an egg case deposited on 8/2/01 (for 19972 F7) were re-assigned to 19973 F6. For replicate 20012 (D03396) B7 the count of 259 eggs recorded on the egg count sheet was used. The count of 342 eggs recorded on the Biological Monitoring sheet was not used. For replicate 20024 (D03407) H7 egg count data for this female were recorded twice on the egg count data form (8/4/01). Data from the first line of data appearing on the form (for this female) were used and the second line of data for the same female was not used. For replicate 20025 (D03412) A10 two egg case counts were

recorded for this female. This female, along with female 20025 A9 were paired with the same male (20025 D3) in the same mating chamber. It is possible that a secondary egg case from 20025 A9 was incorrectly identified as 20025 A10. The egg case deposited on 8/11/01 was used for 20025 A10 and the egg case deposited on 8/10/01 was assumed to be a secondary egg case from 20025 A9.

6) For sample 20074 (D03496) only one egg case (acidified for counting) was produced, therefore hatchability data were not generated for this sample.

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019971 Sample Name: D03193 IPSD-WHO7-061 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	7	0.58	2239.22	2255.83	2240.34	7	2.213
J	12	9	0.75	2120.50	2144.89	2122.61	9	2.476
K	12	10	0.83	2386.16	2406.9	2387.94	10	1.896
L	12	10	0.83	2286.80	2304.07	2288.48	10	1.559
	Mean Surviving:		0.75			Mean Weight (mg):		2.036

Sample ID: 019972 Sample Name: D03198 IPSD-TT2201-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	7	0.58	2313.38	2330.62	2314.29	7	2.333
J	12	11	0.92	2130.00	2147.47	2131.33	10	1.614
K	12	11	0.92	2181.10	2199.37	2182.82	11	1.505
L	12	11	0.92	2491.14	2509.99	2492.62	10	1.737
	Mean Surviving:		0.83			Mean Weight (mg):		1.797

Sample ID: 019981 Sample Name: D03201 IPSD-TT1203-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	10	0.83	2282.98	2296.98	2284.74	10	1.224
J	12	8	0.67	2321.07	2336.37	2322.78	8	1.699
K	12	11	0.92	2282.33	2299.58	2284.52	11	1.369
L	12	0	0.00					
	Mean Surviving:		0.60			Mean Weight (mg):		1.431

000014

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019982 Sample Name: D03206 IPSD-TT2903-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	10	0.83	2484.75	2500.18	2487.48	10	1.270
J	12	13	1.08	2263.32	2281.43	2265.39	13	1.234
K	12	12	1.00	2385.39	2397.91	2387.06	12	0.904
L	12	11	0.92	2426.32	2444.46	2428.58	11	1.444
	Mean Surviving:		0.96			Mean Weight (mg):		1.213

Sample ID: 019983 Sample Name: D03211 IPSD-TT1901-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	6	0.50	2444.83	2454.12	2445.58	4	2.135
J	12	5	0.42	2174.13	2188.85	2175.93	5	2.584
K	12	11	0.92	2377.53	2399.3	2380.21	11	1.735
L	12	8	0.67	2380.46	2392.49	2381.62	7	1.553
	Mean Surviving:		0.63			Mean Weight (mg):		2.002

Sample ID: 020001 Sample Name: D03387 IPSD-TT3302-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	10	0.83	2300.45	2312.99	2301.22	10	1.177
J	12	9	0.75	2421.80	2436.41	2423.29	9	1.458
K	12	10	0.83	2306.58	2321.02	2308.15	10	1.287
L	12	9	0.75	2301.76	2317.48	2303.49	9	1.554
	Mean Surviving:		0.79			Mean Weight (mg):		1.369

000015

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020002 Sample Name: D03392 IPSD-TT3202-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	11	0.92	2162.83	2177.93	2164.68	11	1.205
J	12	9	0.75	2148.46	2161.32	2150.02	9	1.256
K	12	9	0.75	2103.19	2115.28	2104.78	9	1.167
L	12	7	0.58	2186.99	2199.17	2188.32	7	1.550
	Mean Surviving:		0.75			Mean Weight (mg):		1.294

Sample ID: 020012 Sample Name: D03396 IPSD-WW06-062 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	11	0.92	2247.81	2271.59	2249.79	11	1.982
J	12	12	1.00	2138.89	2160.86	2140.96	12	1.658
K	12	12	1.00	2030.60	2049.18	2032.05	12	1.427
L	12	11	0.92	2167.04	2188.34	2169.17	11	1.743
	Mean Surviving:		0.96			Mean Weight (mg):		1.703

Sample ID: 020013 Sample Name: D03401 IPSD-TT1802-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	6	0.50	2157.66	2173.09	2158.64	6	2.408
J	12	5	0.42	2182.46	2196.58	2183.86	5	2.544
K	12	10	0.83	2058.02	2075.8	2060.45	10	1.535
L	12	10	0.83	2194.89	2207.46	2196.19	10	1.127
	Mean Surviving:		0.65			Mean Weight (mg):		1.904

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020024 Sample Name: D03407 IPSD-TT1002-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	6	0.50	2111.27	2129.1	2112.64	6	2.743
J	12	0	0.00					
K	12	3	0.25	2204.44	2210.44	2204.73	2	2.855
L	12	11	0.92	2219.17	2240.62	2220.73	11	1.808
	Mean Surviving:		0.42			Mean Weight (mg):		2.469

Sample ID: 020025 Sample Name: D03412 IPSD-TT1301-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	6	0.50	2116.48	2127.45	2117.86	6	1.598
J	12	6	0.50	2053.02	2064.72	2054.13	6	1.765
K	12	6	0.50	2183.79	2197.51	2185.73	6	1.963
L	12	9	0.75	2138.40	2153.99	2140.50	9	1.499
	Mean Surviving:		0.56			Mean Weight (mg):		1.706

Sample ID: 020026 Sample Name: D03417 IPSD-TT3001-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	9	0.75	2204.78	2221.28	2207.22	9	1.562
J	12	11	0.92	2189.96	2212.29	2191.69	11	1.873
K	12	11	0.92	2181.43	2197.2	2182.95	11	1.295
L	12	10	0.83	2222.80	2241.73	2222.55	10	1.918
	Mean Surviving:		0.85			Mean Weight (mg):		1.662

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020038 Sample Name: Control Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	9	0.75	2175.33	2187.96	2178.13	9	1.092
J	12	6	0.50	2208.63	2221.33	2211.14	6	1.698
K	12	7	0.58	2165.65	2176.88	2168.09	7	1.256
L	12	9	0.75	2455.95	2473.41	2461.19	9	1.358
	Mean Surviving:		0.65			Mean Weight (mg):		1.351

Sample ID: 020039 Sample Name: D03424 IPSD-PPO3-062 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	7	0.58	2239.07	2244.56	2239.55	2	2.505
J	12	6	0.50	2120.36	2133.32	2121.52	3	3.933
K	12	7	0.58	2386.30	2401.03	2387.78	4	3.313
L	12	7	0.58	2286.80	2303.27	2288.88	6	2.398
	Mean Surviving:		0.56			Mean Weight (mg):		3.037

Sample ID: 020040 Sample Name: D03429 IPSD-TTSA01-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	7	0.58	2313.42	2331	2315.39	7	2.230
J	12	4	0.33	2130.08	2133.37	2130.61	1	2.760
K	12	8	0.67	2181.21	2192.41	2182.32	4	2.522
L	12	8	0.67	2491.22	2507.95	2492.80	7	2.164
	Mean Surviving:		0.56			Mean Weight (mg):		2.419

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020041 Sample Name: D03476 IPSD-TTSD01-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	8	0.67	2283.06	2296.89	2284.52	5	2.474
J	12	9	0.75	2321.16	2339.93	2322.98	8	2.119
K	12	4	0.33	2282.46	2290.27	2282.92	3	2.450
L	12	7	0.58	2389.56	2406.62	2391.22	6	2.567
	Mean Surviving:		0.58			Mean Weight (mg):		2.402

Sample ID: 020072 Sample Name: D03486 IPSD-TT04-0626 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	9	0.75	2484.85	2505.48	2486.75	8	2.341
J	12	7	0.58	2263.39	2269.76	2263.86	2	2.950
K	12	6	0.50	2385.42	2394.61	2386.01	3	2.867
L	12	7	0.58	2426.35	2438.29	2427.50	4	2.698
	Mean Surviving:		0.60			Mean Weight (mg):		2.714

Sample ID: 020073 Sample Name: D03491 IPSD-HB00-0626 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	2	0.17	2444.96	2451.25	2445.32	2	2.965
J	12	0	0.00					
K	12	0	0.00					
L	12	1	0.08					
	Mean Surviving:		0.06			Mean Weight (mg):		2.965

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020074 Sample Name: D03496 IPSD-TT0603-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	3	0.25	2300.57	2312.04	2302.14	3	3.300
J	12	1	0.08	2421.90	2423.68	2422.04	1	1.640
K	12	3	0.25	2306.63	2317.03	2308.09	3	2.980
L	12	0	0.00					
	Mean Surviving:		0.15			Mean Weight (mg):		2.640

Sample ID: 020118 Sample Name: D03504 IPSD-TTUF02-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	7	0.58	2163.01	2175.28	2164.61	6	1.778
J	12	6	0.50	2148.59	2165.7	2149.99	5	3.142
K	12	12	1.00	2103.31	2126.88	2106.47	11	1.855
L	12	10	0.83	2187.12	2204.09	2189.70	9	1.599
	Mean Surviving:		0.73			Mean Weight (mg):		2.094

Sample ID: 020119 Sample Name: D03510 IPSD-TTUF03-06 Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	6	0.50	2248.05	2264.38	2249.95	6	2.405
J	12	8	0.67	2139.07	2155.52	2141.01	7	2.073
K	12	8	0.67	2030.67	2043.38	2031.84	5	2.308
L	12	4	0.33	2167.14	2180.36	2168.45	3	3.970
	Mean Surviving:		0.54			Mean Weight (mg):		2.689

000020

Toxicity Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020182 Sample Name: Control Method: 100.5SGR

Replicate	Start Count	Total Surviving	Proportion Surviving	Initial Weight	Larval Weight	Final Weight	Weighed	Mean Replicate Weight
I	12	9	0.75	2157.73	2176.07	2162.08	9	1.554
J	12	4	0.33	2182.51	2184.81	2182.82	1	1.990
K	12	7	0.58	2058.09	2066.92	2059.59	3	2.443
L	12	8	0.67	2194.95	2209.25	2198.14	6	1.852
	Mean Surviving:		0.58			Mean Weight (mg):		1.960

000021

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019971 Sample Name: D03193 IPSD-WHO7-061 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/19/01	22	7/26/01	7		
2	A	C	M	7/21/01	24	7/25/01	4		
3	A	C	F	7/24/01	27	7/26/01	2	7/24/01	19971B6
4	A	C	M	7/25/01	28	8/1/01	7		
5	A	C	F	7/27/01	30	7/30/01	3	7/28/01	19971G6
6	A	C	F	7/27/01	30	8/1/01	5	7/28/01	19971G6
7	A	C	F	7/28/01	31	8/1/01	4	7/28/01	19971P
8	A	C	F	7/28/01	31	8/1/01	4	7/28/01	19971P
9	A	C	F	7/30/01	33	8/1/01	2	7/30/01	19971A4

Proportion Emerged: 0.75 Average Days To Emergence 28.4 Average Days to Mortality 4.2

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/26/01	6		
2	A	C	M	7/21/01	24	7/25/01	4		
3	A	C	M	7/21/01	24				
4	A	C	M	7/22/01	25	7/25/01	3		
5	A	C	M	7/22/01	25	7/28/01	6		
6	A	C	M	7/24/01	27	7/29/01	5		
7	A	C	F	7/25/01	28	7/30/01	5	7/25/01	19971A4
8	A	C	F	7/28/01	31	8/1/01	4	7/28/01	19971H6
9	A	C	M	7/30/01	33	8/2/01	3		
10	A	C	F	8/3/01	37	8/7/01	4	8/4/01, 8/6/01	19971O, 19971O

Proportion Emerged: 0.83 Average Days To Emergence 27.7 Average Days to Mortality 4.4

000022

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019971 Sample Name: D03193 IPSD-WHO7-061 Method: 100.5SGR

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/18/01	21	7/26/01	8		
2	A	C	M	7/19/01	22	7/25/01	6		
3	A	C	M	7/19/01	22	7/24/01	5		
4	A	C	M	7/22/01	25	7/30/01	8		
5	A	C	M	7/23/01	26	7/23/01	0		
6	A	C	M	7/23/01	26	7/26/01	3		
7	A	C	M	7/23/01	26	7/27/01	4		
8	A	C	M	7/24/01	27	8/1/01	8		
9	A	C	F	7/24/01	27	7/27/01	3	7/24/01	19971C8
10	A	C	M	7/26/01	29	8/1/01	6		
11	A	C	M	7/30/01	33	8/3/01	4		
12	A	C	F	8/2/01	36	8/6/01	4	8/2/01	19971P

Proportion Emerged: 1.00 Average Days To Emergence 26.7 Average Days to Mortality 4.9

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/18/01	21	7/25/01	7		
2	A	C	F	7/26/01	29	7/30/01	4	7/26/01	19971C10
3	A	C	F	7/28/01	31	8/3/01	6	7/29/01,7/30/01, 7/31/01, 8/1/01	19971F4,19971C8,19971 B9,19971M
4	A	C	F	7/29/01	32	8/3/01	5	7/29/01,8/1/01	19971O,19971O
5	A	C	F	7/31/01	34	8/5/01	5	7/31/01	19971D6
6	A	C	M	7/31/01	34	8/5/01	5		
7	A	C	F	8/1/01	35	8/7/01	6	8/1/01,8/3/01	19971O,19971M
8	A	C	F	8/3/01	37				
9	A	C	F	8/4/01	38	8/8/01	4	8/4/01	19971M
10	A	C	F	8/4/01	38	8/8/01	4	8/4/01	19971M
11	A	C	F	8/9/01	43	8/12/01	3	8/9/01,8/11/01	19971M,19971M
12	A	C	M	8/10/01	44	8/16/01	6		

Proportion Emerged: 1.00 Average Days To Emergence 34.7 Average Days to Mortality 5.0

000023

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019971 Sample Name: D03193 IPSD-WHO7-061 Method: 100.5SGR

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/18/01	21	7/25/01	7		
2	A	C	M	7/20/01	23	7/25/01	5		
3	A	C	M	7/20/01	23	7/25/01	5		
4	A	C	F	7/21/01	24	7/26/01	5	7/21/01	19971E5
5	A	C	M	7/21/01	24	7/25/01	4		
6	A	C	M	7/25/01	28	7/29/01	4		
7	A	C	F	7/26/01	29	7/27/01	1	7/26/01	19971E6

Proportion Emerged: 0.58 Average Days To Emergence 24.6 Average Days to Mortality 4.4

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/22/01	2		
2	A	C	F	7/20/01	23	7/26/01	6	7/20/01	19971F1
3	A	C	M	7/22/01	25	7/30/01	8		
4	A	C	M	7/22/01	25	7/30/01	8		
5	A	C	M	7/24/01	27	7/30/01	6		
6	A	C	F	7/25/01	28	7/30/01	5	7/25/01	19971F7
7	A	C	M	7/25/01	28	7/28/01	3		
8	A	C	F	7/27/01	30	8/1/01	5	7/27/01	19971M
9	A	C	F	7/29/01	32	7/31/01	2	7/29/01	19971H8
10	A	P	F	7/31/01	34	7/31/01	0		

Proportion Emerged: 0.75 Average Days To Emergence 27.5 Average Days to Mortality 4.5

000024

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019971 Sample Name: D03193 IPSD-WHO7-061 Method: 100.5SGR

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/19/01	22	7/26/01	7		
2	A	C	M	7/23/01	26	8/1/01	9		
3	A	C	F	7/23/01	26	7/29/01	6	7/23/01	19971G2
4	A	C	F	7/23/01	26	7/29/01	6	7/23/01,7/26/01	19971C6,19971G7
5	A	C	F	7/25/01	28	7/30/01	5	7/25/01	19971G6
6	A	C	M	7/25/01	28	7/30/01	5		
7	A	C	M	7/25/01	28	8/1/01	7		
8	A	C	F	7/28/01	31	8/2/01	5	7/29/01,7/30/01,7/31/01	19971F3,19971G2,19971O
9	A	C	F	7/29/01	32	8/1/01	3	7/29/01	19971O
10	A	C	F	7/30/01	33	8/5/01	6	7/30/01	19971B9
11	A	C	F	7/30/01	33	8/1/01	2	7/30/01	19971C10
12	A	C	F	7/30/01	33	8/3/01	4	7/30/01	19971H4

Proportion Emerged: 1.00 Average Days To Emergence 28.8 Average Days to Mortality 5.4

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/18/01	21	7/18/01	0		
2	A	C	M	7/21/01	24	7/27/01	6		
3	A	C	M	7/22/01	25	7/25/01	3		
4	A	C	M	7/23/01	26	8/2/01	10		
5	A	C	M	7/25/01	28	7/26/01	1		
6	A	C	M	7/28/01	31	8/1/01	4		
7	A	C	F	7/28/01	31	8/1/01	4	7/28/01	19971H6
8	A	C	M	7/29/01	32	7/31/01	2		
9	A	C	F	7/30/01	33	8/3/01	4	7/30/01	19971C4

Proportion Emerged: 0.75 Average Days To Emergence 27.9 Average Days to Mortality 3.8

000025

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019972 Sample Name: D03198 IPSD-TT2201-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/20/01	23	7/24/01	4	7/20/01	19972F1
2	A	C	F	7/25/01	28	7/30/01	5	7/25/01	19972A3
3	A	C	M	7/25/01	28	7/28/01	3		
4	A	C	M	7/27/01	30	8/2/01	6		
5	A	C	F	7/27/01	30	7/31/01	4	7/27/01	19972A4
6	A	C	F	7/28/01	31	7/31/01	3	7/28/01	19972B6
7	A	C	F	7/28/01	31	8/2/01	5	7/28/01	19972B6
8	A	C	M	7/29/01	32	8/2/01	4		
9	A	C	F	8/1/01	35	8/5/01	4	8/1/01	19972P
10	A	C	F	8/4/01	38	8/7/01	3	8/4/01	19972C6

Proportion Emerged: 0.83 Average Days To Emergence 30.6 Average Days to Mortality 4.1

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/24/01	4		
2	A	C	M	7/23/01	26	7/29/01	6		
3	A	C	F	7/23/01	26	7/26/01	3	7/23/01	19972B2
4	A	C	M	7/26/01	29	8/1/01	6		
5	A	C	F	7/27/01	30	8/1/01	5	7/27/01	19972C3
6	A	C	M	7/28/01	31	8/4/01	7		
7	A	C	F	7/31/01	34	8/4/01	4	7/31/01	19972E9
8	A	C	F	8/1/01	35	8/5/01	4	8/1/01	19972M

Proportion Emerged: 0.67 Average Days To Emergence 29.3 Average Days to Mortality 4.9

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/23/01	26	7/27/01	4		
2	A	C	M	7/25/01	28	7/27/01	2		
3	A	C	M	7/27/01	30	7/31/01	4		
4	A	C	F	7/29/01	32	8/4/01	6	7/29/01	19972A8
5	A	C	F	8/1/01	35	8/3/01	2	8/1/01	19972C6
6	A	C	M	8/1/01	35	8/7/01	6		
7	A	C	F	8/3/01	37	8/7/01	4	8/3/01	19972D6
8	A	C	F	8/9/01	43	8/13/01	4	8/9/01	19972M

Proportion Emerged: 0.67 Average Days To Emergence 33.3 Average Days to Mortality 4.0

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019972 Sample Name: D03198 IPSD-TT2201-06 Method: 100.5SGR

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/22/01	25	7/26/01	4		
2	A	C	M	7/22/01	25	7/28/01	6		
3	A	C	F	7/25/01	28	7/30/01	5	7/25/01	19972D4
4	A	C	M	7/25/01	28	7/27/01	2		
5	A	C	F	8/1/01	35	8/7/01	6	8/1/01,8/5/01	19972O,19972N
6	A	C	M	8/2/01	36	8/5/01	3		
7	A	C	F	8/3/01	37	8/7/01	4	8/3/01	19972M
8	A	C	F	8/4/01	38	8/8/01	4	8/4/01	19972G5
9	A	C	M	8/7/01	41	8/9/01	2		

Proportion Emerged: 0.75 Average Days To Emergence 32.6 Average Days to Mortality 4.0

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/25/01	5		
2	A	C	M	7/21/01	24	7/27/01	6		
3	A	C	F	7/22/01	25	7/26/01	4	7/22/01	19972D1
4	A	C	F	7/22/01	25	7/27/01	5	7/22/01	19972D2
5	A	C	F	7/23/01	26	7/27/01	4	7/23/01,7/25/01	19972E1,19972H2
6	A	C	F	7/23/01	26	7/30/01	7	7/23/01	19972E2
7	A	C	F	7/25/01	28	7/29/01	4	7/25/01	19972C1
8	A	C	M	7/26/01	29	8/2/01	7		
9	A	C	M	7/31/01	34	8/6/01	6		

Proportion Emerged: 0.75 Average Days To Emergence 26.7 Average Days to Mortality 5.3

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/19/01	22	7/26/01	7		
2	A	C	F	7/23/01	26	7/30/01	7	7/23/01	19972H2
3	A	C	F	7/24/01	27	7/31/01	7	7/24/01	19972H3
4	A	C	F	7/25/01	28	7/30/01	5	7/25/01	19972E2
5	A	C	F	7/27/01	30	8/1/01	5	7/27/01	19972H7
6	A	C	F	7/30/01	33	7/31/01	1	7/30/01	19972B4
7	A	C	F	7/30/01	33	8/3/01	4	7/30/01,8/1/01	19972H6,19972G1
8	A	C	F	7/31/01	34	8/4/01	4	7/31/01	19972E8

Proportion Emerged: 0.67 Average Days To Emergence 29.1 Average Days to Mortality 5.0

000027

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019972 Sample Name: D03198 IPSD-TT2201-06 Method: 100.5SGR

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/29/01	32	8/3/01	5		
2	A	C	F	7/31/01	34	8/7/01	7	7/31/01	19972G3
3	A	C	M	7/31/01	34	8/3/01	3		
4	A	C	F	8/3/01	37	8/8/01	5	8/3/01	19972G5
5	A	C	M	8/3/01	37	8/9/01	6		
6	A	C	F	8/5/01	39	8/11/01	6	8/5/01	19972M
7	A	C	F	8/9/01	43	8/14/01	5	8/9/01	19972M
8	A	C	F	8/10/01	44	8/14/01	4	8/10/01	19972O

Proportion Emerged: 0.67 Average Days To Emergence 37.5 Average Days to Mortality 5.1

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/23/01	26	7/23/01	0		
2	A	C	M	7/23/01	26	7/29/01	6		
3	A	C	M	7/24/01	27	7/27/01	3		
4	A	C	F	7/25/01	28	8/3/01	9	7/25/01	19972D2
5	A	C	M	7/26/01	29	7/30/01	4		
6	A	C	M	7/26/01	29	8/1/01	6		
7	A	C	M	7/27/01	30	8/2/01	6		
8	A	C	F	7/29/01	32	8/3/01	5	7/29/01	19972G1
9	A	C	F	7/30/01	33	8/3/01	4	7/30/01,8/1/01,8/2/01	19972O,19972E8,19972D6
10	A	C	F	7/31/01	34	8/3/01	3	7/31/01	19972G1
11	A	C	F	8/1/01	35	8/6/01	5	8/1/01	19972E9
12	A	C	F	8/6/01	40	8/7/01	1		

Proportion Emerged: 1.00 Average Days To Emergence 30.8 Average Days to Mortality 4.3

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019981 Sample Name: D03201 IPSD-TT1203-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/21/01	24	7/30/01	9		
2	A	C	M	7/24/01	27	7/29/01	5		
3	A	C	M	7/24/01	27	7/29/01	5		
4	A	C	F	7/26/01	29	7/28/01	2	7/26/01	19981A3
5	A	C	M	7/26/01	29	7/28/01	2		
6	A	C	F	7/31/01	34	8/3/01	3	7/31/01	19981G3
7	A	C	F	8/1/01	35	8/7/01	6	8/1/01	19981E4
8	A	C	M	8/2/01	36	8/4/01	2		
9	A	C	M	8/2/01	36	8/8/01	6		

Proportion Emerged: 0.75 Average Days To Emergence 30.8 Average Days to Mortality 4.4

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/21/01	24	7/25/01	4		
2	A	C	F	7/24/01	27	7/28/01	4	7/24/01	19981D2
3	A	C	M	7/31/01	34	8/3/01	3		
4	A	C	F	8/3/01	37	8/6/01	3	8/3/01	19981N
5	A	C	F	8/3/01	37	8/7/01	4	8/3/01	19981N

Proportion Emerged: 0.42 Average Days To Emergence 31.8 Average Days to Mortality 3.6

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/24/01	27	7/28/01	4		
2	A	C	M	7/24/01	27	7/30/01	6		
3	A	C	F	7/25/01	28	7/31/01	6	7/25/01	19981C4
4	A	C	M	7/25/01	28	8/2/01	8		
5	A	C	M	7/27/01	30	8/2/01	6		
6	A	C	F	7/28/01	31	7/31/01	3	7/28/01	19981G3
7	A	C	M	7/30/01	33	8/6/01	7		

Proportion Emerged: 0.58 Average Days To Emergence 29.1 Average Days to Mortality 5.7

000029

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019981 Sample Name: D03201 IPSD-TT1203-06 Method: 100.5SGR

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/21/01	24	7/24/01	3	7/21/01	19981B1
2	A	C	M	7/24/01	27	8/1/01	8		
3	A	C	F	7/24/01	27	7/26/01	2	7/24/01	19981C2
4	A	C	F	7/24/01	27	7/28/01	4	7/24/01	19981C1

Proportion Emerged: 0.33 Average Days To Emergence 26.3 Average Days to Mortality 4.3

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/22/01	25	7/27/01	5		
2	A	C	M	7/22/01	25	7/30/01	8		
3	A	C	F	7/30/01	33	7/31/01	1	7/30/01	19981D2
4	A	C	F	8/1/01	35	8/3/01	2	8/1/01	19981M
5	A	C	F	8/1/01	35	8/2/01	1	8/1/01	19981M
6	A	C	M	8/2/01	36	8/8/01	6		
7	A	C	M	8/2/01	36	8/9/01	7		

Proportion Emerged: 0.58 Average Days To Emergence 32.1 Average Days to Mortality 4.3

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/21/01	24	7/26/01	5	7/21/01	19981G1
2	A	C	M	7/23/01	26	7/28/01	5		

Proportion Emerged: 0.17 Average Days To Emergence 25.0 Average Days to Mortality 5.0

000030

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019981 Sample Name: D03201 IPSD-TT1203-06 Method: 100.5SGR

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/21/01	24	7/26/01	5		
2	A	C	M	7/22/01	25	7/28/01	6		
3	A	C	M	7/28/01	31	8/3/01	6		
4	A	C	F	7/30/01	33	8/1/01	2	7/30/01	19981C5
5	A	C	F	8/4/01	38	8/7/01	3	8/4/01	19981A9
6	A	C	F	8/7/01	41	8/9/01	2	8/7/01	19981E7
7	A	C	F	8/7/01	41	8/10/01	3	8/7/01	19981E7
8	A	C	F	8/9/01	43	8/11/01	2		
9	A	C	F	8/13/01	47	8/16/01	3	8/13/01	19981P

Proportion Emerged: 0.75 Average Days To Emergence 35.9 Average Days to Mortality 3.6

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/27/01	30	8/2/01	6	7/27/01	19981C5
2	A	C	F	7/30/01	33	8/4/01	5	7/30/01	19981C7
3	A	C	F	8/1/01	35	8/8/01	7	8/1/01	19981B3
4	A	C	F	8/2/01	36	8/8/01	6	8/2/01	19981E6

Proportion Emerged: 0.33 Average Days To Emergence 33.5 Average Days to Mortality 6.0

000031

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019982 Sample Name: D03206 IPSD-TT2903-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/18/01	21	7/23/01	5		
2	A	C	M	7/20/01	23	7/27/01	7		
3	A	C	M	7/22/01	25	7/23/01	1		
4	A	C	F	7/24/01	27	7/31/01	7		
5	A	C	F	7/26/01	29	8/1/01	6	7/26/01	19982H3

Proportion Emerged: 0.42 Average Days To Emergence 25.0 Average Days to Mortality 5.2

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/23/01	26	7/25/01	2		
2	A	C	M	7/23/01	26	7/27/01	4		
3	A	C	M	7/24/01	27	7/28/01	4		
4	A	C	M	7/24/01	27	8/1/01	8		
5	A	C	M	7/24/01	27	7/24/01	0		
6	A	C	M	7/29/01	32	8/2/01	4		
7	A	C	F	7/31/01	34	8/6/01	6	7/31/01,8/3/01	19982M,19982N
8	A	C	F	8/6/01	40	8/9/01	3	8/6/01	19982E1

Proportion Emerged: 0.67 Average Days To Emergence 29.9 Average Days to Mortality 3.9

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/19/01	22	7/27/01	8		
2	A	C	M	7/24/01	27	7/29/01	5		
3	A	C	F	7/24/01	27	7/28/01	4	7/24/01	19982C2
4	A	C	F	7/25/01	28	8/2/01	8	7/25/01	19982H2
5	A	C	F	7/27/01	30	7/30/01	3	7/27/01	19982H4
6	A	C	F	7/28/01	31	8/3/01	6	7/28/01,7/29/01	19982C2,19982H5
7	A	C	M	7/30/01	33	8/2/01	3		
8	A	C	F	8/2/01	36	8/3/01	1	8/2/01	19982O

Proportion Emerged: 0.67 Average Days To Emergence 29.3 Average Days to Mortality 4.8

000036

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019982 Sample Name: D03206 IPSD-TT2903-06 Method: 100.5SGR

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/28/01	8		
2	A	C	M	7/22/01	25	7/26/01	4		
3	A	C	F	7/25/01	28	7/31/01	6	7/25/01	19982B4
4	A	C	M	8/1/01	35	8/6/01	5		
5	A	C	F	8/2/01	36	8/3/01	1		
6	A	C	F	8/2/01	36	8/6/01	4	8/3/01	19982E1
7	A	C	F	8/7/01	41	8/14/01	7	8/7/01	19982O
8	A	C	F	8/9/01	43	8/11/01	2	8/9/01	19982N
9	A	C	F	8/10/01	44	8/17/01	7	8/10/01	19982E5

Proportion Emerged: 0.75 Average Days To Emergence 34.6 Average Days to Mortality 4.9

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/3/01	37	8/10/01	7		
2	A	C	F	8/4/01	38	8/9/01	5	8/4/01	19982E3
3	A	C	M	8/4/01	38	8/9/01	5		
4	A	C	F	8/8/01	42	8/16/01	8	8/8/01	19982P
5	A	C	M	8/10/01	44	8/16/01	6		
6	A	C	F	8/12/01	46	8/15/01	3	8/12/01	19982N
7	A	C	M	8/13/01	47	8/17/01	4		
8	A	C	F	8/16/01	50	8/21/01	5	8/16/01	19982N

Proportion Emerged: 0.67 Average Days To Emergence 42.8 Average Days to Mortality 5.4

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/22/01	25	7/27/01	5		
2	A	C	M	7/22/01	25	7/27/01	5		
3	A	C	M	7/24/01	27	7/26/01	2		
4	A	C	M	7/27/01	30	7/30/01	3		
5	A	C	F	7/27/01	30	7/30/01	3	7/27/01	19982F4
6	A	C	F	7/27/01	30	8/2/01	6	7/27/01	19982F4
7	A	C	M	7/29/01	32	7/31/01	2		
8	A	C	M	7/29/01	32	8/1/01	3		

Proportion Emerged: 0.67 Average Days To Emergence 28.9 Average Days to Mortality 3.6

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019982 Sample Name: D03206 IPSD-TT2903-06 Method: 100.5SGR

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/21/01	24	7/30/01	9		
2	A	C	M	7/23/01	26	7/27/01	4		
3	A	C	M	7/24/01	27	7/29/01	5		
4	A	C	F	7/25/01	28	7/27/01	2	7/25/01	19982B3
5	A	C	F	7/26/01	29	7/27/01	1	7/26/01	19982H1

Proportion Emerged: 0.42 Average Days To Emergence 26.8 Average Days to Mortality 4.2

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/24/01	27	7/31/01	7		
2	A	C	M	7/25/01	28	7/27/01	2		
3	A	C	M	7/26/01	29	7/31/01	5		
4	A	C	M	7/27/01	30	7/30/01	3		
5	A	C	M	7/29/01	32	8/3/01	5		
6	A	C	F	7/30/01	33	8/5/01	6	7/30/01	19982C7
7	A	C	F	7/31/01	34	8/3/01	3	7/31/01	19982O

Proportion Emerged: 0.58 Average Days To Emergence 30.4 Average Days to Mortality 4.4

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019983 Sample Name: D03211 IPSD-TT1901-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/23/01	26	7/27/01	4		
2	A	C	F	7/24/01	27	7/30/01	6	7/24/01	19983H6
3	A	C	F	7/24/01	27	7/29/01	5	7/24/01,7/26/01	19983D3,19983G5
4	A	C	M	7/27/01	30	7/29/01	2		
5	A	C	M	7/28/01	31	8/2/01	5		
6	A	C	M	7/31/01	34	8/7/01	7		
7	A	C	F	8/1/01	35	8/4/01	3	8/1/01	19983C7

Proportion Emerged: 0.58 Average Days To Emergence 30.0 Average Days to Mortality 4.6

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/18/01	21	7/26/01	8		
2	A	C	M	7/21/01	24	7/26/01	5		
3	A	C	M	7/23/01	26	7/28/01	5		
4	A	C	F	7/24/01	27	7/28/01	4	7/24/01	19983G2
5	A	C	M	7/28/01	31	8/2/01	5		
6	A	C	F	7/29/01	32	7/29/01	0		
7	A	C	F	7/29/01	32	8/3/01	5	7/29/01	19983M
8	A	C	F	8/3/01	37	8/9/01	6	8/3/01	19983F8
9	A	C	F	8/5/01	39	8/8/01	3	8/5/01	19983B10
10	A	C	M	8/5/01	39	8/10/01	5		
11	A	C	M	8/7/01	41	8/12/01	5		
12	L	N							

Proportion Emerged: 0.92 Average Days To Emergence 31.7 Average Days to Mortality 4.6

000035

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019983 Sample Name: D03211 IPSD-TT1901-06 Method: 100.5SGR

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/27/01	7		
2	A	C	F	7/23/01	26	7/27/01	4	7/23/01	19983A1
3	A	C	F	7/30/01	33				
4	A	C	M	7/30/01	33				
5	A	C	M	7/30/01	33	7/31/01	1		
6	A	C	M	7/30/01	33	8/5/01	6		
7	A	C	M	8/1/01	35	8/9/01	8		
8	A	C	F	8/2/01	36	8/2/01	0		
9	A	C	F	8/9/01	43	8/13/01	4	8/9/01	19983B11

Proportion Emerged: 0.75 Average Days To Emergence 32.8 Average Days to Mortality 4.3

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/28/01	8		
2	A	C	M	7/22/01	25	7/23/01	1		
3	A	C	M	7/22/01	25	7/29/01	7		
4	A	C	M	7/22/01	25	7/28/01	6		
5	A	C	M	7/24/01	27	7/24/01	0		
6	A	C	F	7/29/01	32	8/2/01	4	7/29/01	19983B5
7	A	C	F	7/29/01	32	8/2/01	4	7/29/01	19983B5
8	A	C	F	8/2/01	36	8/7/01	5	8/2/01	19983F5
9	A	C	F	8/3/01	37	8/5/01	2	8/3/01	19983M
10	A	C	F	8/3/01	37	8/6/01	3	8/3/01	19983M
11	A	C	M	8/4/01	38	8/7/01	3		
12	L	N							
13	L	N							
14	L	N							

Proportion Emerged: 0.92 Average Days To Emergence 30.6 Average Days to Mortality 3.9

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/21/01	24	7/25/01	4	7/21/01	19983B2
2	A	C	F	7/21/01	24	7/27/01	6	7/21/01	19983G3

Proportion Emerged: 0.17 Average Days To Emergence 24.0 Average Days to Mortality 5.0

000036

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019983 Sample Name: D03211 IPSD-TT1901-06 Method: 100.5SGR

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/20/01	23	7/23/01	3	7/20/01	19983G1
2	A	C	F	7/27/01	30	8/1/01	5	7/27/01	19983M
3	A	C	F	7/27/01	30	8/1/01	5	7/27/01	19983M
4	A	C	F	7/29/01	32	8/1/01	3	7/29/01	19983M
5	A	C	M	7/30/01	33	8/5/01	6		
6	A	C	F	8/1/01	35	8/2/01	1	8/1/01	19983A6
7	A	C	F	8/1/01	35	8/7/01	6	8/1/01	19983A6
8	A	C	M	8/3/01	37	8/8/01	5		

Proportion Emerged: 0.67 Average Days To Emergence 31.9 Average Days to Mortality 4.3

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/23/01	3		
2	A	C	M	7/21/01	24	7/28/01	7		
3	A	C	M	7/21/01	24	7/29/01	8		
4	A	C	F	7/24/01	27	7/31/01	7	7/24/01	19983D4
5	A	C	M	7/26/01	29	7/28/01	2		
6	A	C	F	7/27/01	30	8/1/01	5	7/27/01,7/29/01	19983G5,19983A5
7	A	C	M	7/28/01	31				
8	A	C	M	7/29/01	32	8/6/01	8		
9	A	C	F	7/30/01	33	8/2/01	3	7/30/01	19983F5
10	A	C	F	8/2/01	36	8/7/01	5	8/2/01,8/5/01	19983C6,19983D11

Proportion Emerged: 0.83 Average Days To Emergence 28.9 Average Days to Mortality 5.3

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/22/01	2		
2	A	C	M	7/20/01	23	7/25/01	5		
3	A	C	M	7/20/01	23	7/25/01	5		
4	A	C	M	7/20/01	23	7/25/01	5		
5	A	C	M	7/20/01	23	7/26/01	6		
6	A	C	M	7/23/01	26	7/26/01	3		

Proportion Emerged: 0.50 Average Days To Emergence 23.5 Average Days to Mortality 4.3

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Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020001 Sample Name: D03387 IPSD-TT3302-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	8/1/01	35	8/7/01	6	8/1/01	20001M
2	A	C	F	8/2/01	36	8/5/01	3	8/2/01	20001M
3	A	C	M	8/6/01	40	8/11/01	5		
4	A	C	F	8/7/01	41	8/9/01	2	8/7/01	20001P
5	A	C	F	8/7/01	41	8/7/01	0		
6	A	C	M	8/9/01	43	8/10/01	1		
7	A	C	M	8/9/01	43	8/13/01	4		
8	A	C	M	8/10/01	44	8/14/01	4		

Proportion Emerged: 0.67 Average Days To Emergence 40.4 Average Days to Mortality 3.1

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/22/01	25	7/25/01	3		
2	A	C	M	7/24/01	27	7/28/01	4		
3	A	C	F	7/24/01	27	7/29/01	5	7/24/01	20001B2
4	A	C	M	7/25/01	28	7/27/01	2		
5	A	C	M	7/26/01	29	7/31/01	5		
6	A	C	F	7/27/01	30	8/1/01	5	7/27/01	20001C4
7	A	C	M	7/28/01	31				
8	A	C	F	7/31/01	34	8/5/01	5	7/31/01	20001D6
9	A	C	M	8/4/01	38	8/10/01	6		
10	A	C	F	8/5/01	39	8/8/01	3	8/5/01	20001F5

Proportion Emerged: 0.83 Average Days To Emergence 30.8 Average Days to Mortality 4.2

000038

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020001 Sample Name: D03387 IPSD-TT3302-06 Method: 100.5SGR

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/23/01	3		
2	A	C	M	7/20/01	23	7/24/01	4		
3	A	C	M	7/23/01	26	7/30/01	7		
4	A	C	M	7/27/01	30	8/1/01	5		
5	A	C	M	7/29/01	32	8/5/01	7		
6	A	C	F	7/30/01	33	7/30/01	0		
7	A	C	F	8/1/01	35	8/5/01	4	8/1/01	20001P
8	A	C	F	8/3/01	37	8/7/01	4	8/3/01,8/5/01	20001C5,20001G6
9	A	C	F	8/7/01	41	8/10/01	3	8/7/01	20001C10
10	A	C	M	8/7/01	41	8/13/01	6		
11	A	C	M	8/22/01	56	8/27/01	5		

Proportion Emerged: 0.92 Average Days To Emergence 34.3 Average Days to Mortality 4.4

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/18/01	21	7/24/01	6		
2	A	C	M	7/24/01	27	7/28/01	4		
3	A	C	M	7/24/01	27	7/28/01	4		
4	A	C	M	7/28/01	31	8/1/01	4		
5	A	C	F	7/30/01	33	8/3/01	4	7/30/01	20001F2
6	A	C	M	7/31/01	34	8/4/01	4		
7	A	C	F	8/1/01	35	8/7/01	6	8/1/01	20001C5
8	A	C	F	8/2/01	36	8/4/01	2	8/2/01	20001G3
9	A	C	F	8/5/01	39	8/8/01	3	8/5/01	20001O

Proportion Emerged: 0.75 Average Days To Emergence 31.4 Average Days to Mortality 4.1

000039

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020001 Sample Name: D03387 IPSD-TT3302-06 Method: 100.5SGR

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/25/01	28	7/31/01	6		
2	A	C	M	8/3/01	37	8/3/01	0		
3	A	C	F	8/11/01	45	8/14/01	3	8/11/01	20001A8
4	A	C	F	8/11/01	45	8/14/01	3	8/11/01	20001A8
5	A	C	M	8/11/01	45				
6	A	C	F	8/12/01	46	8/15/01	3	8/12/01	20001H2
7	A	C	F	8/13/01	47	8/16/01	3	8/13/01	20001H3
8	A	C	F	8/13/01	47	8/15/01	2	8/13/01	20001H3
9	A	C	F	8/19/01	53	8/22/01	3	8/19/01	20001F7

Proportion Emerged: 0.75 Average Days To Emergence 43.7 Average Days to Mortality 2.9

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/26/01	29	7/29/01	3	7/26/01	20001B5
2	A	C	M	7/28/01	31	8/1/01	4		
3	A	C	M	7/29/01	32	8/1/01	3		
4	A	C	F	8/3/01	37	8/3/01	0		
5	A	C	M	8/5/01	39	8/8/01	3		
6	A	C	F	8/18/01	52	8/21/01	3	8/18/01	20001H5
7	A	C	M	8/19/01	53	8/24/01	5		

Proportion Emerged: 0.58 Average Days To Emergence 39.0 Average Days to Mortality 3.0

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/18/01	21				
2	A	C	F	7/30/01	33	8/2/01	3	7/30/01	20001G3
3	A	C	M	7/30/01	33	8/4/01	5		
4	A	C	F	8/3/01	37	8/7/01	4	8/3/01	20001G5
5	A	C	M	8/3/01	37	8/7/01	4		
6	A	C	M	8/4/01	38	8/7/01	3		
7	A	C	F	8/12/01	46	8/16/01	4	8/12/01	20001C10
8	A	C	F	8/13/01	47	8/17/01	4	8/14/01	20001H4
9	A	C	F	8/13/01	47	8/18/01	5	8/14/01	20001H4
10	A	C	F	8/21/01	55	8/23/01	2	8/21/01	20001F7

Proportion Emerged: 0.83 Average Days To Emergence 39.4 Average Days to Mortality 3.8

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020001 Sample Name: D03387 IPSD-TT3302-06 Method: 100.5SGR

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/29/01	32	8/1/01	3	7/29/01	20001F3
2	A	C	M	8/8/01	42	8/15/01	7		
3	A	C	M	8/13/01	47	8/19/01	6		
4	A	C	M	8/14/01	48	8/17/01	3		
5	A	C	M	8/16/01	50	8/20/01	4		
6	A	C	F	8/18/01	52	8/23/01	5	8/18/01	20001P

Proportion Emerged: 0.50 Average Days To Emergence 45.2 Average Days to Mortality 4.7

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020002 Sample Name: D03392 IPSD-TT3202-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/25/01	5		
2	A	C	F	7/25/01	28	8/2/01	8	7/25/01	20002H1
3	A	C	F	7/27/01	30	8/1/01	5	7/27/01	20002B2
4	A	C	F	7/31/01	34	8/1/01	1	7/31/01	20002N
5	A	C	F	7/31/01	34	8/1/01	1	7/31/01	20002D5
6	A	C	M	8/1/01	35	8/5/01	4		
7	A	C	F	8/3/01	37	8/3/01	0		

Proportion Emerged: 0.58 Average Days To Emergence 31.6 Average Days to Mortality 3.4

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/23/01	26	7/26/01	3		
2	A	C	M	7/27/01	30	8/1/01	5		
3	A	C	F	7/28/01	31	8/3/01	6	7/28/01	20002H3,20002H4
4	A	C	F	7/29/01	32	7/29/01	0		
5	A	C	M	7/29/01	32	7/29/01	0		
6	A	C	F	8/1/01	35	8/4/01	3	8/1/01	20002A6
7	A	C	M	8/6/01	40	8/9/01	3		
8	A	C	F	8/9/01	43	8/11/01	2	8/9/01	20002E2
9	A	C	F	8/9/01	43	8/15/01	6	8/9/01	20002E2

Proportion Emerged: 0.75 Average Days To Emergence 34.7 Average Days to Mortality 3.1

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/1/01	35	8/9/01	8		
2	A	C	F	8/2/01	36	8/6/01	4	8/2/01	20002C1
3	A	C	M	8/3/01	37	8/7/01	4		
4	A	C	M	8/5/01	39	8/13/01	8		
5	A	C	F	8/8/01	42	8/14/01	6	8/8/01	20002H8
6	A	C	F	8/10/01	44	8/15/01	5	8/10/01	20002C4
7	A	C	F	8/11/01	45	8/14/01	3	8/11/01,8/13/01	20002C4,20002P

Proportion Emerged: 0.58 Average Days To Emergence 39.7 Average Days to Mortality 5.4

000042

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020002 Sample Name: D03392 IPSD-TT3202-06 Method: 100.5SGR

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/22/01	25	8/1/01	10		
2	A	C	M	7/28/01	31	8/2/01	5		
3	A	C	F	7/28/01	31	8/2/01	5	7/28/01	20002D2
4	A	C	M	7/29/01	32				
5	A	C	M	7/29/01	32	8/6/01	8		
6	A	C	M	8/1/01	35	8/7/01	6		
7	A	C	F	8/7/01	41	8/11/01	4	8/7/01	20002E2
8	A	C	F	8/11/01	45	8/17/01	6	8/12/01,8/14/01	20002E4,20002P

Proportion Emerged: 0.67 Average Days To Emergence 34.0 Average Days to Mortality 6.3

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/31/01	34	8/3/01	3	7/31/01	20002F3
2	A	C	M	8/7/01	41	8/11/01	4		
3	A	C	F	8/8/01	42	8/14/01	6	8/8/01	20002E4
4	A	C	M	8/8/01	42	8/14/01	6		
5	A	C	F	8/9/01	43	8/14/01	5	8/9/01	20002E6
6	A	C	M	8/9/01	43	8/12/01	3		
7	A	C	F	8/16/01	50	8/16/01	0		
8	A	C	F	8/18/01	52	8/22/01	4	8/18/01	20002H10
9	A	C	F	8/18/01	52	8/21/01	3	8/18/01	20002H10
10	A	C	F	8/19/01	53	8/21/01	2	8/19/01	20002P
11	A	C	F	8/20/01	54	8/24/01	4	8/21/01	20002H10

Proportion Emerged: 0.92 Average Days To Emergence 46.0 Average Days to Mortality 3.6

000043

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020002 Sample Name: D03392 IPSD-TT3202-06 Method: 100.5SGR

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/26/01	29	8/3/01	8		
2	A	C	F	7/28/01	31	8/5/01	8	7/28/01	20002G1
3	A	C	M	7/30/01	33	8/4/01	5		
4	A	C	F	8/3/01	37	8/7/01	4	8/3/01	20002C3
5	A	C	F	8/4/01	38	8/10/01	6	8/4/01	20002F6
6	A	C	M	8/4/01	38	8/10/01	6		
7	A	C	F	8/9/01	43	8/10/01	1	8/9/01	20002H8
8	A	C	F	8/9/01	43	8/12/01	3	8/11/01	20002E4
9	A	C	F	8/11/01	45	8/16/01	5	8/11/01	20002P
10	A	C	F	8/11/01	45	8/16/01	5	8/11/01	20002P

Proportion Emerged: 0.83 Average Days To Emergence 38.2 Average Days to Mortality 5.1

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/28/01	31	8/1/01	4		
2	A	C	M	7/29/01	32	8/3/01	5		
3	A	C	M	8/1/01	35	8/6/01	5		
4	A	C	M	8/3/01	37	8/9/01	6		
5	A	C	F	8/5/01	39	8/9/01	4	8/5/01	20002C4
6	A	C	F	8/8/01	42	8/11/01	3	8/8/01	20002C4
7	A	C	F	8/16/01	50	8/19/01	3	8/16/01	20002P

Proportion Emerged: 0.58 Average Days To Emergence 38.0 Average Days to Mortality 4.3

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/25/01	28	7/31/01	6		
2	A	C	M	7/26/01	29	8/3/01	8		
3	A	C	M	7/27/01	30	8/3/01	7		
4	A	C	M	7/27/01	30	7/31/01	4		
5	A	C	M	7/28/01	31	7/28/01	0		
6	A	C	M	7/28/01	31	7/30/01	2		
7	A	C	F	7/31/01	34	8/4/01	4	7/31/01	20002G2
8	A	C	M	8/7/01	41	8/11/01	4		
9	A	C	F	8/11/01	45	8/16/01	5	8/12/01	20002P
10	A	C	M	8/17/01	51	8/23/01	6		

Proportion Emerged: 0.83 Average Days To Emergence 35.0 Average Days to Mortality 4.6

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020012 Sample Name: D03396 IPSD-WW06-062 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/19/01	22	7/27/01	8		
2	A	C	M	7/22/01	25	7/28/01	6		
3	A	C	F	7/24/01	27	7/29/01	5	7/24/01	20012B2
4	A	C	F	7/25/01	28	7/31/01	6	7/25/01	20012D8
5	A	C	M	7/28/01	31	8/1/01	4		
6	A	C	M	7/30/01	33	8/5/01	6		
7	A	C	M	7/30/01	33	8/5/01	6		
8	A	C	M	7/31/01	34	8/7/01	7		
9	A	C	F	8/2/01	36	8/4/01	2	8/2/01	20012A9
10	A	C	M	8/2/01	36	8/7/01	5		
11	A	C	F	8/2/01	36	8/6/01	4	8/2/01	20012A9

Proportion Emerged: 0.92 Average Days To Emergence 31.0 Average Days to Mortality 5.4

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/21/01	24	7/27/01	6		
2	A	C	M	7/24/01	27	7/31/01	7		
3	A	C	M	7/26/01	29	8/1/01	6		
4	A	C	F	7/27/01	30	8/1/01	5	7/28/01	20012N
5	A	C	M	7/29/01	32	8/3/01	5		
6	A	C	M	7/30/01	33	8/5/01	6		
7	A	C	F	7/31/01	34	8/3/01	3	7/31/01	20012B8
8	A	C	M	7/31/01	34	8/5/01	5		
9	A	C	F	8/1/01	35	8/7/01	6	8/1/01	20012B10
10	A	C	M	8/1/01	35	8/7/01	6		
11	A	C	F	8/2/01	36	8/8/01	6	8/2/01	20012A6

Proportion Emerged: 0.92 Average Days To Emergence 31.7 Average Days to Mortality 5.5

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020012 Sample Name: D03396 IPSD-WW06-062 Method: 100.5SGR

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/27/01	7		
2	A	C	M	7/20/01	23	7/27/01	7		
3	A	C	M	7/21/01	24	7/26/01	5		
4	A	C	M	7/21/01	24	7/26/01	5		
5	A	C	M	7/22/01	25	7/22/01	0		
6	A	C	F	7/24/01	27	7/31/01	7	7/24/01	20012D7
7	A	C	F	7/26/01	29	7/30/01	4	7/26/01	20012B3
8	A	C	F	7/26/01	29	7/29/01	3	7/26/01	20012G7
9	A	C	M	8/2/01	36	8/2/01	0		
10	A	C	F	8/3/01	37	8/6/01	3	8/3/01	20012O

Proportion Emerged: 0.83 Average Days To Emergence 27.7 Average Days to Mortality 4.1

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/28/01	8		
2	A	C	M	7/20/01	23				
3	A	C	M	7/20/01	23				
4	A	C	M	7/21/01	24	7/31/01	10		
5	A	C	M	7/22/01	25	7/27/01	5		
6	A	C	M	7/22/01	25	7/29/01	7		
7	A	C	M	7/24/01	27	7/28/01	4		
8	A	C	M	7/25/01	28	8/2/01	8		
9	A	C	F	7/27/01	30	7/28/01	1		
10	A	C	F	8/2/01	36	8/5/01	3	8/2/01	20012F7

Proportion Emerged: 0.83 Average Days To Emergence 26.4 Average Days to Mortality 5.8

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020012 Sample Name: D03396 IPSD-WW06-062 Method: 100.5SGR

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/22/01	25	7/28/01	6		
2	A	C	M	7/22/01	25	7/27/01	5		
3	A	C	F	7/22/01	25	7/24/01	2	7/22/01	20012-2
4	A	C	F	7/23/01	26	7/30/01	7	7/23/01	20012E1
5	A	C	F	7/24/01	27	7/26/01	2	7/24/01	20012G3
6	A	C	F	7/27/01	30	8/3/01	7	7/28/01	20012N
7	A	C	F	7/29/01	32	7/30/01	1	7/29/01	20012G7
8	A	C	M	8/1/01	35	8/1/01	0		
9	A	C	F	8/4/01	38	8/7/01	3	8/4/01	20012O

Proportion Emerged: 0.75 Average Days To Emergence 29.2 Average Days to Mortality 3.7

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/22/01	25	7/27/01	5		
2	A	C	M	7/25/01	28	8/1/01	7		
3	A	C	M	7/27/01	30	8/3/01	7		
4	A	C	F	7/27/01	30	8/1/01	5	7/27/01	20012F3
5	A	C	F	7/29/01	32	8/4/01	6	7/29/01	20012F6
6	A	C	M	7/29/01	32	8/2/01	4		
7	A	C	M	7/30/01	33	8/5/01	6		
8	A	C	M	7/31/01	34	8/7/01	7		
9	A	C	F	8/2/01	36	8/4/01	2	8/2/01	20012G10
10	A	C	F	8/4/01	38	8/9/01	5	8/4/01	20012F8

Proportion Emerged: 0.83 Average Days To Emergence 31.8 Average Days to Mortality 5.4

000047

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020012 Sample Name: D03396 IPSD-WW06-062 Method: 100.5SGR

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/18/01	21	7/23/01	5		
2	A	C	M	7/21/01	24	7/30/01	9		
3	A	C	M	7/22/01	25	7/26/01	4		
4	A	C	F	7/24/01	27	7/27/01	3	7/24/01	20012H2
5	A	C	F	7/25/01	28	7/30/01	5	7/25/01	20012G6
6	A	C	M	7/25/01	28	7/31/01	6		
7	A	C	M	7/26/01	29	8/1/01	6		
8	A	C	F	7/28/01	31	7/31/01	3	7/28/01	20012A5
9	A	C	M	7/29/01	32	8/3/01	5		
10	A	C	M	7/30/01	33	8/3/01	4		

Proportion Emerged: 0.83 Average Days To Emergence 27.8 Average Days to Mortality 5.0

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/21/01	24	7/31/01	10		
2	A	C	M	7/22/01	25	7/27/01	5		
3	A	C	F	7/23/01	26	7/30/01	7	7/23/01	20012A2
4	A	C	F	7/28/01	31	7/31/01	3	7/28/01	20012P
5	A	C	F	7/29/01	32	8/5/01	7	7/29/01	20012A6
6	A	C	F	7/31/01	34	8/2/01	2	7/31/01	20012F8
7	A	P	F	7/31/01	34	7/31/01	0		
8	A	C	F	8/2/01	36	8/2/01	0		

Proportion Emerged: 0.58 Average Days To Emergence 30.3 Average Days to Mortality 4.3

000048

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020013 Sample Name: D03401 IPSD-TT1802-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/19/01	22	7/25/01	6		
2	A	C	F	7/21/01	24	7/27/01	6	7/21/01	20013A1
3	A	C	M	7/22/01	25	7/28/01	6		
4	A	C	M	7/22/01	25	7/26/01	4		
5	A	C	F	7/22/01	25	7/29/01	7	7/22/01	20013A4
6	A	C	F	7/29/01	32	8/3/01	5	7/29/01	20013H4

Proportion Emerged: 0.50 Average Days To Emergence 25.5 Average Days to Mortality 5.7

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/25/01	28	7/29/01	4	7/25/01	20013D1
2	A	C	F	7/29/01	32	8/4/01	6	7/29/01	20013C2
3	A	C	M	7/30/01	33	8/6/01	7		
4	A	C	F	8/2/01	36	8/6/01	4	8/2/01	20013G4
5	A	C	F	8/7/01	41	8/11/01	4	8/7/01	20013N

Proportion Emerged: 0.42 Average Days To Emergence 34.0 Average Days to Mortality 5.0

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	P	ND	7/24/01	27	7/24/01	0		
2	A	C	M	7/28/01	31	8/2/01	5		
3	A	C	F	7/29/01	32	8/2/01	4	7/29/01,7/30/01	20013H3,20013D2
4	A	C	M	7/30/01	33	7/30/01	0		
5	A	C	F	7/31/01	34	8/3/01	3	7/31/01	20013B3
6	A	C	F	8/3/01	37	8/3/01	0		

Proportion Emerged: 0.42 Average Days To Emergence 32.3 Average Days to Mortality 2.0

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020013 Sample Name: D03401 IPSD-TT1802-06 Method: 100.5SGR

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/25/01	28	7/30/01	5		
2	A	C	M	7/30/01	33	8/4/01	5		
3	A	C	F	8/6/01	40	8/10/01	4	8/6/01,8/7/01	20013D4,20013M
4	A	C	M	8/6/01	40	8/7/01	1		
5	A	C	F	8/7/01	41	8/10/01	3	8/7/01	20013F8
6	A	C	M	8/8/01	42	8/14/01	6		
7	A	C	F	8/11/01	45	8/15/01	4	8/11/01	20013G9
8	A	C	F	8/14/01	48	8/20/01	6	8/14/01,8/15/01	20013D9,20013E4
9	A	C	M	8/14/01	48	8/15/01	1		
10	A	C	F	8/17/01	51	8/20/01	3	8/17/01	20013M

Proportion Emerged: 0.83 Average Days To Emergence 41.6 Average Days to Mortality 3.8

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	34	7/31/01	0		
2	A	C	F	8/2/01	36	8/9/01	7	8/2/01	20013F4
3	A	C	M	8/5/01	39	8/13/01	8		
4	A	C	M	8/13/01	47	8/19/01	6		

Proportion Emerged: 0.33 Average Days To Emergence 39.0 Average Days to Mortality 5.3

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/23/01	26	7/29/01	6		
2	A	C	M	7/24/01	27	7/29/01	5		
3	A	C	F	7/31/01	34	8/7/01	7	7/31/01	20013H4
4	A	C	M	8/2/01	36	8/8/01	6		
5	A	C	M	8/3/01	37	8/4/01	1		
6	A	C	F	8/4/01	38	8/9/01	5	8/4/01	20013M
7	A	C	F	8/6/01	40	8/10/01	4	8/6/01	20013F8
8	A	C	M	8/6/01	40	8/10/01	4		
9	A	C	M	8/8/01	42	8/9/01	1		
10	A	C	M	8/10/01	44				

Proportion Emerged: 0.83 Average Days To Emergence 36.4 Average Days to Mortality 4.3

000050

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020013 Sample Name: D03401 IPSD-TT1802-06 Method: 100.5SGR

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	34	8/6/01	6		
2	A	C	F	7/31/01	34	8/1/01	1	7/31/01	20013G1
3	A	C	F	8/1/01	35	8/7/01	6	8/1/01	20013G1
4	A	C	M	8/2/01	36	8/7/01	5		
5	A	C	F	8/3/01	37	8/8/01	5	8/3/01	20013F5
6	A	C	M	8/4/01	38	8/10/01	6		
7	A	C	F	8/5/01	39	8/7/01	2	8/5/01	20013E3
8	A	C	F	8/8/01	42	8/12/01	4	8/8/01	20013D6
9	A	C	M	8/11/01	45	8/16/01	5		
10	A	C	M	8/13/01	47	8/20/01	7		

Proportion Emerged: 0.83 Average Days To Emergence 38.7 Average Days to Mortality 4.7

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/22/01	25	7/29/01	7		
2	A	C	M	7/24/01	27	8/1/01	8		
3	A	C	M	7/25/01	28	7/30/01	5		
4	A	C	M	7/28/01	31	8/4/01	7		
5	A	C	F	8/1/01	35	8/7/01	6	8/1/01	20013D3
6	A	C	M	8/4/01	38	8/11/01	7		
7	A	C	F	8/9/01	43	8/16/01	7	8/9/01	20013E3
8	A	C	F	8/10/01	44	8/16/01	6	8/10/01	20013O
9	A	C	F	8/12/01	46	8/14/01	2	8/12/01	20013H10
10	A	C	M	8/12/01	46	8/19/01	7		

Proportion Emerged: 0.83 Average Days To Emergence 36.3 Average Days to Mortality 6.2

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020024 Sample Name: D03407 IPSD-TT1002-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/19/01	22	7/23/01	4	7/19/01	20024D1

Proportion Emerged: 0.08 Average Days To Emergence 22.0 Average Days to Mortality 4.0

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
0		N							

Proportion Emerged: 0.00 Average Days To Emergence Average Days to Mortality

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/18/01	21	7/23/01	5		
2	A	C	M	7/18/01	21	7/25/01	7		
3	A	C	F	7/19/01	22	7/21/01	2	7/19/01	20024C2
4	A	C	F	7/29/01	32	8/1/01	3		
5	A	C	F	7/29/01	32	8/5/01	7	8/1/01	20024H3

Proportion Emerged: 0.42 Average Days To Emergence 25.6 Average Days to Mortality 4.8

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/19/01	22	7/24/01	5		
2	A	C	M	7/21/01	24	7/24/01	3		
3	A	C	F	7/26/01	29	8/1/01	6	7/27/01	20024O
4	A	C	F	7/26/01	29	7/27/01	1	7/26/01	20024D2
5	A	C	F	7/26/01	29	8/1/01	6	7/26/01	20024F2
6	A	C	F	7/27/01	30	8/1/01	5		
7	A	C	F	7/29/01	32	7/31/01	2	7/29/01	20024H3
8	A	C	F	7/30/01	33	8/3/01	4	7/31/01	20024H3

Proportion Emerged: 0.67 Average Days To Emergence 28.5 Average Days to Mortality 4.0

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020024 Sample Name: D03407 IPSD-TT1002-06 Method: 100.5SGR

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/25/01	5		

Proportion Emerged: 0.08 Average Days To Emergence 23.0 Average Days to Mortality 5.0

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/19/01	22	7/23/01	4	7/19/01	20024C1
2	A	C	M	7/23/01	26	7/28/01	5		
3	A	C	F	7/23/01	26	7/29/01	6	7/23/01	20024F2

Proportion Emerged: 0.25 Average Days To Emergence 24.7 Average Days to Mortality 5.0

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/27/01	30	8/3/01	7		
2	A	C	F	7/27/01	30	8/1/01	5	7/27/01	20024G1
3	A	C	F	7/27/01	30	8/1/01	5	7/27/01	20024G1
4	A	C	F	7/28/01	31	8/3/01	6	7/28/01	20024H2
5	A	C	F	7/28/01	31	8/4/01	7	7/28/01	20024H2
6	A	C	F	7/28/01	31	8/3/01	6	7/28/01	20024H2
7	A	C	M	7/30/01	33	8/1/01	2		
8	A	C	F	8/2/01	36	8/5/01	3	8/2/01	20024M
9	A	C	F	8/2/01	36	8/7/01	5	8/2/01	20024M

Proportion Emerged: 0.75 Average Days To Emergence 32.0 Average Days to Mortality 5.1

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020024 Sample Name: D03407 IPSD-TT1002-06 Method: 100.5SGR

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/22/01	25	7/22/01	0		
2	A	C	M	7/28/01	31	7/31/01	3		
3	A	C	F	7/30/01	33	8/4/01	5	8/1/01	20024G1
4	A	C	M	7/30/01	33	8/4/01	5		
5	A	C	F	7/31/01	34	8/3/01	3	7/31/01	20024P
6	A	C	F	8/1/01	35	8/5/01	4	8/1/01	20024N
7	A	C	F	8/2/01	36	8/8/01	6	8/2/01	20024H3
8	A	C	F	8/3/01	37	8/8/01	5	8/3/01	20024P
9	A	C	F	8/3/01	37	8/3/01	0		
10	A	C	M	8/6/01	40	8/9/01	3		
11	A	C	F	8/11/01	45	8/11/01	0		

Proportion Emerged: 0.92 Average Days To Emergence 35.1 Average Days to Mortality 3.1

000054

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020025 Sample Name: D03412 IPSD-TT1301-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/22/01	25	7/25/01	3		
2	A	C	F	7/23/01	26	7/28/01	5	7/23/01	20025A1
3	A	C	F	7/24/01	27	7/28/01	4	7/24/01	20025E1
4	A	C	M	8/1/01	35	8/7/01	6		
5	A	C	F	8/2/01	36	8/8/01	6	8/3/01	20025E3
6	A	C	F	8/2/01	36	8/8/01	6	8/3/01	20025E3
7	A	C	F	8/6/01	40	8/10/01	4	8/6/01	20025A8
8	A	C	M	8/6/01	40	8/11/01	5		
9	A	C	F	8/8/01	42	8/13/01	5	8/8/01	20025D3
10	A	C	F	8/8/01	42	8/15/01	7	8/8/01	20025D3

Proportion Emerged: 0.83 Average Days To Emergence 34.9 Average Days to Mortality 5.1

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/27/01	30	8/1/01	5	7/27/01	20025F4
2	A	C	M	7/30/01	33	8/5/01	6		
3	A	C	F	8/2/01	36	8/6/01	4	8/2/01	20025H2
4	A	C	F	8/4/01	38	8/8/01	4	8/4/01	20025E3
5	A	C	F	8/6/01	40	8/10/01	4	8/6/01	20025F8
6	A	C	F	8/23/01	57	8/29/01	6	8/23/01,8/26/01	20025E8,20025E10

Proportion Emerged: 0.50 Average Days To Emergence 39.0 Average Days to Mortality 4.8

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/21/01	24	7/26/01	5		
2	A	C	F	7/22/01	25				
3	A	C	F	7/28/01	31	7/28/01	0		
4	A	C	F	8/1/01	35	8/5/01	4	8/1/01	20025A4
5	A	C	M	8/2/01	36	8/2/01	0		
6	A	C	F	8/2/01	36	8/7/01	5	8/2/01	20025E3
7	A	C	F	8/3/01	37	8/7/01	4	8/4/01	20025H6
8	A	C	F	8/12/01	46	8/16/01	4	8/12/01	20025G10
9	L	N							

Proportion Emerged: 0.67 Average Days To Emergence 33.8 Average Days to Mortality 3.1

000055

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020025 Sample Name: D03412 IPSD-TT1301-06 Method: 100.5SGR

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	34	8/4/01	4		
2	A	C	F	8/3/01	37	8/9/01	6	8/3/01	20025H2
3	A	C	M	8/7/01	41	8/12/01	5		
4	A	C	F	8/8/01	42	8/11/01	3	8/8/01	20025A8
5	A	C	F	8/16/01	50	8/21/01	5	8/18/01	20025H8
6	A	C	F	8/16/01	50	8/20/01	4	8/18/01	20025N
7	A	C	F	8/16/01	50	8/20/01	4	8/18/01	20025N
8	L	N							

Proportion Emerged: 0.58 Average Days To Emergence 43.4 Average Days to Mortality 4.4

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/23/01	26	7/31/01	8		
2	A	C	M	7/28/01	31	8/3/01	6		
3	A	C	M	8/2/01	36	8/7/01	5		
4	A	C	F	8/8/01	42	8/11/01	3	8/8/01	20025F8
5	A	C	F	8/10/01	44	8/15/01	5	8/10/01	20025F8
6	A	C	M	8/13/01	47	8/17/01	4		
7	A	C	F	8/17/01	51	8/22/01	5	8/17/01	20025N
8	A	C	M	8/19/01	53	8/24/01	5		
9	A	C	F	8/20/01	54	8/23/01	3	8/20/01	20025E8
10	A	C	M	8/26/01	60	8/31/01	5		

Proportion Emerged: 0.83 Average Days To Emergence 44.4 Average Days to Mortality 4.9

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/22/01	25	7/26/01	4		
2	A	C	M	7/23/01	26	7/29/01	6		
3	A	C	F	7/24/01	27	7/30/01	6	7/24/01	20025F2
4	A	C	M	7/27/01	30	8/1/01	5		
5	A	C	F	7/30/01	33	8/4/01	5	7/30/01	20025G3
6	A	C	F	8/1/01	35	8/3/01	2	8/1/01	20025O
7	A	C	M	8/5/01	39	8/10/01	5		
8	A	C	M	8/6/01	40	8/12/01	6		

Proportion Emerged: 0.67 Average Days To Emergence 31.9 Average Days to Mortality 4.9

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020025 Sample Name: D03412 IPSD-TT1301-06 Method: 100.5SGR

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/22/01	25	7/26/01	4	7/22/01	20025F1
2	A	C	M	7/27/01	30	8/2/01	6		
3	A	C	M	7/30/01	33	8/2/01	3		
4	A	C	F	7/31/01	34	8/5/01	5	7/31/01	20025B2
5	A	C	F	8/1/01	35	8/7/01	6	8/1/01	20025D1
6	A	C	M	8/5/01	39	8/10/01	5		
7	A	C	F	8/6/01	40	8/13/01	7	8/6/01	20025G6
8	A	C	F	8/10/01	44	8/11/01	1		
9	A	C	M	8/12/01	46	8/12/01	0		
10	A	C	M	8/12/01	46	8/17/01	5		

Proportion Emerged: 0.83 Average Days To Emergence 37.2 Average Days to Mortality 4.2

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/23/01	26	7/30/01	7		
2	A	C	M	7/30/01	33	8/6/01	7		
3	A	C	F	8/1/01	35	8/6/01	5	8/1/01	20025H4
4	A	C	M	8/1/01	35	8/4/01	3		
5	A	C	F	8/2/01	36	8/4/01	2	8/2/01	20025D1
6	A	C	M	8/4/01	38	8/7/01	3		
7	A	C	F	8/6/01	40	8/10/01	4	8/6/01	20025F7
8	A	C	M	8/14/01	48	8/20/01	6		

Proportion Emerged: 0.67 Average Days To Emergence 36.4 Average Days to Mortality 4.6

000057

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020026 Sample Name: D03417 IPSD-TT3001-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/21/01	24	7/29/01	8		
2	A	C	F	7/27/01	30	8/1/01	5	7/27/01	20026E2
3	A	C	F	7/28/01	31	7/31/01	3	7/28/01,7/31/01	20026N,20026A5
4	A	C	F	7/28/01	31	8/3/01	6	7/28/01	20026N
5	A	C	M	7/30/01	33	8/4/01	5		
6	A	C	F	7/31/01	34	8/6/01	6	7/31/01	20026G3
7	A	C	F	8/1/01	35	8/7/01	6	8/1/01	20026E11
8	A	C	F	8/1/01	35	8/7/01	6	8/1/01	20026E11
9	A	C	F	8/7/01	41	8/11/01	4		

Proportion Emerged: 0.75 Average Days To Emergence 32.7 Average Days to Mortality 5.4

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/25/01	5		
2	A	C	F	7/21/01	24	7/23/01	2	7/21/01	20026A1
3	A	C	F	7/23/01	26	7/27/01	4	7/23/01	20026B1

Proportion Emerged: 0.25 Average Days To Emergence 24.3 Average Days to Mortality 3.7

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
0									
1	A	C	M	7/21/01	24	7/25/01	4		
2	A	C	F	7/22/01	25	7/27/01	5	7/22/01	20026G1
3	A	C	M	7/24/01	27	7/30/01	6		
4	A	C	M	7/25/01	28	7/31/01	6		
5	A	C	M	7/26/01	29	8/1/01	6		
6	A	C	F	7/28/01	31	8/3/01	6	7/28/01,8/1/01,8/2/01	20026H6,20026G3,20026E8
7	A	C	F	7/31/01	34	8/4/01	4	7/31/01,8/2/01	20026M,20026E9
8	A	C	F	7/31/01	34	8/6/01	6	7/31/01,8/2/01	20026M,20026E9
9	A	C	F	8/1/01	35	8/7/01	6	8/1/01	20026E9

Proportion Emerged: 0.75 Average Days To Emergence 29.7 Average Days to Mortality 5.4

000058

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020026 Sample Name: D03417 IPSD-TT3001-06 Method: 100.5SGR

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/26/01	6		

Proportion Emerged: 0.08 Average Days To Emergence 23.0 Average Days to Mortality 6.0

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/23/01	26	7/23/01	0		
2	A	C	M	7/27/01	30	8/1/01	5		
3	A	C	F	7/29/01	32	8/1/01	3	7/29/01	20026E2
4	A	C	F	7/30/01	33	8/6/01	7	7/30/01	20026G3
5	A	C	F	7/31/01	34	8/4/01	4	7/31/01	20026E6
6	A	C	M	7/31/01	34	8/7/01	7		
7	A	C	F	8/1/01	35	8/3/01	2	8/1/01	20026E8
8	A	C	M	8/1/01	35	8/3/01	2		
9	A	C	M	8/1/01	35	8/6/01	5		
10	A	C	F	8/2/01	36	8/7/01	5	8/2/01	20026E6
11	A	C	M	8/3/01	37	8/7/01	4		
12	A	C	M	8/4/01	38	8/7/01	3		

Proportion Emerged: 1.00 Average Days To Emergence 33.8 Average Days to Mortality 3.9

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/19/01	22	7/23/01	4		
2	A	C	F	7/21/01	24	7/25/01	4	7/21/01	20026C1
3	A	C	M	7/24/01	27	7/30/01	6		
4	A	C	F	7/26/01	29	7/28/01	2	7/26/01	20026C5
5	A	C	F	7/27/01	30	8/3/01	7	7/27/01	20026G3

Proportion Emerged: 0.42 Average Days To Emergence 26.4 Average Days to Mortality 4.6

000059

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020026 Sample Name: D03417 IPSD-TT3001-06 Method: 100.5SGR

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/22/01	25	7/27/01	5		
2	A	C	F	7/25/01	28	8/2/01	8	7/25/01	20026C4
3	A	C	M	7/27/01	30	8/2/01	6		
4	A	C	F	7/29/01	32	8/3/01	5	7/29/01	20026C5
5	A	C	F	7/29/01	32	8/5/01	7	7/29/01	20026C5
6	A	C	F	7/30/01	33	8/6/01	7	7/30/01	20026A5
7	A	C	F	8/1/01	35	8/7/01	6	8/4/01	20026E12
8	A	C	F	8/2/01	36	8/2/01	0		

Proportion Emerged: 0.67 Average Days To Emergence 31.4 Average Days to Mortality 5.5

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/23/01	26	7/30/01	7	7/23/01,7/26/01	20026D1,20026C3
2	A	C	M	7/24/01	27	7/30/01	6		
3	A	C	M	7/24/01	27	7/31/01	7		
4	A	C	F	7/26/01	29	8/3/01	8	7/26/01	20026H2
5	A	C	F	7/26/01	29	8/3/01	8	7/26/01	20026H3
6	A	C	M	7/28/01	31	8/1/01	4		
7	A	C	F	8/1/01	35	8/7/01	6	8/3/01	20026E11
8	A	C	F	8/2/01	36	8/7/01	5	8/5/01	20026E12
9	A	C	F	8/5/01	39	8/10/01	5	8/5/01	20026H10
10	A	C	M	8/5/01	39	8/7/01	2		
11	A	C	M	8/11/01	45	8/18/01	7		

Proportion Emerged: 0.92 Average Days To Emergence 33.0 Average Days to Mortality 5.9

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020038 Sample Name: Control Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/21/01	24	7/22/01	1		
2	A	C	M	7/23/01	26	7/23/01	0		
3	A	C	M	7/23/01	26	7/25/01	2		
4	A	C	F	8/4/01	38	8/9/01	5	8/4/01	20038D4

Proportion Emerged: 0.33 Average Days To Emergence 28.5 Average Days to Mortality 2.0

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	L	N							
2	A	C	M	7/19/01	22	7/21/01	2		
3	A	C	M	7/19/01	22	7/23/01	4		

Proportion Emerged: 0.17 Average Days To Emergence 22.0 Average Days to Mortality 3.0

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/29/01	32	8/2/01	4	7/29/01	20038M,20038N

Proportion Emerged: 0.08 Average Days To Emergence 32.0 Average Days to Mortality 4.0

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/22/01	25	7/22/01	0		
2	A	C	M	7/28/01	31	7/29/01	1		
3	A	C	M	7/30/01	33	8/2/01	3		
4	A	C	M	8/2/01	36	8/8/01	6		
5	A	C	M	8/2/01	36	8/2/01	0		
6	A	C	F	8/5/01	39	8/5/01	0		

Proportion Emerged: 0.50 Average Days To Emergence 33.3 Average Days to Mortality 1.7

000061

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020038 Sample Name: Control Method: 100.5SGR

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	L	N							
2	A	C	M	7/25/01	28	7/31/01	6		
3	A	C	F	7/28/01	31	7/29/01	1	7/28/01	20038D2

Proportion Emerged: 0.17 Average Days To Emergence 29.5 Average Days to Mortality 3.5

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
0		N							

Proportion Emerged: 0.00 Average Days To Emergence Average Days to Mortality

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/20/01	23	7/29/01	9		
2	A	C	M	7/21/01	24	7/24/01	3		
3	A	C	F	8/3/01	37	8/6/01	3	8/3/01	20038M
4	A	C	F	8/6/01	40	8/9/01	3	8/6/01	20038N

Proportion Emerged: 0.33 Average Days To Emergence 31.0 Average Days to Mortality 4.5

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/26/01	29	8/1/01	6		

Proportion Emerged: 0.08 Average Days To Emergence 29.0 Average Days to Mortality 6.0

000052

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020039 Sample Name: D03424 IPSD-PPO3-062 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	E							
2	A	E							
3	A	C	F	8/1/01	21	8/4/01	3	8/1/01	20039F3

Proportion Emerged: 0.25 Average Days To Emergence 21.0 Average Days to Mortality 3.0

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	8/1/01	21	8/3/01	2	8/1/01	20039B2
2	A	C	M	8/1/01	21	8/7/01	6		
3	A	C	F	8/5/01	25	8/8/01	3	8/7/01	20039E4
4	A	C	F	8/8/01	28	8/13/01	5	8/10/01	20039M
5	A	C	F	8/9/01	29	8/10/01	1	8/9/01	20039M

Proportion Emerged: 0.42 Average Days To Emergence 24.8 Average Days to Mortality 3.4

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	E							
2	A	C	F	8/1/01	21	8/3/01	2	8/1/01	20039C3
3	A	C	M	8/1/01	21	8/3/01	2		
4	A	C	M	8/2/01	22	8/3/01	1		
5	A	C	F	8/2/01	22	8/2/01	0		
6	A	C	F	8/3/01	23	8/7/01	4	8/4/01,8/6/01	20039F3,20039E4

Proportion Emerged: 0.50 Average Days To Emergence 21.8 Average Days to Mortality 1.8

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/30/01	19	8/1/01	2		
2	A	C	F	7/31/01	20	8/2/01	2	7/31/01	20039F2

Proportion Emerged: 0.17 Average Days To Emergence 19.5 Average Days to Mortality 2.0

000063

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020039 Sample Name: D03424 IPSD-PPO3-062 Method: 100.5SGR

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	E							
2	A	C	F	8/1/01	21	8/7/01	6	8/2/01, 8/3/01	20039C3,20039B2
3	A	C	F	8/2/01	22	8/3/01	1	8/2/01	20039G3
4	A	C	M	8/5/01	25	8/8/01	3		
5	A	C	F	8/5/01	25	8/9/01	4	8/2/01	20039E4
6	A	C	F	8/5/01	25	8/9/01	4	8/2/01	20039E4
7	P								

Proportion Emerged: 0.50 Average Days To Emergence 23.6 Average Days to Mortality 3.6

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	E							
2	A	C	M	7/31/01	20	8/2/01	2		
3	A	C	M	7/31/01	20	8/6/01	6		
4	A	C	F	8/4/01	24	8/7/01	3	8/4/01	20039G3
5	A	C	F	8/4/01	24	8/4/01	0		

Proportion Emerged: 0.42 Average Days To Emergence 22.0 Average Days to Mortality 2.8

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	E							
2	A	C	F	7/31/01	20	8/7/01	7	7/31/01	
3	A	C	M	7/31/01	20	8/6/01	6		
4	A	C	F	8/1/01	21	8/7/01	6	8/1/01, 8/2/01	20039H1, 20039C4, 20039G3
5	A	C	F	8/4/01	24	8/6/01	2		
6	A	C	M	8/4/01	24	8/4/01	0		

Proportion Emerged: 0.50 Average Days To Emergence 21.8 Average Days to Mortality 4.2

000064

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020039 Sample Name: D03424 IPSD-PPO3-062 Method: 100.5SGR

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	20	8/2/01	2		
2	A	C	M	7/31/01	20	7/31/01	0		
3	A	C	F	7/31/01	20	7/31/01	0		

Proportion Emerged: 0.25 Average Days To Emergence 20.0 Average Days to Mortality 0.7

000065

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020040 Sample Name: D03429 IPSD-TTSA01-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	E							
2	A	C	M	7/31/01	20	8/2/01	2		
3	A	C	M	8/5/01	25	8/10/01	5		

Proportion Emerged: 0.25 Average Days To Emergence 22.5 Average Days to Mortality 3.5

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/30/01	19	8/2/01	3	7/31/01	20040H1
2	A	C	M	8/1/01	21	8/1/01	0		
3	A	C	M	8/2/01	22	8/2/01	0		
4	A	C	F	8/3/01	23	8/5/01	2	8/3/01	20040B5
5	A	C	M	8/3/01	23	8/6/01	3		
6	A	C	F	8/4/01	24	8/4/01	0		
7	A	C	M	8/6/01	26	8/8/01	2		
8	A	C	F	8/7/01	27	8/8/01	1	8/7/01	20040G6
9	A	C	F	8/10/01	30	8/15/01	5	8/10/01	20040P

Proportion Emerged: 0.75 Average Days To Emergence 23.9 Average Days to Mortality 1.8

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/2/01	22	8/5/01	3		
2	A	C	F	8/4/01	24	8/4/01	0		
3	A	C	F	8/4/01	24	8/4/01	0		
4	A	C	F	8/8/01	28	8/10/01	2	8/8/01	20040E6
5	A	C	F	8/8/01	28	8/11/01	3	8/8/01	20040E6
6	A	C	F	8/9/01	29	8/10/01	1	8/9/01	20040N

Proportion Emerged: 0.50 Average Days To Emergence 25.8 Average Days to Mortality 1.5

000065

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020040 Sample Name: D03429 IPSD-TTSA01-06 Method: 100.5SGR

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/2/01	22	8/7/01	5		
2	A	C	M	8/5/01	25	8/8/01	3		
3	A	C	F	8/7/01	27	8/10/01	3	8/7/01	20040H8
4	A	C	M	8/8/01	28	8/10/01	2		
5	A	C	F	8/9/01	29	8/10/01	1	8/9/01	20040F8
6	A	C	F	8/9/01	29	8/12/01	3	8/9/01	20040F8
7	A	C	M	8/10/01	30	8/15/01	5		20040D9
8	A	C	F	8/11/01	31	8/17/01	6	8/11/01	
9	A	C	M	8/11/01	31	8/15/01	4		
10	A	C	M	8/11/01	31	8/16/01	5		
11	A	C	M	8/18/01	38	8/19/01	1		

Proportion Emerged: 0.92 Average Days To Emergence 29.2 Average Days to Mortality 3.5

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	20	8/5/01	5		
2	A	C	M	8/1/01	21	8/4/01	3		
3	A	C	F	8/3/01	23	8/5/01	2	8/3/01	20040E1
4	A	C	F	8/4/01	24	8/6/01	2	8/4/01	20040F1
5	A	C	F	8/5/01	25	8/6/01	1	8/5/01	20040D2
6	A	C	M	8/8/01	28	8/13/01	5		

Proportion Emerged: 0.50 Average Days To Emergence 23.5 Average Days to Mortality 3.0

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	20	8/6/01	6		
2	A	C	M	8/1/01	21	8/1/01	0		
3	A	C	F	8/2/01	22	8/5/01	3	8/2/01	20040D1
4	A	C	F	8/2/01	22	8/4/01	2	8/2/01	20040E2
5	A	C	F	8/4/01	24	8/5/01	1	8/4/01	20040C1
6	A	C	F	8/6/01	26	8/10/01	4	8/6/01	20040B7
7	A	C	M	8/8/01	28	8/11/01	3		
8	A	C	M	8/9/01	29	8/12/01	3		
9	A	C	M	8/11/01	31	8/15/01	4		

Proportion Emerged: 0.75 Average Days To Emergence 24.8 Average Days to Mortality 2.9

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Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020040 Sample Name: D03429 IPSD-TTSA01-06 Method: 100.5SGR

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	E							
2	A	C	M	7/30/01	19	7/30/01	0		
3	A	C	M	8/1/01	21	8/4/01	3		
4	A	C	F	8/2/01	22	8/2/01	0		
5	A	C	F	8/4/01	24	8/6/01	2	8/4/01	20040H3
6	A	C	M	8/6/01	26	8/10/01	4		
7	A	C	M	8/9/01	29	8/9/01	0		
8	A	C	F	8/10/01	30	8/15/01	5	8/10/01	20040D7

Proportion Emerged: 0.67 Average Days To Emergence 24.4 Average Days to Mortality 2.0

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/30/01	19	8/3/01	4		
2	A	C	M	7/30/01	19	8/3/01	4		
3	A	C	M	8/2/01	22	8/7/01	5		
4	A	C	F	8/2/01	22	8/4/01	2	8/2/01	20040H3
5	A	C	F	8/3/01	23	8/8/01	5	8/3/01	20040H6
6	A	C	M	8/3/01	23	8/5/01	2		
7	A	C	F	8/5/01	25	8/7/01	2	8/5/01	20040A3
8	A	C	M	8/6/01	26	8/10/01	4		

Proportion Emerged: 0.67 Average Days To Emergence 22.4 Average Days to Mortality 3.5

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020041 Sample Name: D03476 IPSD-TTSD01-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	8/1/01	21	8/4/01	3	8/1/01	20041C3
2	A	C	F	8/3/01	23	8/4/01	1	8/3/01	20041E2
3	A	C	F	8/5/01	25	8/6/01	1	8/5/01	20041D6
4	A	C	F	8/9/01	29	8/10/01	1	8/9/01	20041C7
5	A	C	F	8/10/01	30	8/10/01	0		

Proportion Emerged: 0.42 Average Days To Emergence 25.6 Average Days to Mortality 1.2

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	8/4/01	24	8/6/01	2	8/4/01	20041D5
2	A	C	M	8/4/01	24	8/4/01	0		
3	A	C	F	8/6/01	26	8/9/01	3	8/6/01	20041D5
4	A	C	F	8/7/01	27	8/9/01	2	8/7/01	20041C7
5	A	C	F	8/13/01	33	8/14/01	1	8/13/01	20041N

Proportion Emerged: 0.42 Average Days To Emergence 26.8 Average Days to Mortality 1.6

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	E							
2	A	E							
3	A	C	M	8/1/01	21	8/9/01	8		
4	A	C	M	8/1/01	21	8/1/01	0		
5	A	C	M	8/2/01	22	8/2/01	0		
6	A	C	M	8/2/01	22	8/5/01	3		
7	A	C	M	8/7/01	27	8/11/01	4		

Proportion Emerged: 0.58 Average Days To Emergence 22.6 Average Days to Mortality 3.0

000069

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020041 Sample Name: D03476 IPSD-TTSD01-06 Method: 100.5SGR

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/2/01	22	8/2/01	0		
2	A	C	F	8/2/01	22	8/2/01	0		
3	A	C	F	8/3/01	23	8/7/01	4	8/3/01	20041E3
4	A	C	F	8/4/01	24	8/4/01	0		
5	A	C	M	8/4/01	24	8/9/01	5		
6	A	C	M	8/4/01	24	8/8/01	4		
7	A	C	F	8/7/01	27	8/9/01	2	8/7/01	20041E3

Proportion Emerged: 0.58 Average Days To Emergence 23.7 Average Days to Mortality 2.1

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	20	8/5/01	5		
2	A	C	M	8/1/01	21	8/6/01	5		
3	A	C	M	8/3/01	23	8/9/01	6		
4	A	C	M	8/5/01	25	8/7/01	2		
5	A	C	M	8/6/01	26	8/10/01	4		
6	A	C	F	8/6/01	26	8/8/01	2	8/6/01	20041E5
7	A	C	F	8/6/01	26	8/10/01	4	8/6/01	20041E5

Proportion Emerged: 0.58 Average Days To Emergence 23.9 Average Days to Mortality 4.0

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/1/01	21	8/1/01	0		
2	A	C	F	8/1/01	21	8/7/01	6	8/1/01	20041E2
3	A	C	M	8/2/01	22	8/3/01	1		
4	A	C	F	8/3/01	23	8/7/01	4	8/3/01, 8/5/01	20041F5, 20041F7
5	A	C	M	8/3/01	23	8/5/01	2		
6	A	C	F	8/4/01	24	8/9/01	5	8/4/01	20041D6
7	A	C	M	8/5/01	25	8/10/01	5		
8	A	C	M	8/10/01	30	8/15/01	5		

Proportion Emerged: 0.67 Average Days To Emergence 23.6 Average Days to Mortality 3.5

000070

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020041 Sample Name: D03476 IPSD-TTSD01-06 Method: 100.5SGR

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	E							
2	A	C	F	8/2/01	22	8/7/01	5	8/2/01, 8/5/01	20041C6, 20041E4
3	A	C	F	8/5/01	25	8/6/01	1	8/5/01	20041D5
4	A	C	F	8/7/01	27	8/10/01	3	8/7/01	20041F7
5	A	C	F	8/9/01	29	8/11/01	2	8/9/01	20041F7
6	A	C	M	8/10/01	30	8/14/01	4		
7	A	C	F	8/11/01	31	8/11/01	0		

Proportion Emerged: 0.58 Average Days To Emergence 27.3 Average Days to Mortality 2.5

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	E							
2	A	C	F	8/6/01	26	8/8/01	2	8/6/01	20041D6
3	A	C	F	8/6/01	26	8/12/01	6	8/6/01	20041H4
4	A	C	M	8/6/01	26	8/10/01	4		
5	A	C	F	8/7/01	27	8/11/01	4	8/7/01	20041H6
6	A	C	M	8/7/01	27	8/12/01	5		

Proportion Emerged: 0.50 Average Days To Emergence 26.4 Average Days to Mortality 4.2

000071

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020072 Sample Name: D03486 IPSD-TT04-0626 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	E							
2	A	E							
3	A	C	M	8/1/01	21	8/7/01	6		
4	A	C	F	8/2/01	22	8/5/01	3	8/2/01	20072D4
5	A	C	F	8/2/01	22	8/6/01	4	8/2/01	20072D5

Proportion Emerged: 0.42 Average Days To Emergence 21.7 Average Days to Mortality 4.3

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/31/01	20	8/5/01	5	7/31/01	20072B2
2	A	C	M	7/31/01	20	8/7/01	7		
3	A	C	M	7/31/01	20	8/6/01	6		
4	A	C	F	8/2/01	22	8/3/01	1	8/2/01	20072G5
5	A	C	F	8/2/01	22	8/5/01	3	8/2/01	20072G6
6	A	C	M	8/5/01	25	8/5/01	0		

Proportion Emerged: 0.50 Average Days To Emergence 21.5 Average Days to Mortality 3.7

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	20	8/8/01	8		
2	A	C	F	8/2/01	22	8/7/01	5	8/2/01	20072G3
3	A	C	F	8/3/01	23	8/7/01	4	8/3/01, 8/5/01	20072C4, 20072G8
4	A	C	M	8/3/01	23	8/5/01	2		
5	A	C	F	8/6/01	26	8/7/01	1	8/6/01	20072E6
6	A	C	F	8/7/01	27	8/8/01	1		

Proportion Emerged: 0.50 Average Days To Emergence 23.5 Average Days to Mortality 3.5

000072

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020072 Sample Name: D03486 IPSD-TT04-0626 Method: 100.5SGR

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/31/01	20	8/2/01	2	7/31/01	20072D2
2	A	C	M	7/31/01	20	8/3/01	3		
3	A	C	M	8/1/01	21	8/2/01	1		
4	A	C	M	8/1/01	21	8/6/01	5		
5	A	C	M	8/1/01	21	8/5/01	4		
6	A	C	M	8/3/01	23	8/8/01	5		
7	A	C	F	8/7/01	27	8/10/01	3	8/7/01	20072E6
8	A	C	M	8/8/01	28	8/15/01	7		

Proportion Emerged: 0.67 Average Days To Emergence 22.6 Average Days to Mortality 3.8

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	20	7/31/01	0		
2	A	C	M	8/1/01	21	8/5/01	4		
3	A	C	M	8/1/01	21	8/7/01	6		
4	A	C	F	8/2/01	22	8/3/01	1	8/2/01	20072G4
5	A	C	F	8/3/01	23	8/7/01	4	8/3/01	20072D6
6	A	C	M	8/6/01	26	8/13/01	7		
7	A	C	F	8/8/01	28	8/10/01	2		

Proportion Emerged: 0.58 Average Days To Emergence 23.0 Average Days to Mortality 3.4

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/31/01	20	8/1/01	1	7/31/01	20072F2
2	A	C	M	7/31/01	20	8/7/01	7		
3	A	C	M	8/1/01	21	8/1/01	0		
4	A	C	F	8/2/01	22	8/3/01	1	8/2/01	20072H3
5	A	C	F	8/3/01	23	8/4/01	1	8/3/01	20072E2

Proportion Emerged: 0.42 Average Days To Emergence 21.2 Average Days to Mortality 2.0

000073

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020072 Sample Name: D03486 IPSD-TT04-0626 Method: 100.5SGR

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	E							
2	A	C	M	7/30/01	19	8/6/01	7		
3	A	C	M	8/1/01	21	8/8/01	7		
4	A	C	M	8/2/01	22	8/6/01	4		
5	A	C	M	8/2/01	22	8/7/01	5		
6	A	C	M	8/2/01	22	8/5/01	3		
7	A	C	F	8/3/01	23	8/4/01	1	8/3/01	20072G5
8	A	C	M	8/4/01	24	8/9/01	5		

Proportion Emerged: 0.67 Average Days To Emergence 21.9 Average Days to Mortality 4.6

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/1/01	21	8/1/01	0		
2	A	C	M	8/1/01	21	8/6/01	5		
3	A	C	M	8/1/01	21	8/5/01	4		
4	A	C	F	8/2/01	22	8/4/01	2	8/2/01	20072H2
5	A	C	F	8/3/01	23	8/3/01	0		
6	A	C	F	8/4/01	24	8/7/01	3	8/4/01	20072G8

Proportion Emerged: 0.50 Average Days To Emergence 22.0 Average Days to Mortality 2.3

000074

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020073 Sample Name: D03491 IPSD-HB00-0626 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
0		N							

Proportion Emerged: 0.00 Average Days To Emergence Average Days to Mortality

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/30/01	19	7/30/01	0		
2	A	C	F	7/31/01	20	8/7/01	7	7/31/01	20073C1
3	A	C	M	8/1/01	21	8/1/01	0		
4	A	C	F	8/2/01	22	8/2/01	0		

Proportion Emerged: 0.33 Average Days To Emergence 20.5 Average Days to Mortality 1.8

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	20	8/7/01	7		
2	A	C	F	8/2/01	22	8/4/01	2	8/2/01	20073D1
3	A	C	F	8/2/01	22	8/4/01	2	8/2/01	20073D1

Proportion Emerged: 0.25 Average Days To Emergence 21.3 Average Days to Mortality 3.7

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/1/01	21	8/5/01	4		
2	A	C	M	8/4/01	24	8/9/01	5		
3	A	C	F	8/6/01	26	8/9/01	3	8/6/01	20073D2
4	A	C	M	8/7/01	27	8/15/01	8		

Proportion Emerged: 0.33 Average Days To Emergence 24.5 Average Days to Mortality 5.0

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
0		N							

Proportion Emerged: 0.00 Average Days To Emergence Average Days to Mortality

000075

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020073 Sample Name: D03491 IPSD-HB00-0626 Method: 100.5SGR

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
0		N							

Proportion Emerged: 0.00 Average Days To Emergence Average Days to Mortality

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
0		N							

Proportion Emerged: 0.00 Average Days To Emergence Average Days to Mortality

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	E							
2	A	C	F	7/31/01	20	8/2/01	2	8/1/01	20073C1
3	A	C	M	8/1/01	21	8/1/01	0		

Proportion Emerged: 0.25 Average Days To Emergence 20.5 Average Days to Mortality 1.0

000076

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020074 Sample Name: D03496 IPSD-TT0603-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	20	8/5/01	5		
2	A	C	F	8/5/01	25	8/7/01	2		
3	A	C	M	8/10/01	30	8/13/01	3		

Proportion Emerged: 0.25 Average Days To Emergence 25.0 Average Days to Mortality 3.3

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
0		N							

Proportion Emerged: 0.00 Average Days To Emergence Average Days to Mortality

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	8/10/01	30	8/15/01	5	8/10/01,8/13/01	20074A3,20074C2
2	A	C	M	8/11/01	31	8/18/01	7		

Proportion Emerged: 0.17 Average Days To Emergence 30.5 Average Days to Mortality 6.0

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	8/8/01	28	8/9/01	1		

Proportion Emerged: 0.08 Average Days To Emergence 28.0 Average Days to Mortality 1.0

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	8/2/01	22	8/6/01	4		
2	A	C	F	8/3/01	23	8/6/01	3		
3	L								
4	L								

Proportion Emerged: 0.17 Average Days To Emergence 22.5 Average Days to Mortality 3.5

000077

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020074 Sample Name: D03496 IPSD-TT0603-06 Method: 100.5SGR

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
0		N							

Proportion Emerged: 0.00 Average Days To Emergence Average Days to Mortality

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
0		N							

Proportion Emerged: 0.00 Average Days To Emergence Average Days to Mortality

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	8/2/01	22	8/5/01	3	8/2/01	20074A1

Proportion Emerged: 0.08 Average Days To Emergence 22.0 Average Days to Mortality 3.0

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020118 Sample Name: D03504 IPSD-TTUF02-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/30/01	19	8/4/01	5		
2	A	C	F	8/2/01	22	8/5/01	3	8/2/01	20118E1
3	A	C	F	8/4/01	24	8/7/01	3	8/4/01, 8/5/01	20118A4, 20118C1
4	A	C	M	8/4/01	24	8/5/01	1		
5	A	C	F	8/8/01	28	8/10/01	2	8/9/01	20118E2

Proportion Emerged: 0.42 Average Days To Emergence 23.4 Average Days to Mortality 2.8

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/1/01	21	8/1/01	0		
2	A	C	M	8/1/01	21	8/6/01	5		
3	A	C	F	8/2/01	22	8/2/01	0		
4	A	C	F	8/3/01	23	8/5/01	2	8/3/01	20118D2
5	A	C	F	8/3/01	23	8/6/01	3	8/3/01	20118D2
6	A	C	F	8/11/01	31	8/11/01	0		

Proportion Emerged: 0.50 Average Days To Emergence 23.5 Average Days to Mortality 1.7

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/4/01	24	8/7/01	3		
2	A	C	F	8/13/01	33	8/18/01	5	8/13/01	20118M
3	A	C	F	8/18/01	38	8/22/01	4	8/18/01	20118M
4	A	C	M	8/19/01	39	8/23/01	4		
5	A	C	F	8/23/01	43	8/27/01	4	8/23/01	20118P

Proportion Emerged: 0.42 Average Days To Emergence 35.4 Average Days to Mortality 4.0

000079

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020118 Sample Name: D03504 IPSD-TTUF02-06 Method: 100.5SGR

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/31/01	20	8/4/01	4	7/31/01	20118A1
2	A	C	M	8/1/01	21	8/7/01	6		
3	A	C	F	8/4/01	24	8/8/01	4	8/4/01	20118C1
4	A	C	M	8/7/01	27	8/7/01	0		
5	A	C	F	8/12/01	32	8/17/01	5	8/12/01, 8/16/01	20118H5, 20118O

Proportion Emerged: 0.42 Average Days To Emergence 24.8 Average Days to Mortality 3.8

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/2/01	22	8/6/01	4		
2	A	C	M	8/6/01	26	8/10/01	4		
3	A	C	F	8/7/01	27	8/9/01	2	8/7/01	20118E2
4	A	C	F	8/7/01	27	8/7/01	0		
5	A	C	M	8/10/01	30	8/14/01	4		
6	A	C	F	8/13/01	33	8/18/01	5	8/13/01	20118O
7	A	C	F	8/15/01	35	8/15/01	0		
8	A	C	F	8/21/01	41	8/25/01	4	8/21/01	20118O
9	A	C	M	8/26/01	46	9/2/01	7		
10	A	C	M	8/29/01	49	8/29/01	0		

Proportion Emerged: 0.83 Average Days To Emergence 33.6 Average Days to Mortality 3.0

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	7/31/01	20	8/5/01	5	8/1/01	20118A1
2	A	C	F	8/2/01	22	8/5/01	3	8/2/01	20118B2

Proportion Emerged: 0.17 Average Days To Emergence 21.0 Average Days to Mortality 4.0

000080

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020118 Sample Name: D03504 IPSD-TTUF02-06 Method: 100.5SGR

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/1/01	21	8/7/01	6		
2	A	C	M	8/1/01	21	8/7/01	6		
3	A	C	F	8/1/01	21	8/2/01	1	8/1/01	20118G2
4	A	C	F	8/3/01	23	8/7/01	4	8/3/01	20118G2
5	A	C	F	8/3/01	23	8/3/01	0		
6	A	C	F	8/7/01	27	8/7/01	0		

Proportion Emerged: 0.50 Average Days To Emergence 22.7 Average Days to Mortality 2.8

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	20	7/31/01	0		
2	A	C	F	8/1/01	21			8/1/01	20118G1
3	A	C	M	8/2/01	22	8/2/01	0		
4	A	C	M	8/2/01	22	8/2/01	0		
5	A	C	M	8/12/01	32	8/16/01	4		

Proportion Emerged: 0.42 Average Days To Emergence 23.4 Average Days to Mortality 1.0

81
000061

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020119 Sample Name: D03510 IPSD-TTUF03-06 Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	E							
2	A	C	M	8/1/01	21	8/9/01	8		
3	A	C	M	8/6/01	26	8/6/01	0		
4	A	C	F	8/6/01	26	8/6/01	0		

Proportion Emerged: 0.33 Average Days To Emergence 24.3 Average Days to Mortality 2.7

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	8/5/01	25	8/7/01	2	8/5/01	20119D2

Proportion Emerged: 0.08 Average Days To Emergence 25.0 Average Days to Mortality 2.0

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	8/8/01	28	8/10/01	2	8/8/01	20119M

Proportion Emerged: 0.08 Average Days To Emergence 28.0 Average Days to Mortality 2.0

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	8/4/01	24	8/4/01	0		
2	A	C	M	8/4/01	24	8/8/01	4		
3	A	C	F	8/5/01	25	8/9/01	4	8/5/01, 8/7/01	20119G3, 20119H2

Proportion Emerged: 0.25 Average Days To Emergence 24.3 Average Days to Mortality 2.7

000084

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020119 Sample Name: D03510 IPSD-TTUF03-06 Method: 100.5SGR

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	8/16/01	36	8/22/01	6	8/16/01	20119O
2	A	C	F	8/16/01	36	8/17/01	1	8/16/01	20119O
3	A	C	F	8/19/01	39	8/22/01	3	8/19/01	20119N
4	A	C	M	8/21/01	41	8/25/01	4		
5	A	C	M	8/26/01	46	9/2/01	7		

Proportion Emerged: 0.42 Average Days To Emergence 39.6 Average Days to Mortality 4.2

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	8/1/01	21	8/4/01	3	8/1/01	20119G1
2	A	C	M	8/1/01	21	8/1/01	0		
3	A	C	F	8/5/01	25	8/9/01	4	8/5/01	20119G1

Proportion Emerged: 0.25 Average Days To Emergence 22.3 Average Days to Mortality 2.3

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/1/01	21	8/8/01	7		
2	A	C	F	8/3/01	23	8/5/01	2	8/3/01	20119G3
3	A	C	M	8/3/01	23	8/7/01	4		
4	A	C	M	8/7/01	27	8/13/01	6		

Proportion Emerged: 0.33 Average Days To Emergence 23.5 Average Days to Mortality 4.8

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	F	8/4/01	24	8/9/01	5		20119D2
2	A	C	M	8/7/01	27	8/9/01	2		
3	A	C	F	8/8/01	28	8/10/01	2	8/8/01	20119G4
4	A	C	F	8/11/01	31	8/16/01	5	8/11/01	20119G4

Proportion Emerged: 0.33 Average Days To Emergence 27.5 Average Days to Mortality 3.5

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020182 Sample Name: Control Method: 100.5SGR

Replicate: A

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/1/01	21	8/6/01	5		
2	A	C	F	8/2/01	22	8/2/01	0		
3	A	C	F	8/4/01	24	8/9/01	5	8/4/01	20182A5
4	A	C	F	8/4/01	24	8/13/01	9	8/4/01	20182A5
5	A	C	M	8/4/01	24	8/9/01	5		
6	A	C	M	8/7/01	27	8/11/01	4		

Proportion Emerged: 0.50 Average Days To Emergence 23.7 Average Days to Mortality 4.7

Replicate: B

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	20	7/31/01	0		
2	A	C	M	8/1/01	21	8/1/01	0		
3	A	C	M	8/1/01	21	8/6/01	5		
4	A	E							
5	A	C	F	8/9/01	29	8/12/01	3	8/9/01, 8/10/01	20182G2. 20182M
6	A	C	M	9/4/01	55	9/8/01	4		

Proportion Emerged: 0.50 Average Days To Emergence 29.2 Average Days to Mortality 2.4

Replicate: C

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/1/01	21	8/8/01	7		
2	A	C	M	8/2/01	22	8/6/01	4		
3	A	C	M	8/2/01	22	8/3/01	1		
4	A	C	F	8/6/01	26	8/15/01	9	8/9/01	20182A6
5	A	C	F	8/10/01	30	8/12/01	2	8/10/01	20182M
6	A	C	F	8/13/01	33	8/19/01	6	8/13/01	20182P
7	A	C	M	8/17/01	37	8/18/01	1		

Proportion Emerged: 0.58 Average Days To Emergence 27.3 Average Days to Mortality 4.3

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Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020182 Sample Name: Control Method: 100.5SGR

Replicate: D

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/1/01	21	8/7/01	6		
2	A	C	F	8/2/01	22	8/2/01	0		
3	A	C	F	8/2/01	22	8/5/01	3	8/2/01	20182D4
4	A	C	M	8/2/01	22	8/9/01	7		
5	A	C	M	8/4/01	24	8/9/01	5		
6	A	C	M	8/4/01	24	8/4/01	0		
7	A	P	M	8/4/01	24	8/4/01	0		
8	L								
9	L								

Proportion Emerged: 0.50 Average Days To Emergence 22.7 Average Days to Mortality 3.0

Replicate: E

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	20	8/1/01	1		
2	A	P	M	8/7/01	27	8/7/01	0		
3	A	C	F	8/16/01	36	8/16/01	0		

Proportion Emerged: 0.17 Average Days To Emergence 27.7 Average Days to Mortality 0.3

Replicate: F

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/30/01	19	8/3/01	4		

Proportion Emerged: 0.08 Average Days To Emergence 19.0 Average Days to Mortality 4.0

000085

Emergence Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/4/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020182 Sample Name: Control Method: 100.5SGR

Replicate: G

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	8/1/01	21	8/5/01	4		
2	A	C	M	8/2/01	22	8/10/01	8		
3	A	C	F	8/3/01	23	8/9/01	6	8/3/01	20182G4
4	A	C	M	8/3/01	23	8/7/01	4		
5	A	C	F	8/4/01	24	8/5/01	1	8/4/01	20182G6
6	A	C	M	8/4/01	24	8/9/01	5		
7	A	C	F	8/5/01	25	8/10/01	5	8/5/01	20182D5
8	A	C	F	8/5/01	25	8/7/01	2	8/5/01	20182G6
9	A	C	F	8/6/01	26	8/9/01	3	8/6/01	20182G2

Proportion Emerged: 0.75 Average Days To Emergence 23.7 Average Days to Mortality 4.2

Replicate: H

Larvae Number	Life Stage	Emergence Status	Sex:	Date Emerged	Days to Emergence	Date Died	Days To Mortality	Date(s) Paired	Male Pairing
1	A	C	M	7/31/01	20	8/3/01	3		
2	A	C	M	8/1/01	21	8/6/01	5		
3	A	C	M	8/2/01	22	8/3/01	1		
4	A	C	F	8/3/01	23	8/7/01	4	8/3/01	20182H2
5	A	C	M	8/10/01	30	8/11/01	1		

Proportion Emerged: 0.42 Average Days To Emergence 23.2 Average Days to Mortality 2.8

000056

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019971 Sample Name: D03193 IPSD-WHO7-061 Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/25/01	R	12	15	16	18	20	49		794	A		0
5	7/25/01	R	12	14	15	14	11	27		356		5	351
7	7/25/01	R	16	20	26	21	20	89		1833		34	1799
9	8/1/01	D							475			0	475

Mean Eggs Produced per Female: 865 Mean Eggs Hatched per Female: 656 Mean Proportion Hatched: 0.74

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
7	7/26/01	R	20	19	24	24	16	82		1689		198	1491

Mean Eggs Produced per Female: 1689 Mean Eggs Hatched per Female: 1491 Mean Proportion Hatched: 0.88

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
9	7/25/01	R	20	18	20	21	14	72		1339		38	1301
12	8/4/01	R	18	18	18	17	17	38		669	A		0

Mean Eggs Produced per Female: 1004 Mean Eggs Hatched per Female: 651 Mean Proportion Hatched: 0.49

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/28/01	R	16	16	14	20	20	35		602		7	595
3	8/1/01	R	13	18	17	16	14	57		889		40	849
4	8/3/01	A							188				
7	8/4/01	R	12	20	25	22	15	83		1560		37	1523
9	8/5/01	R	16	18	22	24	22	77		1571		158	1413
10	8/5/01	R	18	22	25	26	22	103		2328		48	2280

Mean Eggs Produced per Female: 1190 Mean Eggs Hatched per Female: 1332 Mean Proportion Hatched: 0.96

000087

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019971 Sample Name: D03193 IPSD-WHO7-061 Method: 100.5SGR

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	7/22/01	R	14	20	24	14	18	52		936		40	896

Mean Eggs Produced per Female: 936 Mean Eggs Hatched per Female: 896 Mean Proportion Hatched: 0.96

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/22/01	R	13	22	22	24	13	55		1034		169	865
6	7/24/01	R	21	20	19	23	18	47		949	A		0

Mean Eggs Produced per Female: 992 Mean Eggs Hatched per Female: 433 Mean Proportion Hatched: 0.42

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/24/01	R	18	15	20	18	20	53		965		556	409
5	7/26/01	R	18	20	26	20	19	70		1442		308	1134
8	8/1/01	R	17	19	20	16	14	59		1015		112	903
9	7/30/01	R	17	19	23	21	13	78		1451		47	1404
10	7/31/01	R	12	16	15	16	14	61		891		5	886
11	8/1/01	R	13	10	12	11	13	54		637	A		0
12	7/31/01	R	13	17	22	23	15	73		1314	A		0

Mean Eggs Produced per Female: 1102 Mean Eggs Hatched per Female: 676 Mean Proportion Hatched: 0.58

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring	Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
9	8/3/01	A			1004				

Mean Eggs Produced per Female: 1004 Mean Eggs Hatched per Female: Mean Proportion Hatched:

000058

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019972 Sample Name: D03198 IPSD-TT2201-06 Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/21/01R	R	19	16	19	15	17	78		1342		207	1135
2	7/26/01	R	19	21	25	24	16	62		1302		19	1283
5	7/28/01	R	15	20	21	20	16	64		1178		131	1047
6	7/29/01	R	16	22	25	20	18	76		1535		11	1524
9	8/4/01	A							438				

Mean Eggs Produced per Female: 1159 Mean Eggs Hatched per Female: 1247 Mean Proportion Hatched: 0.93

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
7	8/1/01	R	16	16	18	16	4	84		1176		29	1147
8	8/2/01	R	22	24	22	18	24	94		2068		111	1957

Mean Eggs Produced per Female: 1622 Mean Eggs Hatched per Female: 1552 Mean Proportion Hatched: 0.96

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	7/30/01	R	14	15	18	15	16	45		702		8	694
5	8/3/01	A							430				
7	8/5/01	A							659				
8	8/10/01	R	10	13	13	11	10	80		912		46	866

Mean Eggs Produced per Female: 676 Mean Eggs Hatched per Female: 780 Mean Proportion Hatched: 0.97

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/26/01	R	18	24	25	22	20	73		1591		26	1565
7	8/4/01	R	14	16	17	16	16	95		1501		215	1286
8	8/5/01	R	20	24	19	24	22	82		1788		2	1786

Mean Eggs Produced per Female: 1627 Mean Eggs Hatched per Female: 1546 Mean Proportion Hatched: 0.95

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019972 Sample Name: D03198 IPSD-TT2201-06 Method: 100.5SGR

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	7/23/01	R	16	16	18	22	18	64		1152		293	859
5	7/26/01	R	17	22	26	16	16	38		737		2	735
6	7/24/01	R	16	22	22	17	14	63		1147		166	981
7	7/27/01	A							590				

Mean Eggs Produced per Female: 906 Mean Eggs Hatched per Female: 858 Mean Proportion Hatched: 0.87

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/24/01	R	16	20	16	16	18	70		1204		17	1187
3	7/25/01	R	18	20	22	24	16	50		1000		0	1000
4	7/26/01	R	12	20	14	14	17	67		1032		35	997
5	7/28/01	R	18	22	22	24	21	73		1562		21	1541
6	8/1/01	R	12	18	17	17	13	59		909		0	909
7	8/2/01	A							262				
8	8/1/01	R	15	18	19	20	13	89		1513		43	1470

Mean Eggs Produced per Female: 1069 Mean Eggs Hatched per Female: 1184 Mean Proportion Hatched: 0.99

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	8/3/01	R	14	14	18	13	8	34		456		452	4
4	8/4/01	R	16	18	19	19	14	99		1703		34	1669
6	8/7/01	A							484				
8	8/11/01	R	16	20	23	20	9	99		1742	A		0

Mean Eggs Produced per Female: 1096 Mean Eggs Hatched per Female: 557 Mean Proportion Hatched: 0.33

000099

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019972 Sample Name: D03198 IPSD-TT2201-06 Method: 100.5SGR

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	7/26/01	R	14	20	22	16	15	44		766		7	759
8	7/30/01	R	19	20	22	20	18	51		1010		16	994
9	8/3/01	R	11	11	15	20	8	54		702		7	695
10	8/1/01	R	15	19	20	19	16	65		1157		5	1152
11	8/2/01	R	20	18	16	18	22	92		1730		76	1654

Mean Eggs Produced per Female: 1073 Mean Eggs Hatched per Female: 1051 Mean Proportion Hatched: 0.98

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019981 Sample Name: D03201 IPSD-TT1203-06 Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	7/28/01	A							388				
6	8/1/01	R	17	20	20	18	18	57		1060		21	1039
7	8/3/01	R	10	13	14	15	13	81		1053		56	997

Mean Eggs Produced per Female: 834 Mean Eggs Hatched per Female: 1018 Mean Proportion Hatched: 0.96

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/25/01	R	13	19	22	22	16	96		1766		354	1412
4	8/4/01	R	12	21	23	21	16	99		1841		32	1809
5	8/4/01	R	13	17	20	19	12	122		1976		17	1959

Mean Eggs Produced per Female: 1861 Mean Eggs Hatched per Female: 1727 Mean Proportion Hatched: 0.92

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/26/01	R	16	21	16	18	20	84		1529		33	1496
6	7/29/01	R	18	23	26	20	19	80		1696		180	1516

Mean Eggs Produced per Female: 1612 Mean Eggs Hatched per Female: 1506 Mean Proportion Hatched: 0.94

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/24/01	R	21	24	20	20	17	66		1346	A		0
3	7/25/01	R	20	21	20	24	22	76		1626		266	1360
4	7/25/01	R	18	25	21	26	22	93		2083		319	1764

Mean Eggs Produced per Female: 1685 Mean Eggs Hatched per Female: 1042 Mean Proportion Hatched: 0.56

000089

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019981 Sample Name: D03201 IPSD-TT1203-06 Method: 100.5SGR

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	8/2/01	A							432				

Mean Eggs Produced per Female: 432 Mean Eggs Hatched per Female: Mean Proportion Hatched:

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/23/01	A							397				

Mean Eggs Produced per Female: 397 Mean Eggs Hatched per Female: Mean Proportion Hatched:

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	7/31/01	R	19	21	18	18	19	62		1178		19	1159
5	8/5/01	R	18	20	20	24	23	63		1323		90	1233
6	8/8/01	R	16	18	20	18	21	63		1172		100	1072
9	8/14/01	R	18	16	20	16	17	48		835		156	679

Mean Eggs Produced per Female: 1127 Mean Eggs Hatched per Female: 1036 Mean Proportion Hatched: 0.91

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/29/01	R	19	24	26	22	21	72		1613		71	1542
2	7/31/01	R	16	17	18	18	16	49		833		18	815
3	8/2/01	R	22	20	19	18	24	80		1648		0	1648
4	8/3/01	R	8	14	19	16	14	114		1619		39	1580

Mean Eggs Produced per Female: 1428 Mean Eggs Hatched per Female: 1396 Mean Proportion Hatched: 0.98

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019982 Sample Name: D03206 IPSD-TT2903-06 Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	7/25/01	R	19	21	24	24	20	85		1836		266	1570
5	8/1/01	R	19	19	22	25	20	68		1428	A		0

Mean Eggs Produced per Female: 1632 Mean Eggs Hatched per Female: 785 Mean Proportion Hatched: 0.43

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring	Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
7	8/4/01	A			619				

Mean Eggs Produced per Female: 619 Mean Eggs Hatched per Female: Mean Proportion Hatched:

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/25/01	R	17	19	21	20	18	61		1159		187	972
4	7/26/01	R	18	22	26	20	22	88		1901		25	1876
5	7/29/01	A							619				
6	7/31/01	R	15	15	15	15	15	64		960		6	954

Mean Eggs Produced per Female: 1160 Mean Eggs Hatched per Female: 1267 Mean Proportion Hatched: 0.94

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/27/01	R	18	19	22	24	19	54		1102		486	616
7	8/8/01	R	20	22	24	23	12	52		1050		329	721
8	8/10/01	A							855				
9	8/11/01	R	14	21	22	21	18	89		1709		71	1638

Mean Eggs Produced per Female: 1179 Mean Eggs Hatched per Female: 992 Mean Proportion Hatched: 0.73

000094

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019982 Sample Name: D03206 IPSD-TT2903-06 Method: 100.5SGR

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	8/5/01	R	20	18	17	18	20	57		1060		107	953
4	8/9/01	R	20	21	17	20	19	75		1455		34	1421
6	8/13/01	R	24	22	21	20	23	71		1562		309	1253
8	8/18/01	R	20	17	20	22	21	58		1160		124	1036

Mean Eggs Produced per Female: 1309 Mean Eggs Hatched per Female: 1166 Mean Proportion Hatched: 0.89

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring	Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
5	7/28/01	D			215			48	167

Mean Eggs Produced per Female: 215 Mean Eggs Hatched per Female: 167 Mean Proportion Hatched: 0.78

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	7/26/01	R	16	18	22	26	22	86		1789		168	1621

Mean Eggs Produced per Female: 1789 Mean Eggs Hatched per Female: 1621 Mean Proportion Hatched: 0.91

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
6	7/31/01	R	15	19	20	19	14	102		1775		10	1765
7	8/1/01	R	13	18	18	21	16	102		1754		44	1710

Mean Eggs Produced per Female: 1765 Mean Eggs Hatched per Female: 1738 Mean Proportion Hatched: 0.98

000095

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019983 Sample Name: D03211 IPSD-TT1901-06 Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/27/01	A							947			0	
3	7/28/01	R	23	22	24	22	17	52		1123	A		0
7	8/2/01	R	22	20	26	24	26	85		2006		278	1728

Mean Eggs Produced per Female: 1359 Mean Eggs Hatched per Female: 864 Mean Proportion Hatched: 0.43

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	7/25/01	R	18	20	20	24	19	73		1475		262	1213
7	7/30/01	R	23	20	23	23	23	65		1456		22	1434
8	8/4/01	R	20	23	21	21	13	116		2274		36	2238
9	8/7/01	R	20	21	18	19	18	42		806		371	435

Mean Eggs Produced per Female: 1503 Mean Eggs Hatched per Female: 1330 Mean Proportion Hatched: 0.83

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/24/01	R	18	20	24	19	18	55		1089		201	888

Mean Eggs Produced per Female: 1089 Mean Eggs Hatched per Female: 888 Mean Proportion Hatched: 0.82

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
6	7/30/01	R	16	19	17	18	17	58		1009		54	955
7	7/30/01	R	19	20	20	21	19	70		1386		80	1306
8	8/4/01	A							898				
9	8/4/01	R	14	14	19	19	14	93		1488		236	1252

Mean Eggs Produced per Female: 1195 Mean Eggs Hatched per Female: 1171 Mean Proportion Hatched: 0.91

000096

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 019983 Sample Name: D03211 IPSD-TT1901-06 Method: 100.5SGR

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/23/01	D							64		A		0
2	7/22/01	R	14	24	20	24	15	65		1261		132	1129

Mean Eggs Produced per Female: 663 Mean Eggs Hatched per Female: 565 Mean Proportion Hatched: 0.45

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/23/01	A							430				
2	7/28/01	R	14	16	21	18	16	57		969		35	934
3	7/28/01	R	19	20	22	20	18	73		1445		14	1431
4	7/31/01	R	14	15	14	16	14	42		613		15	598
6	8/2/01	R	24	18	26	20	24	94		2106		259	1847
7	8/4/01	R	10	17	17	17	11	19		274		78	196

Mean Eggs Produced per Female: 973 Mean Eggs Hatched per Female: 1001 Mean Proportion Hatched: 0.90

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	7/25/01	R	20	22	24	22	18	67		1420		256	1164
6	7/31/01	R	13	20	21	19	18	78		1420		6	1414
9	7/31/01	D							250			127	123
10	8/5/01	A							817				

Mean Eggs Produced per Female: 977 Mean Eggs Hatched per Female: 900 Mean Proportion Hatched: 0.77

000097

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020001 Sample Name: D03387 IPSD-TT3302-06 Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	8/2/01	R	18	20	16	20	20	55		1034		93	941
4	8/8/01	R	9	13	17	13	16	76		1034		138	896

Mean Eggs Produced per Female: 1034 Mean Eggs Hatched per Female: 918 Mean Proportion Hatched: 0.89

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/25/01	R	18	20	17	19	20	55		1034		93	941
6	7/28/01	R	18	21	24	20	18	76		1535		21	1514
8	8/1/01	R	15	20	23	24	17	81		1604		222	1382
10	8/7/01	A							1562				

Mean Eggs Produced per Female: 1434 Mean Eggs Hatched per Female: 1279 Mean Proportion Hatched: 0.92

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
7	8/3/01	R	12	20	21	20	16	66		1175	A		0
8	8/6/01	R	20	25	20	18	20	64		1318		13	1305
9	8/8/01	R	12	17	16	18	14	89		1371		11	1360

Mean Eggs Produced per Female: 1288 Mean Eggs Hatched per Female: 888 Mean Proportion Hatched: 0.66

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
5	8/1/01	D							114		A		0
7	8/2/01	R	16	18	20	16	20	100		1800		21	1779
9	8/7/01	R	16	16	19	18	21	45		810		0	810

Mean Eggs Produced per Female: 908 Mean Eggs Hatched per Female: 863 Mean Proportion Hatched: 0.66

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020001 Sample Name: D03387 IPSD-TT3302-06 Method: 100.5SGR

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/12/01	R	26	27	24	23	24	74		1835		226	1609
6	8/15/01	D							78		A		0
7	8/15/01	R	15	19	19	18	16	55		957	A		0
8	8/15/01	A							344				
9	8/20/01	R	19	21	19	20	18	77		1494		188	1306

Mean Eggs Produced per Female: 942 Mean Eggs Hatched per Female: 729 Mean Proportion Hatched: 0.44

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/28/01	R	20	22	20	24	18	74		1539		190	1349
6	8/20/01	A							1210				

Mean Eggs Produced per Female: 1375 Mean Eggs Hatched per Female: 1349 Mean Proportion Hatched: 0.88

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	8/5/01	R	18	19	16	18	24	84		1596		172	1424
8	8/15/01	R	16	24	22	22	18	74		1510	A		0
9	8/15/01	R	12	13	15	16	11	57		764	A		0

Mean Eggs Produced per Female: 1290 Mean Eggs Hatched per Female: 475 Mean Proportion Hatched: 0.30

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/30/01	R	11	15	15	14	15	51		714		7	707
6	8/19/01	R	15	18	18	17	15	48		797		184	613

Mean Eggs Produced per Female: 755 Mean Eggs Hatched per Female: 660 Mean Proportion Hatched: 0.88

000099

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020002 Sample Name: D03392 IPSD-TT3202-06 Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/26/01	R	21	24	24	22	18	66		1439		48	1391
3	7/28/01	R	20	22	26	21	20	68		1482		189	1293
4	8/1/01	A							331				

Mean Eggs Produced per Female: 1084 Mean Eggs Hatched per Female: 1342 Mean Proportion Hatched: 0.92

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/29/01	R	16	20	24	21	18	74		1465		267	1198
8	8/10/01	R	15	16	17	19	15	80		1312		92	1220
9	8/10/01	R	15	19	22	20	15	94		1711		479	1232

Mean Eggs Produced per Female: 1496 Mean Eggs Hatched per Female: 1217 Mean Proportion Hatched: 0.82

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	8/3/01	R	15	22	21	21	18	52		1009		37	972
5	8/9/01	R	14	16	17	15	13	60		900		134	766
6	8/11/01	R	15	18	20	19	12	57		958		284	674

Mean Eggs Produced per Female: 955 Mean Eggs Hatched per Female: 804 Mean Proportion Hatched: 0.84

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/29/01	R	14	21	22	24	17	52		1019		37	982
7	8/8/01	R	14	21	22	21	15	64		1190		11	1179
8	8/13/01	R	20	21	22	21	20	63		1310		7	1303

Mean Eggs Produced per Female: 1173 Mean Eggs Hatched per Female: 1155 Mean Proportion Hatched: 0.98

000100

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020002 Sample Name: D03392 IPSD-TT3202-06 Method: 100.5SGR

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	8/1/01	R	11	15	15	14	6	54		659		56	603
3	8/9/01	R	16	14	16	14	15	46		690		112	578
8	8/19/01	R	16	22	22	21	15	73		1402		245	1157
11	8/23/01	R	23	19	20	24	22	60		1296	A		0

Mean Eggs Produced per Female: 1012 Mean Eggs Hatched per Female: 584 Mean Proportion Hatched: 0.64

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/29/01	R	16	20	18	18	14	49		843		149	694
4	8/6/01	R	22	18	20	24	20	46		957	A		0
5	8/5/01	R	18	24	25	24	22	100		2260		64	2196
7	8/10/01	A							1314				
9	8/12/01	R	18	19	20	16	19	123		2263		222	2041
10	8/12/01	R	24	23	22	23	24	65		1508		669	839

Mean Eggs Produced per Female: 1524 Mean Eggs Hatched per Female: 1154 Mean Proportion Hatched: 0.65

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring	Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
5	8/7/01	A			1250				
6	8/9/01	D			52			3	49
7	8/18/01	D			283		A		0

Mean Eggs Produced per Female: 528 Mean Eggs Hatched per Female: 25 Mean Proportion Hatched: 0.47

000101

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020002 Sample Name: D03392 IPSD-TT3202-06 Method: 100.5SGR

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
7	8/1/01	R	16	17	21	20	15	49		872		147	725
9	8/13/01	R	24	23	23	22	21	97		2192		298	1894

Mean Eggs Produced per Female: 1532 Mean Eggs Hatched per Female: 1310 Mean Proportion Hatched: 0.85

000102

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020012 Sample Name: D03396 IPSD-WW06-062 Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/25/01	R	18	16	17	18	16	29		493		39	454
4	7/26/01	R	18	24	25	22	23	54		1210		41	1169
8	8/3/01	R	20	20	21	22	16	88		1742		982	760
10	8/3/01	R	10	15	13	15	11	90		1152		152	1000

Mean Eggs Produced per Female: 1149 Mean Eggs Hatched per Female: 846 Mean Proportion Hatched: 0.80

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	7/29/01	R	18	20	20	22	18	58		1137		39	1098
7	8/2/01	A							259				
9	8/2/01	R	22	24	26	26	22	76		1824		14	1810
11	8/3/01	R	10	14	12	18	14	109		1482		4	1478

Mean Eggs Produced per Female: 1176 Mean Eggs Hatched per Female: 1462 Mean Proportion Hatched: 0.99

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
7	7/27/01	R	18	17	19	21	16	74		1347		158	1189
10	8/4/01	A							1584				

Mean Eggs Produced per Female: 1465 Mean Eggs Hatched per Female: 1189 Mean Proportion Hatched: 0.88

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
10	8/3/01	R	8	12	15	12	10	99		1129		37	1092

Mean Eggs Produced per Female: 1129 Mean Eggs Hatched per Female: 1092 Mean Proportion Hatched: 0.97

000103

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020012 Sample Name: D03396 IPSD-WW06-062 Method: 100.5SGR

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	7/24/01	R	20	22	24	21	18	46		966		120	846
6	7/29/01	R	24	22	24	20	20	46		1012		40	972

Mean Eggs Produced per Female: 989 Mean Eggs Hatched per Female: 909 Mean Proportion Hatched: 0.92

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	7/28/01	R	21	22	24	20	16	61		1257		202	1055
5	7/30/01	R	17	21	20	21	19	58		1137		58	1079
9	8/3/01	A							1332				
10	8/5/01	A							1065				

Mean Eggs Produced per Female: 1198 Mean Eggs Hatched per Female: 1067 Mean Proportion Hatched: 0.89

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	7/25/01	R	20	22	24	26	22	63		1436		97	1339
5	7/26/01	R	22	23	24	24	18	71		1576		546	1030
8	7/29/01	R	28	24	20	26	24	83		2025		294	1731

Mean Eggs Produced per Female: 1679 Mean Eggs Hatched per Female: 1367 Mean Proportion Hatched: 0.81

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/24/01	R	20	24	22	20	24	58		1276		71	1205
4	7/29/01	R	16	20	18	18	20	36		662		49	613
5	7/30/01	R	15	17	16	15	15	54		842		42	800
6	8/1/01	R	22	23	23	23	22	88		1989		310	1679

Mean Eggs Produced per Female: 1192 Mean Eggs Hatched per Female: 1074 Mean Proportion Hatched: 0.92

000104

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020013 Sample Name: D03401 IPSD-TT1802-06 Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/22/01	R	16	21	23	24	20	63		1310		28	1282
5	7/24/01	R	24	22	25	22	24	67		1568		74	1494
6	7/30/01	R	18	20	22	22	21	103		2122		26	2096

Mean Eggs Produced per Female: 1667 Mean Eggs Hatched per Female: 1624 Mean Proportion Hatched: 0.97

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/28/01	D							149		A		0
2	7/30/01	R	6	12	21	19	15	118		1723		53	1670
4	8/4/01	R	7	11	13	13	16	85		1020		24	996
5	8/8/01	R	13	24	24	26	23	101		2222		5	2217

Mean Eggs Produced per Female: 1278 Mean Eggs Hatched per Female: 1221 Mean Proportion Hatched: 0.74

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/31/01	R	20	21	21	16	17	86		1634		28	1606
5	8/1/01	R	10	11	13	12	10	69		773		19	754

Mean Eggs Produced per Female: 1203 Mean Eggs Hatched per Female: 1180 Mean Proportion Hatched: 0.98

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/8/01	R	19	20	19	20	20	63		1235		22	1213
7	8/12/01	D							998				
8	8/16/01	R	25	21	20	24	23	95		2147		137	2010
10	8/19/01	A							1206				

Mean Eggs Produced per Female: 1396 Mean Eggs Hatched per Female: 1611 Mean Proportion Hatched: 0.96

000105

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020013 Sample Name: D03401 IPSD-TT1802-06 Method: 100.5SGR

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	8/3/01	R	14	14	15	16	13	64		922		93	829

Mean Eggs Produced per Female: 922 Mean Eggs Hatched per Female: 829 Mean Proportion Hatched: 0.90

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/1/01	R	17	20	21	20	15	54		1004		16	988
6	8/5/01	R	22	23	24	20	19	64		1382		14	1368
7	8/7/01	A							407				

Mean Eggs Produced per Female: 931 Mean Eggs Hatched per Female: 1178 Mean Proportion Hatched: 0.99

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/3/01	R	6	8	8	9	9	164		1312		31	1281
5	8/5/01	R	23	18	19	23	25	52		1123		98	1025
8	8/9/01	R	22	22	24	23	26	55		1287		8	1279

Mean Eggs Produced per Female: 1241 Mean Eggs Hatched per Female: 1195 Mean Proportion Hatched: 0.96

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
5	8/2/01	R	22	20	24	26	18	79		1738		37	1701
7	8/10/01	R	13	18	18	18	10	65		1001		211	790
8	8/11/01	R	18	22	19	18	12	73		1299		248	1051

Mean Eggs Produced per Female: 1346 Mean Eggs Hatched per Female: 1181 Mean Proportion Hatched: 0.86

000106

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020024 Sample Name: D03407 IPSD-TT1002-06 Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/21/01	R	16	22	22	20	22	42		857		0	857

Mean Eggs Produced per Female: 857 Mean Eggs Hatched per Female: 857 Mean Proportion Hatched: 1.00

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/28/01	R	22	24	25	26	20	66		1544		129	1415
5	7/27/01	R	14	18	17	18	15	61		1000	A		0
8	8/1/01	A							1680				

Mean Eggs Produced per Female: 1408 Mean Eggs Hatched per Female: 708 Mean Proportion Hatched: 0.46

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring	Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/21/01	D			103			5	98
3	7/25/01	A			369				

Mean Eggs Produced per Female: 236 Mean Eggs Hatched per Female: 98 Mean Proportion Hatched: 0.95

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/28/01	R	20	25	23	20	17	83		1743		972	771
4	7/29/01	A							604				
5	7/29/01	R	24	14	20	16	18	55		1012		14	998
6	8/3/01	A							1087				
8	8/3/01	R	17	16	13	13	11	53		742		75	667
9	8/5/01	R	14	16	18	16	17	32		518		5	513

Mean Eggs Produced per Female: 951 Mean Eggs Hatched per Female: 737 Mean Proportion Hatched: 0.83

000107

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020024 Sample Name: D03407 IPSD-TT1002-06 Method: 100.5SGR

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/2/01	A							979				
4	8/1/01	R	15	19	19	18	16	43		748		3	745
6	8/3/01	R	18	20	21	19	15	81		1507		63	1444
7	8/4/01	R	11	12	12	14	11	47		564		35	529

Mean Eggs Produced per Female: 949 Mean Eggs Hatched per Female: 906 Mean Proportion Hatched: 0.96

000108

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020025 Sample Name: D03412 IPSD-TT1301-06 Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/24/01	R	20	19	21	17	18	59		1121		106	1015
3	7/25/01	R	20	11	16	18	20	42		714		42	672
6	8/4/01	R	20	21	22	24	20	79		1691		279	1412
7	8/7/01	R	16	14	13	12	14	26		359		6	353
9	8/9/01	R	20	22	20	18	19	95		1881		64	1817
10	8/11/01	R	10	14	13	13	8	31		360		37	323

Mean Eggs Produced per Female: 1021 Mean Eggs Hatched per Female: 932 Mean Proportion Hatched: 0.92

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/2801	R	14	18	20	16	15	42		697		35	662
3	8/3/01	R	17	21	22	23	19	60		1224		105	1119
4	8/5/01	R	24	17	18	20	16	89		1691			
5	8/7/01	R	20	16	18	20	15	84		1495		12	1483
6	8/27/01	A							958				

Mean Eggs Produced per Female: 1213 Mean Eggs Hatched per Female: 1088 Mean Proportion Hatched: 0.95

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/23/01	R	20	21	20	18	19	62		1215		287	928
6	8/3/01	R	15	19	18	21	18	73		1329		107	1222
8	8/15/01	A							709				

Mean Eggs Produced per Female: 1084 Mean Eggs Hatched per Female: 1075 Mean Proportion Hatched: 0.84

060109

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020025 Sample Name: D03412 IPSD-TT1301-06 Method: 100.5SGR

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	8/5/01	R	16	20	24	22	23	37		777		38	739
4	8/10/01	A							283				
6	8/20/01	A							442				

Mean Eggs Produced per Female: 501 Mean Eggs Hatched per Female: 739 Mean Proportion Hatched: 0.95

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	8/9/01	R	22	18	16	18	19	44		818		36	782
5	8/11/01	R	14	20	18	18	14	89		1495		318	1177
7	8/18/01	R	24	21	24	21	20	112		2464		51	2413

Mean Eggs Produced per Female: 1593 Mean Eggs Hatched per Female: 1458 Mean Proportion Hatched: 0.91

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/24/01	R	20	20	18	20	18	88		1690		411	1279
6	8/3/01	D							304		A		0

Mean Eggs Produced per Female: 997 Mean Eggs Hatched per Female: 639 Mean Proportion Hatched: 0.38

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/23/01	R	18	18	20	16	18	79		1422		60	1362
5	8/2/01	R	24	26	20	24	26	78		1872		176	1696
7	8/7/01	R	22	22	22	20	18	96		1997		147	1850

Mean Eggs Produced per Female: 1764 Mean Eggs Hatched per Female: 1636 Mean Proportion Hatched: 0.93

000110

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020025 Sample Name: D03412 IPSD-TT1301-06 Method: 100.5SGR

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/4/01	R	15	20	23	17	18	39		725	A		0
5	8/4/01	A							330				
7	8/7/01	A							774				

Mean Eggs Produced per Female: 610 Mean Eggs Hatched per Female: 0 Mean Proportion Hatched: 0.00

006111

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020026 Sample Name: D03417 IPSD-TT3001-06 Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/28/01	R	16	22	24	21	18	62		1252		91	1161
3	7/29/01	R	20	26	24	22	22	64		1459		313	1146
4	8/3/01	D							83			6	77
6	8/1/01	R	14	21	18	18	11	85		1394		254	1140
7	8/5/01	R	24	25	26	23	24	78		1903		145	1758
8	8/5/01	A							878				

Mean Eggs Produced per Female: 1162 Mean Eggs Hatched per Female: 1057 Mean Proportion Hatched: 0.88

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/23/01	D							36		A		0
3	7/25/01	R	18	18	20	16	20	99		1822		95	1727

Mean Eggs Produced per Female: 929 Mean Eggs Hatched per Female: 863 Mean Proportion Hatched: 0.47

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
6	8/3/01	D							715		A		0
7	8/3/01	A							748				
9	8/2/01	R	22	20	22	18	22	60		1248		73	1175

Mean Eggs Produced per Female: 904 Mean Eggs Hatched per Female: 588 Mean Proportion Hatched: 0.47

000112

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020026 Sample Name: D03417 IPSD-TT3001-06 Method: 100.5SGR

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	7/31/01	R	9	14	15	11	8	40		456		4	452
4	7/31/01	R	16	18	20	16	15	52		884		52	832
5	8/3/01	R	10	20	16	14	10	50		700		3	697
7	8/2/01	A							203				

Mean Eggs Produced per Female: 561 Mean Eggs Hatched per Female: 660 Mean Proportion Hatched: 0.98

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/23/01	D							172			10	162
4	7/28/01	A							731				
5	7/28/01	R	21	26	26	22	20	94		2162		395	1767

Mean Eggs Produced per Female: 1022 Mean Eggs Hatched per Female: 965 Mean Proportion Hatched: 0.88

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	7/26/01	R	20	26	20	21	24	31		688		27	661
4	7/30/01	R	14	21	19	18	15	64		1114		83	1031
5	8/1/01	R	18	15	17	14	22	74		1273		17	1256
6	7/31/01	R	19	18	19	20	20	59		1133		46	1087
7	8/5/01	A							557				

Mean Eggs Produced per Female: 953 Mean Eggs Hatched per Female: 1009 Mean Proportion Hatched: 0.96

000113

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020026 Sample Name: D03417 IPSD-TT3001-06 Method: 100.5SGR

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/27/01	R	13	18	17	15	16	65		1027		16	1011
4	7/27/01	R	14	16	22	20	18	60		1080		272	808
5	7/28/01	A							224				
7	8/4/01	R	15	21	18	18	16	93		1637		76	1561
9	8/7/01	R	25	23	26	21	16	80		1776		25	1751

Mean Eggs Produced per Female: 1149 Mean Eggs Hatched per Female: 1283 Mean Proportion Hatched: 0.92

Sample ID: 020038 Sample Name: Control Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	8/5/01	R	18	20	20	18	20	43		826		8	818

Mean Eggs Produced per Female: 826 Mean Eggs Hatched per Female: 818 Mean Proportion Hatched: 0.99

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	7/31/01	R	16	18	18	19	14	57		969		2	967

Mean Eggs Produced per Female: 969 Mean Eggs Hatched per Female: 967 Mean Proportion Hatched: 1.00

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/4/01	R	16	16	17	17	13	61		964		150	814

Mean Eggs Produced per Female: 964 Mean Eggs Hatched per Female: 814 Mean Proportion Hatched: 0.84

000114

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020039 Sample Name: D03424 IPSD-PPO3-062 Method: 100.5SGR

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/8/01	A							1196				
4	8/11/01	A							1138				

Mean Eggs Produced per Female: 1167 Mean Eggs Hatched per Female: Mean Proportion Hatched:

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
5	8/6/01	R	18	17	20	22	18	91		1729		281	1448
6	8/6/01	R	26	23	20	20	19	62		1339		4	1335

Mean Eggs Produced per Female: 1534 Mean Eggs Hatched per Female: 1392 Mean Proportion Hatched: 0.92

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	8/7/01	A							583				

Mean Eggs Produced per Female: 583 Mean Eggs Hatched per Female: Mean Proportion Hatched:

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	8/2/01	R	16	22	16	18	16	55		968		0	968
4	8/4/01	R	24	26	26	23	21	62		1488		3	1485

Mean Eggs Produced per Female: 1228 Mean Eggs Hatched per Female: 1227 Mean Proportion Hatched: 1.00

000113

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020040 Sample Name: D03429 IPSD-TTSA01-06 Method: 100.5SGR

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
9	8/11/01	R	15	15	15	16	14	74		1110		106	1004

Mean Eggs Produced per Female: 1110 Mean Eggs Hatched per Female: 1004 Mean Proportion Hatched: 0.90

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	8/9/01	R	23	22	20	21	22	61		1318		174	1144
5	8/9/01	R	18	20	22	22	20	98		1999		43	1956

Mean Eggs Produced per Female: 1658 Mean Eggs Hatched per Female: 1550 Mean Proportion Hatched: 0.92

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
8	8/12/01	R	26	24	27	24	25	89		2243		81	2162

Mean Eggs Produced per Female: 2243 Mean Eggs Hatched per Female: 2162 Mean Proportion Hatched: 0.96

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/5/01	D							214			7	207
5	8/8/01	R	13	15	14	12	12	148		1954	A		0

Mean Eggs Produced per Female: 1084 Mean Eggs Hatched per Female: 104 Mean Proportion Hatched: 0.48

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	8/3/01	A							169			0	
6	8/8/01	R	14	13	17	15	13	64		922		21	901

Mean Eggs Produced per Female: 545 Mean Eggs Hatched per Female: 901 Mean Proportion Hatched: 0.98

000116

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020040 Sample Name: D03429 IPSD-TTSA01-06 Method: 100.5SGR

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
8	8/11/01	R	14	14	19	17	14	50		780		102	678

Mean Eggs Produced per Female: 780 Mean Eggs Hatched per Female: 678 Mean Proportion Hatched: 0.87

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	8/3/01	D							360			1	359
5	8/5/01	R	24	22	22	26	22	74		1717		27	1690

Mean Eggs Produced per Female: 1038 Mean Eggs Hatched per Female: 1024 Mean Proportion Hatched: 0.99

000117

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020041 Sample Name: D03476 IPSD-TTSD01-06 Method: 100.5SGR

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	8/5/01	R	20	20	22	22	24	106		2290		521	1769

Mean Eggs Produced per Female: 2290 Mean Eggs Hatched per Female: 1769 Mean Proportion Hatched: 0.77

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/4/01	R	13	20	24	19	18	66		1241		277	964
7	8/8/01	R	17	19	19	17	15	135		2349		291	2058

Mean Eggs Produced per Female: 1795 Mean Eggs Hatched per Female: 1511 Mean Proportion Hatched: 0.83

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
7	8/8/01	R	18	23	20	17	14	106		1950		38	1912

Mean Eggs Produced per Female: 1950 Mean Eggs Hatched per Female: 1912 Mean Proportion Hatched: 0.98

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	8/3/01	R	16	22	19	16	15	48		845		11	834
6	8/5/01	R	24	22	22	20	22	93		2046		188	1858

Mean Eggs Produced per Female: 1445 Mean Eggs Hatched per Female: 1346 Mean Proportion Hatched: 0.95

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	8/8/01	R	22	19	21	18	15	44		836		14	822
5	8/10/01	R	24	27	24	21	21	74		1732		20	1712

Mean Eggs Produced per Female: 1284 Mean Eggs Hatched per Female: 1267 Mean Proportion Hatched: 0.99

000118

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020041 Sample Name: D03476 IPSD-TTSD01-06 Method: 100.5SGR

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	8/8/01	D							160				
3	8/8/01	D							160				
5	8/8/01	R	15	20	23	22	19	83		1643		310	1333

Mean Eggs Produced per Female: 654 Mean Eggs Hatched per Female: 1333 Mean Proportion Hatched: 0.81

000119

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020072 Sample Name: D03486 IPSD-TT04-0626 Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
5	8/3/01	A							781				

Mean Eggs Produced per Female: 781 Mean Eggs Hatched per Female: Mean Proportion Hatched:

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	8/1/01	R	20	22	23	22	19	71		1505		106	1399
5	8/4/01	A							76				

Mean Eggs Produced per Female: 791 Mean Eggs Hatched per Female: 1399 Mean Proportion Hatched: 0.93

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	8/3/01	R	19	20	19	21	18	80		1552		59	1493
3	8/7/01	R	21	22	22	21	22	57		1231		64	1167

Mean Eggs Produced per Female: 1392 Mean Eggs Hatched per Female: 1330 Mean Proportion Hatched: 0.96

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	8/2/01	D							245		A		0
7	8/10/01	R	9	16	15	12	10	81		1004		1	1003

Mean Eggs Produced per Female: 625 Mean Eggs Hatched per Female: 502 Mean Proportion Hatched: 0.50

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
7	8/9/01	A							677				

Mean Eggs Produced per Female: 677 Mean Eggs Hatched per Female: Mean Proportion Hatched:

000120

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020072 Sample Name: D03486 IPSD-TT04-0626 Method: 100.5SGR

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring	Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
7	8/4/01	A			323				

Mean Eggs Produced per Female: 323 Mean Eggs Hatched per Female: Mean Proportion Hatched:

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring	Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	8/4/01	D			64			64	0
6	8/5/01	A			789				

Mean Eggs Produced per Female: 427 Mean Eggs Hatched per Female: 0 Mean Proportion Hatched: 0.00

Sample ID: 020073 Sample Name: D03491 IPSD-HB00-0626 Method: 100.5SGR

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring	Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	8/1/01	R	18 20 18 21 14	68		1238		10	1228

Mean Eggs Produced per Female: 1238 Mean Eggs Hatched per Female: 1228 Mean Proportion Hatched: 0.99

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring	Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	8/4/01	D			190			190	0
3	8/4/01	A			1239				

Mean Eggs Produced per Female: 715 Mean Eggs Hatched per Female: 0 Mean Proportion Hatched: 0.00

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring	Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/7/01	R	26 27 30 26 24	89		2367		9	2358

Mean Eggs Produced per Female: 2367 Mean Eggs Hatched per Female: 2358 Mean Proportion Hatched: 1.00

000121

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-0322

Sample ID: 020074 Sample Name: D03496 IPSD-TT0603-06 Method: 100.5SGR

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring	Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	8/15/01	A			995				

Mean Eggs Produced per Female: 995 Mean Eggs Hatched per Female: Mean Proportion Hatched:

000122

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020118 Sample Name: D03504 IPSD-TTUF02-06 Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	8/3/01	R	18	18	16	18	16	67		1152		10	1142
3	8/6/01	A							849				
5	8/10/01	R	18	20	23	19	19	74		1465		90	1375

Mean Eggs Produced per Female: 1156 Mean Eggs Hatched per Female: 1259 Mean Proportion Hatched: 0.96

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	8/4/01	R	17	22	25	22	18	55		1144		41	1103
5	8/5/01	A							454				

Mean Eggs Produced per Female: 799 Mean Eggs Hatched per Female: 1103 Mean Proportion Hatched: 0.96

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	8/14/01	R	24	23	22	23	24	69		1601		346	1255
3	8/20/01	R	18	24	21	22	21	102		2162		64	2098
5	8/24/01	R	15	20	22	22	16	78		1482		8	1474

Mean Eggs Produced per Female: 1748 Mean Eggs Hatched per Female: 1609 Mean Proportion Hatched: 0.92

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	8/1/01	R	18	22	22	22	19	64		1318		12	1306
3	8/5/01	R	22	22	22	18	20	55		1144		30	1114

Mean Eggs Produced per Female: 1231 Mean Eggs Hatched per Female: 1210 Mean Proportion Hatched: 0.98

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020118 Sample Name: D03504 IPSD-TTUF02-06 Method: 100.5SGR

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
6	8/14/01	R	18	16	15	16	17	74		1214		14	1200
8	8/23/01	D							170			170	0

Mean Eggs Produced per Female: 692 Mean Eggs Hatched per Female: 600 Mean Proportion Hatched: 0.49

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	8/2/01	R	24	22	28	18	20	87		1949		355	1594
2	8/4/01	A							123				

Mean Eggs Produced per Female: 1036 Mean Eggs Hatched per Female: 1594 Mean Proportion Hatched: 0.82

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
4	8/4/01	R	16	21	23	22	20	73		1489		26	1463

Mean Eggs Produced per Female: 1489 Mean Eggs Hatched per Female: 1463 Mean Proportion Hatched: 0.98

000124

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020119 Sample Name: D03510 IPSD-TTUF03-06 Method: 100.5SGR

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/8/01	R	18	19	18	20	16	67		1219		4	1215

Mean Eggs Produced per Female: 1219 Mean Eggs Hatched per Female: 1215 Mean Proportion Hatched: 1.00

Replicate: E

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	8/17/01	R	20	21	20	24	22	76		1626		0	1626
3	8/20/01	R	22	22	21	20	23	69		1490		110	1380

Mean Eggs Produced per Female: 1558 Mean Eggs Hatched per Female: 1503 Mean Proportion Hatched: 0.96

Replicate: F

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	8/3/01	A							788				
3	8/7/01	R	20	20	22	22	20	42		874		13	861

Mean Eggs Produced per Female: 831 Mean Eggs Hatched per Female: 861 Mean Proportion Hatched: 0.99

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring	Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
2	8/4/01	A			885				

Mean Eggs Produced per Female: 885 Mean Eggs Hatched per Female: Mean Proportion Hatched:

Replicate: H

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
1	8/5/01	A							1221				
3	8/9/01	A							687				
4	8/12/01	R	22	24	23	24	25	91		2148		49	2099

Mean Eggs Produced per Female: 1352 Mean Eggs Hatched per Female: 2099 Mean Proportion Hatched: 0.98

000125

Egg Production Detail Report

Tetra Tech NUS Inc
55 Jonspin Road

Wilmington, MA 01887-1062

Date: 10/8/01
Project: 01032
SDG 5286
Site: N0564-322

Sample ID: 020182 Sample Name: Control Method: 100.5SGR

Replicate: A

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/8/01	R	17	24	23	22	16	61		1244	A		0
4	8/8/01	A							1032				

Mean Eggs Produced per Female: 1138 Mean Eggs Hatched per Female: 0 Mean Proportion Hatched: 0.00

Replicate: B

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
5	8/11/01	R	10	16	17	20	12	64		960		12	948

Mean Eggs Produced per Female: 960 Mean Eggs Hatched per Female: 948 Mean Proportion Hatched: 0.99

Replicate: C

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
5	8/10/01	R	15	14	16	15	16	42		638		19	619
6	8/18/01	R	21	20	20	20	19	44		880	A		0

Mean Eggs Produced per Female: 759 Mean Eggs Hatched per Female: 310 Mean Proportion Hatched: 0.49

Replicate: D

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/3/01	R	15	15	14	12	9	33		429		0	429

Mean Eggs Produced per Female: 429 Mean Eggs Hatched per Female: 429 Mean Proportion Hatched: 1.00

Replicate: G

Larvae Number	Deposit Date	Case Preparation	Eggs Counted Per Ring					Number of Rings	Eggs Direct Count	Eggs Estimate Count	All Eggs Not Hatched	Eggs Not Hatched	Eggs Hatched
3	8/4/01	R	14	14	15	18	13	70		1036	A		0

Mean Eggs Produced per Female: 1036 Mean Eggs Hatched per Female: 0 Mean Proportion Hatched: 0.00

000126

APPENDIX D.9

BENTHIC MACROINVERTEBRATE ENUMERATION AND TAXONOMY

Industri-plex
Case 0225 H
SDG D03190

Part 9

Aquatec Biological Sciences

Ecology | Environmental Toxicology | Natural Resource Assessments | Microbiology

Summary Report of Macroinvertebrate Enumeration, Taxonomy and Diversity Indices For Tetra Tech, NUS Sediment Triad Study

1.0 SAMPLE RECEIPT

Macroinvertebrate samples were received at ambient temperatures, preserved and under chain-of-custody (Appendix A). The samples were logged into Aquatec Biological Sciences' Laboratory Management System and COC discrepancies noted. The sample labeled IPSD-HB00C-062601, 1of 2, had the sample bottle # D03493 while sample labeled IPSD-HB00B-062601, 1 of 2, had the sample bottle #D03494 which was not in agreement with the chain of custody. Ms. Lucy Guzman, Tetra Tech, NUS, was contacted and Aquatec Biological was instructed that the sample labels (IPSD labels) took precedence over sample numbers (D03 numbers).

2.0 SAMPLE PROCESSING

Macroinvertebrate samples were picked in their entirety in the laboratory following Standard Methods (APHA,1985) and Standard Operating Procedures. Personnel sorting (picking) samples initialed and dated the worksheets (Table 1). At the conclusion of the initial sorting, eleven samples (IPSD-TT04-062601 replicates A,B, C; IPSD-HB00-062601 replicates A,B; IPSD-TTUF02-062701 replicates A,B; IPSD-TTA)03-062701 replicates A,B,C) were sorted for a second time and recorded on a second bench worksheet. One sample (IPSD-HB00C-062601) was inadequately preserved in the field and was not processed.

Table 1. Macroinvertebrate sample sorters and taxonomist.

Initials	Biologist
ARW	Ann Williams
JJG	Jennifer Gallant
JAM	Josie McKnight

Macroinvertebrates were identified to the lowest practical taxonomic level using taxonomic references listed in Table 2.

100000

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3.0 QA/QC SORTING

Six samples were chosen for a quality control re-pick and identification. The overall picking efficiency for these six samples was 93% (Table 3).

Table 3. Summary of QC re-picking of six samples.

Aquatec Sample No.	Client Identifier	No. of Macroinvertebrates QC Re-pick	Total/sample	Picking Efficiency
19984	IPSD-TT1203A-061901	13	908	98.6%
20018	IPSD-TT1802B-62101	23	1825	98.7%
20035	IPSD-TT3001C-62201	168	310	45.8%
20046	IPSD-TTSA01B-62501	119	517	77.0%
20077	IPSD-TT04C-62601	60	469	87.2%
20017	IPSD-TT1802A-062101	10	1900	99.5%
	Overall	**393**	**5929**	**93.4%**

4.0 DATA REPORTING AND ANALYSIS

The results of the macroinvertebrate identifications and enumerations are presented in Appendix B and Appendix C. Appendix B presents the enumerations in complete taxonomic phylogeny on a per sample basis. Appendix C presents the data on a taxon-specific relative abundance basis with selected sample-specific diversity indices. Diversity indices were calculated as follows:

Number of taxa (S):

$$S = \sum s_i$$

s_i= i^{th} taxon

Shannon-Weiner Index (H'):

$$H' = - \sum (n_i/N \log (n_i/N)) \qquad \text{(Pielou, 1977)}$$

n_i=number of the i^{th} taxon individuals in the sample
N=total number of individuals in the sample

Eveness Index (J'):

J'=(H'/ Log (S)) (Pielou, 1977)

Community Loss Index (CLI):

CLI=((d-a)/(e)) (Plafkin et al., 1989)

d=total number of taxa present in the reference station
a=number of taxa common to both stations
e=total number of taxa present in the comparison station

The Shannon-Weiner and the Eveness Indices were calculated on a sample (each station replicate) basis.

The Community Loss Index (CLI) was calculated on a station basis (three replicate samples combined). These indices are presented on a habitat type grouping based on habitat types submitted by Dr. Deborah Roberts (Roberts Environmental Consulting, Inc.) (Table 4). For two habitat types, Wetlands and Streams, there were two reference stations. Due to the concern that the number of taxa might be artificially inflated by combining two stations (i.e., 6 replicate samples of the reference compared to 3 replicate samples from each target station) only one reference station was used for comparison for each habitat type: IPSD-HB00-062601 for wetland's and IPSD-TT04-062601 for stream station CLI's. The second reference station for the Wetlands habitat type (IPSD-TTSA01-062501) and Stream habitat type (IPSD-TTSD01-062601) were compared to the chosen reference station for the respective habitat type (Tables 5, 6, and 7).

5.0 LITERATURE CITED

APHA. 1985. Standard Methods, 19th Edition. American Public Health Association.

Plafkin, James L., Michael T. Barbour, Kimberly D. Porter, Sharon K. Gross, and Robert M. Hughes. 1989. Rapid Bioassessment Protocols For Use In Streams And Rivers: Benthic Macroinvertebrates And Fish. USEPA Office of Water Regulations and Standards, Washington D.C. 20460, EPA/444/4-89/001.

Pielou, E. C. 1977. Mathematical Ecology. Wiley, New York.

Table 2. Taxonomic references used to identify macroinvertebrates.

Bousfield,E. L.1973. Shallow Water Gammaridean Amphipoda of New England. Cornell University Press, Ithaca, NY.

Brinkhurst,R. O. 1986. Guide to the Freshwater Microdrile Oligochaetes of North America. Dept. of Fisheries and Oceans Publ., Ottawa.

Epler,J. H. 1992. Identification Manual for the Larval Chironomidae (Diptera) of Florida. State of Florida Dept. of Environmental Regulation, Tallahassee, FL.

Johannsen,O. A. 1969. Aquatic Diptera. Cornell University Agricultural Experiment Station, Ithaca, NY (Reprinted by Entomological Reprint Specialists, Los Angeles, CA.

Merritt,Richard W. and Kenneth W. Cummins. 1996. An Introduction to the Auatic Insects of North America,3rd Ed. Kendall/Hunt Publishing Co.,Dubuque, Iowa.

Peckarsky,Barbara L. Pierre R. Fraissinet, Marjory A. Penton, and Don J. Conklin, Jr. 1990. Freshwater Macroinvertebrates of Northeastern North America. Cornell University Press, Ithaca, NY.

Pennak,Robert W. 1989. Fresh-Water Invertebrates of the United States,3rd Ed. John Wiley & Sons,Inc., New York.

Pratt,Henry S. 1935. A manual of the Common Invertebrate Animals. McGraw-Hill Book Co, Inc.,York, PA.

Saether,Ole A. 1970. Nearctic and Palaearctic Chaoborus (Diptera:Chaoboridae). Fisheries Research Board of Canada, Ottawa.

Simpson, K.W., Robert W. Bode, and Paula Albu. 1983. Keys for the Genus Cricotopus *adapted from "Revision der Gattung Cricotopus van der Wulp und ihrer* Verwandten (Diptera, Chironomidae)' by M. Hirvenoja. Bulletin No. 450, NYS Museum, New York State Education Dept., Albany, NY.

Simpson, Karl W. and Robert W. Bode. 1980. Common larvae of Chironomidae (Diptera from New York State Streams and Rivers. Bulletin No. 439, NYS Museum, New York State Education Dept., Albany, NY.

Table 5. Pond Stations Diversity Indices Summary

Aquatec Biological Test Request Number	Aquatec Sample Number	Client Sample Identifier	Location	Habitat Type	Organisms per Sample	No. of Taxa	Shannon-Weiner Index	Pielou's Evenness Index	Community Loss Index
		IPSD-PP03-062501	**Phillips Pond**	**reference pond**	19	6			
5310	20042	D03425 IPSD-PP03A-062501			9	4	1.31	0.95	
5310	20043	D03426 IPSD-PP03B-062501			6	3	1.1	1	
5310	20044	D03427 IPSD-PP03C-062501			4	2	0.56	0.81	
		IPSD-TT0603-062601	**Judkins Pond**	**pond**	**896**	**30**			**0.10**
5324	20081	D03497 IPSD-TT0603A-062601			263	17	1.83	0.65	
5324	20082	D03498 IPSD-TT0603B-062601			335	13	1.61	0.63	
5324	20083	D03499 IPSD-TT0603C-062601			298	20	1.73	0.58	
		IPSD-TTUF02-062701	**Upper Forebay, Mystic Lake**	**pond**	**2278**	**31**			**0.10**
5331	20112	D03505 IPSD-TTUF02A-062701			419	19	1.42	0.48	
5331	20113	D03506 IPSD-TTUF02B-062701			1147	23	1.82	0.58	
5331	20114	D03507 IPSD-TTUF02C-062701			712	18	1.67	0.58	
		IPSD-TTAO03-062701	**Upper Forebay, Mystic Lake**	**pond**	**4972**	**33**			**0.09**
5331	20115	D03511 IPSD-TTUF03A-062701			1465	18	1.29	0.45	
5331	20116	D03512 IPSD-TTUF03B-062701			1607	21	1.42	0.47	
5331	20117	D03513 IPSD-TTUF03C-062701			1900	26	1.39	0.43	

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Table 6. Stream Stations Diversity Indices Summary

Aquatec Biological Test Request Number	Aquatec Sample Number	Client Sample Identifier	Location	Habitat Type	Organisms per Sample	No. of Taxa	Shannon-Weiner Index	Pielou's Eveness Index	Community Loss Index
		IPSD-TT04-062601	**Hall's Brook, Third Road**	**reference stream**	**1179**	**38**			
5324	20075	D03487 IPSD-TT04A-062601			491	22	1.67	0.54	
5324	20076	D03488 IPSD-TT04B-062601			219	26	2.15	0.66	
5324	20077	D03489 IPSD-TT04C-062601			469	25	2.36	0.73	
		IPSD-TT1203-061901	**23-acre wetland**	**stream**	**1824**	**21**			**1.29**
5289	19984	D03202 IPSD-TT1203A-061901			907	15	0.42	0.15	
5289	19985	D03203 IPSD-TT1203B-061901			168	7	0.48	0.25	
5289	19986	D03204 IPSD-TT1203C-061901			749	11	0.51	0.21	
		IPSD-TT2903-061901	**23-acre wetland**	**stream**	**3065**	**23**			**1.09**
5289	19987	D03207 IPSD-TT2903A-061901			1367	15	0.72	0.26	
5289	19988	D03208 IPSD-TT2903B-061901			1254	11	0.73	0.31	
5289	19989	D03209 IPSD-TT2903C-061901			444	9	0.7	0.32	
		IPSD-TT1802-062101	**23-acre wetland**	**stream**	**4750**	**27**			**0.81**
5301	20017	D03402 IPSD-TT1802A-062101			837	17	1.1	0.39	
5301	20018	D03403 IPSD-TT1802B-062101			1825	16	1.01	0.36	
5301	20019	D03404 IPSD-TT1802C-062101			2088	19	0.92	0.31	
		IPSD-TT1002-062201	**North of Salem Street**	**stream**	**68**	**8**			**4.13**
5306	20027	D03408 IPSD-TT1002A-062201			32	6	0.91	0.51	
5306	20028	D03409 IPSD-TT1002B-062201			21	3	0.59	0.54	
5306	20029	D03410 IPSD-TT1002C-062201			15	4	1.08	0.78	
		IPSD-TT3001-062201	**Cranberry bog**	**stream**	**980**	**36**			**0.47**
5306	20033	D03418 IPSD-TT3001A-062201			156	19	1.85	0.63	
5306	20034	D03419 IPSD-TT3001B-062201			514	18	0.59	0.2	
5306	20035	D03420 IPSD-TT3001C-062201			310	24	1.45	0.46	
		IPSD-TTSD01-062501	**S. Branch Aberjona River, Willow St.**	**reference stream**	**1348**	**31**			**0.65**
5310	20048	D03477 IPSD-TTSD01A-062501			257	18	1.53	0.53	
5310	20049	D03478 IPSD-TTSD01B-062501			479	19	1.61	0.55	
5310	20050	D03479 IPSD--TTSD01C-062501			612	22	1.77	0.57	

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Table 7. Wetland Stations Diversity Indices Summary

Aquatec Biological Test Request Number	Aquatec Sample Number	Client Sample Identifier	Location	Habitat Type	Organisms per Sample	No. of Taxa	Shannon-Weiner Index	Pielou's Evenness Index	Community Loss Index
		IPSD-HB00-062601	**Hall's Brook, Danforth St.**	**reference wetland**	**1318**	**36**			
5324	20078	D03492 IPSD-HB00A-062601			777	26	1.91	0.59	
5324	20079	D03493 IPSD-HB00B-062601			541	30	2.08	0.61	
5324	20080	D03494 IPSD-HB00C-062601			0	0	0	0	
		IPSD-WH07-061801	**23-acre wetland, near well H**	**wetland**	**488**	**30**			**1.00**
5287	19975	D03190 IPSD-WH07A-061801			180	22	2.33	0.75	
5287	19976	D03191 IPSD-WH07B-061801			207	23	2.43	0.77	
5287	19977	D03192 IPSD-WH07C-061801			101	15	2.12	0.78	
		IPSD-TT2201-061801	**23-acre wetland, near rifle range**	**wetland**	**1108**	**39**			**0.69**
5287	19978	D03195 IPSD-TT2201A-061801			523	32	2.38	0.69	
5287	19979	D03196 IPSD-TT2201B-061801			445	26	2.19	0.67	
5287	19980	D03197 IPSD-TT2201C-061801			140	22	2.64	0.85	
		IPSD-TT1901-061901	**23-acre wetland**	**wetland**	**508**	**31**			**0.84**
5289	19990	D03212 IPSD-TT1901A-061901			186	17	1.72	0.61	
5289	19991	D03243 IPSD-TT1901B-061901			222	22	1.87	0.61	
5289	19992	D03244 IPSD-TT1901C-061901			100	12	1.71	0.69	
		IPSD-TT3302-062001	**Cranberry Bog**	**wetland**	**1122**	**22**			**1.23**
5297	20003	D03388 IPSD-TT3302A-062001			329	12	0.85	0.34	
5297	20004	D03389 IPSD-TT3302B-062001			383	9	0.75	0.34	
5297	20005	D03390 IPSD-TT3302C-062001			410	14	1.03	0.39	
		IPSD-TT3202-062001	**Cranberry Bog**	**wetland**	**1938**	**35**			**0.69**
5297	20006	D03393 IPDS-TT3202A-062001			244	22	1.39	0.45	
5297	20007	D03394 IPSD-TT3202B-062001			803	22	1.15	0.37	
5297	20008	D03395 IPSD-TT3202C-062001			891	27	0.92	0.28	
		IPSD-WW06-062101	**23-acre wetland, near Wildwood**	**wetland**	**554**	**34**			**0.74**
5301	20014	D03397 IPSD-WW06A-062101			166	17	1.56	0.55	
5301	20015	D03398 IPSD-WW06B-062101			194	22	1.93	0.62	
5301	20016	D03399 IPSD-WW06C-062101			194	23	1.79	0.57	
		IPSD-TT1301-062201	**23-acre wetland**	**wetland**	**1943**	**36**			**0.53**
5306	20030	D03413 IPSD-TT1301A-062201			1320	21	0.67	0.22	
5306	20031	D03414 IPSD-TT1301B-062201			218	23	2.43	0.78	
5306	20032	D03415 IPSD-TT1301C-062201			405	23	2.1	0.67	
		IPSD-TTSA01-062501	**S. Branch Aberjona River, Arcadia Rd.**	**reference wetland**	**1097**	**29**			**0.93**
5310	20045	D03430 IPSD-TTSA01A-062501			271	15	1.1	0.41	
5310	20046	D03431 IPSD-TTSA01B-062501			517	23	1.73	0.55	
5310	20047	D03432 IPSD-TTSA01C-062501			309	16	1.36	0.49	

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APPENDIX C

TAXONOMIC IDENTIFICATIONS AND ENUMERATIONS

Aquatec Biological Sciences

Ecology | Environmental Toxicology | Natural Resource Assessments | Microbiology

Lucy Guzman
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Date : 10/5/2001
BTR No. : 05287
Project No. : 01032
No. of Samples : 6
Date Received : 6/19/2001

Reference: N0564-0322

Laboratory Sample ID : 19975
Client Sample ID : D03190 IPSD-WH07A-061801
Remarks :

Date/Time Sample Collected : 6/18/2001 @ 11:30:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Platyhelminthes	Turbellaria	Tricladida	Planariidae			*Phagocata woodworthi*	8
Annelida	Oligochaeta	Lumbricina	Lumbricidae				1
		Lumbriculida	Lumbriculidae			*Lumbriculus variegatus*	33
						Stylodrilus heringianus	22
		Tubificida	Enchytraeidae			*Enchytraeus sp.*	1
						Lumbricillus sp.	1
			Naididae			*Nais communis*	2
						Pristina aequiseta	2
			Tubificidae			*Limnodrilus claparedianus*	5
Mollusca	Gastropoda						1
		Basommatophora	Lymnaeidae			*Stagnicola sp.*	2
			Physidae			*Physella heterostropha*	2
			Planorbidae			*Planorbella trivolvis*	41
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	14
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	13
		Isopoda	Asellidae			*Caecidotea communis*	24
	Insecta	Coleoptera	Scirtidae			*Cyphon sp.*	1
						Prionocyphon sp.	1
		Collembola	Isotomidae			*Isotomurus sp.*	3

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Remarks :

Date/Time Sample Collected : 6/18/2001 @ 11:30:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Tanytarsini	*Micropsectra sp.*	1
				Orthocladiinae	Orthocladiini	*Parametriocnemus lundbecki*	1
				Tanypodinae	Pentaneurini	*Zavrelimyia sp.*	1
						Sub-Total:	180
						Grand Total:	180

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Date : 10/5/2001
BTR No. : 05287
Project No. : 01032
No. of Samples : 6
Date Received : 6/19/2001

Reference: N0564-0322

Laboratory Sample ID : 19976
Client Sample ID : D03191 IPSD-WH07B-061801
Remarks :

Date/Time Sample Collected : 6/18/2001 @ 11:30:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Platyhelminthes	Turbellaria	Tricladida	Planariidae			*Phagocata woodworthi*	8
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Lumbriculus variegatus*	32
						Stylodrilus heringianus	28
		Tubificida	Enchytraeidae			*Enchytraeus sp.*	5
						Lumbricillus sp.	1
			Naididae			*Nais communis*	1
						Pristina aequiseta	1
			Tubificidae			*Limnodrilus claparedianus*	6
Mollusca	Gastropoda	Basommatophora	Lymnaeidae			*Stagnicola sp.*	1
			Physidae			*Physella heterostropha*	1
			Planorbidae			*Planorbella trivolvis*	23
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	21
Arthropoda	Arachnoidea	Acariformes					3
			Hydryphantidae			*Protzia sp.*	2
	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	13
		Isopoda	Asellidae			*Caecidotea communis*	43
	Insecta	Coleoptera	Hydrophilidae			*Tropisternus sp*	1
			Scirtidae			*Cyphon sp.*	3
		Collembola	Isotomidae			*Isotomurus sp.*	10

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Remarks :

Date/Time Sample Collected : 6/18/2001 @ 11:30:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Phaenopsectra flavipes*	1
					Tanytarsini	*Micropsectra sp.*	1
				Orthocladiinae		*Limnophyes sp.*	1
					Orthocladiini	*Parametriocnemus lundbecki*	1
						Sub-Total:	207
						Grand Total:	207

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Aquatec Biological Sciences

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Project No. : 01032
No. of Samples : 6
Date Received : 6/19/2001

Laboratory Sample ID : 19977
Client Sample ID : D03192 IPSD-WH07C-061801
Remarks :

Date/Time Sample Collected : 6/18/2001 @ 11:30:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Lumbriculus variegatus*	14
						Stylodrilus heringianus	5
		Tubificida	Enchytraeidae			*Enchytraeus sp.*	1
						Lumbricillus sp.	5
			Tubificidae			*Limnodrilus claparedianus*	2
Mollusca	Gastropoda	Basommatophora	Planorbidae			*Planorbella trivolvis*	9
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	6
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	14
		Isopoda	Asellidae			*Caecidotea communis*	35
	Insecta	Coleoptera					2
			Dytiscidae			*Ilybius sp.*	1
		Collembola	Isotomidae			*Isotomurus sp.*	3
		Diptera	Chironomidae	Chironominae	Tanytarsini	*Micropsectra sp.*	1
				Tanypodinae	Pentaneurini	*Zavrelimyia sp.*	2
						Sub-Total:	**101**
						Grand Total:	**101**

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Lucy Guzman
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55 Jonspin Road
Wilmington, MA 01887-1062

Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05287
Project No. : 01032
No. of Samples : 6
Date Received : 6/19/2001

Laboratory Sample ID : 19978
Client Sample ID : D03195 IPSD-TT2201A-061801
Remarks :

Date/Time Sample Collected : 6/18/2001 @ 3:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Platyhelminthes	Turbellaria	Tricladida	Planariidae			*Phagocata woodworthi*	7
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
		Dorylaimida				*Dorylaimus sp.*	1
		Mononchida				*Mononchus sp.*	1
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Lumbriculus variegatus*	5
						Stylodrilus heringianus	36
		Tubificida	Enchytraeidae			*Lumbricillus sp.*	6
			Naididae			*Nais communis*	8
						Pristina aequiseta	1
			Tubificidae			*Ilyodrilus templetoni*	8
						Limnodrilus claparedianus	36
Mollusca	Gastropoda	Basommatophora	Physidae			*Physella heterostropha*	22
			Planorbidae			*Planorbella trivolvis*	18
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	10
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	10
		Isopoda	Asellidae			*Caecidotea communis*	132
	Insecta	Coleoptera	Dytiscidae			*Hygrotus sp.*	1
						Laccornis sp.	1
			Hydrophilidae			*Tropisternus sp.*	1

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05287
Project No. : 01032
No. of Samples : 6
Date Received : 6/19/2001

Laboratory Sample ID : 19978
Client Sample ID : D03195 IPSD-TT2201A-061801
Remarks :

Date/Time Sample Collected : 6/18/2001 @ 3:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Collembola	Isotomidae			*Isotomurus sp.*	1
		Diptera	Ceratopogonidae			*Bezzia sp.*	4
						Culicoides sp.	1
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	10
						Phaenopsectra flavipes	15
						Polypedilum tritum	1
					Tanytarsini	*Micropsectra sp.*	149
				Orthocladiinae	Corynoneurini	*Corynoneura taris*	3
					Orthocladiini	*Heterotrissocladius marcidus*	8
						Rheocricotopus robacki	1
				Prodiamesinae		*Prodiamesa olivacea*	9
				Tanypodinae	Pentaneurini	*Zavrelimyia sp.*	15
			Tipulidae			*Pseudolimnophila sp.*	1
						Sub-Total:	523
						Grand Total:	523

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Reference: N0564-0322

Date	: 10/5/2001
BTR No.	: 05287
Project No.	: 01032
No. of Samples	: 6
Date Received	: 6/19/2001

Laboratory Sample ID	: 19979	Date/Time Sample Collected	: 6/18/2001 @ 3:30:0
Client Sample ID	: D03196 IPSD-TT2201B-061801	Percent Sample Examined	: 100
Remarks	:	Sampling Depth (m)	: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Cnidaria	Hydrozoa	Hydroida	Hydridae			*Hydra americana*	4
Platyhelminthes	Turbellaria	Tricladida	Planariidae			*Phagocata woodworthi*	7
Ioda		Araeolaimida				*Aphanolaimus sp.*	1
		Dorylaimida				*Dorylaimus sp.*	1
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Stylodrilus heringianus*	3
		Tubificida	Naididae			*Nais communis*	3
						Pristina aequiseta	3
			Tubificidae			*Ilyodrilus templetoni*	2
						Limnodrilus claparedianus	32
Mollusca	Gastropoda	Basommatophora	Lymnaeidae			*Stagnicola sp.*	3
			Physidae			*Physella heterostropha*	13
			Planorbidae			*Planorbella trivolvis*	11
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	14
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	7
		Isopoda	Asellidae			*Caecidotea communis*	137
	Insecta	Coleoptera	Dytiscidae			*Laccornis sp.*	1
			Hydrophilidae			*Tropisternus sp.*	1
		Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	34
						Dicrotendipes nervosus	1

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05287
Project No. : 01032
No. of Samples : 6
Date Received : 6/19/2001

Laboratory Sample ID : 19979
Client Sample ID : D03196 IPSD-TT2201B-061801
Remarks :

Date/Time Sample Collected : 6/18/2001 @ 3:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Phaenopsectra flavipes*	14
					Tanytarsini	*Micropsectra sp.*	121
				Orthocladiinae	Corynoneurini	*Corynoneura taris*	1
					Orthocladiini	*Heterotrissocladius marcidus*	3
						Rheocricotopus robacki	2
				Prodiamesinae		*Prodiamesa olivacea*	16
				Tanypodinae	Pentaneurini	*Zavrelimyia sp.*	10
						Sub-Total:	445
						Grand Total:	445

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05287
Project No. : 01032
No. of Samples : 6
Date Received : 6/19/2001

Laboratory Sample ID : 19980
Client Sample ID : D03197 IPSD-TT2201C-061801
Remarks :

Date/Time Sample Collected : 6/18/2001 @ 3:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Platyhelminthes	Turbellaria	Tricladida	Planariidae			*Phagocata woodworthi*	7
Nematoda		Dorylaimida				*Actinolaimus sp.*	1
		Mononchida				*Mononchus sp.*	1
Annelida	Oligochaeta	Tubificida	Enchytraeidae			*Lumbricillus sp.*	9
			Naididae			*Pristina aequiseta*	1
			Tubificidae			*Ilyodrilus templetoni*	4
						Limnodrilus claparedianus	8
Mollusca	Gastropoda						1
		Basommatophora	Lymnaeidae			*Stagnicola sp.*	3
			Physidae			*Physella heterostropha*	6
			Planorbidae			*Planorbella trivolvis*	3
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	6
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	18
		Isopoda	Asellidae			*Caecidotea communis*	32
	Insecta	Coleoptera	Dytiscidae			*Laccomis sp.*	5
		Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	11
						Phaenopsectra flavipes	6
					Tanytarsini	*Micropsectra sp.*	7
				Orthocladiinae		*Limnophyes sp.*	1

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05287
Project No. : 01032
No. of Samples : 6
Date Received : 6/19/2001

Laboratory Sample ID : 19980
Client Sample ID : D03197 IPSD-TT2201C-061801
Remarks :

Date/Time Sample Collected : 6/18/2001 @ 3:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Orthocladiinae	Corynoneurini	*Corynoneura taris*	1
				Tanypodinae	Pentaneurini	*Zavrelimyia sp.*	8
			Culicidae			*Aedes sp.*	1
						Sub-Total:	140
						Grand Total:	140

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Date : 10/5/2001
BTR No. : 05289
Project No. : 01032
No. of Samples : 9
Date Received : 6/20/2001

Reference: N0564-0322

Laboratory Sample ID : 19984
Client Sample ID : D03202 IPSD-TT1203A-061901
Remarks :

Date/Time Sample Collected : 6/19/2001 @ 9:45:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Platyhelminthes	Turbellaria	Neorhabdocoela					2
Nematoda		Dorylaimida				*Actinolaimus sp.*	1
		Enoplida				*Rhabdolaimus sp.*	1
Annelida	Hirudinea	Rhynchobdellida	Piscicolidae			*Myzobdella lugubris*	1
	Oligochaeta	Tubificida	Enchytraeidae			*Lumbricillus sp.*	3
			Naididae			*Dero digitata*	5
						Nais communis	1
						Pristina aequiseta	9
			Tubificidae			*Ilyodrilus templetoni*	42
						Limnodrilus claparedianus	820
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	4
	Insecta	Diptera	Ceratopogonidae			*Alluaudomyia sp.*	1
			Chironomidae	Tanypodinae	Coelotanypodini	*Clinotanypus pinguis*	2
			Dolichopodidae			*Hydrophorus sp.*	1
			Ephydridae				1
						Sub-Total:	894
QA Repick:							
Annelida	Oligochaeta	Tubificida	Tubificidae			*Limnodrilus claparedianus*	13
						Sub-Total:	13

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05289
Project No. : 01032
No. of Samples : 9
Date Received : 6/20/2001

Laboratory Sample ID : 19984
Client Sample ID : D03202 IPSD-TT1203A-061901
Remarks :

Date/Time Sample Collected : 6/19/2001 @ 9:45:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
						Grand Total:	907

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Date : 10/5/2001
BTR No. : 05289
Project No. : 01032
No. of Samples : 9
Date Received : 6/20/2001

Reference: N0564-0322

Laboratory Sample ID : 19985
Client Sample ID : D03203 IPSD-TT1203B-061901
Remarks :

Date/Time Sample Collected : 6/19/2001 @ 9:45:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
		Enoplida				*Rhabdolaimus sp.*	1
elida	Oligochaeta	Tubificida	Naididae			*Dero digitata*	1
						Pristina aequiseta	2
			Tubificidae			*Ilyodrilus templetoni*	13
						Limnodrilus claparedianus	149
Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Coelotanypodini	*Clinotanypus pinguis*	1
						Sub-Total:	168
						Grand Total:	168

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05289
Project No. : 01032
No. of Samples : 9
Date Received : 6/20/2001

Laboratory Sample ID	: 19986	Date/Time Sample Collected	: 6/19/2001 @ 9:45:0
Client Sample ID	: D03204 IPSD-TT1203C-061901	Percent Sample Examined	: 100
Remarks	:	Sampling Depth (m)	: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Platyhelminthes	Turbellaria	Neorhabdocoela					1
Nematoda		Enoplida				*Tobrilus sp.*	5
elida	Oligochaeta	Tubificida	Naididae			*Dero digitata*	2
			Tubificidae			*Ilyodrilus templetoni*	65
						Limnodrilus claparedianus	658
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	1
	Insecta	Collembola	Isotomidae			*Isotomurus sp.*	3
		Diptera					2
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	1
						Polypedilum illinoense	1
			Ephydridae				10
						Sub-Total:	**749**
						Grand Total:	**749**

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05289
Project No. : 01032
No. of Samples : 9
Date Received : 6/20/2001

Laboratory Sample ID : 19987
Client Sample ID : D03207 IPSD-TT2903A-061901
Remarks :

Date/Time Sample Collected : 6/19/2001 @ 11:30:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Enoplida				*Tobrilus sp.*	2
		Mononchida				*Miconchus sp.*	1
elida	Oligochaeta	Lumbricina	Lumbricidae			*Eisenia sp.*	1
		Tubificida	Naididae			*Dero digitata*	2
			Tubificidae			*Aulodrilus limnobius*	2
						Ilyodrilus templetoni	386
						Limnodrilus claparedianus	958
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	2
		Isopoda	Asellidae			*Caecidotea communis*	1
	Insecta	Collembola	Isotomidae			*Isotomurus sp.*	1
		Diptera	Ceratopogonidae			*Ceratopogon sp.*	1
						Culicoides sp.	2
						Monohelea sp.	1
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	2
				Tanypodinae	Coelotanypodini	*Clinotanypus pinguis*	5
						Sub-Total:	1367
						Grand Total:	1367

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05289
Project No. : 01032
No. of Samples : 9
Date Received : 6/20/2001

Laboratory Sample ID : 19988
Client Sample ID : D03208 IPSD-TT2903B-061901
Remarks :

Date/Time Sample Collected : 6/19/2001 @ 11:30:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Naididae			*Nais communis*	2
						Pristina aequiseta	1
			Tubificidae			*Aulodrilus limnobius*	2
						Ilyodrilus templetoni	415
						Limnodrilus claparedianus	821
Mollusca	Gastropoda	Basommatophora	Lymnaeidae			*Stagnicola sp.*	2
			Physidae			*Physella heterostropha*	2
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	6
	Insecta	Diptera	Ceratopogonidae			*Bezzia sp.*	1
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	1
				Orthocladiinae	Orthocladiini	*Psectrocladius sp.*	1
						Sub-Total:	**1254**
						Grand Total:	**1254**

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05289
Project No. : 01032
No. of Samples : 9
Date Received : 6/20/2001

Laboratory Sample ID : 19989
Client Sample ID : D03209 IPSD-TT2903C-061901
Remarks :

Date/Time Sample Collected : 6/19/2001 @ 11:30:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Enoplida				*Tobrilus sp.*	1
Annelida	Oligochaeta	Tubificida	Enchytraeidae			*Lumbriculus sp.*	1
			Naididae			*Dero digitata*	1
			Tubificidae			*Ilyodrilus templetoni*	109
						Limnodrilus claparedianus	325
Mollusca	Pelecypoda.	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	1
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	4
	Insecta	Diptera	Ceratopogonidae			*Ceratopogon sp.*	1
			Chironomidae	Tanypodinae	Coelotanypodini	*Clinotanypus pinguis*	1
						Sub-Total:	**444**
						Grand Total:	**444**

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Date : 10/5/2001
BTR No. : 05289
Project No. : 01032
No. of Samples : 9
Date Received : 6/20/2001

Reference: N0564-0322

Laboratory Sample ID : 19990
Client Sample ID : D03212 IPSD-TT1901A-061901
Remarks :

Date/Time Sample Collected : 6/19/2001 @ 2:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Eclipidrilus lacustris*	3
		Tubificida	Tubificidae			*Aulodrilus limnobius*	6
						Ilyodrilus templetoni	45
						Limnodrilus claparedianus	3
Mollusca	Gastropoda	Basommatophora	Lymnaeidae			*Stagnicola sp.*	2
			Physidae			*Physella heterostropha*	2
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	17
Arthropoda	Insecta	Collembola	Isotomidae			*Isotomurus sp.*	1
		Diptera	Ceratopogonidae			*Bezzia sp.*	1
						Culicoides sp.	1
						Sphaeromias sp.	1
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	87
						Polypedilum illinoense	6
				Orthocladiinae	Orthocladiini	*Cricotopus bicinctus*	2
						Rheocricotopus robacki	1
				Tanypodinae		*Psectrotanypus sp.*	6
					Procladiini	*Procladius sp.*	2
						Sub-Total:	**186**
						Grand Total:	**186**

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55 Jonspin Road
Wilmington, MA 01887-1062

Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05289
Project No. : 01032
No. of Samples : 9
Date Received : 6/20/2001

Laboratory Sample ID : 19991
Client Sample ID : D03243 IPSD-TT1901B-061901
Remarks :

Date/Time Sample Collected : 6/19/2001 @ 2:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Stylodrilus heringianus*	1
		Tubificida	Tubificidae			*Ilyodrilus templetoni*	29
						Limnodrilus claparedianus	27
Mollusca	Gastropoda	Basommatophora	Lymnaeidae			*Stagnicola sp.*	4
			Physidae			*Physella heterostropha*	12
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	17
Arthropoda	Arachnoidea	Acariformes	Hydryphantidae			*Protzia sp.*	1
	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	2
		Isopoda	Asellidae			*Caecidotea communis*	1
	Insecta	Collembola	Isotomidae			*Isotomurus sp.*	1
		Diptera					2
			Ceratopogonidae			*Bezzia sp.*	1
						Ceratopogon sp.	2
						Monohelea sp.	4
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	106
						Dicrotendipes nervosus	1
						Paratendipes subaequalis	1
						Phaenopsectra flavipes	2
				Orthocladiinae	Orthocladiini	*Rheocricotopus robacki*	5

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Lucy Guzman
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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05289
Project No. : 01032
No. of Samples : 9
Date Received : 6/20/2001

Laboratory Sample ID : 19991
Client Sample ID : D03243 IPSD-TT1901B-061901
Remarks :

Date/Time Sample Collected : 6/19/2001 @ 2:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Coelotanypodini	*Clinotanypus pinguis*	1
					Natarsiini	*Natarsia sp.*	1
					Procladiini	*Procladius sp.*	1
						Sub-Total:	222
						Grand Total:	222

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05289
Project No. : 01032
No. of Samples : 9
Date Received : 6/20/2001

Laboratory Sample ID : 19992
Client Sample ID : D03244 IPSD-TT1901C-061901
Remarks :

Date/Time Sample Collected : 6/19/2001 @ 2:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Eclipidrilus lacustris*	3
		Tubificida	Naididae			*Dero digitata*	1
			Tubificidae			*Ilyodrilus templetoni*	34
						Limnodrilus claparedianus	7
Mollusca	Gastropoda	Basommatophora	Lymnaeidae			*Stagnicola sp.*	1
			Physidae			*Physella heterostropha*	4
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	4
Arthropoda	Insecta	Diptera	Ceratopogonidae			*Ceratopogon sp.*	2
						Monohelea sp.	4
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	37
				Tanypodinae		*Psectrotanypus sp*	2
						Sub-Total:	100
						Grand Total:	100

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Lucy Guzman
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Date : 10/5/2001
BTR No. : 05297
Project No. : 01032
No. of Samples : 6
Date Received : 6/21/2001

Reference: N0564-0322

Laboratory Sample ID : 20003
Client Sample ID : D03388 IPSD-TT3302A-062001
Remarks :

Date/Time Sample Collected : 6/20/2001 @ 11:20:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Stylodrilus heringianus*	2
		Tubificida	Enchytraeidae			*Lumbricillus sp.*	1
			Naididae			*Dero digitata*	1
			Tubificidae			*Aulodrilus limnobius*	1
						Ilyodrilus templetoni	53
						Limnodrilus claparedianus	250
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	11
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	3
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	3
						Dicrotendipes nervosus	1
					Tanytarsini	*Micropsectra sp.*	2
				Prodiamesinae		*Prodiamesa olivacea*	1
						Sub-Total:	329
						Grand Total:	329

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Lucy Guzman
Tetra Tech NUS Inc
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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05297
Project No. : 01032
No. of Samples : 6
Date Received : 6/21/2001

Laboratory Sample ID : 20004
Client Sample ID : D03389 IPSD-TT3302B-062001
Remarks :

Date/Time Sample Collected : 6/20/2001 @ 11:20:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Dorylaimida				*Dorylaimus sp.*	1
Annelida	Oligochaeta	Tubificida	Tubificidae			*Ilyodrilus templetoni*	101
						Limnodrilus claparedianus	271
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	1
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Phaenopsectra flavipes*	4
					Tanytarsini	*Micropsectra sp.*	2
				Prodiamesinae		*Prodiamesa olivacea*	1
				Tanypodinae	Natarsiini	*Natarsia sp.*	1
					Procladiini	*Procladius sp.*	1
						Sub-Total:	**383**
						Grand Total:	**383**

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Date : 10/5/2001
BTR No. : 05297
Project No. : 01032
No. of Samples : 6
Date Received : 6/21/2001

Reference: N0564-0322

Laboratory Sample ID : 20005
Client Sample ID : D03390 IPSD-TT3302C-062001
Remarks :

Date/Time Sample Collected : 6/20/2001 @ 11:20:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Dorylaimida				*Dorylaimus sp.*	4
Annelida	Oligochaeta	Tubificida	Tubificidae			*Ilyodrilus templetoni*	93
						Limnodrilus claparedianus	278
Mollusca	Gastropoda	Basommatophora	Ancylidae			*Ferrissia sp.*	2
			Physidae			*Physella heterostropha*	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	9
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	1
			Talitridae			*Hyalella azteca*	1
		Isopoda	Asellidae			*Caecidotea communis*	1
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	9
						Phaenopsectra flavipes	3
						Polypedilum scalaenum	3
					Tanytarsini	*Micropsectra sp.*	2
				Tanypodinae	Coelotanypodini	*Clinotanypus pinguis*	3

Sub-Total: 410
Grand Total: 410

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Date : 10/5/2001
BTR No. : 05297
Project No. : 01032
No. of Samples : 6
Date Received : 6/21/2001

Reference: N0564-0322

Laboratory Sample ID : 20006
Client Sample ID : D03393 IPDS-TT3202A-062001
Remarks :

Date/Time Sample Collected : 6/20/2001 @ 2:10:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Platyhelminthes	Turbellaria	Tricladida	Planariidae			*Phagocata woodworthi*	1
Nematoda		Enoplida				*Tobrilus sp.*	1
nelida	Oligochaeta	Tubificida	Enchytraeidae			*Enchytraeus sp.*	1
						Lumbricillus sp.	1
			Naididae			*Dero digitata*	1
						Nais communis	14
						Pristina aequiseta	9
			Tubificidae			*Aulodrilus limnobius*	1
						Ilyodrilus templetoni	11
						Limnodrilus claparedianus	169
Mollusca	Gastropoda	Basommatophora	Lymnaeidae			*Stagnicola sp.*	1
			Physidae			*Physella heterostropha*	1
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	11
			Talitridae			*Hyalella azteca*	8
		Isopoda	Asellidae			*Caecidotea communis*	2
	Insecta	Collembola	Isotomidae			*Isotomurus sp.*	1
		Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	3
						Dicrotendipes nervosus	1
						Phaenopsectra flavipes	1

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05297
Project No. : 01032
No. of Samples : 6
Date Received : 6/21/2001

Laboratory Sample ID : 20006
Client Sample ID : D03393 IPDS-TT3202A-062001
Remarks :

Date/Time Sample Collected : 6/20/2001 @ 2:10:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Polypedilum scalaenum*	1
					Tanytarsini	*Micropsectra sp.*	4
				Orthocladiinae	Orthocladiini	*Cricotopus trifasciatus*	1
						Sub-Total:	244
						Grand Total:	244

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05297
Project No. : 01032
No. of Samples : 6
Date Received : 6/21/2001

Laboratory Sample ID : 20007
Client Sample ID : D03394 IPSD-TT3202B-062001
Remarks :

Date/Time Sample Collected : 6/20/2001 @ 2:10:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Dorylaimida				*Dorylaimus sp.*	1
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Eclipidrilus lacustris*	1
		Tubificida	Enchytraeidae			*Lumbricillus sp.*	2
			Naididae			*Dero digitata*	3
						Nais communis	4
						Pristina aequiseta	7
						Slavina appendiculata	3
			Tubificidae			*Aulodrilus limnobius*	9
						Ilyodrilus templetoni	136
						Limnodrilus claparedianus	562
Mollusca	Gastropoda	Basommatophora	Lymnaeidae			*Stagnicola sp.*	3
			Physidae			*Physella heterostropha*	4
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	5
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	29
			Talitridae			*Hyalella azteca*	13
		Isopoda	Asellidae			*Caecidotea communis*	3
	Insecta	Diptera	Ceratopogonidae			*Ceratopogon sp.*	1
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	8
						Dicrotendipes nervosus	1

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05297
Project No. : 01032
No. of Samples : 6
Date Received : 6/21/2001

Laboratory Sample ID : 20007
Client Sample ID : D03394 IPSD-TT3202B-062001
Remarks :

Date/Time Sample Collected : 6/20/2001 @ 2:10:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Phaenopsectra flavipes*	3
					Tanytarsini	*Micropsectra sp.*	4
				Tanypodinae	Procladiini	*Procladius bellus*	1
						Sub-Total:	803
						Grand Total:	803

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05297
Project No. : 01032
No. of Samples : 6
Date Received : 6/21/2001

Laboratory Sample ID : 20008
Client Sample ID : D03395 IPSD-TT3202C-062001
Remarks :

Date/Time Sample Collected : 6/20/2001 @ 2:10:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Hirudinea	Rhynchobdellida	Glossiphoniidae			*Batracobdella phalera*	1
	Oligochaeta	Tubificida	Enchytraeidae			*Enchytraeus sp.*	2
						Fridericia sp.	1
			Naididae			*Dero digitata*	4
						Nais communis	15
						Pristina aequiseta	8
						Slavina appendiculata	1
			Tubificidae			*Aulodrilus limnobius*	2
						Ilyodrilus templetoni	30
						Limnodrilus claparedianus	729
Mollusca	Gastropoda	Basommatophora	Ancylidae			*Ferrissia sp.*	1
			Lymnaeidae			*Stagnicola sp.*	1
			Physidae			*Physella heterostropha*	4
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	4
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	40
			Talitridae			*Hyalella azteca*	22
		Decapoda	Cambaridae	Cambarinae		*Orconectes sp*	1
		Isopoda	Asellidae			*Caecidotea communis*	6
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	6

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Lucy Guzman
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Wilmington, MA 01887-1062

Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05297
Project No. : 01032
No. of Samples : 6
Date Received : 6/21/2001

Laboratory Sample ID : 20008
Client Sample ID : D03395 IPSD-TT3202C-062001
Remarks :

Date/Time Sample Collected : 6/20/2001 @ 2:10:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Cryptochironomus fulvus*	1
						Dicrotendipes nervosus	2
						Phaenopsectra flavipes	3
						Polypedilum scalaenum	3
					Tanytarsini	*Micropsectra sp.*	1
						Paratanytarsus sp.	1
				Orthocladiinae	Orthocladiini	*Cricotopus trifasciatus*	1
				Tanypodinae		*Hudsonimyia sp.*	1
						Sub-Total:	**891**
						Grand Total:	**891**

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Date : 10/5/2001
BTR No. : 05301
Project No. : 01032
No. of Samples : 6
Date Received : 6/22/2001

Reference: N0564-0322

Laboratory Sample ID : 20014
Client Sample ID : D03397 IPSD-WW06A-062101
Remarks :

Date/Time Sample Collected : 6/21/2001 @ 9:12:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	2
Annelida	Oligochaeta	Tubificida	Enchytraeidae			*Lumbricillus sp.*	3
			Naididae			*Pristina aequiseta*	1
			Tubificidae			*Limnodrilus claparedianus*	7
Mollusca	Gastropoda	Basommatophora	Lymnaeidae			*Stagnicola sp.*	18
			Physidae			*Physella heterostropha*	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	101
Arthropoda	Arachnoidea	Acariformes	Hydryphantidae			*Pseudohydryphantes sp.*	1
	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	1
	Insecta	Collembola	Isotomidae			*Isotomurus sp.*	9
			Sminthuridae			*Bourletiella sp.*	1
		Diptera	Chironomidae	Chironominae	Chironomini	*Paratendipes albimanus*	2
						Polypedilum trigonus	5
					Tanytarsini	*Micropsectra sp.*	10
				Orthocladiinae	Orthocladiini	*Parametriocnemus lundbecki*	1
				Tanypodinae	Natarsiini	*Natarsia sp.*	2
			Stratiomyidae			*Brachypremna sp.*	1
						Sub-Total:	166
						Grand Total:	166

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05301
Project No. : 01032
No. of Samples : 6
Date Received : 6/22/2001

Laboratory Sample ID : 20015
Client Sample ID : D03398 IPSD-WW06B-062101
Remarks :

Date/Time Sample Collected : 6/21/2001 @ 9:12:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nemertea	Enopla	Hoplonemertea	Prostomatidae			*Prostoma graecense*	1
Nematoda		Araeolaimida				*Aphanolaimus sp.*	2
elida	Hirudinea	Rhynchobdellida	Piscicolidae			*Myzobdella lugubris*	2
	Oligochaeta	Tubificida	Enchytraeidae			*Lumbricillus sp.*	7
			Naididae			*Pristina aequiseta*	7
			Tubificidae			*Limnodrilus claparedianus*	25
Mollusca	Gastropoda	Basommatophora	Lymnaeidae			*Stagnicola sp.*	22
			Physidae			*Physella heterostropha*	1
			Planorbidae			*Planorbella trivolvis*	2
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	95
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	2
	Insecta	Collembola	Isotomidae			*Isotomurus sp.*	2
		Diptera	Ceratopogonidae			*Bezzia sp.*	1
			Chironomidae	Chironominae	Chironomini	*Phaenopsectra flavipes*	1
						Polypedilum scalaenum	2
						Polypedilum trigonus	8
					Tanytarsini	*Micropsectra sp.*	5
				Orthocladiinae		*Pseudosmittia sp.*	1
					Orthocladiini	*Parametriocnemus lundbecki*	4

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Date : 10/5/2001
BTR No. : 05301
Project No. : 01032
No. of Samples : 6
Date Received : 6/22/2001

Reference: N0564-0322

Laboratory Sample ID : 20015
Client Sample ID : D03398 IPSD-WW06B-062101
Remarks :

Date/Time Sample Collected : 6/21/2001 @ 9:12:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Natarsiini	*Natarsia sp.*	1
			Stratiomyidae			*Brachypremna sp.*	1
			Tipulidae	Limoniinae		*Pilaria sp.*	2
						Sub-Total:	194
						Grand Total:	194

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05301
Project No. : 01032
No. of Samples : 6
Date Received : 6/22/2001

Laboratory Sample ID : 20016
Client Sample ID : D03399 IPSD-WW06C-062101
Remarks :

Date/Time Sample Collected : 6/21/2001 @ 9:12:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Platyhelminthes	Turbellaria	Tricladida	Planariidae			*Phagocata woodworthi*	1
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
lida	Oligochaeta	Lumbriculida	Lumbriculidae			*Eclipidrilus lacustris*	1
						Lumbriculus variegatus	2
		Tubificida	Enchytraeidae			*Lumbricillus sp.*	2
			Tubificidae			*Limnodrilus claparedianus*	37
Mollusca	Gastropoda	Basommatophora	Lymnaeidae			*Stagnicola sp.*	20
			Physidae			*Physella heterostropha*	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	96
Arthropoda	Arachnoidea	Acariformes	Hydryphantidae			*Protzia sp.*	1
	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	7
		Isopoda	Asellidae			*Caecidotea communis*	1
	Insecta	Collembola	Isotomidae			*Isotomurus sp.*	1
		Diptera	Ceratopogonidae			*Alluaudomyia sp.*	1
						Bezzia sp.	2
			Chironomidae	Chironominae	Chironomini	*Polypedilum trigonus*	5
						Polypedilum tritum	1
					Tanytarsini	*Micropsectra sp.*	7
				Orthocladiinae	Orthocladiini	*Parametriocnemus lundbecki*	3

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Lucy Guzman
Tetra Tech NUS Inc
55 Jonspin Road
Wilmington, MA 01887-1062

Reference: N0564-0322

Date	: 10/5/2001
BTR No.	: 05301
Project No.	: 01032
No. of Samples	: 6
Date Received	: 6/22/2001

Laboratory Sample ID	: 20016	Date/Time Sample Collected	: 6/21/2001 @ 9:12:0
Client Sample ID	: D03399 IPSD-WW06C-062101	Percent Sample Examined	: 100
Remarks	:	Sampling Depth (m)	: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Natarsiini	*Natarsia sp.*	1
			Stratiomyidae			*Brachypremna sp.*	1
			Tipulidae				1
						Pseudolimnophila sp.	1
						Sub-Total:	**194**
						Grand Total:	**194**

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05301
Project No. : 01032
No. of Samples : 6
Date Received : 6/22/2001

Laboratory Sample ID : 20017
Client Sample ID : D03402 IPSD-TT1802A-062101
Remarks :

Date/Time Sample Collected : 6/21/2001 @ 2:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
		Enoplida				*Tobrilus sp.*	2
Annelida	Oligochaeta	Tubificida	Tubificidae			*Aulodrilus limnobius*	59
						Ilyodrilus templetoni	541
						Limnodrilus claparedianus	181
Mollusca	Gastropoda	Basommatophora	Physidae			*Physella heterostropha*	1
			Planorbidae			*Planorbella trivolvis*	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	4
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	1
		Isopoda	Asellidae			*Caecidotea communis*	1
	Insecta	Collembola	Isotomidae			*Isotomurus sp.*	1
		Diptera	Ceratopogonidae			*Sphaeromias sp.*	1
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	18
				Orthocladiinae	Orthocladiini	*Psectrocladius sp.*	1
				Tanypodinae		*Psectrotanypus sp.*	2
					Coelotanypodini	*Clinotanypus pinguis*	21
					Procladiini	*Procladius sp.*	1
						Sub-Total:	**837**
						Grand Total:	**837**

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05301
Project No. : 01032
No. of Samples : 6
Date Received : 6/22/2001

Laboratory Sample ID : 20018
Client Sample ID : D03403 IPSD-TT1802B-062101
Remarks :

Date/Time Sample Collected : 6/21/2001 @ 2:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Dorylaimida				*Dorylaimus sp.*	1
		Enoplida				*Tobrilus sp.*	2
nelida	Oligochaeta	Tubificida	Enchytraeidae			*Lumbricillus sp.*	1
			Naididae			*Dero digitata*	9
			Tubificidae			*Aulodrilus limnobius*	115
						Aulodrilus pigueti	1
						Ilyodrilus templetoni	1269
						Limnodrilus claparedianus	294
Mollusca	Gastropoda	Basommatophora	Lymnaeidae			*Pseudosuccinea columella*	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	8
Arthropoda	Crustacea	Amphipoda	Talitridae			*Hyalella azteca*	1
	Insecta	Diptera	Ceratopogonidae			*Culicoides sp.*	5
						Sphaeromias sp.	2
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	78
				Tanypodinae		*Psectrotanypus sp.*	5
					Coelotanypodini	*Clinotanypus pinguis*	10
						Sub-Total:	**1802**
QA Replck:							
Annelida	Oligochaeta	Tubificida	Tubificidae			*Ilyodrilus templetoni*	14
						Limnodrilus claparedianus	4

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05301
Project No. : 01032
No. of Samples : 6
Date Received : 6/22/2001

Laboratory Sample ID : 20018
Client Sample ID : D03403 IPSD-TT1802B-062101
Remarks :

Date/Time Sample Collected : 6/21/2001 @ 2:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	1
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	1
				Tanypodinae		*Psectrotanypus sp.*	2
					Coelotanypodini	*Clinotanypus pinguis*	1
						Sub-Total:	23
						Grand Total:	1825

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05301
Project No. : 01032
No. of Samples : 6
Date Received : 6/22/2001

Laboratory Sample ID : 20019
Client Sample ID : D03404 IPSD-TT1802C-062101
Remarks :

Date/Time Sample Collected : 6/21/2001 @ 2:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	2
		Dorylaimida				*Dorylaimus sp.*	1
		Enoplida				*Tobrilus sp.*	1
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Eclipidrilus lacustris*	1
		Tubificida	Naididae			*Dero digitata*	14
			Tubificidae			*Aulodrilus limnobius*	80
						Ilyodrilus templetoni	1477
						Limnodrilus claparedianus	421
Mollusca	Gastropoda	Basommatophora	Physidae			*Physella heterostropha*	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	1
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	1
			Talitridae			*Hyalella azteca*	2
	Insecta	Diptera	Ceratopogonidae			*Bezzia sp.*	2
						Culicoides sp.	1
						Sphaeromias sp.	4
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	75
				Tanypodinae		*Psectrotanypus sp.*	2
					Coelotanypodini	*Clinotanypus pinguis*	1
			Ephydridae			*Ephydra sp.*	1
						Sub-Total:	2088

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05301
Project No. : 01032
No. of Samples : 6
Date Received : 6/22/2001

Laboratory Sample ID : 20019
Client Sample ID : D03404 IPSD-TT1802C-062101
Remarks :

Date/Time Sample Collected : 6/21/2001 @ 2:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
						Grand Total:	2088

Submitted By:

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55 Jonspin Road
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Date : 10/5/2001
BTR No. : 05306
Project No. : 01032
No. of Samples : 9
Date Received : 6/23/2001

Reference: N0564-0322

Laboratory Sample ID : 20027
Client Sample ID : D03408 IPSD-TT1002A-062201
Remarks :

Date/Time Sample Collected : 6/22/2001 @ 8:45:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Naididae			*Dero digitata*	1
			Tubificidae			*Aulodrilus pigueti*	4
						Ilyodrilus templetoni	24
Arthropoda	Crustacea	Amphipoda	Talitridae			*Hyalella azteca*	1
	Insecta	Diptera	Ceratopogonidae			*Sphaeromias sp.*	1
			Chironomidae	Tanypodinae	Coelotanypodini	*Clinotanypus pinguis*	1
						Sub-Total:	32
						Grand Total:	32

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05306
Project No. : 01032
No. of Samples : 9
Date Received : 6/23/2001

Laboratory Sample ID : 20028
Client Sample ID : D03409 IPSD-TT1002B-062201
Remarks :

Date/Time Sample Collected : 6/22/2001 @ 8:45:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Tubificidae			*Aulodrilus pigueti*	3
						Ilyodrilus templetoni	17
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Sphaerium sp.*	1
						Sub-Total:	21
						Grand Total:	21

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Lucy Guzman
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Date : 10/5/2001
BTR No. : 05306
Project No. : 01032
No. of Samples : 9
Date Received : 6/23/2001

Reference: N0564-0322

Laboratory Sample ID : 20029
Client Sample ID : D03410 IPSD-TT1002C-062201
Remarks :

Date/Time Sample Collected : 6/22/2001 @ 8:45:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Tubificidae			*Aulodrilus pigueti*	2
						Ilyodrilus templetoni	9
						Limnodrilus claparedianus	1
Arthropoda	Insecta	Diptera	Ceratopogonidae			*Sphaeromias sp.*	3
						Sub-Total:	15
						Grand Total:	15

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05306
Project No. : 01032
No. of Samples : 9
Date Received : 6/23/2001

Laboratory Sample ID : 20030
Client Sample ID : D03413 IPSD-TT1301A-062201
Remarks :

Date/Time Sample Collected : 6/22/2001 @ 10:46:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Eclipidrilus lacustris*	3
		Tubificida	Naididae			*Dero digitata*	4
						Nais communis	2
			Tubificidae			*Aulodrilus limnobius*	8
						Aulodrilus pigueti	1
						Ilyodrilus templetoni	139
						Limnodrilus claparedianus	1110
						Limnodrilus hoffmeisteri	17
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	5
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	9
			Gammaridae			*Gammarus pseudolimnaeus*	1
			Talitridae			*Hyalella azteca*	3
		Decapoda	Cambaridae	Cambarinae		*Orconectes sp.*	1
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	8
						Polypedilum trigonus	1
				Tanypodinae		*Larsia sp.*	1
						Psectrotanypus sp.	2
					Coelotanypodini	*Clinotanypus pinguis*	2

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05306
Project No. : 01032
No. of Samples : 9
Date Received : 6/23/2001

Laboratory Sample ID : 20030
Client Sample ID : D03413 IPSD-TT1301A-062201
Remarks :

Date/Time Sample Collected : 6/22/2001 @ 10:46:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Tipulidae				1
				Limoniinae		*Pilaria sp.*	1
						Sub-Total:	1320
						Grand Total:	1320

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05306
Project No. : 01032
No. of Samples : 9
Date Received : 6/23/2001

Laboratory Sample ID : 20031
Client Sample ID : D03414 IPSD-TT1301B-062201
Remarks :

Date/Time Sample Collected : 6/22/2001 @ 10:46:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Eclipidrilus lacustris*	10
		Tubificida	Naididae			*Dero digitata*	6
			Tubificidae			*Aulodrilus pigueti*	2
						Aulodrilus pluriseta	1
						Ilyodrilus templetoni	30
						Limnodrilus claparedianus	32
Mollusca	Gastropoda	Basommatophora	Physidae			*Physella heterostropha*	3
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Musculium sp.*	19
						Pisidium sp.	2
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	16
			Talitridae			*Hyalella azteca*	35
	Insecta	Diptera	Ceratopogonidae			*Sphaeromias sp.*	1
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	13
						Cladopelma sp.	1
						Cryptochironomus fulvus	2
						Phaenopsectra flavipes	1
					Tanytarsini	*Micropsectra sp.*	36
				Orthocladiinae		*Paraphaenocladius sp.*	2
				Tanypodinae		*Larsia sp.*	1

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05306
Project No. : 01032
No. of Samples : 9
Date Received : 6/23/2001

Laboratory Sample ID : 20031
Client Sample ID : D03414 IPSD-TT1301B-062201
Remarks :

Date/Time Sample Collected : 6/22/2001 @ 10:46:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Coelotanypodini	*Clinotanypus pinguis*	2
					Natarsiini	*Natarsia sp.*	1
		Hemiptera	Corixidae	Corixinae		*Trichocorixa sp.*	1
		Odonata	Libellulidae			*Plathemis sp.*	1
						Sub-Total:	218
						Grand Total:	218

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05306
Project No. : 01032
No. of Samples : 9
Date Received : 6/23/2001

Laboratory Sample ID : 20032
Client Sample ID : D03415 IPSD-TT1301C-062201
Remarks :

Date/Time Sample Collected : 6/22/2001 @ 10:46:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
Annelida	Hirudinea	Pharyngobdellida	Erpobdellidae			*Erpobdella punctata*	3
	Oligochaeta	Lumbriculida	Lumbriculidae			*Eclipidrilus lacustris*	4
		Tubificida	Enchytraeidae			*Lumbricillus sp.*	1
			Naididae			*Dero digitata*	7
						Nais communis	3
			Tubificidae			*Aulodrilus pluriseta*	4
						Ilyodrilus templetoni	34
						Limnodrilus claparedianus	173
						Limnodrilus hoffmeisteri	2
Mollusca	Gastropoda	Basommatophora	Physidae			*Physella heterostropha*	7
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Musculium sp.*	11
						Pisidium sp.	10
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	45
			Talitridae			*Hyalella azteca*	41
		Decapoda	Cambaridae	Cambarinae		*Orconectes sp.*	1
		Isopoda	Asellidae			*Caecidotea communis*	21
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	14
						Cryptochironomus fulvus	1

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Date : 10/5/2001
BTR No. : 05306
Project No. : 01032
No. of Samples : 9
Date Received : 6/23/2001

Reference: N0564-0322

Laboratory Sample ID : 20032
Client Sample ID : D03415 IPSD-TT1301C-062201
Remarks :

Date/Time Sample Collected : 6/22/2001 @ 10:46:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Phaenopsectra flavipes*	3
					Tanytarsini	*Micropsectra sp.*	16
				Tanypodinae	Coelotanypodini	*Clinotanypus pinguis*	1
					Natarsiini	*Natarsia sp.*	2
						Sub-Total:	405
						Grand Total:	405

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Date : 10/5/2001
BTR No. : 05306
Project No. : 01032
No. of Samples : 9
Date Received : 6/23/2001

Reference: N0564-0322

Laboratory Sample ID : 20033
Client Sample ID : D03418 IPSD-TT3001A-062201
Remarks :

Date/Time Sample Collected : 6/22/2001 @ 1:25:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Eclipidrilus lacustris*	3
		Tubificida	Enchytraeidae			*Lumbricillus sp.*	1
			Tubificidae			*Limnodrilus claparedianus*	74
Mollusca	Gastropoda	Basommatophora	Physidae			*Physella heterostropha*	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Musculium sp.*	1
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	15
			Talitridae			*Hyalella azteca*	26
		Isopoda	Asellidae			*Caecidotea communis*	5
	Insecta	Diptera	Ceratopogonidae			*Bezzia sp.*	1
			Chironomidae	Chironominae	Chironomini	*Cryptochironomus fulvus*	3
						Dicrotendipes modestus	2
						Polypedilum convictum	1
						Polypedilum scalaenum	1
					Tanytarsini	*Micropsectra sp.*	12
						Paratanytarsus sp.	1
						Rheotanytarsus sp.	3
				Tanypodinae	Natarsiini	*Natarsia sp.*	4
		Trichoptera	Leptoceridae			*Oecetis sp.*	1
						Sub-Total:	156

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Lucy Guzman
Tetra Tech NUS Inc
55 Jonspin Road
Wilmington, MA 01887-1062

Reference: N0564-0322

Date	: 10/5/2001
BTR No.	: 05306
Project No.	: 01032
No. of Samples	: 9
Date Received	: 6/23/2001

Laboratory Sample ID	: 20033	Date/Time Sample Collected	: 6/22/2001 @ 1:25:0
Client Sample ID	: D03418 IPSD-TT3001A-062201	Percent Sample Examined	: 100
Remarks	:	Sampling Depth (m)	: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
						Grand Total:	156

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05306
Project No. : 01032
No. of Samples : 9
Date Received : 6/23/2001

Laboratory Sample ID : 20034
Client Sample ID : D03419 IPSD-TT3001B-062201
Remarks :

Date/Time Sample Collected : 6/22/2001 @ 1:25:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Hirudinea	Pharyngobdellida	Erpobdellidae			*Erpobdella punctata*	2
	Oligochaeta	Tubificida	Enchytraeidae			*Lumbricillus sp.*	1
			Tubificidae			*Aulodrilus pigueti*	1
						Ilyodrilus templetoni	3
						Limnodrilus claparedianus	458
Mollusca	Gastropoda	Basommatophora	Physidae			*Physella heterostropha*	2
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Musculium sp.*	1
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	15
			Talitridae			*Hyalella azteca*	1
	Insecta	Diptera	Ceratopogonidae			*Bezzia sp.*	1
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	15
						Parachironomus hirtalatus	1
						Polypedilum convictum	1
						Polypedilum illinoense	2
						Polypedilum scalaenum	1
						Polypedilum tritum	1
					Tanytarsini	*Micropsectra sp.*	6
				Tanypodinae	Coelotanypodini	*Clinotanypus pinguis*	2
						Sub-Total:	514

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Date : 10/5/2001
BTR No. : 05306
Project No. : 01032
No. of Samples : 9
Date Received : 6/23/2001

Reference: N0564-0322

Laboratory Sample ID	: 20034	Date/Time Sample Collected	: 6/22/2001 @ 1:25:0
Client Sample ID	: D03419 IPSD-TT3001B-062201	Percent Sample Examined	: 100
Remarks	:	Sampling Depth (m)	: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
						Grand Total:	514

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Date : 10/5/2001
BTR No. : 05306
Project No. : 01032
No. of Samples : 9
Date Received : 6/23/2001

Reference: N0564-0322

Laboratory Sample ID : 20035
Client Sample ID : D03420 IPSD-TT3001C-062201
Remarks :

Date/Time Sample Collected : 6/22/2001 @ 1:25:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Eclipidrilus lacustris*	1
		Tubificida	Enchytraeidae			*Lumbricillus sp.*	2
			Tubificidae			*Limnodrilus claparedianus*	52
Mollusca	Gastropoda	Basommatophora	Physidae			*Physella heterostropha*	2
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	38
			Talitridae			*Hyalella azteca*	1
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	27
						Cryptochironomus fulvus	1
						Dicrotendipes modestus	2
						Paratendipes albimanus	1
						Phaenopsectra flavipes	1
						Polypedilum scalaenum	1
						Polypedilum tritum	2
					Tanytarsini	*Micropsectra sp.*	4
						Rheotanytarsus sp.	1
				Tanypodinae		*Larsia sp.*	1
					Coelotanypodini	*Clinotanypus pinguis*	5
						Sub-Total:	142
QA Replck:							
Annelida	Oligochaeta	Tubificida	Enchytraeidae			*Lumbricillus sp.*	1

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05306
Project No. : 01032
No. of Samples : 9
Date Received : 6/23/2001

Laboratory Sample ID : 20035
Client Sample ID : D03420 IPSD-TT3001C-062201
Remarks :

Date/Time Sample Collected : 6/22/2001 @ 1:25:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Tubificidae			*Ilyodrilus templetoni*	1
						Limnodrilus claparedianus	142
Mollusca	Gastropoda	Basommatophora	Physidae			*Physella heterostropha*	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	2
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	3
	Insecta	Coleoptera	Hydrophilidae			*Helophorus sp.*	1
		Diptera	Ceratopogonidae			*Sphaeromias sp.*	1
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	4
						Dicrotendipes modestus	1
						Polypedilum tritum	2
					Tanytarsini	*Micropsectra sp.*	6
				Orthocladiinae		*Pseudosmittia sp.*	1
				Tanypodinae		*Psectrotanypus sp.*	1
			Dolichopodidae			*Hydrophorus sp.*	1
						Sub-Total:	**168**
						Grand Total:	**310**

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05310
Project No. : 01032
No. of Samples : 9
Date Received : 6/19/2001

Laboratory Sample ID : 20042
Client Sample ID : D03425 IPSD-PP03A-062501
Remarks :

Date/Time Sample Collected : 6/25/2001 @ 10:10:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chaoboridae			*Chaoborus punctipennis*	3
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	3
						Polypedilum trilum	1
				Tanypodinae	Procladiini	*Procladius sp.*	2
						Sub-Total:	9
						Grand Total:	9

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Date : 10/5/2001
BTR No. : 05310
Project No. : 01032
No. of Samples : 9
Date Received : 6/19/2001

Reference: N0564-0322

Laboratory Sample ID : 20043
Client Sample ID : D03426 IPSD-PP03B-062501
Remarks :

Date/Time Sample Collected : 6/25/2001 @ 10:10:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Crustacea	Amphipoda	Talitridae			*Hyalella azteca*	2
	Insecta	Diptera	Chaoboridae			*Chaoborus punctipennis*	2
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	2
						Sub-Total:	6
						Grand Total:	6

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05310
Project No. : 01032
No. of Samples : 9
Date Received : 6/19/2001

Laboratory Sample ID : 20044
Client Sample ID : D03427 IPSD-PP03C-062501
Remarks :

Date/Time Sample Collected : 6/25/2001 @ 10:10:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chaoboridae			*Chaoborus punctipennis*	3
			Chironomidae	Orthocladiinae	Orthocladiini	*Psectrocladius sp.*	1
						Sub-Total:	4
						Grand Total:	4

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Date : 10/5/2001
BTR No. : 05310
Project No. : 01032
No. of Samples : 9
Date Received : 6/19/2001

Reference: N0564-0322

Laboratory Sample ID : 20045
Client Sample ID : D03430 IPSD-TTSA01A-062501
Remarks :

Date/Time Sample Collected : 6/25/2001 @ 1:50:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
Annelida	Oligochaeta	Tubificida	Tubificidae			*Ilyodrilus templetoni*	1
						Limnodrilus claparedianus	8
						Limnodrilus hoffmeisteri	6
						Limnodrilus udekemianus	6
Mollusca	Gastropoda	Basommatophora	Planorbidae			*Planorbella trivolvis*	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	1
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	3
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	200
						Phaenopsectra flavipes	8
					Tanytarsini	*Micropsectra sp.*	4
				Prodiamesinae		*Prodiamesa olivacea*	1
				Tanypodinae		*Psectrotanypus sp.*	29
					Natarsiini	*Natarsia sp.*	1
			Stratiomyidae			*Allognosta sp.*	1
						Sub-Total:	271
						Grand Total:	271

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Date : 10/5/2001
BTR No. : 05310
Project No. : 01032
No. of Samples : 9
Date Received : 6/19/2001

Reference: N0564-0322

Laboratory Sample ID : 20046
Client Sample ID : D03431 IPSD-TTSA01B-062501
Remarks :

Date/Time Sample Collected : 6/25/2001 @ 1:50:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Lumbriculus variegatus*	1
		Tubificida	Tubificidae			*Ilyodrilus templetoni*	1
						Limnodrilus claparedianus	8
						Limnodrilus hoffmeisteri	4
						Limnodrilus udekemianus	12
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	1
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	239
						Endochironomus nigricans	1
						Phaenopsectra flavipes	29
					Tanytarsini	*Micropsectra sp.*	8
				Tanypodinae		*Psectrotanypus sp.*	93
						Sub-Total:	398
QA Repick:							
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
		Dorylaimida				*Dorylaimus sp.*	2
						Microlaimus sp.	1
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Eclipidrilus lacustris*	1
		Tubificida	Tubificidae			*Ilyodrilus templetoni*	1
						Limnodrilus claparedianus	10

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Date : 10/5/2001
BTR No. : 05310
Project No. : 01032
No. of Samples : 9
Date Received : 6/19/2001

Reference: N0564-0322

Laboratory Sample ID : 20046
Client Sample ID : D03431 IPSD-TTSA01B-062501
Remarks :

Date/Time Sample Collected : 6/25/2001 @ 1:50:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Tubificidae			*Limnodrilus hoffmeisteri*	19
						Limnodrilus udekemianus	1
Mollusca	Gastropoda	Basommatophora	Lymnaeidae			*Stagnicola sp.*	10
			Planorbidae			*Planorbella trivolvis*	2
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	11
Arthropoda	Insecta	Collembola	Isotomidae			*Isotomurus sp.*	2
		Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	18
						Parachironomus hirtalatus	1
						Paratendipes albimanus	2
						Phaenopsectra flavipes	1
						Polypedilum illinoense	1
					Tanytarsini	*Micropsectra sp.*	18
				Orthocladiinae		*Pseudorthocladius sp.*	1
				Tanypodinae		*Psectrotanypus sp.*	15
					Natarsiini	*Natarsia sp.*	1
						Sub-Total:	**119**
						Grand Total:	**517**

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05310
Project No. : 01032
No. of Samples : 9
Date Received : 6/19/2001

Laboratory Sample ID : 20047
Client Sample ID : D03432 IPSD-TTSA01C-062501
Remarks :

Date/Time Sample Collected : 6/25/2001 @ 1:50:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Stylodrilus heringianus*	7
		Tubificida	Naididae			*Pristina aequiseta*	1
			Tubificidae			*Ilyodrilus templetoni*	6
						Limnodrilus claparedianus	26
						Limnodrilus hoffmeisteri	11
						Limnodrilus udekemianus	5
Mollusca	Gastropoda	Basommatophora	Lymnaeidae			*Stagnicola sp.*	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	6
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	5
	Insecta	Diptera	Ceratopogonidae			*Bezzia sp.*	8
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	207
						Endochironomus nigricans	1
					Tanytarsini	*Micropsectra sp.*	1
				Tanypodinae		*Psectrotanypus sp.*	22
					Natarsiini	*Natarsia sp.*	1
						Sub-Total:	**309**
						Grand Total:	**309**

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05310
Project No. : 01032
No. of Samples : 9
Date Received : 6/19/2001

Laboratory Sample ID : 20048
Client Sample ID : D03477 IPSD-TTSD01A-062501
Remarks :

Date/Time Sample Collected : 6/25/2001 @ 4:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Stylodrilus heringianus*	9
		Tubificida	Tubificidae			*Aulodrilus limnobius*	136
						Aulodrilus pigueti	1
						Ilyodrilus templetoni	33
						Limnodrilus claparedianus	51
						Limnodrilus hoffmeisteri	1
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	9
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	2
	Insecta	Diptera	Ceratopogonidae			*Bezzia sp.*	2
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	2
						Cladopelma sp.	1
						Polypedilum tritum	1
					Tanytarsini	*Micropsectra sp.*	3
				Tanypodinae		*Psectrotanypus sp.*	2
			Stratiomyidae			*Brachypremna sp.*	1
			Tipulidae			*Ormosia sp.*	1
						Pseudolimnophila sp.	1
				Limoniinae		*Pilaria sp.*	1
						Sub-Total:	257

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05310
Project No. : 01032
No. of Samples : 9
Date Received : 6/19/2001

Laboratory Sample ID : 20048
Client Sample ID : D03477 IPSD-TTSD01A-062501
Remarks :

Date/Time Sample Collected : 6/25/2001 @ 4:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
						Grand Total:	257

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Date : 10/5/2001
BTR No. : 05310
Project No. : 01032
No. of Samples : 9
Date Received : 6/19/2001

Reference: N0564-0322

Laboratory Sample ID : 20049
Client Sample ID : D03478 IPSD-TTSD01B-062501
Remarks :

Date/Time Sample Collected : 6/25/2001 @ 4:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Hirudinea	Pharyngobdellida	Erpobdellidae			*Erpobdella punctata*	2
		Rhynchobdellida	Glossiphoniidae			*Helobdella stagnalis*	1
	Oligochaeta	Lumbriculida	Lumbriculidae			*Stylodrilus heringianus*	4
		Tubificida	Tubificidae			*Aulodrilus limnobius*	249
						Aulodrilus pigueti	2
						Ilyodrilus templetoni	60
						Limnodrilus claparedianus	59
						Limnodrilus hoffmeisteri	63
						Limnodrilus udekemianus	1
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	7
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	8
		Isopoda	Asellidae			*Caecidotea communis*	3
	Insecta	Diptera	Ceratopogonidae			*Bezzia sp.*	2
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	5
						Paratendipes albimanus	3
						Phaenopsectra flavipes	1
					Tanytarsini	*Micropsectra sp.*	3
				Tanypodinae		*Psectrotanypus sp.*	4
			Ptychopteridae			*Bittacomorpha sp.*	2

Sub-Total: 479

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05310
Project No. : 01032
No. of Samples : 9
Date Received : 6/19/2001

Laboratory Sample ID : 20049
Client Sample ID : D03478 IPSD-TTSD01B-062501
Remarks :

Date/Time Sample Collected : 6/25/2001 @ 4:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
						Grand Total:	479

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55 Jonspin Road
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Date : 10/5/2001
BTR No. : 05310
Project No. : 01032
No. of Samples : 9
Date Received : 6/19/2001

Reference: N0564-0322

Laboratory Sample ID : 20050
Client Sample ID : D03479 IPSD--TTSD01C-062501
Remarks :

Date/Time Sample Collected : 6/25/2001 @ 4:30:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Hirudinea	Rhynchobdellida	Glossiphoniidae			*Alboglossiphonia heteroclita*	1
	Oligochaeta	Lumbriculida	Lumbriculidae			*Stylodrilus heringianus*	18
		Tubificida	Naididae			*Dero digitata*	1
						Nais communis	1
			Tubificidae			*Aulodrilus limnobius*	158
						Ilyodrilus templetoni	55
						Limnodrilus claparedianus	275
						Limnodrilus hoffmeisteri	19
						Limnodrilus udekemianus	21
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	9
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	3
	Insecta	Diptera	Ceratopogonidae			*Bezzia sp.*	4
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	5
						Paratendipes albimanus	3
						Polypedilum scalaenum	1
						Polypedilum tritum	5
					Tanytarsini	*Micropsectra sp.*	7
				Tanypodinae		*Psectrotanypus sp.*	7
			Ptychopteridae			*Ptychoptera sp.*	2

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Reference: N0564-0322

Date	**: 10/5/2001**
BTR No.	**: 05310**
Project No.	**: 01032**
No. of Samples	**: 9**
Date Received	**: 6/19/2001**

Laboratory Sample ID	: 20050	Date/Time Sample Collected	: 6/25/2001 @ 4:30:0
Client Sample ID	: D03479 IPSD--TTSD01C-062501	Percent Sample Examined	: 100
Remarks	:	Sampling Depth (m)	: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Stratiomyidae			*Brachypremna sp.*	4
			Tipulidae				4
				Limoniinae		*Pilaria sp.*	9
						Sub-Total:	612
						Grand Total:	612

ubmitted By: **ABS** **Page 13 of 13**

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Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Reference: N0564-0322

Laboratory Sample ID : 20075
Client Sample ID : D03487 IPSD-TT04A-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 9:15:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Eclipidrilus lacustris*	14
		Tubificida	Naididae			*Dero digitata*	5
			Tubificidae			*Aulodrilus limnobius*	288
						Aulodrilus pluriseta	37
						Ilyodrilus templetoni	16
						Limnodrilus hoffmeisteri	4
Mollusca	Gastropoda	Mesogastropoda	Bithyniidae			*Bithynia tentaculata*	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	2
Arthropoda	Crustacea	Amphipoda	Talitridae			*Hyalella azteca*	25
		Decapoda	Cambaridae	Cambarinae		*Orconectes sp.*	1
		Isopoda	Asellidae			*Caecidotea communis*	4
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	39
						Cryptochironomus fulvus	1
						Paratendipes albimanus	2
						Phaenopsectra flavipes	29
					Tanytarsini	*Micropsectra sp.*	9
				Prodiamesinae		*Prodiamesa olivacea*	5
				Tanypodinae		*Psectrotanypus sp.*	1
					Coelotanypodini	*Clinotanypus pinguis*	2

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Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Reference: N0564-0322

Laboratory Sample ID : 20075
Client Sample ID : D03487 IPSD-TT04A-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 9:15:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Natarsiini	*Natarsia sp.*	4
					Pentaneurini	*Thienemannimyia sp.*	1
					Tanypodini	*Tanypus punctipennis*	1
						Sub-Total:	491
						Grand Total:	491

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Laboratory Sample ID : 20076
Client Sample ID : D03488 IPSD-TT04B-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 9:15:0
Percent Sample Examined :
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	2
		Dorylaimida				*Dorylaimus sp.*	1
·lida	Oligochaeta	Lumbriculida	Lumbriculidae			*Eclipidrilus lacustris*	4
						Stylodrilus heringianus	2
		Tubificida	Enchytraeidae			*Lumbricillus sp.*	1
			Naididae			*Nais communis*	1
						Pristina aequiseta	1
			Tubificidae			*Aulodrilus limnobius*	22
						Aulodrilus pluriseta	2
						Ilyodrilus templetoni	9
						Limnodrilus claparedianus	9
						Limnodrilus hoffmeisteri	38
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	2
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	1
			Talitridae			*Hyalella azteca*	4
		Isopoda	Asellidae			*Caecidotea communis*	4
	Insecta	Diptera	Ceratopogonidae			*Bezzia sp.*	1
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	7
						Cryptochironomus fulvus	6

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Laboratory Sample ID : 20076
Client Sample ID : D03488 IPSD-TT04B-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 9:15:0
Percent Sample Examined :
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Phaenopsectra flavipes*	90
						Polypedilum trilum	1
				Prodiamesinae		*Prodiamesa olivacea*	1
				Tanypodinae	Natarsiini	*Natarsia sp.*	6
					Pentaneurini	*Paramerina sp.*	1
						Thienemannimyia sp.	2
			Tipulidae				1
						Sub-Total:	**219**
						Grand Total:	**219**

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Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Reference: N0564-0322

Laboratory Sample ID : 20077
Client Sample ID : D03489 IPSD-TT04C-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 9:15:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae			*Stylodrilus heringianus*	1
		Tubificida	Naididae			*Dero digitata*	4
						Nais communis	1
			Tubificidae			*Aulodrilus limnobius*	56
						Aulodrilus pluriseta	28
						Ilyodrilus templetoni	52
						Limnodrilus claparedianus	1
						Limnodrilus hoffmeisteri	46
Mollusca	Gastropoda	Basommatophora	Ancylidae			*Ferrissia sp.*	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	8
Arthropoda	Crustacea	Amphipoda	Talitridae			*Hyalella azteca*	22
		Isopoda	Asellidae			*Caecidotea communis*	3
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	55
						Cryptochironomus fulvus	1
						Paratendipes albimanus	1
						Phaenopsectra flavipes	96
					Tanytarsini	*Micropsectra sp.*	9
						Paratanytarsus sp.	4

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Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Reference: N0564-0322

Laboratory Sample ID : 20077
Client Sample ID : D03489 IPSD-TT04C-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 9:15:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Prodiamesinae		*Prodiamesa olivacea*	13
				Tanypodinae	Natarsiini	*Natarsia sp.*	4
					Pentaneurini	*Thienemannimyia sp.*	2
						Sub-Total:	409
Q~ kepick:							
Nematoda		Dorylaimida				*Dorylaimus sp.*	2
Annelida	Oligochaeta	Tubificida	Tubificidae			*Aulodrilus limnobius*	14
						Aulodrilus pluriseta	1
						Ilyodrilus templetoni	3
						Limnodrilus claparedianus	1
						Limnodrilus hoffmeisteri	1
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	5
Arthropoda	Crustacea	Amphipoda	Talitridae			*Hyalella azteca*	1
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	9
						Phaenopsectra flavipes	11
						Polypedilum illinoense	1
					Tanytarsini	*Micropsectra sp*	4
						Paratanytarsus sp.	1
				Orthocladiinae	Corynoneurini	*Corynoneura taris*	1
				Prodiamesinae		*Prodiamesa olivacea*	2
				Tanypodinae	Natarsiini	*Natarsia sp.*	3

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Laboratory Sample ID : 20077
Client Sample ID : D03489 IPSD-TT04C-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 9:15:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
						Sub-Total:	60
						Grand Total:	469

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Laboratory Sample ID : 20078
Client Sample ID : D03492 IPSD-HB00A-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 11:55:
Percent Sample Examined :
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Hirudinea	Pharyngobdellida	Erpobdellidae			*Erpobdella punctata*	20
		Rhynchobdellida	Glossiphoniidae			*Alboglossiphonia heteroclita*	2
						Glossiphonia complanata	1
						Helobdella stagnalis	158
			Piscicolidae			*Myzobdella lugubris*	1
	Oligochaeta	Tubificida	Naididae			*Dero digitata*	27
						Nais communis	4
						Pristina leidyi	1
						Slavina appendiculata	7
			Tubificidae			*Aulodrilus pluriseta*	21
						Ilyodrilus templetoni	2
						Limnodrilus hoffmeisteri	4
						Tubifex tubifex	7
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Musculium sp*	33
						Pisidium sp.	46
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	14
			Talitridae			*Hyalella azteca*	345
		Isopoda	Asellidae			*Caecidotea communis*	64
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	1

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Laboratory Sample ID : 20078
Client Sample ID : D03492 IPSD-HB00A-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 11:55:
Percent Sample Examined :
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Microtendipes caelum*	1
						Polypedilum trigonus	5
						Polypedilum tritum	1
					Tanytarsini	*Micropsectra sp.*	4
						Paratanytarsus sp.	2
				Tanypodinae		*Larsia sp.*	4
					Natarsiini	*Natarsia sp.*	2
						Sub-Total:	**777**
						Grand Total:	**777**

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Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Reference: N0564-0322

Laboratory Sample ID : 20079
Client Sample ID : D03493 IPSD-HB00B-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 11:55:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Hirudinea	Pharyngobdellida	Erpobdellidae			*Erpobdella punctata*	15
		Rhynchobdellida	Glossiphoniidae			*Alboglossiphonia heteroclita*	3
						Helobdella stagnalis	81
	Oligochaeta	Tubificida	Naididae			*Dero digitata*	8
						Nais communis	1
						Slavina appendiculata	1
			Tubificidae			*Aulodrilus pluriseta*	31
						Ilyodrilus templetoni	4
						Limnodrilus hoffmeisteri	16
						Tubifex tubifex	3
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Musculium sp.*	18
						Pisidium sp.	25
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	8
			Talitridae			*Hyalella azteca*	241
		Isopoda	Asellidae			*Caecidotea communis*	41
	Insecta	Coleoptera	Dytiscidae			*Hydroporus sp.*	1
		Collembola	Isotomidae			*Isotomurus sp.*	1
			Sminthuridae			*Bourletiella sp.*	2
		Diptera					1

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Laboratory Sample ID : 20079.
Client Sample ID : D03493 IPSD-HB00B-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 11:55:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	1
						Polypedilum illinoense	1
						Polypedilum trigonus	7
					Tanytarsini	*Micropsectra sp.*	3
				Tanypodinae		*Larsia sp.*	19
						Monopelopia sp.	1
					Natarsiini	*Natarsia sp.*	3
					Pentaneurini	*Ablabesmyia mallochi*	1
			Tipulidae				2
		Megaloptera	Sialidae			*Sialis sp.*	1
		Trichoptera	Limnephilidae			*Limnephilus sp.*	1
						Sub-Total:	**541**
						Grand Total:	**541**

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Laboratory Sample ID : 20080
Client Sample ID : D03494 IPSD-HB00C-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 11:55:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Sample not preserved/processed							0
						Sub-Total:	0
						Grand Total:	0

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Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Reference: N0564-0322

Laboratory Sample ID : 20081
Client Sample ID : D03497 IPSD-TT0603A-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 2:50:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Hirudinea	Rhynchobdellida	Glossiphoniidae			*Helobdella stagnalis*	2
			Piscicolidae			*Myzobdella lugubris*	6
	Oligochaeta	Tubificida	Naididae			*Dero digitata*	25
			Tubificidae			*Aulodrilus limnobius*	2
						Aulodrilus pluriseta	12
						Ilyodrilus templetoni	13
						Limnodrilus claparedianus	13
						Limnodrilus hoffmeisteri	65
						Limnodrilus udekemianus	6
Mollusca	Gastropoda	Mesogastropoda	Hydrobiidae			*Amnicola limosa*	1
Arthropoda	Crustacea	Amphipoda	Crangonictidae			*Crangonyx pseudogracilis*	1
			Gammaridae			*Gammarus pseudolimnaeus*	1
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	107
						Cryptochironomus fulvus	1
						Polypedilum halterale	1
						Polypedilum illinoense	1
				Tanypodinae		*Psectrotanypus sp.*	6
						Sub-Total:	263
						Grand Total:	263

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Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Reference: N0564-0322

Laboratory Sample ID : 20082
Client Sample ID : D03498 IPSD-TT0603B-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 2:50:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
Annelida	Oligochaeta	Tubificida	Naididae			*Dero digitata*	26
			Tubificidae			*Aulodrilus limnobius*	6
						Aulodrilus pluriseta	8
						Ilyodrilus templetoni	33
						Limnodrilus claparedianus	9
						Limnodrilus hoffmeisteri	153
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	83
						Cryptochironomus fulvus	1
						Polypedilum illinoense	1
				Tanypodinae		*Larsia sp.*	1
						Psectrotanypus sp.	5
					Procladiini	*Procladius sp.*	8
						Sub-Total:	335
						Grand Total:	335

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Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Reference: N0564-0322

Laboratory Sample ID : 20083
Client Sample ID : D03499 IPSD-TT0603C-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 2:50:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Platyhelminthes	Turbellaria	Tricladida	Planariidae			*Phagocata woodworthi*	1
Annelida	Oligochaeta	Tubificida	Naididae			*Chaetogaster diaphanus*	1
						Dero digitata	16
						Nais variabilis	1
						Ophidonais serpentina	1
			Tubificidae			*Aulodrilus limnobius*	4
						Aulodrilus pigueti	1
						Aulodrilus pluriseta	7
						Ilyodrilus templetoni	31
						Limnodrilus claparedianus	15
						Limnodrilus hoffmeisteri	97
						Limnodrilus udekemianus	6
						Tubifex tubifex	1
Arthropoda	Crustacea	Isopoda	Asellidae			*Caecidotea communis*	1
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	110
						Cryptochironomus fulvus	1
						Polypedilum tritum	1
					Tanytarsini	*Micropsectra sp.*	1
				Tanypodinae		*Psectrotanypus sp.*	1

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05324
Project No. : 01032
No. of Samples : 9
Date Received : 6/27/2001

Laboratory Sample ID : 20083
Client Sample ID : D03499 IPSD-TT0603C-062601
Remarks :

Date/Time Sample Collected : 6/26/2001 @ 2:50:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Natarsiini	*Natarsia sp.*	1
						Sub-Total:	298
						Grand Total:	298

Submitted By:

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Date : 10/5/2001
BTR No. : 05331
Project No. : 01032
No. of Samples : 6
Date Received : 6/28/2001

Reference: N0564-0322

Laboratory Sample ID : 20112
Client Sample ID : D03505 IPSD-TTUF02A-062701
Remarks :

Date/Time Sample Collected : 6/27/2001 @ 9:50:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Nematoda		Araeolaimida				*Aphanolaimus sp.*	1
Annelida	Oligochaeta	Tubificida	Naididae			*Dero digitata*	41
						Nais communis	1
						Slavina appendiculata	1
						Stylaria lacustris	42
			Tubificidae			*Aulodrilus pigueti*	234
						Ilyodrilus templetoni	2
						Limnodrilus hoffmeisteri	77
Mollusca	Gastropoda	Mesogastropoda	Valvatidae			*Valvata tricarinata*	1
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	3
Arthropoda	Arachnoidea	Acariformes	Pionidae			*Piona sp.*	1
	Insecta	Collembola	Isotomidae			*Isotomurus sp.*	2
		Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	1
						Cladopelma sp.	4
						Cryptochironomus fulvus	2
						Dicrotendipes modestus	1
						Polypedilum trifum	1
				Orthocladiinae	Orthocladiini	*Cricotopus trifasciatus*	1
				Tanypodinae	Procladiini	*Procladius bellus*	3

Sub-Total: 419

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Date : 10/5/2001
BTR No. : 05331
Project No. : 01032
No. of Samples : 6
Date Received : 6/28/2001

Reference: N0564-0322

Laboratory Sample ID : 20112
Client Sample ID : D03505 IPSD-TTUF02A-062701
Remarks :

Date/Time Sample Collected : 6/27/2001 @ 9:50:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
						Grand Total:	419

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05331
Project No. : 01032
No. of Samples : 6
Date Received : 6/28/2001

Laboratory Sample ID : 20113
Client Sample ID : D03506 IPSD-TTUF02B-062701
Remarks :

Date/Time Sample Collected : 6/27/2001 @ 9:50:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Platyhelminthes	Turbellaria	Tricladida	Planariidae			*Hymanella retenuova*	1
Annelida	Oligochaeta	Tubificida	Naididae			*Chaetogaster diaphanus*	17
						Dero digitata	157
						Ophidonais serpentina	1
						Slavina appendiculata	94
						Stylaria lacustris	233
			Tubificidae			*Aulodrilus pigueti*	445
						Aulodrilus pluriseta	1
						Ilyodrilus templetoni	2
						Limnodrilus claparedianus	2
						Limnodrilus hoffmeisteri	111
Mollusca	Gastropoda	Mesogastropoda	Hydrobiidae			*Amnicola limosa*	1
			Valvatidae			*Valvata tricarinata*	4
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	34
						Sphaerium sp.	3
Arthropoda	Crustacea	Amphipoda	Talitridae			*Hyalella azteca*	2
	Insecta	Collembola	Isotomidae			*Isotomurus sp.*	11
		Diptera	Ceratopogonidae			*Sphaeromias sp.*	1
			Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	17

000108

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Reference: N0564-0322

Date	: 10/5/2001
BTR No.	: 05331
Project No.	: 01032
No. of Samples	: 6
Date Received	: 6/28/2001

Laboratory Sample ID	: 20113	Date/Time Sample Collected	: 6/27/2001 @ 9:50:0
Client Sample ID	: D03506 IPSD-TTUF02B-062701	Percent Sample Examined	: 100
Remarks	:	Sampling Depth (m)	: Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Cladopelma sp.*	7
						Cryptochironomus fulvus	1
				Orthocladiinae	Orthocladiini	*Cricotopus trifasciatus*	1
				Tanypodinae	Tanypodini	*Tanypus punctipennis*	1
						Sub-Total:	1147
						Grand Total:	1147

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05331
Project No. : 01032
No. of Samples : 6
Date Received : 6/28/2001

Laboratory Sample ID : 20114
Client Sample ID : D03507 IPSD-TTUF02C-062701
Remarks :

Date/Time Sample Collected : 6/27/2001 @ 9:50:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Naididae			*Chaetogaster diaphanus*	10
						Dero digitata	77
						Ophidonais serpentina	1
						Slavina appendiculata	24
						Stylaria lacustris	231
			Tubificidae			*Aulodrilus pigueti*	239
						Aulodrilus pluriseta	1
						Ilyodrilus templetoni	2
						Limnodrilus claparedianus	2
						Limnodrilus hoffmeisteri	94
Mollusca	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	11
Arthropoda	Crustacea	Amphipoda	Talitridae			*Hyalella azteca*	3
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	8
						Cladopelma sp.	5
						Cryptochironomus fulvus	1
						Einfeldia natchitocheae	1
						Polypedilum illinoense	1
						Polypedilum tritum	1
						Sub-Total:	712

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05331
Project No. : 01032
No. of Samples : 6
Date Received : 6/28/2001

Laboratory Sample ID : 20114
Client Sample ID : D03507 IPSD-TTUF02C-062701
Remarks :

Date/Time Sample Collected : 6/27/2001 @ 9:50:0
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
						Grand Total:	712

000111

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Reference: N0564-0322

Date	**: 10/5/2001**
BTR No.	**: 05331**
Project No.	**: 01032**
No. of Samples	**: 6**
Date Received	**: 6/28/2001**

Laboratory Sample ID	**: 20115**	**Date/Time Sample Collected**	**: 6/27/2001 @ 11:25:**
Client Sample ID	**: D03511 IPSD-TTUF03A-062701**	**Percent Sample Examined**	**: 100**
Remarks	**:**	**Sampling Depth (m)**	**: Not Reported**

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Naididae			*Dero digitata*	826
						Slavina appendiculata	47
						Stylaria lacustris	16
			Tubificidae			*Aulodrilus limnobius*	5
						Aulodrilus pigueti	412
						Aulodrilus pluriseta	40
						Ilyodrilus templetoni	2
						Limnodrilus hoffmeisteri	60
Mollusca	Gastropoda	Mesogastropoda	Hydrobiidae			*Amnicola limosa*	6
			Valvatidae			*Valvata tricarinata*	14
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Musculium sp.*	1
						Pisidium sp.	23
Arthropoda	Arachnoidea	Acariformes	Pionidae			*Piona sp.*	1
	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	7
						Cladopelma sp.	2
				Tanypodinae	Procladiini	*Procladius sp.*	1
					Tanypodini	*Tanypus punctipennis*	1
			Simuliidae			*Simulium sp.*	1
						Sub-Total:	1465

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05331
Project No. : 01032
No. of Samples : 6
Date Received : 6/28/2001

Laboratory Sample ID : 20115
Client Sample ID : D03511 IPSD-TTUF03A-062701
Remarks :

Date/Time Sample Collected : 6/27/2001 @ 11:25:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
						Grand Total:	1465

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05331
Project No. : 01032
No. of Samples : 6
Date Received : 6/28/2001

Laboratory Sample ID : 20116
Client Sample ID : D03512 IPSD-TTUF03B-062701
Remarks :

Date/Time Sample Collected : 6/27/2001 @ 11:25
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Annelida	Oligochaeta	Tubificida	Naididae			*Dero digitata*	737
						Slavina appendiculata	33
						Stylaria lacustris	26
			Tubificidae			*Aulodrilus limnobius*	13
						Aulodrilus pigueti	585
						Aulodrilus pluriseta	53
						Ilyodrilus templetoni	4
						Limnodrilus hoffmeisteri	81
						Limnodrilus udekemianus	1
Mollusca	Gastropoda	Mesogastropoda	Hydrobiidae			*Amnicola limosa*	4
			Valvatidae			*Valvata tricarinata*	17
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Musculium sp*	2
						Pisidium sp	26
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	6
						Cladopelma sp.	7
						Cryptochironomus fulvus	3
						Dicrotendipes modestus	2
						Polypedilum halterale	1
				Tanypodinae		*Psectrotanypus sp.*	1

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05331
Project No. : 01032
No. of Samples : 6
Date Received : 6/28/2001

Laboratory Sample ID : 20116
Client Sample ID : D03512 IPSD-TTUF03B-062701
Remarks :

Date/Time Sample Collected : 6/27/2001 @ 11:25:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Tanypodinae	Procladiini	*Procladius sp.*	4
		Trichoptera	Hydroptilidae	Hydroptilinae		*Oxyethira sp.*	1
						Sub-Total:	1607
						Grand Total:	1607

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05331
Project No. : 01032
No. of Samples : 6
Date Received : 6/28/2001

Laboratory Sample ID : 20117
Client Sample ID : D03513 IPSD-TTUF03C-062701
Remarks :

Date/Time Sample Collected : 6/27/2001 @ 11:25:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Platyhelminthes	Turbellaria	Tricladida	Planariidae			*Hymanella retenuova*	2
Nematoda		Dorylaimida				*Dorylaimus sp.*	2
elida	Oligochaeta	Tubificida	Enchytraeidae			*Lumbricillus sp.*	1
			Naididae			*Chaetogaster diaphanus*	1
						Dero digitata	937
						Nais variabilis	1
						Ophidonais serpentina	1
						Slavina appendiculata	53
						Stylaria lacustris	15
			Tubificidae			*Aulodrilus limnobius*	14
						Aulodrilus pigueti	620
						Aulodrilus pluriseta	48
						Ilyodrilus templetoni	5
						Limnodrilus hoffmeisteri	125
						Limnodrilus udekemianus	1
Mollusca	Gastropoda	Mesogastropoda	Hydrobiidae			*Amnicola limosa*	3
			Valvatidae			*Valvata tricarinata*	11
	Pelecypoda	Prionodesmacea	Sphaeriidae			*Pisidium sp.*	22
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	12

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Reference: N0564-0322

Date : 10/5/2001
BTR No. : 05331
Project No. : 01032
No. of Samples : 6
Date Received : 6/28/2001

Laboratory Sample ID : 20117
Client Sample ID : D03513 IPSD-TTUF03C-062701
Remarks :

Date/Time Sample Collected : 6/27/2001 @ 11:25:
Percent Sample Examined : 100
Sampling Depth (m) : Not Reported

Phylum	Class	Order	Family	Sub-Family	Tribe	Genus/Species/Variety	# Counted
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Cladopelma sp.*	3
						Cryptochironomus fulvus	1
						Parachironomus hirtalatus	1
					Tanytarsini	*Micropsectra sp.*	2
				Orthocladiinae	Orthocladiini	*Psectrocladius sp.*	3
				Tanypodinae	Procladiini	*Procladius sp.*	5
		Trichoptera	Hydroptilidae	Hydroptilinae		*Oxyethira sp.*	1
						Sub-Total:	**1890**
QA Repick:							
Annelida	Oligochaeta	Tubificida	Naididae			*Dero digitata*	5
						Slavina appendiculata	1
			Tubificidae			*Aulodrilus pigueti*	3
Arthropoda	Insecta	Diptera	Chironomidae	Chironominae	Chironomini	*Chironomus decorus*	1
						Sub-Total:	**10**
						Grand Total:	**1900**

Submitted By: ABS

000117

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APPENDIX E

APPENDIX E

E.1 COPC EXPOSURE CALCULATIONS BY RECEPTOR

E.2 ADDITIONAL FISH TISSUE COMPARISONS

E.3 TOXICITY REFERENCE VALUES

E.4 BASELINE ECOLOGICAL RISK ASSESSMENT SUPPLEMENTAL DATA - SURFACE WATER

E.5 BASELINE ECOLOGICAL RISK ASSESSMENT SUPPLEMENTAL DATA - SEDIMENT

APPENDIX E.1

COPC EXPOSURE CALCULATIONS BY RECEPTOR

Table E.1-1. Exposure Calculations for Muskrat - Station 01

	Mean Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 6	Reach 5																	
	Volatile Organics																				
	2-Butanone	0.0093125	0.0025			9.73	0	0	0	2.18192E-05	0.0002525	2.74E-04	0.00E+00	0.00E+00	2.24E-06	2.60E-05	*2.82E-05*	0	0	0.07953941	0.92046059
	Acetone	0.0325	0.0025			1367.05	0	0	0	7.61475E-05	0.0002525	3.29E-04	0.00E+00	0.00E+00	5.57E-08	1.85E-07	*2.40E-07*	0	0	0.23169962	0.76830038
	cis-1,2-Dichloroethene	0	0.0005			2504.11	0	0	0	0	0.0000505	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.02E-08	*2.02E-08*	0	0	0	1
	Tetrachloroethene	0.006875	0.0005			6.09	0	0	0	1.61081E-05	0.0000505	6.66E-05	0.00E+00	0.00E+00	2.64E-06	8.29E-06	*1.09E-05*	0	0	0.24183424	0.75816576
	Trichloroethene	0.006875	0.0005			3.05	0	0	0	1.61081E-05	0.0000505	6.66E-05	0.00E+00	0.00E+00	5.29E-06	1.66E-05	*2.19E-05*	0	0	0.24183424	0.75816576
	Semivolatile Organics																				
	2-Methylnaphthalene	0.226875	0.0025			62.53	0	0	0	0.000531568	0.0002525	7.84E-04	0.00E+00	0.00E+00	8.50E-06	4.04E-06	*1.25E-05*	0	0	0.67796166	0.32203834
	Acenaphthylene	0.226875	0.0025			58.00	0	0	0	0.000531568	0.0002525	7.84E-04	0.00E+00	0.00E+00	9.16E-06	4.35E-06	*1.35E-05*	0	0	0.67796166	0.32203834
	Anthracene	0.141875	0.0025			435.11	0	0	0	0.000332413	0.0002525	5.85E-04	0.00E+00	0.00E+00	7.64E-07	5.80E-07	*1.34E-06*	0	0	0.56831196	0.43168804
	Benzo(a)anthracene	0.238125	0.0025			0.57	0	0	0	0.000557927	0.0002525	8.10E-04	0.00E+00	0.00E+00	9.86E-04	4.46E-04	*1.43E-03*	0	0	0.6884358	0.3115642
	Benzo(a)pyrene	0.254625	0.0025		0.04	0.57	0	0.020326689	0.020326689	0.000596586	0.0002525	2.12E-02	0.00E+00	3.59E-02	1.05E-03	4.46E-04	*3.74E-02*	0	0.95990294	0.02817306	0.011924
	Benzo(b)fluoranthene	0.281625	0.0025		0.02	0.57	0	0.010782112	0.010782112	0.000659847	0.0002525	1.17E-02	0.00E+00	1.91E-02	1.17E-03	4.46E-04	*2.07E-02*	0	0.92198465	0.05642393	0.02159142
	Benzo(g,h,i)perylene	0.28875	0.0025			58.00	0	0	0	0.000676541	0.0002525	9.29E-04	0.00E+00	0.00E+00	1.17E-05	4.35E-06	*1.60E-05*	0	0	0.72821444	0.27178556
	Benzo(k)fluoranthene	0.254875	0.0025		0.05	0.57	0	0.025520585	0.025520585	0.000597172	0.0002525	2.64E-02	0.00E+00	4.51E-02	1.06E-03	4.46E-04	*4.66E-02*	0	0.96777915	0.02264567	0.00957518
	Carbazole	0.212375	0			58.00	0	0	0	0.000497595	0	4.98E-04	0.00E+00	0.00E+00	8.58E-06	0.00E+00	*8.58E-06*	0	0	1	0
	Chrysene	0.309375	0.0025		0.04	0.57	0	0.018156321	0.018156321	0.000724866	0.0002525	1.91E-02	0.00E+00	3.21E-02	1.28E-03	4.46E-04	*3.38E-02*	0	0.94891912	0.03788426	0.01319662
	Dibenz(a,h)anthracene	0.226875	0.0025			0.57	0	0	0	0.000531568	0.0002525	7.84E-04	0.00E+00	0.00E+00	9.40E-04	4.46E-04	*1.39E-03*	0	0	0.67796166	0.32203834
	Dibenzofuran	0.226875	0.0025			58.00	0	0	0	0.000531568	0.0002525	7.84E-04	0.00E+00	0.00E+00	9.16E-06	4.35E-06	*1.35E-05*	0	0	0.67796166	0.32203834
	Fluoranthene	0.413125	0.0025		0.02	54.39	0	0.009820316	0.009820316	0.000967952	0.0002525	1.10E-02	0.00E+00	1.81E-04	1.78E-05	4.64E-06	*2.03E-04*	0	0.88945951	0.0876707	0.02286979
	Fluorene	0.209875	0.0025			54.39	0	0	0	0.000491737	0.0002525	7.44E-04	0.00E+00	0.00E+00	9.04E-06	4.64E-06	*1.37E-05*	0	0	0.66072641	0.33927359
	Indeno(1,2,3-cd)pyrene	0.27375	0.0025		0.12	0.57	0	0.057989681	0.057989681	0.000641396	0.0002525	5.89E-02	0.00E+00	1.03E-01	1.13E-03	4.46E-04	*1.04E-01*	0	0.98481926	0.01089262	0.00428812
	Naphthalene	0.226875	0.0025			60.92	0	0	0	0.000531568	0.0002525	7.84E-04	0.00E+00	0.00E+00	8.73E-06	4.15E-06	*1.29E-05*	0	0	0.67796166	0.32203834
	N-nitrosodiphenylamine	0.226875	0.0025			120.62	0	0	0	0.000531568	0.0002525	7.84E-04	0.00E+00	0.00E+00	4.41E-06	2.09E-06	*6.50E-06*	0	0	0.67796166	0.32203834
	Phenanthrene	0.285625	0.0025		0.08	58.00	0	0.038679894	0.038679894	0.000669219	0.0002525	3.96E-02	0.00E+00	6.67E-04	1.15E-05	4.35E-06	*6.83E-04*	0	0.97672521	0.01689879	0.006376
	Pyrene	0.406875	0.0025		0.02	58.00	0	0.012543313	0.012543313	0.000953308	0.0002525	1.37E-02	0.00E+00	2.16E-04	1.64E-05	4.35E-06	*2.37E-04*	0	0.91229926	0.06933593	0.01836481
	Pesticides and PCBs																				
	4,4'-DDD	0.00536875	0.00005	0.0016	2.77E-04	6.84	4.776E-05	0.000139553	0.000187309	1.2579E-05	0.00000505	2.05E-04	6.99E-06	2.04E-05	1.84E-06	7.39E-07	*3.00E-05*	0.23302995	0.6809492	0.06137931	0.02464154
	4,4'-DDE	0.00536875	0.00005	0.0046	2.33E-04	0.83	0.0001373	0.000117294	0.000254595	1.2579E-05	0.00000505	2.72E-04	1.66E-04	1.42E-04	1.52E-05	6.11E-06	*3.29E-04*	0.50436662	0.43087433	0.04620817	0.01855089
	4,4'-DDT	0.00536875	0.00005	0.0007	8.62E-04	0.64	2.119E-05	0.000433852	0.000455044	1.2579E-05	0.00000505	4.73E-04	3.29E-05	6.74E-04	1.96E-05	7.85E-06	*7.35E-04*	0.04483458	0.91786904	0.02661246	0.01068393
	Aldrin	0.00275	0.000025	0.0004		0.16	1.089E-05	0	1.08945E-05	6.44325E-06	0.000002525	1.99E-05	6.77E-05	0.00E+00	4.01E-05	1.57E-05	*1.24E-04*	0.54848946	0	0.32438829	0.12712225
	alpha-Chlordane	0.00275	0.000025	0.0006	2.81E-04	1.99	1.91E-05	0.000141609	0.000160712	6.44325E-06	0.000002525	1.70E-04	9.59E-06	7.11E-05	3.23E-06	1.27E-06	*8.51E-05*	0.11258088	0.83456521	0.03797296	0.01488096
	Aroclor 1248	0.0536875	0.0005	0.0036		0.57	0.0001075	0	0.000107453	0.00012579	0.0000505	2.84E-04	1.90E-04	0.00E+00	2.22E-04	8.93E-05	*5.02E-04*	0.37869814	0	0.44332366	0.1779782
	Aroclor 1254	0.0536875	0.0005	0.0140		0.15	0.0004179	0	0.000417872	0.00012579	0.0000505	5.94E-04	2.85E-03	0.00E+00	8.59E-04	3.45E-04	*4.06E-03*	0.70329663	0	0.21170969	0.08499368
	Aroclor 1260	0.0536875	0.0005	0.0106	3.35E-03	0.28	0.0003149	0.001687081	0.002001978	0.00012579	0.0000505	2.18E-03	1.14E-03	6.08E-03	4.53E-04	1.82E-04	*7.85E-03*	0.14456278	0.77450601	0.05774765	0.02318356
	beta-BHC	0.00275	0.000025	0.0004		3.22	1.089E-05	0	1.08945E-05	6.44325E-06	0.000002525	1.99E-05	3.39E-06	0.00E+00	2.00E-06	7.85E-07	*6.18E-06*	0.54848946	0	0.32438829	0.12712225
	delta-BHC	0.00275	0.000025	0.0004		1.29	1.089E-05	0	1.08945E-05	6.44325E-06	0.000002525	1.99E-05	8.47E-06	0.00E+00	5.01E-06	1.96E-06	*1.54E-05*	0.54848946	0	0.32438829	0.12712225
	Endosulfan I	0.00275	0.000025	0.0005	4.53E-04	1.21	1.612E-05	0.000227694	0.000243812	6.44325E-06	0.000002525	2.53E-04	1.34E-05	1.89E-04	5.34E-06	2.09E-06	*2.10E-04*	0.06376254	0.90075903	0.02548952	0.00998891
	Endosulfan Sulfate	0.00536875	0.00005	0.0007		1.21	2.089E-05	0	2.08936E-05	1.2579E-05	0.00000505	3.85E-05	1.73E-05	0.00E+00	1.04E-05	4.19E-06	*3.19E-05*	0.54237279	0	0.32653526	0.13109194
	Endrin Aldehyde	0.00536875	0.00005	0.0018	1.65E-03	0.04	5.373E-05	0.000830159	0.000883885	1.2579E-05	0.00000505	9.02E-04	1.34E-03	2.07E-02	3.14E-04	1.26E-04	*2.25E-02*	0.05959573	0.92084941	0.01395317	0.00560169
	gamma-Chlordane	0.00275	0.000025	0.0004	2.64E-04	1.99	1.194E-05	0.000132814	0.000144753	6.44325E-06	0.000002525	1.54E-04	5.99E-06	6.66E-05	3.23E-06	1.27E-06	*7.71E-05*	0.07766781	0.86399123	0.04191513	0.01642583
	Inorganics																				
X	Aluminum	5328.75	0.205525	23.8500	8.87E+01	41.82	0.7118748	44.62836726	45.34024206	12.48526125	0.020758025	5.78E+01	1.70E-02	1.07E+00	2.99E-01	4.96E-04	*1.38E+00*	0.01230632	0.7714996	0.21583523	0.00035885
	Antimony	0.6106238	0.0006	0.0470		0.05	0.0014029	0	0.001402856	0.001430692	0.0000606	2.89E-03	2.58E-02	0.00E+00	2.63E-02	1.11E-03	*5.32E-02*	0.48472166	0	0.49433954	0.02093881
X	Arsenic	25.05	0.0035875	0.2400	1.32	0.05	0.0071635	0.664319898	0.671483418	0.029932997	0.000362338	7.02E-01	1.31E-01	1.21E+01	5.46E-01	6.61E-03	*1.28E+01*	0.01020766	0.94662299	0.04265304	0.00051631
	Barium	15.4	0.0376	2.0000	1.50	4.33	0.059696	0.755556935	0.815252935	0.0360822	0.0037976	8.55E-01	1.38E-02	1.74E-01	8.33E-03	8.77E-04	*1.97E-01*	0.06980905	0.88355515	0.04219485	0.00444095
	Beryllium	0.1689994	4.0625E-05	0.0060		0.53	0.0001791	0	0.000179088	0.000395966	4.10313E-06	5.79E-04	3.37E-04	0.00E+00	7.46E-04	7.73E-06	*1.09E-03*	0.309222	0	0.68369334	0.00708465
	Cadmium	4.7999375	4.9625E-05	0.0625	0.51	0.78	0.0018655	0.258717803	0.260583303	0.011246254	5.01213E-06	2.72E-01	2.41E-03	3.34E-01	1.45E-02	6.46E-06	*3.50E-01*	0.00686263	0.95174725	0.04137168	1.8438E-05
	Chromium	18.8375	0.0016675	0.2000	0.35	7.24	0.0059696	0.177122946	0.183092546	0.044136263	0.000168418	2.27E-01	8.25E-04	2.45E-02	6.10E-03	2.33E-05	*3.14E-02*	0.02625186	0.77891428	0.19409323	0.00074063
	Cobalt	7.7	0.0002575	0.2700	0.68	4.02	0.008059	0.34409959	0.35215855	0.0180411	2.60075E-05	3.70E-01	2.00E-03	8.56E-02	4.49E-03	6.47E-06	*9.21E-02*	0.0217677	0.92943205	0.04873001	7.0248E-05
	Copper	167.4	0.004375	40.5500	8.48	12.23	1.2103364	4.265915043	5.476251443	0.3922182	0.000441875	5.87E+00	9.89E-02	3.49E-01	3.21E-02	3.61E-05	*4.80E-01*	0.20622843	0.72686648	0.0668298	7.5291E-05
	Cyanide	0.31625	0.0025	0.1900		51.90	0.0056711	0	0.00567112	0.000740974	0.0002525	6.66E-03	1.09E-04	0.00E+00	1.43E-05	4.87E-06	*1.28E-04*	0.85093259	0	0.11118063	0.03788678
X	Iron	7327.5	0.65775	88.2500	606.57	2.57	2.634086	305.1963869	307.8304729	17.1683325	0.06643275	3.25E+02	1.03E+00	1.19E+02	6.69E+00	2.59E-02	*1.27E+02*	0.00810325	0.93887734	0.05281504	0.00020437
	Lead	62.1375	0.00343125	0.2125	5.67	6.43	0.0063427	2.851176278	2.857518978	0.145588163	0.000346556	3.00E+00	9.86E-04	4.43E-01	2.26E-02	5.39E-05	*4.67E-01*	0.0021118	0.94929923	0.04847358	0.00011539
	Manganese	105.7375	0.176575	79.1000	59.63	70.76	2.3609768	30.00110221	32.36207901	0.247742963	0.017834075	3.26E+01	3.34E-02	4.24E-01	3.50E-03	2.52E-04	*4.61E-01*	0.07236121	0.91949916	0.00759304	0.00054659
	Mercury	0.0884375	0.00006775	0.0080	0.00	0.03	0.0002388	0.001558742	0.001797526	0.000207209	6.84275E-06	2.01E-03	9.28E-03	6.06E-02	8.05E-03	2.66E-04	*7.82E-02*	0.11870481	0.7748853	0.10300821	0.00340168
	Nickel	8.1625	0.0013725	0.0415	0.21	32.17	0.0012387	0.106096943	0.107335635	0.019124738	0.000138623	1.27E-01	3.85E-05	3.30E-03	5.95E-04	4.31E-06	*3.94E-03*	0.00978437	0.83805518	0.15106548	0.00109497
	Selenium	0.3925	0.00075	0.5150	0.03	0.16	0.0153717	0.016969092	0.032340812	0.000919628	0.00007575	3.33E-02	9.56E-02	1.06E-01	5.72E-03	4.71E-04	*2.07E-01*	0.46111209	0.50902914	0.02758646	0.00227231
	Silver	0.221875	0.0003725	0.0635		145.71	0.0018953	0	0.001895348	0.000519853	3.76225E-05	2.45E-03	1.30E-05	0.00E+00	3.57E-06	2.58E-07	*1.68E-05*	0.77272087	0	0.21194069	0.01533844
	Thallium	0.6956238	0.00085	0.0650		0.06	0.0019401	0	0.00194012	0.001629847	0.00008585	3.66E-03	3.23E-02	0.00E+00	2.71E-02	1.43E-03	*6.08E-02*	0.53069402	0	0.44582285	0.02348313
X	Vanadium	11.975	0.00086375	0.0420	0.42	0.16	0.0012536	0.209652692	0.210906308	0.028057425	8.72388E-05	2.39E-01	8.00E-03	1.34E+00	1.79E-01	5.56E-04	*1.52E+00*	0.00524414	0.87702087	0.11737005	0.00036494
	Zinc	1010.2875	0.022325	18.3500	39.11	128.66	0.5477108	19.67862346	20.22633426	2.367103613	0.002254825	2.26E+01	4.26E-03	1.53E-01	1.84E-02	1.75E-05	*1.76E-01*	0.02423961	0.87090154	0.10475906	9.979E-05

Table E.1-2. Exposure Calculations for Muskrat - Station 02

	Mean Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 6	Reach 5																	
	Volatile Organics																				
	2-Butanone	0.007	0.0025			9.730183192	0	0	0	1.64E-05	0.0002525	2.69E-04	0.00E+00	0.00E+00	1.69E-06	2.60E-05	***2.76E-05***	0	0	0.06099271	0.93900729
	Acetone	0.0165	0.0025			1367.050531	0	0	0	3.866E-05	0.0002525	2.91E-04	0.00E+00	0.00E+00	2.83E-08	1.85E-07	***2.13E-07***	0	0	0.13277774	0.86722226
	cis-1,2-Dichloroethene	0.013	0.0005			2504.114914	0	0	0	3.046E-05	0.0000505	8.10E-05	0.00E+00	0.00E+00	1.22E-08	2.02E-08	***3.23E-08***	0	0	0.37622747	0.62377253
	Tetrachloroethene	0.014125	0.0005			6.09153838	0	0	0	3.309E-05	0.0000505	8.36E-05	0.00E+00	0.00E+00	5.43E-06	8.29E-06	***1.37E-05***	0	0	0.39589598	0.60410402
	Trichloroethene	0.00775	0.0005			3.04576919	0	0	0	1.816E-05	0.0000505	6.87E-05	0.00E+00	0.00E+00	5.96E-06	1.66E-05	***2.25E-05***	0	0	0.26447295	0.73552705
	Semivolatile Organics																				
	2-Methylnaphthalene	0.15675	0.0025			62.53	0	0	0	0.0003673	0.0002525	6.20E-04	0.00E+00	0.00E+00	5.87E-06	4.04E-06	***9.91E-06***	0	0	0.59258768	0.40741232
	Acenaphthylene	0.15925	0.0025			58.00	0	0	0	0.0003731	0.0002525	6.26E-04	0.00E+00	0.00E+00	6.43E-06	4.35E-06	***1.08E-05***	0	0	0.59640214	0.40359786
	Anthracene	0.13675	0.0025			435.11	0	0	0	0.0003204	0.0002525	5.73E-04	0.00E+00	0.00E+00	7.36E-07	5.80E-07	***1.32E-06***	0	0	0.55926394	0.44073606
	Benzo(a)anthracene	0.292	0.0025			0.57	0	0	0	0.0006842	0.0002525	9.37E-04	0.00E+00	0.00E+00	1.21E-03	4.46E-04	***1.66E-03***	0	0	0.73042398	0.26957602
	Benzo(a)pyrene	0.305	0.0025		0.05	0.57	0	0.02434812	0.02434812	0.0007146	0.0002525	2.53E-02	0.00E+00	4.30E-02	1.26E-03	4.46E-04	***4.48E-02***	0	0.96179712	0.02822865	0.00997423
	Benzo(b)fluoranthene	0.3275	0.0025		0.02	0.57	0	0.012538453	0.012538453	0.0007673	0.0002525	1.36E-02	0.00E+00	2.22E-02	1.36E-03	4.46E-04	***2.40E-02***	0	0.9247816	0.0565951	0.0186233
	Benzo(g,h,i)perylene	0.22375	0.0025			58.00	0	0	0	0.0005242	0.0002525	7.77E-04	0.00E+00	0.00E+00	9.04E-06	4.35E-06	***1.34E-05***	0	0	0.67492601	0.32507399
	Benzo(k)fluoranthene	0.2275	0.0025		0.05	0.57	0	0.022779532	0.022779532	0.000533	0.0002525	2.36E-02	0.00E+00	4.03E-02	9.42E-04	4.46E-04	***4.17E-02***	0	0.96666538	0.02261961	0.01071501
	Carbazole	0.205	0			58.00014758	0	0	0	0.0004803	0	4.80E-04	0.00E+00	0.00E+00	8.28E-06	0.00E+00	***8.28E-06***	0	0	1	0
	Chrysene	0.33625	0.0025		0.04	0.57	0	0.019733537	0.019733537	0.0007878	0.0002525	2.08E-02	0.00E+00	3.49E-02	1.39E-03	4.46E-04	***3.67E-02***	0	0.94992105	0.03792426	0.01215469
	Dibenz(a,h)anthracene	0.171	0.0025			0.57	0	0	0	0.0004007	0.0002525	6.53E-04	0.00E+00	0.00E+00	7.08E-04	4.46E-04	***1.15E-03***	0	0	0.6134137	0.3865863
	Dibenzofuran	0.205	0.0025			58.00	0	0	0	0.0004803	0.0002525	7.33E-04	0.00E+00	0.00E+00	8.28E-06	4.35E-06	***1.26E-05***	0	0	0.65543828	0.34456172
	Fluoranthene	0.48125	0.0025		0.02	54.39	0	0.011439702	0.011439702	0.0011276	0.0002525	1.28E-02	0.00E+00	2.10E-04	2.07E-05	4.64E-06	***2.36E-04***	0	0.89234841	0.08795545	0.01969614
	Fluorene	0.16475	0.0025			54.39	0	0	0	0.000386	0.0002525	6.39E-04	0.00E+00	0.00E+00	7.10E-06	4.64E-06	***1.17E-05***	0	0	0.60454762	0.39545238
	Indeno(1,2,3-cd)pyrene	0.240125	0.0025		0.10	0.57	0	0.050866747	0.050866747	0.0005626	0.0002525	5.17E-02	0.00E+00	8.99E-02	9.95E-04	4.46E-04	***9.14E-02***	0	0.98422826	0.01088608	0.00488566
	Naphthalene	0.157	0.0025			60.92	0	0	0	0.0003679	0.0002525	6.20E-04	0.00E+00	0.00E+00	6.04E-06	4.15E-06	***1.02E-05***	0	0	0.59297237	0.40702763
	N-nitrosodiphenylamine	0.205	0.0025			120.62	0	0	0	0.0004803	0.0002525	7.33E-04	0.00E+00	0.00E+00	3.98E-06	2.09E-06	***6.08E-06***	0	0	0.65543828	0.34456172
	Phenanthrene	0.2525	0.0025		0.07	58.00	0	0.034194042	0.034194042	0.0005916	0.0002525	3.50E-02	0.00E+00	5.90E-04	1.02E-05	4.35E-06	***6.04E-04***	0	0.9759089	0.01688467	0.00720643
	Pyrene	0.4825	0.0025		0.03	58.00	0	0.014874713	0.014874713	0.0011305	0.0002525	1.63E-02	0.00E+00	2.56E-04	1.95E-05	4.35E-06	***2.80E-04***	0	0.91493282	0.06953608	0.01553109
	Pesticides and PCBs																				
	4,4'-DDD	0.0069938	0.00005	0.0016	3.61E-04	6.84	4.776E-05	0.000181792	0.000229549	1.639E-05	0.00000505	2.51E-04	6.99E-06	2.66E-05	2.40E-06	7.39E-07	***3.67E-05***	0.19027728	0.72431391	0.06528811	0.0201207
	4,4'-DDE	0.0101125	0.00005	0.0046	4.39E-04	0.83	0.0001373	0.000220934	0.000358235	2.369E-05	0.00000505	3.87E-04	1.66E-04	2.67E-04	2.87E-05	6.11E-06	***4.68E-04***	0.35480218	0.57092085	0.06122715	0.01304982
	4,4'-DDT	0.0019875	0.00005	0.0007	3.19E-04	0.64	2.119E-05	0.000160611	0.000181803	4.657E-06	0.00000505	1.92E-04	3.29E-05	2.50E-04	7.24E-06	7.85E-06	***2.98E-04***	0.11065797	0.83865682	0.0243158	0.02636941
	Aldrin	0.0008075	0.000025	0.0004		0.16	1.089E-05	0	1.08945E-05	1.892E-06	0.000002525	1.53E-05	6.77E-05	0.00E+00	1.18E-05	1.57E-05	***9.52E-05***	0.71152567	0	0.12356552	0.16490881
	alpha-Chlordane	0.0035375	0.000025	0.0006	3.62E-04	1.99	1.91E-05	0.000182161	0.000201263	8.288E-06	0.000002525	2.12E-04	9.59E-06	9.14E-05	4.16E-06	1.27E-06	***1.06E-04***	0.09007456	0.85893747	0.0390819	0.01190607
	Aroclor 1248	0.055375	0.0005	0.0036		0.57	0.0001075	0	0.000107453	0.0001297	0.0000505	2.88E-04	1.90E-04	0.00E+00	2.29E-04	8.93E-05	***5.09E-04***	0.37349369	0	0.45097406	0.17553225
	Aroclor 1254	0.015775	0.0005	0.0140		0.15	0.0004179	0	0.000417872	3.696E-05	0.0000505	5.05E-04	2.85E-03	0.00E+00	2.53E-04	3.45E-04	***3.45E-03***	0.82692431	0	0.07314155	0.09993414
	Aroclor 1260	0.050375	0.0005	0.0106	3.15E-03	0.28	0.0003149	0.001582989	0.001897885	0.000118	0.0000505	2.07E-03	1.14E-03	5.71E-03	4.25E-04	1.82E-04	***7.45E-03***	0.15238786	0.76605605	0.05711761	0.02443847
	beta-BHC	0.0008075	0.000025	0.0004		3.22	1.089E-05	0	1.08945E-05	1.892E-06	0.000002525	1.53E-05	3.39E-06	0.00E+00	5.88E-07	7.85E-07	***4.76E-06***	0.71152567	0	0.12356552	0.16490881
	delta-BHC	0.0011125	0.000025	0.0004		1.29	1.089E-05	0	1.08945E-05	2.607E-06	0.000002525	1.60E-05	8.47E-06	0.00E+00	2.03E-06	1.96E-06	***1.25E-05***	0.67979826	0	0.16264633	0.15755541
	Endosulfan I	0.0008075	0.000025	0.0005	1.33E-04	1.21	1.612E-05	6.68593E-05	8.29772E-05	1.892E-06	0.000002525	8.74E-05	1.34E-05	5.54E-05	1.57E-06	2.09E-06	***7.25E-05***	0.18442781	0.76503139	0.02164872	0.02889208
	Endosulfan Sulfate	0.001655	0.00005	0.0007		1.21	2.089E-05	0	2.08936E-05	3.878E-06	0.00000505	2.98E-05	1.73E-05	0.00E+00	3.21E-06	4.19E-06	***2.47E-05***	0.70062756	0	0.1300302	0.16934225
	Endrin Aldehyde	0.0019375	0.00005	0.0018	5.95E-04	0.04	5.373E-05	0.000299592	0.000353318	4.54E-06	0.00000505	3.63E-04	1.34E-03	7.48E-03	1.13E-04	1.26E-04	***9.07E-03***	0.14804429	0.82553146	0.01250887	0.01391539
	gamma-Chlordane	0.0027875	0.000025	0.0004	2.68E-04	1.99	1.194E-05	0.000134625	0.000146564	6.531E-06	0.000002525	1.56E-04	5.99E-06	6.76E-05	3.28E-06	1.27E-06	***7.81E-05***	0.07672007	0.86508628	0.04196826	0.01622539
	Inorganics																				
X	Aluminum	5177.5	0.205525	23.8500	8.62E+01	41.82	0.7118748	43.36164607	44.07352087	12.130883	0.020758025	5.62E+01	1.70E-02	1.04E+00	2.90E-01	4.96E-04	***1.34E+00***	0.01266114	0.77121426	0.21575541	0.00036919
	Antimony	0.77875	0.0006	0.0470		0.05	0.0014029	0	0.001402856	0.0018246	0.0000606	3.29E-03	2.58E-02	0.00E+00	3.35E-02	1.11E-03	***6.05E-02***	0.42665064	0	0.55491908	0.01843028
X	Arsenic	19.1375	0.0035875	0.2400	1.01	0.05	0.0071635	0.507521838	0.514685358	0.022868	0.000362338	5.38E-01	1.31E-01	9.26E+00	4.17E-01	6.61E-03	***9.81E+00***	0.01331718	0.94349703	0.04251219	0.0006736
	Barium	31	0.0376	2.0000	3.02	4.33	0.059696	1.520926298	1.580622298	0.072633	0.0037976	1.66E+00	1.38E-02	3.51E-01	1.68E-02	8.77E-04	***3.83E-01***	0.0360254	0.91785018	0.04383264	0.00229178
	Beryllium	0.157125	4.063E-05	0.0060		0.53	0.0001791	0	0.000179088	0.0003681	4.10313E-06	5.51E-04	3.37E-04	0.00E+00	6.94E-04	7.73E-06	***1.04E-03***	0.3248261	0	0.66773173	0.00744216
	Cadmium	1.141875	4.963E-05	0.0625	0.12	0.78	0.0018655	0.061547341	0.063412841	0.0026754	5.01213E-06	6.61E-02	2.41E-03	7.93E-02	3.45E-03	6.46E-06	***8.52E-02***	0.02822527	0.93121954	0.04047936	7.5834E-05
	Chromium	37.1875	0.0016675	0.2000	0.69	7.24	0.0059696	0.349662086	0.355631686	0.0871303	0.000168418	4.43E-01	8.25E-04	4.83E-02	1.20E-02	2.33E-05	***6.12E-02***	0.01347751	0.78942893	0.19671332	0.00038023
	Cobalt	8.375	0.0002575	0.2700	0.74	4.02	0.008059	0.374264165	0.382323125	0.0196226	2.60075E-05	4.02E-01	2.00E-03	9.31E-02	4.88E-03	6.47E-06	***1.00E-01***	0.02004857	0.9310708	0.04881593	6.47E-05
	Copper	44.9375	0.004375	40.5500	2.28	12.23	1.2103364	1.145158645	2.355495045	0.1052886	0.000441875	2.46E+00	9.89E-02	9.36E-02	8.61E-03	3.61E-05	***2.01E-01***	0.49176169	0.46527986	0.04277892	0.00017953
	Cyanide	0.3116667	0.0025	0.1900		51.90	0.0056711	0	0.00567112	0.0007302	0.0002525	6.65E-03	1.09E-04	0.00E+00	1.41E-05	4.87E-06	***1.28E-04***	0.85230591	0	0.10974617	0.03794793
X	Iron	9841.25	0.65775	88.2500	814.66	2.57	2.634086	409.8961368	412.5302228	23.058049	0.06643275	4.36E+02	1.03E+00	1.60E+02	8.99E+00	2.59E-02	***1.70E+02***	0.00604627	0.94087389	0.05292735	0.00015249
X	Lead	152.975	0.0034313	0.2125	13.95	6.43	0.0063427	7.019250711	7.025593411	0.3584204	0.000346556	7.38E+00	9.86E-04	1.09E+00	5.57E-02	5.39E-05	***1.15E+00***	0.00085894	0.95055636	0.04853778	4.6931E-05
	Manganese	121.225	0.176575	79.1000	68.36	70.76	2.3609768	34.39540007	36.75637687	0.2840302	0.017834075	3.71E+01	3.34E-02	4.86E-01	4.01E-03	2.52E-04	***5.24E-01***	0.0637099	0.92814443	0.00766443	0.00048124
	Mercury	0.11475	6.775E-05	0.0080	0.00	0.03	0.0002388	0.002022509	0.002261293	0.0002689	6.84275E-06	2.54E-03	9.28E-03	7.86E-02	1.04E-02	2.66E-04	***9.86E-02***	0.09412078	0.79720658	0.10597546	0.00269719
	Nickel	10.7375	0.0013725	0.0415	0.28	32.17	0.0012387	0.139567036	0.140805728	0.025158	0.000138623	1.66E-01	3.85E-05	4.34E-03	7.82E-04	4.31E-06	***5.16E-03***	0.0074574	0.8402474	0.15146064	0.00083456
	Selenium	0.60375	0.00075	0.5150	0.05	0.16	0.0153717	0.026102138	0.041473858	0.0014146	0.00007575	4.30E-02	9.56E-02	1.62E-01	8.80E-03	4.71E-04	***2.67E-01***	0.35777978	0.60753235	0.03292477	0.0017631
	Silver	0.20125	0.0003725	0.0635		145.71	0.0018953	0	0.001895348	0.0004715	3.76225E-05	2.40E-03	1.30E-05	0.00E+00	3.24E-06	2.58E-07	***1.65E-05***	0.78825061	0	0.19610268	0.01564671
TRV	Thallium	0.4862488	0.00085	0.0650		0.06	0.0019401	0	0.00194012	0.0011393	0.00008585	3.17E-03	3.23E-02	0.00E+00	1.89E-02	1.43E-03	***5.26E-02***	0.6129435	0	0.35993384	0.02712265
X	Vanadium	18.425	0.0008638	0.0420	0.64	0.16	0.0012536	0.322576272	0.323829888	0.0431698	8.72388E-05	3.67E-01	8.00E-03	2.06E+00	2.75E-01	5.56E-04	***2.34E+00***	0.00341504	0.87874634	0.11760097	0.00023765
	Zinc	341.55	0.022325	18.3500	13.22	128.66	0.5477108	6.652793231	7.200504031	0.8002517	0.002254825	8.00E+00	4.26E-03	5.17E-02	6.22E-03	1.75E-05	***6.22E-02***	0.0684381	0.83128633	0.09999383	0.00028175

Table E.1-3. Exposure Calculations for Muskrat - Station 03

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 6	Reach 5																	
	Volatile Organics																				
	2-Butanone	0.0273333	0.0025			9.730183192	0	0	0	6.404E-05	0.0002525	3.17E-04	0.00E+00	0.00E+00	6.58E-06	2.60E-05	*3.25E-05*	0	0	0.20231754	0.79768246
	Acetone	0.0586667	0.0025			1367.050531	0	0	0	0.0001375	0.0002525	3.90E-04	0.00E+00	0.00E+00	1.01E-07	1.85E-07	*2.85E-07*	0	0	0.35249105	0.64750895
	cis-1,2-Dichloroethene	0.028	0.0005			2504.114914	0	0	0	6.56E-05	0.0000505	1.16E-04	0.00E+00	0.00E+00	2.62E-08	2.02E-08	*4.64E-08*	0	0	0.56504513	0.43495487
	Tetrachloroethene	0.0225	0.0005			6.09153838	0	0	0	5.272E-05	0.0000505	1.03E-04	0.00E+00	0.00E+00	8.65E-06	8.29E-06	*1.69E-05*	0	0	0.51074188	0.48925812
	Trichloroethene	0.0115	0.0005			3.04576919	0	0	0	2.694E-05	0.0000505	7.74E-05	0.00E+00	0.00E+00	8.85E-06	1.66E-05	*2.54E-05*	0	0	0.34792012	0.65207988
	Semivolatile Organics																				
	2-Methylnaphthalene	0.20275	0.0025			62.53	0	0	0	0.000475	0.0002525	7.28E-04	0.00E+00	0.00E+00	7.60E-06	4.04E-06	*1.16E-05*	0	0	0.65294159	0.34705841
	Acenaphthylene	0.2085	0.0025			58.00				0.0004885		4.89E-04	0.00E+00	0.00E+00	8.42E-06	0.00E+00	*8.42E-06*	0	0	1	0
	Anthracene	0.149	0.0025			435.11	0	0	0	0.0003491	0.0002525	6.02E-04	0.00E+00	0.00E+00	8.02E-07	5.80E-07	*1.38E-06*	0	0	0.58029079	0.41970921
	Benzo(a)anthracene	0.50375	0.0025			0.57	0	0	0	0.0011803	0.0002525	1.43E-03	0.00E+00	0.00E+00	2.09E-03	4.46E-04	*2.53E-03*	0	0	0.82376994	0.17623006
	Benzo(a)pyrene	0.45375	0.0025		0.07	0.57	0	0.036222818	0.036222818	0.0010631	0.0002525	3.75E-02	0.00E+00	6.40E-02	1.88E-03	4.46E-04	*6.64E-02*	0	0.96495231	0.02832126	0.00672644
	Benzo(b)fluoranthene	0.54875	0.0025		0.04	0.57	0	0.021009087	0.021009087	0.0012857	0.0002525	2.25E-02	0.00E+00	3.71E-02	2.27E-03	4.46E-04	*3.99E-02*	0	0.93177805	0.05702327	0.01119868
	Benzo(g,h,i)perylene	0.32875	0.0025			58.00	0	0	0	0.0007703	0.0002525	1.02E-03	0.00E+00	0.00E+00	1.33E-05	4.35E-06	*1.76E-05*	0	0	0.75311931	0.24688069
	Benzo(k)fluoranthene	0.35875	0.0025		0.07	0.57	0	0.035921569	0.035921569	0.0008406	0.0002525	3.70E-02	0.00E+00	6.35E-02	1.49E-03	4.46E-04	*6.54E-02*	0	0.97046974	0.02270863	0.00682163
	Carbazole	0.265	0			58.00014758	0	0	0	0.0006209	0	6.21E-04	0.00E+00	0.00E+00	1.07E-05	0.00E+00	*1.07E-05*	0	0	1	0
	Chrysene	0.57125	0.0025		0.07	0.57	0	0.033525006	0.033525006	0.0013384	0.0002525	3.51E-02	0.00E+00	5.93E-02	2.37E-03	4.46E-04	*6.21E-02*	0	0.95469469	0.03811484	0.00719047
	Dibenz(a,h)anthracene	0.22625	0.0025			0.57	0	0	0	0.0005301	0.0002525	7.83E-04	0.00E+00	0.00E+00	9.37E-04	4.46E-04	*1.38E-03*	0	0	0.67735907	0.32264093
	Dibenzofuran	0.265	0.0025			58.00	0	0	0	0.0006209	0.0002525	8.73E-04	0.00E+00	0.00E+00	1.07E-05	4.35E-06	*1.51E-05*	0	0	0.71089828	0.28910172
	Fluoranthene	0.93375	0.0025		0.04	54.39	0	0.022195994	0.022195994	0.0021878	0.0002525	2.46E-02	0.00E+00	4.08E-04	4.02E-05	4.64E-06	*4.53E-04*	0	0.90094782	0.08880306	0.01024912
	Fluorene	0.23625	0.0025			54.39	0	0	0	0.0005535	0.0002525	8.06E-04	0.00E+00	0.00E+00	1.02E-05	4.64E-06	*1.48E-05*	0	0	0.68673768	0.31326232
	Indeno(1,2,3-cd)pyrene	0.33625	0.0025		0.14	0.57	0	0.071229334	0.071229334	0.0007878	0.0002525	7.23E-02	0.00E+00	1.26E-01	1.39E-03	4.46E-04	*1.28E-01*	0	0.98560484	0.01090131	0.00349386
	Naphthalene	0.20325	0.0025			60.92	0	0	0	0.0004762	0.0002525	7.29E-04	0.00E+00	0.00E+00	7.82E-06	4.15E-06	*1.20E-05*	0	0	0.65349953	0.34650047
	N-nitrosodiphenylamine	0.265	0.0025			120.62	0	0	0	0.0006209	0.0002525	8.73E-04	0.00E+00	0.00E+00	5.15E-06	2.09E-06	*7.24E-06*	0	0	0.71089828	0.28910172
	Phenanthrene	0.44125	0.0025		0.12	58.00	0	0.059754935	0.059754935	0.0010338	0.0002525	6.10E-02	0.00E+00	1.03E-03	1.78E-05	4.35E-06	*1.05E-03*	0	0.97892658	0.01693688	0.00413654
	Pyrene	0.96875	0.0025		0.06	58.00	0	0.029865032	0.029865032	0.0022698	0.0002525	3.24E-02	0.00E+00	5.15E-04	3.91E-05	4.35E-06	*5.58E-04*	0	0.92212132	0.07008242	0.00779626
	Pesticides and PCBs																				
	4,4'-DDD	0.0297375	0.00005	0.0016	1.54E-03	6.84	4.776E-05	0.000772982	0.000820739	6.967E-05	0.00000505	8.95E-04	6.99E-06	1.13E-04	1.02E-05	7.39E-07	*1.31E-04*	0.05333191	0.86321977	0.07780879	0.00563953
	4,4'-DDE	0.0127375	0.00005	0.0046	5.53E-04	0.83	0.0001373	0.000278284	0.000415585	2.984E-05	0.00000505	4.50E-04	1.66E-04	3.37E-04	3.61E-05	6.11E-06	*5.45E-04*	0.30478856	0.61775172	0.06624942	0.01121029
	4,4'-DDT	0.0034375	0.00005	0.0007	5.52E-04	0.64	2.119E-05	0.000277786	0.000298978	8.054E-06	0.00000505	3.12E-04	3.29E-05	4.32E-04	1.25E-05	7.85E-06	*4.85E-04*	0.0679054	0.89010549	0.02580749	0.01618162
	Aldrin	0.001225	0.000025	0.0004		0.16	1.089E-05	0	1.08945E-05	2.87E-06	0.000002525	1.63E-05	6.77E-05	0.00E+00	1.78E-05	1.57E-05	*1.01E-04*	0.66879828	0	0.17619575	0.15500597
	alpha-Chlordane	0.0045625	0.000025	0.0006	4.67E-04	1.99	1.91E-05	0.000234942	0.000254045	1.069E-05	0.000002525	2.67E-04	9.59E-06	1.18E-04	5.36E-06	1.27E-06	*1.34E-04*	0.0714762	0.87907777	0.03999829	0.00944773
	Aroclor 1248	0.059875	0.0005	0.0036		0.57	0.0001075	0	0.000107453	0.0001403	0.0000505	2.98E-04	1.90E-04	0.00E+00	2.48E-04	8.93E-05	*5.27E-04*	0.36028979	0	0.47038345	0.16932676
	Aroclor 1254	0.020275	0.0005	0.0140		0.15	0.0004179	0	0.000417872	4.75E-05	0.0000505	5.16E-04	2.85E-03	0.00E+00	3.25E-04	3.45E-04	*3.52E-03*	0.8100236	0	0.09208472	0.09789168
	Aroclor 1260	0.047375	0.0005	0.0106	2.96E-03	0.28	0.0003149	0.001488717	0.001803613	0.000111	0.0000505	1.97E-03	1.14E-03	5.37E-03	4.00E-04	1.82E-04	*7.08E-03*	0.16024344	0.75757317	0.05648512	0.02569827
	beta-BHC	0.001225	0.000025	0.0004		3.22	1.089E-05	0	1.08945E-05	2.87E-06	0.000002525	1.63E-05	3.39E-06	0.00E+00	8.92E-07	7.85E-07	*5.06E-06*	0.66879828	0	0.17619575	0.15500597
	delta-BHC	0.0016	0.000025	0.0004		1.29	1.089E-05	0	1.08945E-05	3.749E-06	0.000002525	1.72E-05	8.47E-06	0.00E+00	2.91E-06	1.96E-06	*1.33E-05*	0.63457112	0	0.21835567	0.14707321
	Endosulfan I	0.001225	0.000025	0.0005	2.02E-04	1.21	1.612E-05	0.000101427	0.000117545	2.87E-06	0.000002525	1.23E-04	1.34E-05	8.41E-05	2.38E-06	2.09E-06	*1.02E-04*	0.1311034	0.82501217	0.02334605	0.02053839
	Endosulfan Sulfate	0.0023875	0.00005	0.0007		1.21	2.089E-05	0	2.08936E-05	5.594E-06	0.00000505	3.15E-05	1.73E-05	0.00E+00	4.64E-06	4.19E-06	*2.61E-05*	0.66249994	0	0.17737329	0.16012677
	Endrin Aldehyde	0.0035625	0.00005	0.0018	1.09E-03	0.04	5.373E-05	0.000550862	0.000604588	8.347E-06	0.00000505	6.18E-04	1.34E-03	1.38E-02	2.09E-04	1.26E-04	*1.54E-02*	0.08693798	0.89138362	0.01350669	0.00817171
	gamma-Chlordane	0.00335	0.000025	0.0004	3.22E-04	1.99	1.194E-05	0.000161791	0.000173731	7.849E-06	0.000002525	1.84E-04	5.99E-06	8.12E-05	3.94E-06	1.27E-06	*9.24E-05*	0.06485005	0.87880131	0.04263362	0.01371502
	Inorganics																				
X	Aluminum	4760	0.205525	23.8500	7.92E+01	41.82	0.7118748	39.86507683	40.57695163	11.15268	0.020758025	5.18E+01	1.70E-02	9.53E-01	2.67E-01	4.96E-04	*1.24E+00*	0.01375593	0.77033385	0.2155091	0.00040112
	Antimony	0.92125	0.0006	0.0470		0.05	0.0014029	0	0.001402856	0.0021585	0.0000606	3.62E-03	2.58E-02	0.00E+00	3.97E-02	1.11E-03	*6.66E-02*	0.3873212	0	0.59594745	0.01673134
X	Arsenic	34.65	0.0035875	0.2400	1.83	0.05	0.0071635	0.91890956	0.92607308	0.0414043	0.000362338	9.68E-01	1.31E-01	1.68E+01	7.55E-01	6.61E-03	*1.77E+01*	0.00740156	0.94944392	0.04278015	0.00037438
	Barium	34.2	0.0376	2.0000	3.33	4.33	0.059696	1.677925142	1.737621142	0.0801306	0.0037976	1.82E+00	1.38E-02	3.87E-01	1.85E-02	8.77E-04	*4.21E-01*	0.0327721	0.92115273	0.04399035	0.00208482
	Beryllium	0.28625	4.0625E-05	0.0060		0.53	0.0001791	0	0.000179088	0.0006707	4.10313E-06	8.54E-04	3.37E-04	0.00E+00	1.26E-03	7.73E-06	*1.61E-03*	0.20973565	0	0.78545905	0.0048053
	Cadmium	2.134125	4.9625E-05	0.0625	0.23	0.78	0.0018655	0.115029859	0.116895359	0.0050003	5.01213E-06	1.22E-01	2.41E-03	1.48E-01	6.45E-03	6.46E-06	*1.57E-01*	0.01530345	0.94363633	0.04101911	4.1116E-05
	Chromium	74.8	0.0016675	0.2000	1.40	7.24	0.0059696	0.70332031	0.70928991	0.1752564	0.000168418	8.85E-01	8.25E-04	9.72E-02	2.42E-02	2.33E-05	*1.22E-01*	0.00674749	0.79496847	0.19809368	0.00019036
	Cobalt	11.35	0.0002575	0.2700	1.01	4.02	0.008059	0.507211734	0.515270694	0.0265931	2.60075E-05	5.42E-01	2.00E-03	1.26E-01	6.61E-03	6.47E-06	*1.35E-01*	0.01487196	0 9360054	0.04907465	4.7994E-05
	Copper	75.475	0.004375	40.5500	3.82	12.23	1.2103364	1.923356857	3.133693257	0.1768379	0.000441875	3.31E+00	9.89E-02	1.57E-01	1.45E-02	3.61E-05	*2.71E-01*	0.36555308	0.58090381	0.05340965	0.00013346
	Cyanide	0.4616667	0.0025	0.1900		51.90	0.0056711	0	0.00567112	0.0010817	0.0002525	7.01E-03	1.09E-04	0.00E+00	2.08E-05	4.87E-06	*1.35E-04*	0.80954647	0	0.15440942	0.03604411
X	Iron	11005	0.65775	88.2500	910.99	2.57	2.634086	458.3672792	461.0013652	25.784715	0.06643275	4.87E+02	1.03E+00	1.79E+02	1.01E+01	2.59E-02	*1.90E+02*	0.00541044	0.94149104	0.05296207	0.00013645
	Lead	125.225	0.00343125	0.2125	11.42	6.43	0.0063427	5.745943261	5.752285961	0.2934022	0.000346556	6.05E+00	9.86E-04	8.93E-01	4.56E-02	5.39E-05	*9.40E-01*	0.00104907	0.95036558	0.04852803	5.732E-05
	Manganese	234.175	0.176575	79.1000	132.05	70.76	2.3609768	66.44291864	68.80389544	0.548672	0.017834075	6.94E+01	3.34E-02	9.39E-01	7.75E-03	2.52E-04	*9.80E-01*	0.03403435	0.95779925	0.00790931	0.00025708
	Mercury	0.2625	0.00006775	0.0080	0.01	0.03	0.0002388	0.004626656	0.00486544	0.000615	6.84275E-06	5.49E-03	9.28E-03	1.80E-01	2.39E-02	2.66E-04	*2.13E-01*	0.0435156	0.84315399	0.11208341	0.00124701
	Nickel	12.275	0.0013725	0.0415	0.32	32.17	0.0012387	0.159551605	0.160790297	0.0287603	0.000138623	1.90E-01	3.85E-05	4.96E-03	8.94E-04	4.31E-06	*5.90E-03*	0.00653011	0.84112099	0.15161811	0.00073079
	Selenium	1.43875	0.00075	0.5150	0.12	0.16	0.0153717	0.06220199	0.07757371	0.003371	0.00007575	8.10E-02	9.56E-02	3.87E-01	2.10E-02	4.71E-04	*5.04E-01*	0.18972642	0.76773196	0.04160667	0.00093495
	Silver	0.31375	0.0003725	0.0635		145.71	0.0018953	0	0.001895348	0.0007351	3.76225E-05	2.67E-03	1.30E-05	0.00E+00	5.05E-06	2.58E-07	*1.83E-05*	0.7103772	0	0.27552187	0.01410093
	Thallium	0.37875	0.00085	0.0650		0.06	0.0019401	0	0.00194012	0.0008874	0.00008585	2.91E-03	3.23E-02	0.00E+00	1.48E-02	1.43E-03	*4.84E-02*	0.66593413	0	0.30459839	0.02946748
X	Vanadium	21.65	0.00086375	0.0420	0.75	0.16	0.0012536	0.379038062	0.380291678	0.050726	8.72388E-05	4.31E-01	8.00E-03	2.42E+00	3.24E-01	5.56E-04	*2.75E+00*	0.00290791	0.87922473	0.11766499	0.00020236
	Zinc	725.25	0.022325	18.3500	28.08	128.66	0.5477108	14.12659432	14.67430512	1.6992608	0.002254825	1.64E+01	4.26E-03	1.10E-01	1.32E-02	1.75E-05	*1.27E-01*	0.03344631	0.86264955	0.10376645	0.00013769

Table E.1-4. Exposure Calculations for Muskrat - Station 04

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 6	Reach 5																	
	Volatile Organics																				
	2-Butanone	0.05	0.0025			9.730183192	0	0	0	0.0001172	0.0002525	3.70E-04	0.00E+00	0.00E+00	1.20E-05	2.60E-05	*3.80E-05*	0	0	0.31692141	0.68307859
	Acetone	0.1415	0.0025			1367.050531	0	0	0	0.0003315	0.0002525	5.84E-04	0.00E+00	0.00E+00	2.43E-07	1.85E-07	*4.27E-07*	0	0	0.56766253	0.43233747
	cis-1,2-Dichloroethene	0	0.0005			2504.114914	0	0	0	0	0.0000505	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.02E-08	*2.02E-08*	0	0	0	1
	Tetrachloroethene	0.0106667	0.0005			6.09153838	0	0	0	2.499E-05	0.0000505	7.55E-05	0.00E+00	0.00E+00	4.10E-06	8.29E-06	*1.24E-05*	0	0	0.33105495	0.66894505
	Trichloroethene	0.0106667	0.0005			3.04576919	0	0	0	2.499E-05	0.0000505	7.55E-05	0.00E+00	0.00E+00	8.21E-06	1.66E-05	*2.48E-05*	0	0	0.33105495	0.66894505
	Semivolatile Organics																				
	2-Methylnaphthalene	0.31	0.0025			62.53	0	0	0	0.0007263	0.0002525	9.79E-04	0.00E+00	0.00E+00	1.16E-05	4.04E-06	*1.57E-05*	0	0	0.74203896	0.25796104
	Acenaphthylene	0.28875	0.0025			58.00	0	0	0	0.0006765	0.0002525	9.29E-04	0.00E+00	0.00E+00	1.17E-05	4.35E-06	*1.60E-05*	0	0	0.72821444	0.27178556
	Anthracene	0.46875	0.0025			435.11	0	0	0	0.0010983	0.0002525	1.35E-03	0.00E+00	0.00E+00	2.52E-06	5.80E-07	*3.10E-06*	0	0	0.81307114	0.18692886
	Benzo(a)anthracene	1.6875	0.0025			0.57	0	0	0	0.0039538	0.0002525	4.21E-03	0.00E+00	0.00E+00	6.99E-03	4.46E-04	*7.44E-03*	0	0	0.93997117	0.06002883
	Benzo(a)pyrene	1.7725	0.0025		0.28	0.57	0	0.1414985	0.1414985	0.004153	0.0002525	1.46E-01	0.00E+00	2.50E-01	7.34E-03	4.46E-04	*2.58E-01*	0	0.9698057	0.02846371	0.00173059
	Benzo(b)fluoranthene	1.93	0.0025		0.15	0.57	0	0.07389073	0.07389073	0.004522	0.0002525	7.87E-02	0.00E+00	1.31E-01	7.99E-03	4.46E-04	*1.39E-01*	0	0.93930621	0.05748398	0.0032098
	Benzo(g,h,i)perylene	1.03375	0.0025			58.00	0	0	0	0.0024221	0.0002525	2.67E-03	0.00E+00	0.00E+00	4.18E-05	4.35E-06	*4.61E-05*	0	0	0.90559252	0.09440748
	Benzo(k)fluoranthene	1.51625	0.0025		0.30	0.57	0	0.151821823	0.151821823	0.0035526	0.0002525	1.56E-01	0.00E+00	2.68E-01	6.28E-03	4.46E-04	*2.75E-01*	0	0.97555002	0.0228275	0.00162247
	Carbazole	0.24	0			58.00014758	0	0	0	0.0005623	0	5.62E-04	0.00E+00	0.00E+00	9.70E-06	0.00E+00	*9.70E-06*	0	0	1	0
	Chrysene	2.41	0.0025		0.28	0.57	0	0.14143591	0.14143591	0.0056466	0.0002525	1.47E-01	0.00E+00	2.50E-01	9.98E-03	4.46E-04	*2.60E-01*	0	0.95996112	0.0383251	0.00171378
	Dibenz(a,h)anthracene	0.47875	0.0025			0.57	0	0	0	0.0011217	0.0002525	1.37E-03	0.00E+00	0.00E+00	1.98E-03	4.46E-04	*2.43E-03*	0	0	0.81625824	0.18374176
	Dibenzofuran	0.24375	0.0025			58.00	0	0	0	0.0005711	0.0002525	8.24E-04	0.00E+00	0.00E+00	9.85E-06	4.35E-06	*1.42E-05*	0	0	0.69342146	0.30657854
	Fluoranthene	3.31	0.0025		0.16	54.39	0	0.078681381	0.078681381	0.0077553	0.0002525	8.67E-02	0.00E+00	1.45E-03	1.43E-04	4.64E-06	*1.59E-03*	0	0.90762599	0.08946131	0.0029127
	Fluorene	0.27	0.0025			54.39	0	0	0	0.0006326	0.0002525	8.85E-04	0.00E+00	0.00E+00	1.16E-05	4.64E-06	*1.63E-05*	0	0	0.71472472	0.28527528
	Indeno(1,2,3-cd)pyrene	0.93875	0.0025		0.40	0.57	0	0.198859591	0.198859591	0.0021995	0.0002525	2.01E-01	0.00E+00	3.52E-01	3.89E-03	4.46E-04	*3.56E-01*	0	0.98781992	0.01092581	0.00125427
	Naphthalene	0.24125	0.0025			60.92	0	0	0	0.0005652	0.0002525	8.18E-04	0.00E+00	0.00E+00	9.28E-06	4.15E-06	*1.34E-05*	0	0	0.69122545	0.30877455
	N-nitrosodiphenylamine	0.31	0.0025			120.62	0	0	0	0.0007263	0.0002525	9.79E-04	0.00E+00	0.00E+00	6.02E-06	2.09E-06	*8.11E-06*	0	0	0.74203896	0.25796104
	Phenanthrene	1.9	0.0025		0.51	58.00	0	0.257301702	0.257301702	0.0044517	0.0002525	2.62E-01	0.00E+00	4.44E-03	7.68E-05	4.35E-06	*4.52E-03*	0	0.98204544	0.01699084	0.00096372
	Pyrene	3.175	0.0025		0.19	58.00	0	0.097880233	0.097880233	0.007439	0.0002525	1.06E-01	0.00E+00	1.69E-03	1.28E-04	4.35E-06	*1.82E-03*	0	0.9271441	0.07046416	0.00239174
	Pesticides and PCBs																				
	4,4'-DDD	0.0431	0.00005	0.0016	2.23E-03	6.84	4.776E-05	0.00112032	0.001168077	0.000101	0.00000505	1.27E-03	6.99E-06	1.64E-04	1.48E-05	7.39E-07	*1.86E-04*	0.03748246	0.87929611	0.07925788	0.00396355
	4,4'-DDE	0.02235	0.00005	0.0046	9.70E-04	0.83	0.0001373	0.000488294	0.000625595	5.237E-05	0.00000505	6.83E-04	1.66E-04	5.91E-04	6.33E-05	6.11E-06	*8.26E-04*	0.20102277	0.71491412	0.07666939	0.00739373
	4,4'-DDT	0.0108	0.00005	0.0007	1.73E-03	0.64	2.119E-05	0.000872754	0.000893946	2.53E-05	0.00000505	9.24E-04	3.29E-05	1.36E-03	3.93E-05	7.85E-06	*1.44E-03*	0.0229277	0.94423189	0.02737681	0.00546359
	Aldrin	0.0055667	0.000025	0.0004		0.16	1.089E-05	0	1.08945E-05	1.304E-05	0.000002525	2.65E-05	6.77E-05	0.00E+00	8.11E-05	1.57E-05	*1.65E-04*	0.41170091	0	0.49288004	0.09541905
	alpha-Chlordane	0.0055667	0.000025	0.0006	5.70E-04	1.99	1.91E-05	0.000286651	0.000305754	1.304E-05	0.000002525	3.21E-04	9.59E-06	1.44E-04	6.54E-06	1.27E-06	*1.61E-04*	0.05945051	0.89210048	0.04059083	0.00785818
	Aroclor 1248	0.108	0.0005	0.0036		0.57	0.0001075	0	0.000107453	0.000253	0.0000505	4.11E-04	1.90E-04	0.00E+00	4.47E-04	8.93E-05	*7.27E-04*	0.26144437	0	0.61568363	0.122872
	Aroclor 1254	0.108	0.0005	0.0140		0.15	0.0004179	0	0.000417872	0.000253	0.0000505	7.21E-04	2.85E-03	0.00E+00	1.73E-03	3.45E-04	*4.93E-03*	0.57923861	0	0.35076017	0.07000122
	Aroclor 1260	0.108	0.0005	0.0106	6.75E-03	0.28	0.0003149	0.003393802	0.003708699	0.000253	0.0000505	4.01E-03	1.14E-03	1.22E-02	9.12E-04	1.82E-04	*1.45E-02*	0.07848388	0.84586167	0.06306797	0.01258648
	beta-BHC	0.0055667	0.000025	0.0004		3.22	1.089E-05	0	1.08945E-05	1.304E-05	0.000002525	2.65E-05	3.39E-06	0.00E+00	4.05E-06	7.85E-07	*8.23E-06*	0.41170091	0	0.49288004	0.09541905
	delta-BHC	0.0055667	0.000025	0.0004		1.29	1.089E-05	0	1.08945E-05	1.304E-05	0.000002525	2.65E-05	8.47E-06	0.00E+00	1.01E-05	1.96E-06	*2.06E-05*	0.41170091	0	0.49288004	0.09541905
	Endosulfan I	0.0055667	0.000025	0.0005	9.16E-04	1.21	1.612E-05	0.000460908	0.000477026	1.304E-05	0.000002525	4.93E-04	1.34E-05	3.82E-04	1.08E-05	2.09E-06	*4.08E-04*	0.0327205	0.93567598	0.02647759	0.00512593
	Endosulfan Sulfate	0.0108	0.00005	0.0007		1.21	2.089E-05	0	2.08936E-05	2.53E-05	0.00000505	5.12E-05	1.73E-05	0.00E+00	2.10E-05	4.19E-06	*4.25E-05*	0.40769591	0	0.49376366	0.09854043
	Endrin Aldehyde	0.0108	0.00005	0.0018	3.32E-03	0.04	5.373E-05	0.001669982	0.001723708	2.53E-05	0.00000505	1.75E-03	1.34E-03	4.17E-02	6.32E-04	1.26E-04	*4.38E-02*	0.03062969	0.95206511	0.01442617	0.00287903
	gamma-Chlordane	0.0055667	0.000025	0.0004	5.34E-04	1.99	1.194E-05	0.000268848	0.000280787	1.304E-05	0.000002525	2.96E-04	5.99E-06	1.35E-04	6.54E-06	1.27E-06	*1.49E-04*	0.0402869	0.90718241	0.04401048	0.0085202
	Inorganics																				
X	Aluminum	14388.571	0.205525	23.8500	2.39E+02	41.82	0.7118748	120.5045179	121.2163927	33.712423	0.020758025	1.55E+02	1.70E-02	2.88E+00	8.06E-01	4.96E-04	*3.71E+00*	0.00459424	0.77770151	0.21757028	0.00013397
	Antimony	2.29125	0.0006	0.0470		0.05	0.0014029	0	0.001402856	0.0053684	0.0000606	6.83E-03	2.58E-02	0.00E+00	9.87E-02	1.11E-03	*1.26E-01*	0.20534043	0	0.78578936	0.00887021
X	Arsenic	86.328571	0.0035875	0.2400	4.55	0.05	0.0071635	2.289412684	2.296576204	0.1031566	0.000362338	2.40E+00	1.31E-01	4.18E+01	1.88E+00	6.61E-03	*4.38E+01*	0.00298468	0.95388414	0.04298021	0.00015097
X	Barium	122.71429	0.0376	2.0000	11.97	4.33	0.059696	6.020625298	6.080321298	0.2875196	0.0037976	6.37E+00	1.38E-02	1.39E+00	6.64E-02	8.77E-04	*1.47E+00*	0.00936902	0.94491006	0.0451249	0.00059602
	Beryllium	0.7871429	4.0625E-05	0.0060		0.53	0.0001791	0	0.000179088	0.0018443	4.10313E-06	2.03E-03	3.37E-04	0.00E+00	3.47E-03	7.73E-06	*3.82E-03*	0.08833091	0	0.90964532	0.00202377
	Cadmium	7.5785714	4.9625E-05	0.0625	0.81	0.78	0.0018655	0.408486849	0.410352349	0.0177566	5.01213E-06	4.28E-01	2.41E-03	5.27E-01	2.29E-02	6.46E-06	*5.52E-01*	0.00435748	0.95415448	0.04147632	1.1707E-05
	Chromium	229.57143	0.0016675	0.2000	4.29	7.24	0.0059696	2.158586207	2.164555807	0.5378859	0.000168418	2.70E+00	8.25E-04	2.98E-01	7.43E-02	2.33E-05	*3.73E-01*	0.00220883	0.79870427	0.19902459	6.2317E-05
	Cobalt	21.028571	0.0002575	0.2700	1.87	4.02	0.008059	0.939730235	0.947789195	0.0492699	2.60075E-05	9.97E-01	2.00E-03	2.34E-01	1.23E-02	6.47E-06	*2.48E-01*	0.00808252	0.94247742	0.04941398	2.6084E-05
	Copper	316.11429	0.004375	40.5500	16.01	12.23	1.2103364	8.055655237	9.265991637	0.7406558	0.000441875	1.00E+01	9.89E-02	6.59E-01	6.05E-02	3.61E-05	*8.18E-01*	0.1209479	0.80499484	0.07401311	4.4156E-05
	Cyanide	1.0725	0.0025	0.1900		51.90	0.0056711	0	0.00567112	0.0025129	0.0002525	8.44E-03	1.09E-04	0.00E+00	4.84E-05	4.87E-06	*1.63E-04*	0.67221341	0	0.29785708	0.02992952
X	Iron	30044.286	0.65775	88.2500	2487.06	2.57	2.634086	1251.36915	1254.003236	70.393761	0.06643275	1.32E+03	1.03E+00	4.88E+02	2.74E+01	2.59E-02	*5.16E+02*	0.00198879	0.94481216	0.05314889	5.0158E-05
X	Lead	442.81429	0.00343125	0.2125	40.38	6.43	0.0063427	20.31851276	20.32485546	1.0375139	0.000346556	2.14E+01	9.86E-04	3.16E+00	1.61E-01	5.39E-05	*3.32E+00*	0.00029691	0.9511203	0.04856657	1.6222E-05
X	Manganese	672.61429	0.176575	79.1000	379.29	70.76	2.3609768	190.842132	193.2031088	1.5759353	0.017834075	1.95E+02	3.34E-02	2.70E+00	2.23E-02	2.52E-04	*2.75E+00*	0.0121202	0.9796981	0.00809015	9.1552E-05
	Mercury	0.9042857	0.00006775	0.0080	0.03	0.03	0.0002388	0.015938356	0.01617714	0.0021187	6.84275E-06	1.83E-02	9.28E-03	6.19E-01	8.23E-02	2.66E-04	*7.11E-01*	0.01304636	0.87081879	0.11576098	0.00037387
	Nickel	28.471429	0.0013725	0.0415	0.74	32.17	0.0012387	0.370074309	0.371313001	0.0667086	0.000138623	4.38E-01	3.85E-05	1.15E-02	2.07E-03	4.31E-06	*1.36E-02*	0.00282703	0.84460963	0.15224696	0.00031637
	Selenium	1.4207143	0.00075	0.5150	0.12	0.16	0.0153717	0.061422246	0.076793966	0.0033287	0.00007575	8.02E-02	9.56E-02	3.82E-01	2.07E-02	4.71E-04	*4.99E-01*	0.19167104	0.76587822	0.04150621	0.00094453
	Silver	0.3914286	0.0003725	0.0635		145.71	0.0018953	0	0.001895348	0.0009171	3.76225E-05	2.85E-03	1.30E-05	0.00E+00	6.29E-06	2.58E-07	*1.96E-05*	0.66501392	0	0.32178561	0.01320047
	Thallium	0.7535714	0.00085	0.0650		0.06	0.0019401	0	0.00194012	0.0017656	0.00008585	3.79E-03	3.23E-02	0.00E+00	2.94E-02	1.43E-03	*6.31E-02*	0.51169064	0	0.46566713	0.02264223
X	Vanadium	51.585714	0.00086375	0.0420	1.79	0.16	0.0012536	0.903138529	0.904392145	0.1208653	8.72388E-05	1.03E+00	8.00E-03	5.76E+00	7.71E-01	5.56E-04	*6.54E+00*	0.00122263	0.88081454	0.11787775	8.5082E-05
	Zinc	1702.8571	0.022325	18.3500	65.92	128.66	0.5477108	33.1686619	33.7163727	3.9897943	0.002254825	3.77E+01	4.26E-03	2.58E-01	3.10E-02	1.75E-05	*2.93E-01*	0.01452489	0.87960886	0.10580645	5.9796E-05

Table E.1-5. Exposure Calculations for Muskrat - Station 05

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 5	Reach 5																	
	Volatile Organics																				
	2-Butanone	0.017	0.0025			9.730183192	0	0	0	0.000039831	0.0002525	2.92E-04	0.00E+00	0.00E+00	4.09E-06	2.60E-05	*3.00E-05*	0	0	0.13625308	0.86374692
	Acetone	0.034	0.0025			1367.050531	0	0	0	0.000079662	0.0002525	3.32E-04	0.00E+00	0.00E+00	5.83E-08	1.85E-07	*2.43E-07*	0	0	0.23982876	0.76017124
	cis-1,2-Dichloroethene	0.007	0.0005			2504.114914	0	0	0	0.000016401	0.0000505	6.69E-05	0.00E+00	0.00E+00	6.55E-09	2.02E-08	*2.67E-08*	0	0	0.24515329	0.75484671
	Tetrachloroethene	0.009	0.002			6.09153838	0	0	0	0.000021087	0.000202	2.23E-04	0.00E+00	0.00E+00	3.46E-06	3.32E-05	*3.66E-05*	0	0	0.09452366	0.90547634
	Trichloroethene	0.007	0.0005			3.04576919	0	0	0	0.000016401	0.0000505	6.69E-05	0.00E+00	0.00E+00	5.38E-06	1.66E-05	*2.20E-05*	0	0	0.24515329	0.75484671
	Semivolatile Organics																				
	2-Methylnaphthalene	0.195125	0.0025			62.53	0	0	0	0.000457178	0.0002525	7.10E-04	0.00E+00	0.00E+00	7.31E-06	4.04E-06	*1.14E-05*	0	0	0.64420477	0.35579523
	Acenaphthylene	0.1715	0.0025			58.00	0	0	0	0.000401825	0.0002525	6.54E-04	0.00E+00	0.00E+00	6.93E-06	4.35E-06	*1.13E-05*	0	0	0.61410585	0.38589415
	Anthracene	0.29125	0.0025			435.11	0	0	0	0.000682399	0.0002525	9.35E-04	0.00E+00	0.00E+00	1.57E-06	5.80E-07	*2.15E-06*	0	0	0.72991728	0.27008272
	Benzo(a)anthracene	0.89875	0.0025			0.57	0	0	0	0.002105771	0.0002525	2.36E-03	0.00E+00	0.00E+00	3.72E-03	4.46E-04	*4.17E-03*	0	0	0.89293004	0.10706996
	Benzo(a)pyrene	0.88375	0.0025		0.14	0.57	0	0.070549675	0.070549675	0.002070626	0.0002525	7.29E-02	0.00E+00	1.25E-01	3.66E-03	4.46E-04	*1.29E-01*	0	0.96812081	0.02841425	0.00346494
	Benzo(b)fluoranthene	1.015	0.0025		0.08	0.57	0	0.038859632	0.038859632	0.002378145	0.0002525	4.15E-02	0.00E+00	6.87E-02	4.20E-03	4.46E-04	*7.34E-02*	0	0.93659611	0.05731813	0.00608576
	Benzo(g,h,i)perylene	0.4575	0.0025			58.00	0	0	0	0.001071923	0.0002525	1.32E-03	0.00E+00	0.00E+00	1.85E-05	4.35E-06	*2.28E-05*	0	0	0.80935087	0.19064913
	Benzo(k)fluoranthene	0.6654375	0.0025		0.13	0.57	0	0.06663013	0.06663013	0.00155912	0.0002525	6.84E-02	0.00E+00	1.18E-01	2.76E-03	4.46E-04	*1.21E-01*	0	0.97353048	0.02278025	0.00368927
	Carbazole	0.2066667	0			58.00014758	0	0	0	0.00048422	0	4.84E-04	0.00E+00	0.00E+00	8.35E-06	0.00E+00	*8.35E-06*	0	0	1	0
	Chrysene	1.05375	0.0025		0.12	0.57	0	0.061841531	0.061841531	0.002468936	0.0002525	6.46E-02	0.00E+00	1.09E-01	4.36E-03	4.46E-04	*1.14E-01*	0	0.95784834	0.03824075	0.00391091
	Dibenz(a,h)anthracene	0.209375	0.0025			0.57	0	0	0	0.000490566	0.0002525	7.43E-04	0.00E+00	0.00E+00	8.67E-04	4.46E-04	*1.31E-03*	0	0	0.66019152	0.33980848
	Dibenzofuran	0.1623333	0.0025			58.00	0	0	0	0.000380347	0.0002525	6.33E-04	0.00E+00	0.00E+00	6.56E-06	4.35E-06	*1.09E-05*	0	0	0.60100941	0.39899059
	Fluoranthene	1.8125	0.0025		0.09	54.39	0	0.043084593	0.043084593	0.004246688	0.0002525	4.76E-02	0.00E+00	7.92E-04	7.81E-05	4.64E-06	*8.75E-04*	0	0.90544704	0.08924653	0.00530643
	Fluorene	0.21375	0.0025			54.39	0	0	0	0.000500816	0.0002525	7.53E-04	0.00E+00	0.00E+00	9.21E-06	4.64E-06	*1.39E-05*	0	0	0.66481541	0.33518459
	Indeno(1,2,3-cd)pyrene	0.42975	0.0025		0.18	0.57	0	0.091035855	0.091035855	0.001006904	0.0002525	9.23E-02	0.00E+00	1.61E-01	1.78E-03	4.46E-04	*1.63E-01*	0	0.98635462	0.0109096	0.00273579
	Naphthalene	0.129375	0.0025			60.92	0	0	0	0.000303126	0.0002525	5.56E-04	0.00E+00	0.00E+00	4.98E-06	4.15E-06	*9.12E-06*	0	0	0.54555732	0.45444268
	N-nitrosodiphenylamine	0.2416667	0.0025			120.62	0	0	0	0.000566225	0.0002525	8.19E-04	0.00E+00	0.00E+00	4.69E-06	2.09E-06	*6.79E-06*	0	0	0.69159364	0.30840636
	Phenanthrene	1.0625	0.0025		0.29	58.00	0	0.14388582	0.14388582	0.002489438	0.0002525	1.47E-01	0.00E+00	2.48E-03	4.29E-05	4.35E-06	*2.53E-03*	0	0.98130001	0.01697794	0.00172205
	Pyrene	1.69	0.0025		0.10	58.00	0	0.05210003	0.05210003	0.00395967	0.0002525	5.63E-02	0.00E+00	8.98E-04	6.83E-05	4.35E-06	*9.71E-04*	0	0.92519969	0.07031638	0.00448393
	Pesticides and PCBs																				
	4,4'-DDD	0.09525	0.00005	0.0016	4.92E-03	6.84	4.776E-05	0.002475882	0.002523639	0.000223171	0.00000505	2.75E-03	6.99E-06	3.62E-04	3.26E-05	7.39E-07	*4.03E-04*	0.01735437	0.89971235	0.08109815	0.00183512
	4,4'-DDE	0.023	0.00005	0.0046	9.99E-04	0.83	0.0001373	0.000502495	0.000639796	0.000053889	0.00000505	6.99E-04	1.66E-04	6.08E-04	6.52E-05	6.11E-06	*8.45E-04*	0.19649907	0.71914993	0.07712365	0.00722735
	4,4'-DDT	0.009875	0.00005	0.0007	1.59E-03	0.64	2.119E-05	0.000798004	0.000819196	2.31371E-05	0.00000505	8.47E-04	3.29E-05	1.24E-03	3.60E-05	7.85E-06	*1.32E-03*	0.02500885	0.94172743	0.0273042	0.00595952
	Aldrin	0.003175	0.000025	0.0004		0.16	1.089E-05	0	1.08945E-05	7.43903E-06	0.000002525	2.09E-05	6.77E-05	0.00E+00	4.63E-05	1.57E-05	*1.30E-04*	0.52230489	0	0.35664161	0.12105351
	alpha-Chlordane	0.009275	0.000025	0.0006	9.49E-04	1.99	1.91E-05	0.000477609	0.000496711	2.17313E-05	0.000002525	5.21E-04	9.59E-06	2.40E-04	1.09E-05	1.27E-06	*2.61E-04*	0.03666777	0.91677208	0.04171339	0.00484675
	Aroclor 1248	0.1125	0.0005	0.0036		0.57	0.0001075	0	0.000107453	0.000263588	0.0000505	4.22E-04	1.90E-04	0.00E+00	4.66E-04	8.93E-05	*7.45E-04*	0.25490517	0	0.62529609	0.11979875
	Aroclor 1254	0.053325	0.0005	0.0140		0.15	0.0004179	0	0.000417872	0.00012494	0.0000505	5.93E-04	2.85E-03	0.00E+00	8.54E-04	3.45E-04	*4.05E-03*	0.70430341	0	0.21058124	0.08511535
	Aroclor 1260	0.08975	0.0005	0.0106	5.61E-03	0.28	0.0003149	0.002820313	0.003135209	0.000210284	0.0000505	3.40E-03	1.14E-03	1.02E-02	7.58E-04	1.82E-04	*1.22E-02*	0.09272586	0.8304824	0.06192128	0.01487047
	beta-BHC	0.003175	0.000025	0.0004		3.22	1.089E-05	0	1.08945E-05	7.43903E-06	0.000002525	2.09E-05	3.39E-06	0.00E+00	2.31E-06	7.85E-07	*6.48E-06*	0.52230489	0	0.35664161	0.12105351
	delta-BHC	0.004575	0.000025	0.0004		1.29	1.089E-05	0	1.08945E-05	1.07192E-05	0.000002525	2.41E-05	8.47E-06	0.00E+00	8.33E-06	1.96E-06	*1.88E-05*	0.45132918	0	0.4440672	0.10460362
	Endosulfan I	0.003175	0.000025	0.0005	5.22E-04	1.21	1.612E-05	0.000262883	0.000279001	7.43903E-06	0.000002525	2.89E-04	1.34E-05	2.18E-04	6.17E-06	2.09E-06	*2.40E-04*	0.05577805	0.90974021	0.02574366	0.00873807
	Endosulfan Sulfate	0.006075	0.00005	0.0007		1.21	2.089E-05	0	2.08936E-05	1.42337E-05	0.00000505	4.02E-05	1.73E-05	0.00E+00	1.18E-05	4.19E-06	*3.33E-05*	0.52003462	0	0.35427259	0.12569279
	Endrin Aldehyde	0.006075	0.00005	0.0018	1.87E-03	0.04	5.373E-05	0.000939365	0.000993091	1.42337E-05	0.00000505	1.01E-03	1.34E-03	2.35E-02	3.56E-04	1.26E-04	*2.53E-02*	0.05306967	0.92788233	0.01405974	0.00498827
	gamma-Chlordane	0.008575	0.000025	0.0004	8.23E-04	1.99	1.194E-05	0.000414138	0.000426077	2.00912E-05	0.000002525	4.49E-04	5.99E-06	2.08E-04	1.01E-05	1.27E-06	*2.25E-04*	0.02660882	0.92298653	0.04477719	0.00562745
	Inorganics																				
X	Aluminum	5072.5	0.0273	23.8500	8.44E+01	41.82	0.7118748	42.48226937	43.19414417	11.8848675	0.0027573	5.51E+01	1.70E-02	1.02E+00	2.84E-01	6.59E-05	*1.32E+00*	0.01292396	0.77125826	0.21576772	5.0058E-05
	Antimony	1.1525	0.0006	0.0470		0.05	0.0014029	0	0.001402856	0.002700308	0.0000606	4.16E-03	2.58E-02	0.00E+00	4.96E-02	1.11E-03	*7.66E-02*	0.33692019	0	0.64852567	0.01455414
X	Arsenic	12.3875	0.0017	0.2400	0.65	0.05	0.0071635	0.328513482	0.335677002	0.014802195	0.0001717	3.51E-01	1.31E-01	5.99E+00	2.70E-01	3.13E-03	*6.40E+00*	0.02042921	0.93686765	0.04221348	0.00048966
	Barium	32.05	0.0503	2.0000	3.13	4.33	0.059696	1.572441543	1.632137543	0.07509315	0.0050803	1.71E+00	1.38E-02	3.63E-01	1.73E-02	1.17E-03	*3.95E-01*	0.03486283	0.91831539	0.04385485	0.00296693
	Beryllium	0.26375	0.0000295	0.0060		0.53	0.0001791	0	0.000179088	0.000617966	2.9795E-06	8.00E-04	3.37E-04	0.00E+00	1.16E-03	5.61E-06	*1.51E-03*	0.22385056	0	0.77242523	0.00372422
	Cadmium	0.564125	0.0000495	0.0625	0.06	0.78	0.0018655	0.030406475	0.032271975	0.001321745	4.9995E-06	3.36E-02	2.41E-03	3.92E-02	1.70E-03	6.45E-06	*4.33E-02*	0.05552295	0.90498911	0.03933914	0.0001488
	Chromium	62.3875	0.00085	0.2000	1.17	7.24	0.0059696	0.58660957	0.59257917	0.146173913	0.00008585	7.39E-01	8.25E-04	8.11E-02	2.02E-02	1.19E-05	*1.02E-01*	0.0080797	0.79396137	0.19784273	0.0001162
	Cobalt	8.475	0.0002	0.2700	0.75	4.02	0.008059	0.378732991	0.386791951	0.019856925	0.0000202	4.07E-01	2.00E-03	9.42E-02	4.94E-03	5.02E-06	*1.01E-01*	0.019817	0.93130512	0.04882821	4.9672E-05
	Copper	39.0125	0.0017	40.5500	1.98	12.23	1.2103364	0.994169717	2.204506117	0.091406288	0.0001717	2.30E+00	9.89E-02	8.13E-02	7.47E-03	1.40E-05	*1.88E-01*	0.52713069	0.43298489	0.03980964	7.4779E-05
	Cyanide	0.365	0.0025	0.1900		51.90	0.0056711	0	0.00567112	0.000855195	0.0002525	6.78E-03	1.09E-04	0.00E+00	1.65E-05	4.87E-06	*1.31E-04*	0.8365946	0	0.12615701	0.0372484
X	Iron	11162.5	0.376	88.2500	924.03	2.57	2.634086	464.9272834	467.5613694	26.1537375	0.037976	4.94E+02	1.03E+00	1.81E+02	1.02E+01	1.48E-02	*1.92E+02*	0.00533482	0.941619	0.05296926	7.6913E-05
X	Lead	235.575	0.00042	0.2125	21.48	6.43	0.0063427	10.80934784	10.81569054	0.551952225	0.00004242	1.14E+01	9.86E-04	1.68E+00	8.58E-02	6.59E-06	*1.77E+00*	0.00055796	0.95088381	0.0485545	3.7316E-06
X	Manganese	349.1125	0.32	79.1000	196.87	70.76	2.3609768	99.05435437	101.4153312	0.817970588	0.03232	1.02E+02	3.34E-02	1.40E+00	1.16E-02	4.57E-04	*1.45E+00*	0.02308671	0.96859876	0.00799849	0.00031604
	Mercury	0.3675	0.0001	0.0080	0.01	0.03	0.0002388	0.006477318	0.006716102	0.000861053	0.0000101	7.59E-03	9.28E-03	2.52E-01	3.35E-02	3.92E-04	*2.95E-01*	0.03147173	0.85371039	0.1134867	0.00133118
	Nickel	9.275	0.0013	0.0415	0.24	32.17	0.0012387	0.120557323	0.121796015	0.021731325	0.0001313	1.44E-01	3.85E-05	3.75E-03	6.76E-04	4.08E-06	*4.47E-03*	0.00862247	0.83919299	0.15127057	0.00091397
	Selenium	0.46625	0.00075	0.5150	0.04	0.16	0.0153717	0.020157552	0.035529272	0.001092424	0.00007575	3.67E-02	9.56E-02	1.25E-01	6.79E-03	4.71E-04	*2.28E-01*	0.41887711	0.54929033	0.02976839	0.00206418
	Silver	0.25	0.00037	0.0635		145.71	0.0018953	0	0.001895348	0.00058575	0.00003737	2.52E-03	1.30E-05	0.00E+00	4.02E-06	2.56E-07	*1.73E-05*	0.75257974	0	0.23258187	0.01483839
	Thallium	0.6225	0.00085	0.0650		0.06	0.0019401	0	0.00194012	0.001458518	0.00008585	3.48E-03	3.23E-02	0.00E+00	2.43E-02	1.43E-03	*5.79E-02*	0.55678776	0	0.41857447	0.02463777
X	Vanadium	17.2875	0.00068	0.0420	0.60	0.16	0.0012536	0.302661454	0.30391507	0.040504613	0.00006868	3.44E-01	8.00E-03	1.93E+00	2.58E-01	4.38E-04	*2.20E+00*	0.00363907	0.87858252	0.11757904	0.00019937
	Zinc	233.75	0.0108	18.3500	9.05	128.66	0.5477108	4.553038846	5.100749646	0.54767625	0.0010908	5.65E+00	4.26E-03	3.54E-02	4.26E-03	8.48E-06	*4.39E-02*	0.09694826	0.80591652	0.09694214	0.00019308

Table E.1-6. Exposure Calculations for Muskrat - Station 06

	Mean Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 4	Reach 3																	
	Volatile Organics																				
	2-Butanone	0.0506667	0.0025			9.730183192	0	0	0	0.0001187	0.0002525	3.71E-04	0.00E+00	0.00E+00	1.22E-05	2.60E-05	*3.82E-05*	0	0	0.3197957	0.6802043
	Acetone	0.105	0.0025			1367.050531	0	0	0	0.000246	0.0002525	4.99E-04	0.00E+00	0.00E+00	1.80E-07	1.85E-07	*3.65E-07*	0	0	0.49349568	0.50650432
	cis-1,2-Dichloroethene	0.038	0.0005			2504.114914	0	0	0	8.903E-05	0.0000505	1.40E-04	0.00E+00	0.00E+00	3.56E-08	2.02E-08	*5.57E-08*	0	0	0.63808104	0.36191896
	Tetrachloroethene	0.020875	0.0005			6.09153838	0	0	0	4.891E-05	0.0000505	9.94E-05	0.00E+00	0.00E+00	8.03E-06	8.29E-06	*1.63E-05*	0	0	0.49200346	0.50799654
	Trichloroethene	0.021875	0.0005			3.04576919	0	0	0	5.125E-05	0.0000505	1.02E-04	0.00E+00	0.00E+00	1.68E-05	1.66E-05	*3.34E-05*	0	0	0.50370075	0.49629925
	Semivolatile Organics																				
	2-Methylnaphthalene	0.499	0.0025			62.53	0	0	0	0.0011692	0.0002525	1.42E-03	0.00E+00	0.00E+00	1.87E-05	4.04E-06	*2.27E-05*	0	0	0.82239035	0.17760965
	Acenaphthylene	0.425	0.0025			58.00	0	0	0	0.0009958	0.0002525	1.25E-03	0.00E+00	0.00E+00	1.72E-05	4.35E-06	*2.15E-05*	0	0	0.79772085	0.20227915
	Anthracene	0.4768	0.0025			435.11	0	0	0	0.0011171	0.0002525	1.37E-03	0.00E+00	0.00E+00	2.57E-06	5.80E-07	*3.15E-06*	0	0	0.81564531	0.18435469
	Benzo(a)anthracene	1.788	0.0025			0.57	0	0	0	0.0041893	0.0002525	4.44E-03	0.00E+00	0.00E+00	7.41E-03	4.46E-04	*7.85E-03*	0	0	0.94315347	0.05684653
	Benzo(a)pyrene	1.91	0.0025		0.30	0.57	0	0.152475112	0.152475112	0.0044751	0.0002525	1.57E-01	0.00E+00	2.70E-01	7.91E-03	4.46E-04	*2.78E-01*	0	0.96992654	0.02846725	0.00160621
	Benzo(b)fluoranthene	2.087	0.0025		0.16	0.57	0	0.07990153	0.07990153	0.0048898	0.0002525	8.50E-02	0.00E+00	1.41E-01	8.64E-03	4.46E-04	*1.50E-01*	0	0.93953308	0.05749786	0.00296906
	Benzo(g,h,i)perylene	0.954	0.0025			58.00	0	0	0	0.0022352	0.0002525	2.49E-03	0.00E+00	0.00E+00	3.85E-05	4.35E-06	*4.29E-05*	0	0	0.89850152	0.10149848
	Benzo(k)fluoranthene	0.983	0.0025		0.20	0.57	0	0.098427602	0.098427602	0.0023032	0.0002525	1.01E-01	0.00E+00	1.74E-01	4.07E-03	4.46E-04	*1.79E-01*	0	0.97469215	0.02280743	0.00250041
	Carbazole	0.547	0			58.00014758	0	0	0	0.0012816	0	1.28E-03	0.00E+00	0.00E+00	2.21E-05	0.00E+00	*2.21E-05*	0	0	1	0
	Chrysene	2.69	0.0025		0.31	0.57	0	0.157868298	0.157868298	0.0063027	0.0002525	1.64E-01	0.00E+00	2.79E-01	1.11E-02	4.46E-04	*2.91E-01*	0	0.96013239	0.03833194	0.00153567
	Dibenz(a,h)anthracene	0.635	0.0025			0.57	0	0	0	0.0014878	0.0002525	1.74E-03	0.00E+00	0.00E+00	2.63E-03	4.46E-04	*3.08E-03*	0	0	0.85491049	0.14508951
	Dibenzofuran	0.61375	0.0025			58.00	0	0	0	0.001438	0.0002525	1.69E-03	0.00E+00	0.00E+00	2.48E-05	4.35E-06	*2.91E-05*	0	0	0.85063734	0.14936266
	Fluoranthene	5.016	0.0025		0.24	54.39	0	0.119234383	0.119234383	0.0117525	0.0002525	1.31E-01	0.00E+00	2.19E-03	2.16E-04	4.64E-06	*2.41E-03*	0	0.90852602	0.08955002	0.00192397
	Fluorene	0.316	0.0025			54.39	0	0	0	0.0007404	0.0002525	9.93E-04	0.00E+00	0.00E+00	1.36E-05	4.64E-06	*1.83E-05*	0	0	0.74569136	0.25430864
	Indeno(1,2,3-cd)pyrene	0.968	0.0025		0.41	0.57	0	0.205055748	0.205055748	0.002268	0.0002525	2.08E-01	0.00E+00	3.63E-01	4.01E-03	4.46E-04	*3.67E-01*	0	0.98785736	0.01092622	0.00121642
	Naphthalene	0.5016	0.0025			60.92	0	0	0	0.0011752	0.0002525	1.43E-03	0.00E+00	0.00E+00	1.93E-05	4.15E-06	*2.34E-05*	0	0	0.82314816	0.17685184
	N-nitrosodiphenylamine	0.61375	0.0025			120.62	0	0	0	0.001438	0.0002525	1.69E-03	0.00E+00	0.00E+00	1.19E-05	2.09E-06	*1.40E-05*	0	0	0.85063734	0.14936266
	Phenanthrene	2.666	0.0025		0.72	58.00	0	0.361034914	0.361034914	0.0062464	0.0002525	3.68E-01	0.00E+00	6.22E-03	1.08E-04	4.35E-06	*6.34E-03*	0	0.98231744	0.01699554	0.00068701
	Pyrene	3.38	0.0025		0.21	58.00	0	0.104200059	0.104200059	0.0079193	0.0002525	1.12E-01	0.00E+00	1.80E-03	1.37E-04	4.35E-06	*1.94E-03*	0	0.92727862	0.07047438	0.002247
	Pesticides and PCBs																				
	4,4'-DDD	0.07084	0.00005	0.0033	3.66E-03	6.84	9.75E-05	0.001841381	0.001938884	0.000166	0.00000505	2.11E-03	1.43E-05	2.69E-04	2.43E-05	7.39E-07	*3.09E-04*	0.0462121	0.87272855	0.07866589	0.00239346
	4,4'-DDE	0.07132	0.00005	0.0058	3.10E-03	0.83	0.0001721	0.001558172	0.001730296	0.0001671	0.00000505	1.90E-03	2.08E-04	1.88E-03	2.02E-04	6.11E-06	*2.30E-03*	0.0904747	0.8190352	0.08783562	0.00265447
	4,4'-DDT	0.0180375	0.00005	0.0014	2.90E-03	0.64	4.278E-05	0.00145762	0.001500402	4.226E-05	0.00000505	1.55E-03	6.65E-05	2.27E-03	6.57E-05	7.85E-06	*2.41E-03*	0.02764214	0.941789	0.02730599	0.00326288
	Aldrin	0.0057788	0.000025	0.0003		0.16	7.561E-06	0	7.56149E-06	1.354E-05	0.000002525	2.36E-05	4.70E-05	0.00E+00	8.42E-05	1.57E-05	*1.47E-04*	0.32004822	0	0.57307847	0.10687331
	alpha-Chlordane	0.034063	0.000025	0.0014	3.49E-03	1.99	4.278E-05	0.001754046	0.001796828	7.981E-05	0.000002525	1.88E-03	2.15E-05	8.80E-04	4.00E-05	1.27E-06	*9.43E-04*	0.02276659	0.9334189	0.04247083	0.00134368
	Aroclor 1248	0.139125	0.0005	0.0025		0.57	7.412E-05	0	7.41225E-05	0.000326	0.0000505	4.51E-04	1.31E-04	0.00E+00	5.76E-04	8.93E-05	*7.97E-04*	0.16450018	0	0.72342514	0.11207468
	Aroclor 1254	0.109525	0.0005	0.0095		0.15	0.0002836	0	0.000283556	0.0002566	0.0000505	5.91E-04	1.94E-03	0.00E+00	1.75E-03	3.45E-04	*4.04E-03*	0.48005574	0	0.43444857	0.08549569
	Aroclor 1260	0.129625	0.0005	0.0237	8.10E-03	0.28	0.0007064	0.004073349	0.004779751	0.0003037	0.0000505	5.13E-03	2.55E-03	1.47E-02	1.09E-03	1.82E-04	*1.85E-02*	0.13759404	0.7934122	0.0591573	0.00983646
	beta-BHC	0.0057788	0.000025	0.0003		3.22	8.507E-06	0	8.50668E-06	1.354E-05	0.000002525	2.46E-05	2.64E-06	0.00E+00	4.21E-06	7.85E-07	*7.64E-06*	0.34620403	0	0.55103377	0.1027622
	delta-BHC	0.0118288	0.000025	0.0003		1.29	7.561E-06	0	7.56149E-06	2.771E-05	0.000002525	3.78E-05	5.88E-06	0.00E+00	2.15E-05	1.96E-06	*2.94E-05*	0.20003285	0	0.73317043	0.06679673
	Endosulfan I	0.0057788	0.000025	0.0003	9.51E-04	1.21	7.561E-06	0.000478468	0.00048603	1.354E-05	0.000002525	5.02E-04	6.27E-06	3.97E-04	1.12E-05	2.09E-06	*4.16E-04*	0.0150599	0.9529449	0.02696626	0.00502893
	Endosulfan Sulfate	0.0113125	0.00005	0.0007		1.21	2.069E-05	0	2.06946E-05	2.651E-05	0.00000505	5.22E-05	1.72E-05	0.00E+00	2.20E-05	4.19E-06	*4.33E-05*	0.39607065	0	0.50727826	0.09665109
	Endrin Aldehyde	0.0113125	0.00005	0.0014	3.48E-03	0.04	4.228E-05	0.001749229	0.001791513	2.651E-05	0.00000505	1.82E-03	1.06E-03	4.37E-02	6.62E-04	1.26E-04	*4.55E-02*	0.02319423	0.95949694	0.01453878	0.00277005
	gamma-Chlordane	0.0175788	0.000025	0.0006	1.69E-03	1.99	1.771E-05	0.000848983	0.000866692	4.119E-05	0.000002525	9.10E-04	8.89E-06	4.26E-04	2.07E-05	1.27E-06	*4.57E-04*	0.01945269	0.93253347	0.04524035	0.00277349
	Inorganics																				
X	Aluminum	9906.6667	0.199	58.3333	1.65E+02	41.82	1.7411333	82.96849323	84.70962656	23.21132	0.020099	1.08E+02	4.16E-02	1.98E+00	5.55E-01	4.81E-04	*2.58E+00*	0.01613041	0.76864637	0.21503701	0.0001862
	Antimony	2.2833333	0.0006	0.0458		0.05	0.001368	0	0.001368032	0.0053498	0.0000606	6.78E-03	2.52E-02	0.00E+00	9.84E-02	1.11E-03	*1.25E-01*	0.20181986	0	0.78924009	0.00894005
X	Arsenic	73.716667	0.00325	1.5333	3.89	0.05	0.0457669	1.954948044	2.000714976	0.0880863	0.00032825	2.09E+00	8.35E-01	3.57E+01	1.61E+00	5.99E-03	*3.81E+01*	0.02190718	0.9357716	0.0421641	0.00015712
X	Barium	77.066667	0.032	13.9667	7.51	4.33	0.4168771	3.781055486	4.197932554	0.1805672	0.003232	4.38E+00	9.63E-02	8.73E-01	4.17E-02	7.46E-04	*1.01E+00*	0.0951398	0.8629135	0.04120909	0.00073761
	Beryllium	0.61	0.0000485	0.0040		0.53	0.0001189	0	0.000118894	0.0014292	4.8985E-06	1.55E-03	2.24E-04	0.00E+00	2.69E-03	9.23E-06	*2.93E-03*	0.07655625	0	0.92028958	0.00315417
	Cadmium	5.0333333	0.0000495	0.0465	0.54	0.78	0.0013879	0.271297894	0.272685826	0.0117931	4.9995E-06	2.84E-01	1.79E-03	3.50E-01	1.52E-02	6.45E-06	*3.67E-01*	0.00487877	0.95364929	0.04145436	1.7574E-05
	Chromium	305.5	0.0043	0.8900	5.71	7.24	0.0265647	2.87251811	2.89908283	0.7157865	0.0004343	3.62E+00	3.67E-03	3.97E-01	9.89E-02	6.00E-05	*5.00E-01*	0.00734785	0.79454408	0.19798793	0.00012013
	Cobalt	14.066667	0.00044	0.3967	1.25	4.02	0.0118397	0.628614838	0.640454545	0.0329582	0.00004444	6.73E-01	2.94E-03	1.56E-01	8.20E-03	1.11E-05	*1.67E-01*	0.01758049	0.9334147	0.04893882	6.5988E-05
	Copper	237.65	0.0052	41.2000	12.04	12.23	1.2297376	6.056121326	7.285858926	0.556814	0.0005252	7.84E+00	1.01E-01	4.95E-01	4.55E-02	4.29E-05	*6.41E-01*	0.15679033	0.77214948	0.07099323	6.6962E-05
	Cyanide	1.6125	0.0025	0.2467		51.90	0.0073625	0	0.007362508	0.0037781	0.0002525	1.14E-02	1.42E-04	0.00E+00	7.28E-05	4.87E-06	*2.20E-04*	0.64622542	0	0.33161204	0.02216255
X	Iron	22738.333	1.18	277.3333	1882.27	2.57	8.2778453	947.0702392	955.3480845	53.275915	0.11918	1.01E+03	3.23E+00	3.69E+02	2.08E+01	4.65E-02	*3.93E+02*	0.0082061	0.9388616	0.05281415	0.00011815
X	Lead	365.5	0.0057	1.0133	33.33	6.43	0.030246	16.77095038	16.80119636	0.8563665	0.0005757	1.77E+01	4.70E-03	2.61E+00	1.33E-01	8.95E-05	*2.74E+00*	0.00171286	0.94975755	0.04849699	3.2603E-05
X	Manganese	678.5	0.504	98.3000	382.61	70.76	2.9340584	192.5120969	195.4461553	1.5897255	0.050904	1.97E+02	4.15E-02	2.72E+00	2.25E-02	7.19E-04	*2.79E+00*	0.01488714	0.97678846	0.00806612	0.00025828
X	Mercury	1.3616667	0.0001	0.0065	0.05	0.03	0.000194	0.023999859	0.024193871	0.0031904	0.0000101	2.74E-02	7.54E-03	9.33E-01	1.24E-01	3.92E-04	*1.06E+00*	0.00708219	0.87608772	0.1164614	0.00036869
	Nickel	22.116667	0.0019	0.0983	0.57	32.17	0.0029351	0.287474516	0.290409568	0.0518194	0.0001919	3.42E-01	9.12E-05	8.94E-03	1.61E-03	5.97E-06	*1.06E-02*	0.00857148	0.83953574	0.15133236	0.00056042
	Selenium	1.2841667	0.00075	0.4300	0.11	0.16	0.0128346	0.055518835	0.068353475	0.0030088	0.00007575	7.14E-02	7.98E-02	3.45E-01	1.87E-02	4.71E-04	*4.44E-01*	0.17966118	0.7771608	0.04211766	0.00106036
	Silver	0.2716667	0.000375	0.0273		145.71	0.0008158	0	0.000815844	0.0006365	0.000037875	1.49E-03	5.60E-06	0.00E+00	4.37E-06	2.60E-07	*1.02E-05*	0.54746041	0	0.42712413	0.02541546
	Thallium	0.6833333	0.00085	0.0650		0.06	0.0019401	0	0.00194012	0.001601	0.00008585	3.63E-03	3.23E-02	0.00E+00	2.66E-02	1.43E-03	*6.03E-02*	0.53490746	0	0.44142297	0.02366957
X	Vanadium	40.733333	0.0015	0.1975	1.42	0.16	0.005895	0.713140125	0.719035105	0.0954382	0.0001515	8.15E-01	3.76E-02	4.55E+00	6.09E-01	9.66E-04	*5.20E+00*	0.00723644	0.87542157	0.11715602	0.00018598
	Zinc	1067.5	0.0298	23.9333	41.33	128.66	0.7143621	20.79302232	21.50738445	2.5011525	0.0030098	2.40E+01	5.55E-03	1.62E-01	1.94E-02	2.34E-05	*1.87E-01*	0.02975078	0.8659593	0.10416457	0.00012535

Table E.1-7. Exposure Calculations for Muskrat - Station 07

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 3	Reach 3																	
	Volatile Organics																				
	2-Butanone	0.022675	0.0025			9.730183192	0	0	0	5.313E-05	0.0002525	3.06E-04	0.00E+00	0.00E+00	5.46E-06	2.60E-05	*3.14E-05*	0	0	0.17383096	0.82616904
	Acetone	0.0461667	0.0025			1367.050531	0	0	0	0.0001082	0.0002525	3.61E-04	0.00E+00	0.00E+00	7.91E-08	1.85E-07	*2.64E-07*	0	0	0.29991114	0.70008886
	cis-1,2-Dichloroethene	0.0206667	0.0005			2504.114914	0	0	0	4.842E-05	0.0000505	9.89E-05	0.00E+00	0.00E+00	1.93E-08	2.02E-08	*3.95E-08*	0	0	0.48949678	0.51050322
	Tetrachloroethene	0.0189583	0.0005			6.09153838	0	0	0	4.442E-05	0.0000505	9.49E-05	0.00E+00	0.00E+00	7.29E-06	8.29E-06	*1.56E-05*	0	0	0.46796953	0.53203047
	Trichloroethene	0.014625	0.0005			3.04576919	0	0	0	3.427E-05	0.0000505	8.48E-05	0.00E+00	0.00E+00	1.13E-05	1.66E-05	*2.78E-05*	0	0	0.4042449	0.5957551
	Semivolatile Organics																				
	2-Methylnaphthalene	0.3710833	0.0025			62.53	0	0	0	0.0008694	0.0002525	1.12E-03	0.00E+00	0.00E+00	1.39E-05	4.04E-06	*1.79E-05*	0	0	0.77494506	0.22505494
	Acenaphthylene	0.3673333	0.0025			58.00	0	0	0	0.0008607	0.0002525	1.11E-03	0.00E+00	0.00E+00	1.48E-05	4.35E-06	*1.92E-05*	0	0	0.77316869	0.22683131
	Anthracene	0.6046923	0.0025			435.11	0	0	0	0.0014168	0.0002525	1.67E-03	0.00E+00	0.00E+00	3.26E-06	5.80E-07	*3.84E-06*	0	0	0.84873846	0.15126154
	Benzo(a)anthracene	3.9926923	0.0025			0.57	0	0	0	0.0093549	0.0002525	9.61E-03	0.00E+00	0.00E+00	1.65E-02	4.46E-04	*1.70E-02*	0	0	0.97371812	0.02628188
	Benzo(a)pyrene	3.8907692	0.0025		0.62	0.57	0	0.310599724	0.310599724	0.0091161	0.0002525	3.20E-01	0.00E+00	5.49E-01	1.61E-02	4.46E-04	*5.66E-01*	0	0.97072031	0.02849055	0.00078914
	Benzo(b)fluoranthene	6.8119231	0.0025		0.52	0.57	0	0.260796873	0.260796873	0.0159603	0.0002525	2.77E-01	0.00E+00	4.61E-01	2.82E-02	4.46E-04	*4.90E-01*	0	0.94147196	0.05761652	0.00091152
	Benzo(g,h,i)perylene	1.7776923	0.0025			58.00	0	0	0	0.0041651	0.0002525	4.42E-03	0.00E+00	0.00E+00	7.18E-05	4.35E-06	*7.62E-05*	0	0	0.9428427	0.0571573
	Benzo(k)fluoranthene	5.2907692	0.0025		1.05	0.57	0	0.529763712	0.529763712	0.0123963	0.0002525	5.42E-01	0.00E+00	9.37E-01	2.19E-02	4.46E-04	*9.59E-01*	0	0.97668053	0.02285396	0.00046551
	Carbazole	0.3384	0			58.00014758	0	0	0	0.0007929	0	7.93E-04	0.00E+00	0.00E+00	1.37E-05	0.00E+00	*1.37E-05*	0	0	1	0
	Chrysene	4.9961538	0.0025		0.58	0.57	0	0.293209779	0.293209779	0.011706	0.0002525	3.05E-01	0.00E+00	5.18E-01	2.07E-02	4.46E-04	*5.40E-01*	0	0.96081346	0.03835913	0.00082741
	Dibenz(a,h)anthracene	0.5732308	0.0025			0.57	0	0	0	0.0013431	0.0002525	1.60E-03	0.00E+00	0.00E+00	2.37E-03	4.46E-04	*2.82E-03*	0	0	0.8417503	0.1582497
	Dibenzofuran	0.4067778	0.0025			58.00	0	0	0	0.0009531	0.0002525	1.21E-03	0.00E+00	0.00E+00	1.64E-05	4.35E-06	*2.08E-05*	0	0	0.7905573	0.2094427
	Fluoranthene	9.1423077	0.0025		0.43	54.39	0	0.217320059	0.217320059	0.0214204	0.0002525	2.39E-01	0.00E+00	4.00E-03	3.94E-04	4.64E-06	*4.39E-03*	0	0.90931564	0.08962785	0.00105652
	Fluorene	0.3911538	0.0025			54.39	0	0	0	0.0009165	0.0002525	1.17E-03	0.00E+00	0.00E+00	1.69E-05	4.64E-06	*2.15E-05*	0	0	0.78399852	0.21600148
	Indeno(1,2,3-cd)pyrene	2.0280769	0.0025		0.85	0.57	0	0.429616561	0.429616561	0.0047518	0.0002525	4.35E-01	0.00E+00	7.60E-01	8.40E-03	4.46E-04	*7.68E-01*	0	0.98848586	0.01093317	0.00058097
	Naphthalene	0.3669167	0.0025			60.92	0	0	0	0.0008597	0.0002525	1.11E-03	0.00E+00	0.00E+00	1.41E-05	4.15E-06	*1.83E-05*	0	0	0.77296958	0.22703042
	N-nitrosodiphenylamine	0.5594444	0.0025			120.62	0	0	0	0.0013108	0.0002525	1.56E-03	0.00E+00	0.00E+00	1.09E-05	2.09E-06	*1.30E-05*	0	0	0.83848046	0.16151954
	Phenanthrene	4.1384615	0.0025		1.11	58.00	0	0.560438525	0.560438525	0.0096964	0.0002525	5.70E-01	0.00E+00	9.66E-03	1.67E-04	4.35E-06	*9.83E-03*	0	0.98255762	0.0169997	0.00044268
	Pyrene	7.08	0.0025		0.43	58.00	0	0.218265212	0.218265212	0.0165884	0.0002525	2.35E-01	0.00E+00	3.76E-03	2.86E-04	4.35E-06	*4.05E-03*	0	0.92836878	0.07055723	0.00107398
	Pesticides and PCBs																				
	4,4'-DDD	0.0386538	0.00005	0.0033	2.00E-03	6.84	9.75E-05	0.001004749	0.001102253	9.057E-05	0.00000505	1.20E-03	1.43E-05	1.47E-04	1.32E-05	7.39E-07	*1.75E-04*	0.08139745	0.83878081	0.07560591	0.00421582
	4,4'-DDE	0.0323462	0.00005	0.0058	1.40E-03	0.83	0.0001721	0.000706687	0.00087881	7.579E-05	0.00000505	9.60E-04	2.08E-04	8.55E-04	9.17E-05	6.11E-06	*1.16E-03*	0.17936122	0.73640256	0.07897387	0.00526235
	4,4'-DDT	0.0224154	0.00005	0.0014	3.60E-03	0.64	4.278E-05	0.001811399	0.001854182	5.252E-05	0.00000505	1.91E-03	6.65E-05	2.82E-03	8.16E-05	7.85E-06	*2.97E-03*	0.02237851	0.94750813	0.02747181	0.00264156
	Aldrin	0.0026033	0.000025	0.0003		0.16	7.561E-06	0	7.56149E-06	6.1E-06	0.000002525	1.62E-05	4.70E-05	0.00E+00	3.79E-05	1.57E-05	*1.01E-04*	0.46715956	0	0.37684242	0.15599803
	alpha-Chlordane	0.0354808	0.000025	0.0014	3.63E-03	1.99	4.278E-05	0.001827053	0.001869835	8.313E-05	0.000002525	1.96E-03	2.15E-05	9.17E-04	4.17E-05	1.27E-06	*9.81E-04*	0.02187794	0.93431904	0.04251179	0.00129124
	Aroclor 1248	0.0456667	0.0005	0.0025		0.57	7.412E-05	0	7.41225E-05	0.000107	0.0000505	2.32E-04	1.31E-04	0.00E+00	1.89E-04	8.93E-05	*4.09E-04*	0.32001849	0	0.46195154	0.21802997
	Aroclor 1254	0.0349875	0.0005	0.0095		0.15	0.0002836	0	0.000283556	8.198E-05	0.0000505	4.16E-04	1.94E-03	0.00E+00	5.60E-04	3.45E-04	*2.84E-03*	0.68157304	0	0.19704198	0.12138498
	Aroclor 1260	0.0528333	0.0005	0.0237	3.30E-03	0.28	0.0007064	0.00166024	0.002366642	0.0001238	0.0000505	2.54E-03	2.55E-03	5.98E-03	4.46E-04	1.82E-04	*9.16E-03*	0.27800939	0.65339823	0.04871777	0.01987461
	beta-BHC	0.0032192	0.000025	0.0003		3.22	8.507E-06	0	8.50668E-06	7.543E-06	0.000002525	1.86E-05	2.64E-06	0.00E+00	2.34E-06	7.85E-07	*5.77E-06*	0.45798026	0	0.4060795	0.13594024
	delta-BHC	0.0045254	0.000025	0.0003		1.29	7.561E-06	0	7.56149E-06	1.06E-05	0.000002525	2.07E-05	5.88E-06	0.00E+00	8.24E-06	1.96E-06	*1.61E-05*	0.36547543	0	0.5124818	0.12204277
	Endosulfan I	0.0019917	0.000025	0.0003	3.28E-04	1.21	7.561E-06	0.000164906	0.000172467	4.666E-06	0.000002525	1.80E-04	6.27E-06	1.37E-04	3.87E-06	2.09E-06	*1.49E-04*	0.04208808	0.91788341	0.0259741	0.01405442
	Endosulfan Sulfate	0.0036846	0.00005	0.0007		1.21	2.069E-05	0	2.06946E-05	8.633E-06	0.00000505	3.44E-05	1.72E-05	0.00E+00	7.16E-06	4.19E-06	*2.85E-05*	0.6019784	0	0.25112391	0.1468977
	Endrin Aldehyde	0.005535	0.00005	0.0014	1.70E-03	0.04	4.228E-05	0.000855866	0.00089815	1.297E-05	0.00000505	9.16E-04	1.06E-03	2.14E-02	3.24E-04	1.26E-04	*2.29E-02*	0.04615379	0.93417898	0.01415515	0.00551208
	gamma-Chlordane	0.0260692	0.000025	0.0006	2.50E-03	1.99	1.771E-05	0.001259038	0.001276748	6.108E-05	0.000002525	1.34E-03	8.89E-06	6.32E-04	3.07E-05	1.27E-06	*6.73E-04*	0.01321279	0.93933315	0.04557022	0.00188383
	Inorganics																				
X	Aluminum	10170.769	0.129	58.3333	1.69E+02	41.82	1.7411333	85.18035646	86.92148979	23.830112	0.013029	1.11E+02	4.16E-02	2.04E+00	5.70E-01	3.12E-04	*2.65E+00*	0.01571922	0.76902126	0.21514189	0.00011763
	Antimony	1.9965385	0.0013	0.0458		0.05	0.001368	0	0.001368032	0.0046779	0.0001313	6.18E-03	2.52E-02	0.00E+00	8.60E-02	2.41E-03	*1.14E-01*	0.22146401	0	0.75728049	0.02125551
X	Arsenic	61.526923	0.00695	1.5333	3.24	0.05	0.0457669	1.631679013	1.677445945	0.0735204	0.00070195	1.75E+00	8.35E-01	2.98E+01	1.34E+00	1.28E-02	*3.20E+01*	0.02612763	0.93150002	0.04197163	0.00040073
	Barium	67.111539	0.0339	13.9667	6.54	4.33	0.4168771	3.292635606	3.709512674	0.1572423	0.0034239	3.87E+00	9.63E-02	7.60E-01	3.63E-02	7.91E-04	*8.94E-01*	0.10771519	0.8507709	0.04062922	0.00088469
	Beryllium	0.5634608	0.00005	0.0040		0.53	0.0001189	0	0.000118894	0.0013202	0.00000505	1.44E-03	2.24E-04	0.00E+00	2.49E-03	9.52E-06	*2.72E-03*	0.08232871	0	0.91417438	0.00349691
	Cadmium	3.3711538	0.0000495	0.0465	0.36	0.78	0.0013879	0.181706013	0.183093945	0.0078986	4.9995E-06	1.91E-01	1.79E-03	2.34E-01	1.02E-02	6.45E-06	*2.46E-01*	0.00726675	0.95135255	0.04135453	2.6176E-05
	Chromium	183.73846	0.0031	0.8900	3.43	7.24	0.0265647	1.727633578	1.754198298	0.4304992	0.0003131	2.19E+00	3.67E-03	2.39E-01	5.95E-02	4.33E-05	*3.02E-01*	0.01215771	0.79067514	0.19702386	0.00014329
	Cobalt	14.392308	0.00048	0.3967	1.28	4.02	0.0118397	0.643167167	0.655006875	0.0337212	0.00004848	6.89E-01	2.94E-03	1.60E-01	8.39E-03	1.21E-05	*1.71E-01*	0.01718948	0.93378206	0.04895808	7.0386E-05
	Copper	174.8	0.0036	41.2000	8.85	12.23	1.2297376	4.454491933	5.684229533	0.4095564	0.0003636	6.09E+00	1.01E-01	3.64E-01	3.35E-02	2.97E-05	*4.98E-01*	0.20178986	0.73094562	0.06720485	5.9664E-05
	Cyanide	0.7215	0.0025	0.2467		51.90	0.0073625	0	0.007362508	0.0016905	0.0002525	9.31E-03	1.42E-04	0.00E+00	3.26E-05	4.87E-06	*1.79E-04*	0.79120109	0	0.18166436	0.02713454
X	Iron	20693.462	1.92	277.3333	1713.00	2.57	8.2778453	861.8996512	870.1774965	48.48478	0.19392	9.19E+02	3.23E+00	3.36E+02	1.89E+01	7.56E-02	*3.58E+02*	0.00900886	0.93801365	0.05276645	0.00021104
X	Lead	267.22308	0.0043	1.0133	24.37	6.43	0.030246	12.26151837	12.29176434	0.6261037	0.0004343	1.29E+01	4.70E-03	1.91E+00	9.73E-02	6.75E-05	*2.01E+00*	0.00234133	0.94915865	0.0484664	3.3619E-05
X	Manganese	336.58077	0.585	98.3000	189.80	70.76	2.9340584	95.49870253	98.43276093	0.7886087	0.059085	9.93E+01	4.15E-02	1.35E+00	1.11E-02	8.35E-04	*1.40E+00*	0.02955323	0.96190839	0.00794324	0.00059513
X	Mercury	1.4396146	0.00022	0.0065	0.05	0.03	0.000194	0.025373718	0.02556773	0.003373	0.00002222	2.90E-02	7.54E-03	9.86E-01	1.31E-01	8.63E-04	*1.13E+00*	0.00669862	0.87607454	0.11645965	0.00076719
	Nickel	22.588462	0.0017	0.0983	0.58	32.17	0.0029351	0.293606949	0.296542001	0.0529248	0.0001717	3.50E-01	9.12E-05	9.13E-03	1.65E-03	5.34E-06	*1.09E-02*	0.00839453	0.83974441	0.15136997	0.00049108
	Selenium	1.1884615	0.00075	0.4300	0.10	0.16	0.0128346	0.051381178	0.064215818	0.0027846	0.00007575	6.71E-02	7.98E-02	3.19E-01	1.73E-02	4.71E-04	*4.17E-01*	0.19134436	0.76601282	0.0415135	0.00112931
	Silver	0.4580769	0.00037	0.0273		145.71	0.0008158	0	0.000815844	0.0010733	0.00003737	1.93E-03	5.60E-06	0.00E+00	7.37E-06	2.56E-07	*1.32E-05*	0.42348778	0	0.55711424	0.01939799
	Thallium	1.5692308	0.00085	0.0650		0.06	0.0019401	0	0.00194012	0.0036767	0.00008585	5.70E-03	3.23E-02	0.00E+00	6.11E-02	1.43E-03	*9.48E-02*	0.3402121	0	0.64473356	0.01505433
X	Vanadium	40.338462	0.0019	0.1975	1.40	0.16	0.005895	0.706226894	0.712121874	0.094513	0.0001919	8.07E-01	3.76E-02	4.50E+00	6.03E-01	1.22E-03	*5.15E+00*	0.00730638	0.87531414	0.11714164	0.00023785
	Zinc	974.42308	0.0189	23.9333	37.72	128.66	0.7143621	18.98004758	19.69440971	2.2830733	0.0019089	2.20E+01	5.55E-03	1.48E-01	1.77E-02	1.48E-05	*1.71E-01*	0.03250145	0.86353834	0.10387336	8.685E-05

Table E.1-8. Exposure Calculations for Muskrat - Station 08

	Mean Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach 2																	
	Volatile Organics																				
	2-Butanone	0.0066667	0.0025			9.730183192	0	0	0	1.562E-05	0.0002525	2.68E-04	0.00E+00	0.00E+00	1.61E-06	2.60E-05	*2.76E-05*	0	0	0.0582575	0.9417425
	Acetone	0.0091667	0.0025			1367.050531	0	0	0	2.148E-05	0.0002525	2.74E-04	0.00E+00	0.00E+00	1.57E-08	1.85E-07	*2.00E-07*	0	0	0.07839147	0.92160853
	cis-1,2-Dichloroethene	0	0.0025			2504.114914	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E-07	*1.01E-07*	0	0	0	1
	Tetrachloroethene	0.0066667	0.0005			6.09153838	0	0	0	1.562E-05	0.0000505	6.61E-05	0.00E+00	0.00E+00	2.56E-06	8.29E-06	*1.09E-05*	0	0	0.23623715	0.76376285
	Trichloroethene	0.0066667	0.0015			3.04576919	0	0	0	1.562E-05	0.0001515	1.67E-04	0.00E+00	0.00E+00	5.13E-06	4.97E-05	*5.49E-05*	0	0	0.09346577	0.90653423
	Semivolatile Organics																				
	2-Methylnaphthalene	0.2183333	0.0025			62.53	0	0	0	0.0005116	0.0002525	7.64E-04	0.00E+00	0.00E+00	8.18E-06	4.04E-06	*1.22E-05*	0	0	0.66952641	0.33047359
	Acenaphthylene	0.1336667	0.0025			58.00	0	0	0	0.0003132	0.0002525	5.66E-04	0.00E+00	0.00E+00	5.40E-06	4.35E-06	*9.75E-06*	0	0	0.55363535	0.44636465
	Anthracene	0.0986667	0.0025			435.11	0	0	0	0.0002312	0.0002525	4.84E-04	0.00E+00	0.00E+00	5.31E-07	5.80E-07	*1.11E-06*	0	0	0.47795632	0.52204368
	Benzo(a)anthracene	0.4833333	0.0025			0.57	0	0	0	0.0011324	0.0002525	1.38E-03	0.00E+00	0.00E+00	2.00E-03	4.46E-04	*2.45E-03*	0	0	0.81768295	0.18231705
	Benzo(a)pyrene	0.6266667	0.0025		0.10	0.57	0	0.050026738	0.050026738	0.0014683	0.0002525	5.17E-02	0.00E+00	8.84E-02	2.60E-03	4.46E-04	*9.15E-02*	0	0.96674662	0.02837392	0.00487946
	Benzo(b)fluoranthene	1.2833333	0.0025		0.10	0.57	0	0.049132869	0.049132869	0.0030068	0.0002525	5.24E-02	0.00E+00	8.69E-02	5.32E-03	4.46E-04	*9.26E-02*	0	0.93778943	0.05739116	0.00481942
	Benzo(g,h,i)perylene	0.4133333	0.0025			58.00	0	0	0	0.0009684	0.0002525	1.22E-03	0.00E+00	0.00E+00	1.67E-05	4.35E-06	*2.11E-05*	0	0	0.79319213	0.20680787
	Benzo(k)fluoranthene	1.3533333	0.0025		0.27	0.57	0	0.135509008	0.135509008	0.0031709	0.0002525	1.39E-01	0.00E+00	2.40E-01	5.61E-03	4.46E-04	*2.46E-01*	0	0.97535952	0.02282305	0.00181743
	Carbazole	0.1276667	0			58.00014758	0	0	0	0.0002991	0	2.99E-04	0.00E+00	0.00E+00	5.16E-06	0.00E+00	*5.16E-06*	0	0	1	0
	Chrysene	0.6766667	0.0025		0.08	0.57	0	0.039711604	0.039711604	0.0015854	0.0002525	4.15E-02	0.00E+00	7.02E-02	2.80E-03	4.46E-04	*7.35E-02*	0	0.95576533	0.03815759	0.00607708
	Dibenz(a,h)anthracene	0.0933333	0.0025			0.57	0	0	0	0.0002187	0.0002525	4.71E-04	0.00E+00	0.00E+00	3.87E-04	4.46E-04	*8.33E-04*	0	0	0.46411138	0.53588862
	Dibenzofuran	0.1553333	0.0025			58.00	0	0	0	0.0003639	0.0002525	6.16E-04	0.00E+00	0.00E+00	6.27E-06	4.35E-06	*1.06E-05*	0	0	0.59039397	0.40960603
	Fluoranthene	0.8966667	0.0025		0.04	54.39	0	0.021314493	0.021314493	0.0021009	0.0002525	2.37E-02	0.00E+00	3.92E-04	3.86E-05	4.64E-06	*4.35E-04*	0	0.9005661	0.08876544	0.01066847
	Fluorene	0.0726667	0.0025			54.39	0	0	0	0.0001703	0.0002525	4.23E-04	0.00E+00	0.00E+00	3.13E-06	4.64E-06	*7.77E-06*	0	0	0.40273159	0.59726841
	Indeno(1,2,3-cd)pyrene	0.4	0.0025		0.17	0.57	0	0.08473378	0.08473378	0.0009372	0.0002525	8.59E-02	0.00E+00	1.50E-01	1.66E-03	4.46E-04	*1.52E-01*	0	0.98615396	0.01090738	0.00293866
	Naphthalene	0.0983333	0.0025			60.92	0	0	0	0.0002304	0.0002525	4.83E-04	0.00E+00	0.00E+00	3.78E-06	4.15E-06	*7.93E-06*	0	0	0.477112	0.522888
	N-nitrosodiphenylamine	0.1676667	0.0025			120.62	0	0	0	0.0003928	0.0002525	6.45E-04	0.00E+00	0.00E+00	3.26E-06	2.09E-06	*5.35E-06*	0	0	0.6087352	0.3912648
	Phenanthrene	0.4766667	0.0025		0.13	58.00	0	0.064551129	0.064551129	0.0011168	0.0002525	6.59E-02	0.00E+00	1.11E-03	1.93E-05	4.35E-06	*1.14E-03*	0	0.97922754	0.01694208	0.00383037
	Pyrene	1.15	0.0025		0.07	58.00	0	0.035452683	0.035452683	0.0026945	0.0002525	3.84E-02	0.00E+00	6.11E-04	4.65E-05	4.35E-06	*6.62E-04*	0	0.92325578	0.07016864	0.00657558
	Pesticides and PCBs																				
	4,4'-DDD	0.0066	0.00005	0.0033	3.41E-04	6.84	9.85E-05	0.000171557	0.000270056	1.546E-05	0.00000505	2.91E-04	1.44E-05	2.51E-05	2.26E-06	7.39E-07	*4.25E-05*	0.33898408	0.59041729	0.05321896	0.01737967
	4,4'-DDE	0.0039333	0.00005	0.0080	1.71E-04	0.83	0.0002388	8.5934E-05	0.000324718	9.216E-06	0.00000505	3.39E-04	2.89E-04	1.04E-04	1.11E-05	6.11E-06	*4.10E-04*	0.70441129	0.25350469	0.02718655	0.01489747
	4,4'-DDT	0.001935	0.00005	0.0011	3.11E-04	0.64	3.134E-05	0.000156368	0.000187709	4.534E-06	0.00000505	1.97E-04	4.87E-05	2.43E-04	7.05E-06	7.85E-06	*3.07E-04*	0.15885246	0.79257142	0.02297961	0.02559651
	Aldrin	0.00115	0.000025	0.0003		0.16	8.059E-06	0	8.05896E-06	2.694E-06	0.000002525	1.33E-05	5.01E-05	0.00E+00	1.68E-05	1.57E-05	*8.26E-05*	0.60692206	0	0.20291963	0.19015831
	alpha-Chlordane	0.0012667	0.000025	0.0006	1.30E-04	1.99	1.851E-05	6.5226E-05	8.37317E-05	2.968E-06	0.000002525	8.92E-05	9.29E-06	3.27E-05	1.49E-06	1.27E-06	*4.48E-05*	0.20740666	0.73103179	0.03326216	0.02829939
	Aroclor 1248	0.0225	0.0005	0.0025		0.57	7.462E-05	0	0.00007462	5.272E-05	0.0000505	1.78E-04	1.32E-04	0.00E+00	9.32E-05	8.93E-05	*3.14E-04*	0.41959654	0	0.29643635	0.2839671
	Aroclor 1254	0.0225	0.0005	0.0220		0.15	0.0006567	0	0.000656656	5.272E-05	0.0000505	7.60E-04	4.49E-03	0.00E+00	3.60E-04	3.45E-04	*5.19E-03*	0.86416489	0	0.06937668	0.06645843
	Aroclor 1260	0.0225	0.0005	0.0410	1.41E-03	0.28	0.0012238	0.000707042	0.00193081	5.272E-05	0.0000505	2.03E-03	4.41E-03	2.55E-03	1.90E-04	1.82E-04	*7.33E-03*	0.60164767	0.34760696	0.02591779	0.02482759
	beta-BHC	0.00115	0.000025	0.0003		3.22	7.462E-06	0	0.000007462	2.694E-06	0.000002525	1.27E-05	2.32E-06	0.00E+00	8.38E-07	7.85E-07	*3.94E-06*	0.58841852	0	0.21247176	0.19910972
	delta-BHC	0.0008733	0.000025	0.0003		1.29	7.462E-06	0	0.000007462	2.046E-06	0.000002525	1.20E-05	5.80E-06	0.00E+00	1.59E-06	1.96E-06	*9.35E-06*	0.62011665	0	0.17004758	0.20983577
	Endosulfan I	0.00115	0.000025	0.0003	1.89E-04	1.21	7.462E-06	9.52176E-05	0.00010268	2.694E-06	0.000002525	1.08E-04	6.19E-06	7.89E-05	2.23E-06	2.09E-06	*8.95E-05*	0.06915725	0.88246929	0.02497196	0.02340151
	Endosulfan Sulfate	0.00225	0.00005	0.0007		1.21	2.134E-05	0	2.13413E-05	5.272E-06	0.00000505	3.17E-05	1.77E-05	0.00E+00	4.37E-06	4.19E-06	*2.62E-05*	0.67401297	0	0.16649523	0.1594918
	Endrin Aldehyde	0.00126	0.00005	0.0030	3.87E-04	0.04	8.805E-05	0.000194831	0.000282883	2.952E-06	0.00000505	2.91E-04	2.20E-03	4.87E-03	7.37E-05	1.26E-04	*7.27E-03*	0.30270245	0.66978778	0.01014896	0.01736081
	gamma-Chlordane	0.0007833	0.000025	0.0003	7.52E-05	1.99	7.462E-06	3.78318E-05	4.52938E-05	1.835E-06	0.000002525	4.97E-05	3.74E-06	1.90E-05	9.21E-07	1.27E-06	*2.49E-05*	0.15027939	0.76190626	0.03696265	0.05085171
	Inorganics																				
X	Aluminum	5456.6667	0.1403333	52.7000	9.08E+01	41.82	1.5729896	45.6996714	47.272661	12.78497	0.014173667	6.01E+01	3.76E-02	1.09E+00	3.06E-01	3.39E-04	*1.44E+00*	0.02618516	0.76075077	0.21282813	0.00023595
	Antimony	1.03	0.0006	0.0550		0.05	0.0016416	0	0.00164164	0.0024133	0.0000606	4.12E-03	3.02E-02	0.00E+00	4.44E-02	1.11E-03	*7.57E-02*	0.39888909	0	0.5863862	0.01472471
X	Arsenic	18.733333	0.0126833	2.7000	0.99	0.05	0.0805896	0.496803436	0.577393036	0.022385	0.001281017	6.01E-01	1.47E+00	9.06E+00	4.08E-01	2.34E-02	*1.10E+01*	0.13407933	0.82654677	0.03724263	0.00213127
	Barium	18.9	0.0320833	9.9750	1.84	4.33	0.2977338	0.92727442	1.22500822	0.0442827	0.003240417	1.27E+00	6.88E-02	2.14E-01	1.02E-02	7.48E-04	*2.94E-01*	0.23396972	0.72868494	0.03479891	0.00254643
	Beryllium	0.2216667	4.567E-05	0.0065		0.53	0.000194	0	0.000194012	0.0005194	4.61234E-06	7.18E-04	3.66E-04	0.00E+00	9.79E-04	8.69E-06	*1.35E-03*	0.27021568	0	0.72336036	0.00642396
	Cadmium	0.6166667	0.00056	0.1105	0.07	0.78	0.0032982	0.033238486	0.03653669	0.0014449	0.00005656	3.80E-02	4.25E-03	4.29E-02	1.86E-03	7.29E-05	*4.90E-02*	0.08670791	0.87382088	0.03798429	0.00148693
	Chromium	54.4	0.0062	2.2000	1.02	7.24	0.0656656	0.51150568	0.57717128	0.1274592	0.0006262	7.05E-01	9.07E-03	7.07E-02	1.76E-02	8.65E-05	*9.74E-02*	0.0931088	0.72527591	0.18072739	0.0008879
	Cobalt	7.3	0.000985	0.5400	0.65	4.02	0.0161179	0.326224287	0.342342207	0.0171039	0.000099485	3.60E-01	4.01E-03	8.11E-02	4.25E-03	2.47E-05	*8.94E-02*	0.04482858	0.90732384	0.04757088	0.0002767
	Copper	73.666667	0.0071833	62.2500	3.73	12.23	1.858038	1.877274442	3.735312442	0.172601	0.000725517	3.91E+00	1.52E-01	1.53E-01	1.41E-02	5.93E-05	*3.20E-01*	0.47536701	0.48028853	0.04415885	0.00018562
	Cyanide	0.3033333	0.0025	0.2250		51.90	0.0067158	0	0.0067158	0.0007107	0.0002525	7.68E-03	1.29E-04	0.00E+00	1.37E-05	4.87E-06	*1.48E-04*	0.87456587	0	0.09255229	0.03288184
X	Iron	13236.667	1.2093333	342.5000	1095.73	2.57	10.22294	551.3180268	561.5409668	31.01351	0.122142667	5.93E+02	3.99E+00	2.15E+02	1.21E+01	4.76E-02	*2.31E+02*	0.01724877	0.93021727	0.05232788	0.00020609
	Lead	43.166667	0.0033083	0.9700	3.94	6.43	0.0289526	1.98070048	2.00965304	0.1011395	0.000334142	2.11E+00	4.50E-03	3.08E-01	1.57E-02	5.19E-05	*3.28E-01*	0.01371427	0.93821962	0.04790783	0.00015828
	Manganese	160.83333	0.5925	120.0000	90.70	70.76	3.58176	45.6335479	49.2153079	0.3768325	0.0598425	4.97E+01	5.06E-02	6.45E-01	5.33E-03	8.46E-04	*7.02E-01*	0.0721373	0.91906799	0.00758948	0.00120524
	Mercury	0.4566667	0.0001158	0.0140	0.02	0.03	0.0004179	0.008048913	0.008466785	0.00107	1.16992E-05	9.55E-03	1.62E-02	3.13E-01	4.16E-02	4.55E-04	*3.71E-01*	0.04376332	0.84295455	0.11205689	0.00122524
	Nickel	12.2	0.0016333	0.1025	0.32	32.17	0.0030594	0.158576748	0.161636168	0.0285846	0.000164967	1.90E-01	9.51E-05	4.93E-03	8.89E-04	5.13E-06	*5.92E-03*	0.01606959	0.83292348	0.15014045	0.00086649
	Selenium	0.39	0.00075	0.3950	0.03	0.16	0.01179	0.016861008	0.028650968	0.0009138	0.00007575	2.96E-02	7.33E-02	1.05E-01	5.68E-03	4.71E-04	*1.84E-01*	0.39776537	0.56885056	0.03082844	0.00255563
	Silver	0.1516667	0.000375	0.0195		145.71	0.000582	0	0.000582036	0.0003554	0.000037875	9.75E-04	3.99E-06	0.00E+00	2.44E-06	2.60E-07	*6.69E-06*	0.59679713	0	0.36436731	0.03883556
	Thallium	1.4333333	0.00085	0.1325		0.06	0.0039549	0	0.00395486	0.0033583	0.00008585	7.40E-03	6.58E-02	0.00E+00	5.58E-02	1.43E-03	*1.23E-01*	0.53451206	0	0.45388504	0.0116029
X	Vanadium	14.9	0.0009333	0.1575	0.52	0.16	0.0047011	0.260862223	0.265563283	0.0349107	9.42667E-05	3.01E-01	3.00E-02	1.66E+00	2.23E-01	6.01E-04	*1.92E+00*	0.01564057	0.8678968	0.11614899	0.00031363
	Zinc	350	0.05855	27.7500	13.55	128.66	0.828282	6.817384368	7.645666368	0.82005	0.00591355	8.47E+00	6.44E-03	5.30E-02	6.37E-03	4.60E-05	*6.58E-02*	0.09777127	0.80473114	0.09679955	0.00069804

Table E.1-9. Exposure Calculations for Muskrat - Station 09

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach 2																	
	Volatile Organics																				
	2-Butanone	0.00655	0.0025			9.730183192	0	0	0	1.535E-05	0.0002525	2.68E-04	0.00E+00	0.00E+00	1.58E-06	2.60E-05	*2.75E-05*	0	0	0.0572964	0.9427036
	Acetone	0.00765	0.0025			1367.050531	0	0	0	1.792E-05	0.0002525	2.70E-04	0.00E+00	0.00E+00	1.31E-08	1.85E-07	*1.98E-07*	0	0	0.06628093	0.93371907
	cis-1,2-Dichloroethene	0	0.0025			2504.114914	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E-07	*1.01E-07*	0	0	0	1
	Tetrachloroethene	0.00655	0.0005			6.09153838	0	0	0	1.535E-05	0.0000505	6.58E-05	0.00E+00	0.00E+00	2.52E-06	8.29E-06	*1.08E-05*	0	0	0.23306653	0.76693347
	Trichloroethene	0.00655	0.0015			3.04576919	0	0	0	1.535E-05	0.0001515	1.67E-04	0.00E+00	0.00E+00	5.04E-06	4.97E-05	*5.48E-05*	0	0	0.09198057	0.90801943
	Semivolatile Organics																				
	2-Methylnaphthalene	0.219	0.0025			62.53	0	0	0	0.0005131	0.0002525	7.66E-04	0.00E+00	0.00E+00	8.21E-06	4.04E-06	*1.22E-05*	0	0	0.67020064	0.32979936
	Acenaphthylene	0.2052	0.0025			58.00	0	0	0	0.0004808	0.0002525	7.33E-04	0.00E+00	0.00E+00	8.29E-06	4.35E-06	*1.26E-05*	0	0	0.65565847	0.34434153
	Anthracene	0.29	0.0025			435.11	0	0	0	0.0006795	0.0002525	9.32E-04	0.00E+00	0.00E+00	1.56E-06	5.80E-07	*2.14E-06*	0	0	0.72906853	0.27093147
	Benzo(a)anthracene	0.2122	0.0025			0.57	0	0	0	0.0004972	0.0002525	7.50E-04	0.00E+00	0.00E+00	8.79E-04	4.46E-04	*1.33E-03*	0	0	0.66319169	0.33680831
	Benzo(a)pyrene	0.209	0.0025		0.03	0.57	0	0.016684449	0.016684449	0.0004897	0.0002525	1.74E-02	0.00E+00	2.95E-02	8.66E-04	4.46E-04	*3.08E-02*	0	0.95741077	0.02809991	0.01448931
	Benzo(b)fluoranthene	0.3961	0.0025		0.03	0.57	0	0.015164828	0.015164828	0.0009281	0.0002525	1.63E-02	0.00E+00	2.68E-02	1.64E-03	4.46E-04	*2.89E-02*	0	0.92777399	0.05677823	0.01544778
	Benzo(g,h,i)perylene	0.2099	0.0025			58.00	0	0	0	0.0004918	0.0002525	7.44E-04	0.00E+00	0.00E+00	8.48E-06	4.35E-06	*1.28E-05*	0	0	0.66075311	0.33924689
	Benzo(k)fluoranthene	0.3614	0.0025		0.07	0.57	0	0.036186913	0.036186913	0.0008468	0.0002525	3.73E-02	0.00E+00	6.40E-02	1.50E-03	4.46E-04	*6.59E-02*	0	0.97051829	0.02270976	0.00677195
	Carbazole	0.245	0			58.00014758	0	0	0	0.000574	0	5.74E-04	0.00E+00	0.00E+00	9.90E-06	0.00E+00	*9.90E-06*	0	0	1	0
	Chrysene	0.2519	0.0025		0.03	0.57	0	0.01478328	0.01478328	0.0005902	0.0002525	1.56E-02	0.00E+00	2.61E-02	1.04E-03	4.46E-04	*2.76E-02*	0	0.94607048	0.03777053	0.01615898
	Dibenz(a,h)anthracene	0.205	0.0025			0.57	0	0	0	0.0004803	0.0002525	7.33E-04	0.00E+00	0.00E+00	8.49E-04	4.46E-04	*1.30E-03*	0	0	0.65543828	0.34456172
	Dibenzofuran	0.247	0.0025			58.00	0	0	0	0.0005787	0.0002525	8.31E-04	0.00E+00	0.00E+00	9.98E-06	4.35E-06	*1.43E-05*	0	0	0.69623	0.30377
	Fluoranthene	0.3384	0.0025		0.02	54.39	0	0.008044042	0.008044042	0.0007929	0.0002525	9.09E-03	0.00E+00	1.48E-04	1.46E-05	4.64E-06	*1.67E-04*	0	0.88499024	0.08723018	0.02777957
	Fluorene	0.262	0.0025			54.39	0	0	0	0.0006139	0.0002525	8.66E-04	0.00E+00	0.00E+00	1.13E-05	4.64E-06	*1.59E-05*	0	0	0.70855274	0.29144726
	Indeno(1,2,3-cd)pyrene	0.1875	0.0025		0.08	0.57	0	0.039718959	0.039718959	0.0004393	0.0002525	4.04E-02	0.00E+00	7.02E-02	7.77E-04	4.46E-04	*7.14E-02*	0	0.98288049	0.01087117	0.00624833
	Naphthalene	0.222	0.0025			60.92	0	0	0	0.0005201	0.0002525	7.73E-04	0.00E+00	0.00E+00	8.54E-06	4.15E-06	*1.27E-05*	0	0	0.67320092	0.32679908
	N-nitrosodiphenylamine	0.217	0.0025			120.62	0	0	0	0.0005084	0.0002525	7.61E-04	0.00E+00	0.00E+00	4.22E-06	2.09E-06	*6.31E-06*	0	0	0.66816965	0.33183035
	Phenanthrene	0.306	0.0025		0.08	58.00	0	0.041439116	0.041439116	0.000717	0.0002525	4.24E-02	0.00E+00	7.14E-04	1.24E-05	4.35E-06	*7.31E-04*	0	0.97714005	0.01690597	0.00595398
	Pyrene	0.371	0.0025		0.02	58.00	0	0.011437344	0.011437344	0.0008693	0.0002525	1.26E-02	0.00E+00	1.97E-04	1.50E-05	4.35E-06	*2.17E-04*	0	0.91068203	0.06921302	0.02010495
	Pesticides and PCBs																				
	4,4'-DDD	0.016009	0.00005	0.0033	8.27E-04	6.84	9.85E-05	0.00041613	0.000514629	3.751E-05	0.00000505	5.57E-04	1.44E-05	6.09E-05	5.49E-06	7.39E-07	*8.15E-05*	0.17677778	0.74684026	0.06731859	0.00906337
	4,4'-DDE	0.0075839	0.00005	0.0080	3.29E-04	0.83	0.0002388	0.00016569	0.000404474	1.777E-05	0.00000505	4.27E-04	2.89E-04	2.00E-04	2.15E-05	6.11E-06	*5.17E-04*	0.55882932	0.38776689	0.04158521	0.01181858
	4,4'-DDT	0.003978	0.00005	0.0011	6.39E-04	0.64	3.134E-05	0.000321464	0.000352805	9.32E-06	0.00000505	3.67E-04	4.87E-05	5.00E-04	1.45E-05	7.85E-06	*5.71E-04*	0.08535544	0.8755067	0.02538421	0.01375365
	Aldrin	0.000618	0.000025	0.0003		0.16	8.059E-06	0	8.05896E-06	1.448E-06	0.000002525	1.20E-05	5.01E-05	0.00E+00	9.00E-06	1.57E-05	*7.48E-05*	0.66979756	0	0.12034424	0.2098582
	alpha-Chlordane	0.00083	0.000025	0.0006	8.49E-05	1.99	1.851E-05	4.27402E-05	6.12459E-05	1.945E-06	0.000002525	6.57E-05	9.29E-06	2.14E-05	9.76E-07	1.27E-06	*3.30E-05*	0.28160368	0.65038068	0.02959251	0.03842313
	Aroclor 1248	0.0217	0.0005	0.0025		0.57	7.462E-05	0	0.00007462	5.084E-05	0.0000505	1.76E-04	1.32E-04	0.00E+00	8.99E-05	8.93E-05	*3.11E-04*	0.42406618	0	0.28894183	0.28699199
	Aroclor 1254	0.0217	0.0005	0.0220		0.15	0.0006567	0	0.000656656	5.084E-05	0.0000505	7.58E-04	4.49E-03	0.00E+00	3.47E-04	3.45E-04	*5.18E-03*	0.86630182	0	0.06707541	0.06662277
	Aroclor 1260	0.0217	0.0005	0.0410	1.36E-03	0.28	0.0012238	0.000681903	0.001905671	5.084E-05	0.0000505	2.01E-03	4.41E-03	2.46E-03	1.83E-04	1.82E-04	*7.23E-03*	0.60974562	0.33975991	0.02533271	0.02516176
	beta-BHC	0.000726	0.000025	0.0003		3.22	7.462E-06	0	0.000007462	1.701E-06	0.000002525	1.17E-05	2.32E-06	0.00E+00	5.29E-07	7.85E-07	*3.63E-06*	0.6384316	0	0.1455352	0.21603321
	delta-BHC	0.000978	0.000025	0.0003		1.29	7.462E-06	0	0.000007462	2.291E-06	0.000002525	1.23E-05	5.80E-06	0.00E+00	1.78E-06	1.96E-06	*9.54E-06*	0.60773123	0	0.18662398	0.20564478
	Endosulfan I	0.000927	0.000025	0.0003	1.53E-04	1.21	7.462E-06	7.67537E-05	8.42157E-05	2.172E-06	0.000002525	8.89E-05	6.19E-06	6.36E-05	1.80E-06	2.09E-06	*7.37E-05*	0.0839251	0.86324819	0.02442804	0.02839867
	Endosulfan Sulfate	0.00217	0.00005	0.0007		1.21	2.134E-05	0	2.13413E-05	5.084E-06	0.00000505	3.15E-05	1.77E-05	0.00E+00	4.22E-06	4.19E-06	*2.61E-05*	0.67802678	0	0.16153164	0.16044159
	Endrin Aldehyde	0.002	0.00005	0.0030	6.15E-04	0.04	8.805E-05	0.000309256	0.000397307	4.686E-06	0.00000505	4.07E-04	2.20E-03	7.73E-03	1.17E-04	1.26E-04	*1.02E-02*	0.21631988	0.7597613	0.01151228	0.01240654
	gamma-Chlordane	0.000761	0.000025	0.0003	7.30E-05	1.99	7.462E-06	3.67532E-05	4.42152E-05	1.783E-06	0.000002525	4.85E-05	3.74E-06	1.84E-05	8.95E-07	1.27E-06	*2.43E-05*	0.15378196	0.75743538	0.03674575	0.05203691
	Inorganics																				
X	Aluminum	4247	0.1403333	52.7000	7.07E+01	41.82	1.5729896	35.56869355	37.14168315	9.950721	0.014173667	4.71E+01	3.76E-02	8.51E-01	2.38E-01	3.39E-04	*1.13E+00*	0.03339214	0.75506851	0.21123846	0.00030089
	Antimony	0.814999	0.0006	0.0550		0.05	0.0016416	0	0.00164164	0.0019095	0.0000606	3.61E-03	3.02E-02	0.00E+00	3.51E-02	1.11E-03	*6.64E-02*	0.45452347	0	0.52869811	0.01677842
X	Arsenic	29.27	0.0126833	2.7000	1.54	0.05	0.0805896	0.77623327	0.85682287	0.0349756	0.001281017	8.93E-01	1.47E+00	1.42E+01	6.38E-01	2.34E-02	*1.63E+01*	0.09023788	0.86916482	0.03916292	0.00143438
	Barium	21	0.0320833	9.9750	2.05	4.33	0.2977338	1.030304911	1.328038711	0.049203	0.003240417	1.38E+00	6.88E-02	2.38E-01	1.14E-02	7.48E-04	*3.19E-01*	0.21567378	0.74633702	0.0356419	0.00234731
	Beryllium	0.16305	4.567E-05	0.0065		0.53	0.000194	0	0.000194012	0.000382	4.61234E-06	5.81E-04	3.66E-04	0.00E+00	7.20E-04	8.69E-06	*1.09E-03*	0.33412871	0	0.65792789	0.0079434
	Cadmium	0.485	0.00056	0.1105	0.05	0.78	0.0032982	0.026141618	0.029439822	0.0011364	0.00005656	3.06E-02	4.25E-03	3.37E-02	1.46E-03	7.29E-05	*3.95E-02*	0.10766925	0.85338826	0.0370961	0.00184639
	Chromium	44.64	0.0062	2.2000	0.83	7.24	0.0656656	0.419735543	0.485401143	0.1045915	0.0006262	5.91E-01	9.07E-03	5.80E-02	1.45E-02	8.65E-05	*8.16E-02*	0.11118101	0.71067074	0.17708801	0.00106024
	Cobalt	5.94	0.000985	0.5400	0.53	4.02	0.0161179	0.265448256	0.281566176	0.0139174	0.000099485	2.96E-01	4.01E-03	6.60E-02	3.46E-03	2.47E-05	*7.35E-02*	0.05452924	0.89804956	0.04708463	0.00033657
	Copper	46.71	0.0071833	62.2500	2.37	12.23	1.858038	1.190327907	3.048365907	0.1094415	0.000725517	3.16E+00	1.52E-01	9.73E-02	8.95E-03	5.93E-05	*2.58E-01*	0.58825981	0.37686101	0.03464948	0.0002297
	Cyanide	0.285625	0.0025	0.2250		51.90	0.0067158	0	0.0067158	0.0006692	0.0002525	7.64E-03	1.29E-04	0.00E+00	1.29E-05	4.87E-06	*1.47E-04*	0.87931692	0	0.08762261	0.03306047
X	Iron	10919	1.2093333	342.5000	903.87	2.57	10.22294	454.7853086	465.0082486	25.583217	0.122142667	4.91E+02	3.99E+00	1.77E+02	9.97E+00	4.76E-02	*1.91E+02*	0.0208328	0.92678357	0.05213472	0.00024891
	Lead	30.21	0.0033083	0.9700	2.76	6.43	0.0289526	1.386184435	1.415136995	0.070782	0.000334142	1.49E+00	4.50E-03	2.15E-01	1.10E-02	5.19E-05	*2.31E-01*	0.01948023	0.93267047	0.04762448	0.00022482
X	Manganese	364.82	0.5925	120.0000	205.73	70.76	3.58176	103.5110733	107.0928333	0.8547733	0.0598425	1.08E+02	5.06E-02	1.46E+00	1.21E-02	8.46E-04	*1.53E+00*	0.03316216	0.95836976	0.00791402	0.00055406
	Mercury	0.25815	0.0001158	0.0140	0.01	0.03	0.0004179	0.004549985	0.004967857	0.0006048	1.16992E-05	5.58E-03	1.62E-02	1.77E-01	2.35E-02	4.55E-04	*2.17E-01*	0.07482842	0.81476681	0.1083098	0.00209497
	Nickel	8.01	0.0016333	0.1025	0.21	32.17	0.0030594	0.104114734	0.107174154	0.0187674	0.000164967	1.26E-01	9.51E-05	3.24E-03	5.83E-04	5.13E-06	*3.92E-03*	0.0242606	0.82560924	0.14882201	0.00130815
	Selenium	0.431	0.00075	0.3950	0.04	0.16	0.01179	0.018633576	0.030423536	0.0010098	0.00007575	3.15E-02	7.33E-02	1.16E-01	6.28E-03	4.71E-04	*1.96E-01*	0.37417612	0.5913709	0.03204891	0.00240407
	Silver	0.1505	0.000375	0.0195		145.71	0.000582	0	0.000582036	0.0003526	0.000037875	9.73E-04	3.99E-06	0.00E+00	2.42E-06	2.60E-07	*6.67E-06*	0.5984746	0	0.36258068	0.03894471
	Thallium	0.916	0.00085	0.1325		0.06	0.0039549	0	0.00395486	0.0021462	0.00008585	6.19E-03	6.58E-02	0.00E+00	3.57E-02	1.43E-03	*1.03E-01*	0.63923149	0	0.34689242	0.0138761
X	Vanadium	11.34	0.0009333	0.1575	0.39	0.16	0.0047011	0.19853541	0.20323647	0.0265696	9.42667E-05	2.30E-01	3.00E-02	1.27E+00	1.69E-01	6.01E-04	*1.47E+00*	0.02044825	0.86357156	0.11557016	0.00041003
	Zinc	156.45	0.05855	27.7500	6.06	128.66	0.828282	3.047370812	3.875652812	0.3665624	0.00591355	4.25E+00	6.44E-03	2.37E-02	2.85E-03	4.60E-05	*3.30E-02*	0.19497573	0.71734428	0.08628796	0.00139204

Table E.1-10. Exposure Calculations for Muskrat - Station 10

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0.01375	0.0025			9.730183192	0	0	0	3.22163E-05	0.0002525	2.85E-04	0.00E+00	0.00E+00	3.31E-06	2.60E-05	*2.93E-05*	0	0	0.11315213	0.88684787
	Acetone	0.087	0.0025			1367.050531	0	0	0	0.000203841	0.0002525	4.56E-04	0.00E+00	0.00E+00	1.49E-07	1.85E-07	*3.34E-07*	0	0	0.4466857	0.5533143
	cis-1,2-Dichloroethene	0.0426667	0.0005833			2504.114914	0	0	0	9.9968E-05	5.89167E-05	1.59E-04	0.00E+00	0.00E+00	3.99E-08	2.35E-08	*6.34E-08*	0	0	0.62918596	0.37081404
	Tetrachloroethene	0.080625	0.0005			6.09153838	0	0	0	0.000188904	0.0000505	2.39E-04	0.00E+00	0.00E+00	3.10E-05	8.29E-06	*3.93E-05*	0	0	0.78905983	0.21094017
	Trichloroethene	0.034875	0.0005			3.04576919	0	0	0	8.17121E-05	0.0000505	1.32E-04	0.00E+00	0.00E+00	2.68E-05	1.66E-05	*4.34E-05*	0	0	0.61803806	0.38196194
	Semivolatile Organics																				
	2-Methylnaphthalene	0.1595	0.0025			62.53	0	0	0	0.000373709	0.0002525	6.26E-04	0.00E+00	0.00E+00	5.98E-06	4.04E-06	*1.00E-05*	0	0	0.59677967	0.40322033
	Acenaphthylene	0.15825	0.0025			58.00	0	0	0	0.00037078	0.0002525	6.23E-04	0.00E+00	0.00E+00	6.39E-06	4.35E-06	*1.07E-05*	0	0	0.59488496	0.40511504
	Anthracene	0.186375	0.0025			435.11	0	0	0	0.000436677	0.0002525	6.89E-04	0.00E+00	0.00E+00	1.00E-06	5.80E-07	*1.58E-06*	0	0	0.63362077	0.36637923
	Benzo(a)anthracene	0.3475	0.0025			0.57	0	0	0	0.000814193	0.0002525	1.07E-03	0.00E+00	0.00E+00	1.44E-03	4.46E-04	*1.89E-03*	0	0	0.76328698	0.23671302
	Benzo(a)pyrene	0.3675	0.0025		0.06	0.57	0	0.029337489	0.029337489	0.000861053	0.0002525	3.05E-02	0.00E+00	5.19E-02	1.52E-03	4.46E-04	*5.38E-02*	0	0.96343138	0.02827662	0.008292
	Benzo(b)fluoranthene	0.4591667	0.0025		0.03	0.57	0	0.017579357	0.017579357	0.001075828	0.0002525	1.89E-02	0.00E+00	3.11E-02	1.90E-03	4.46E-04	*3.34E-02*	0	0.92974669	0.05689895	0.01335436
	Benzo(g,h,i)perylene	0.29125	0.0025			58.00	0	0	0	0.000682399	0.0002525	9.35E-04	0.00E+00	0.00E+00	1.18E-05	4.35E-06	*1.61E-05*	0	0	0.72991728	0.27008272
	Benzo(k)fluoranthene	0.3616667	0.0025		0.07	0.57	0	0.036213614	0.036213614	0.000847385	0.0002525	3.73E-02	0.00E+00	6.40E-02	1.50E-03	4.46E-04	*6.60E-02*	0	0.97052313	0.02270988	0.00676699
	Carbazole	0.3	0			58.00014758	0	0	0	0.0007029	0	7.03E-04	0.00E+00	0.00E+00	1.21E-05	0.00E+00	*1.21E-05*	0	0	1	0
	Chrysene	0.4075	0.0025		0.05	0.57	0	0.023914993	0.023914993	0.000954773	0.0002525	2.51E-02	0.00E+00	4.23E-02	1.69E-03	4.46E-04	*4.44E-02*	0	0.95194412	0.03800503	0.01005085
	Dibenz(a,h)anthracene	0.1985	0.0025			0.57	0	0	0	0.000465086	0.0002525	7.18E-04	0.00E+00	0.00E+00	8.22E-04	4.46E-04	*1.27E-03*	0	0	0.64812555	0.35187445
	Dibenzofuran	0.3	0.0025			58.00	0	0	0	0.0007029	0.0002525	9.55E-04	0.00E+00	0.00E+00	1.21E-05	4.35E-06	*1.65E-05*	0	0	0.73571279	0.26428721
	Fluoranthene	0.5858333	0.0025		0.03	54.39	0	0.013925733	0.013925733	0.001372607	0.0002525	1.56E-02	0.00E+00	2.56E-04	2.52E-05	4.64E-06	*2.86E-04*	0	0.89549713	0.08826581	0.01623706
	Fluorene	0.19675	0.0025			54.39	0	0	0	0.000460985	0.0002525	7.13E-04	0.00E+00	0.00E+00	8.48E-06	4.64E-06	*1.31E-05*	0	0	0.64610341	0.35389659
	Indeno(1,2,3-cd)pyrene	0.29875	0.0025		0.13	0.57	0	0.063285542	0.063285542	0.000699971	0.0002525	6.42E-02	0.00E+00	1.12E-01	1.24E-03	4.46E-04	*1.14E-01*	0	0.98517278	0.01089653	0.00393069
	Naphthalene	0.17425	0.0025			60.92	0	0	0	0.000408268	0.0002525	6.61E-04	0.00E+00	0.00E+00	6.70E-06	4.15E-06	*1.08E-05*	0	0	0.61786876	0.38213124
	N-nitrosodiphenylamine	0.42	0.0025			120.62	0	0	0	0.00098406	0.0002525	1.24E-03	0.00E+00	0.00E+00	8.16E-06	2.09E-06	*1.03E-05*	0	0	0.79580449	0.20419551
	Phenanthrene	0.375	0.0025		0.10	58.00	0	0.050783231	0.050783231	0.000878625	0.0002525	5.19E-02	0.00E+00	8.76E-04	1.51E-05	4.35E-06	*8.95E-04*	0	0.97821171	0.01692451	0.00486378
	Pyrene	0.569	0.0025		0.03	58.00	0	0.017541371	0.017541371	0.001333167	0.0002525	1.91E-02	0.00E+00	3.02E-04	2.30E-05	4.35E-06	*3.30E-04*	0	0.91709814	0.06970065	0.01320121
	Pesticides and PCBs																				
	4,4'-DDD	0.0735667	0.00005	0.0006	3.80E-03	6.84	1.925E-05	0.001912256	0.001931508	0.000172367	0.00000505	2.11E-03	2.82E-06	2.80E-04	2.52E-05	7.39E-07	*3.09E-04*	0.0091288	0.90674459	0.08173202	0.00239459
	4,4'-DDE	0.053675	0.00005	0.0010	2.33E-03	0.83	2.91E-05	0.001172671	0.001201773	0.000125761	0.00000505	1.33E-03	3.52E-05	1.42E-03	1.52E-04	6.11E-06	*1.61E-03*	0.02183863	0.87999826	0.09437347	0.00378963
	4,4'-DDT	0.0019342	0.00005	0.0011	3.11E-04	0.64	3.209E-05	0.000156301	0.000188388	4.53175E-06	0.00000505	1.98E-04	4.99E-05	2.43E-04	7.04E-06	7.85E-06	*3.08E-04*	0.16207857	0.78952127	0.02289117	0.02550899
	Aldrin	0.0052088	0.000025	0.0003		0.16	9.104E-06	0	9.10364E-06	1.22041E-05	0.000002525	2.38E-05	5.66E-05	0.00E+00	7.59E-05	1.57E-05	*1.48E-04*	0.3819804	0	0.51207291	0.10594669
	alpha-Chlordane	0.008945	2.173E-05	0.0006	9.15E-04	1.99	1.866E-05	0.000460615	0.00047927	2.09581E-05	2.19459E-06	5.02E-04	9.36E-06	2.31E-04	1.05E-05	1.10E-06	*2.52E-04*	0.03713006	0.91678783	0.04171411	0.00436801
	Aroclor 1248	0.16525	0.0005	0.0025		0.57	7.462E-05	0	0.00007462	0.000387181	0.0000505	5.12E-04	1.32E-04	0.00E+00	6.84E-04	8.93E-05	*9.06E-04*	0.14565663	0	0.75576846	0.09857491
	Aroclor 1254	0.01435	0.0005	0.0195		0.15	0.000582	0	0.000582036	3.36221E-05	0.0000505	6.66E-04	3.98E-03	0.00E+00	2.30E-04	3.45E-04	*4.55E-03*	0.87372058	0	0.05047158	0.07580784
	Aroclor 1260	0.1045	0.0005	0.0215	6.53E-03	0.28	0.0006417	0.003283818	0.00392555	0.000244844	0.0000505	4.22E-03	2.31E-03	1.18E-02	8.83E-04	1.82E-04	*1.52E-02*	0.152037	0.7779912	0.0580075	0.01196429
	beta-BHC	0.0009213	0.000025	0.0003		3.22	7.611E-06	0	7.61124E-06	2.15849E-06	0.000002525	1.23E-05	2.37E-06	0.00E+00	6.71E-07	7.85E-07	*3.82E-06*	0.6190653	0	0.17556213	0.20537257
	delta-BHC	0.0005313	0.000025	0.0003		1.29	7.611E-06	0	7.61124E-06	1.24472E-06	0.000002525	1.14E-05	5.92E-06	0.00E+00	9.67E-07	1.96E-06	*8.85E-06*	0.66876967	0	0.10936853	0.2218618
	Endosulfan I	0.0009213	0.000025	0.0006	1.52E-04	1.21	1.866E-05	7.62776E-05	9.49326E-05	2.15849E-06	0.000002525	9.96E-05	1.55E-05	6.32E-05	1.79E-06	2.09E-06	*8.26E-05*	0.18726902	0.76571558	0.02166808	0.02534732
	Endosulfan Sulfate	0.0018063	0.00005	0.0009		1.21	2.821E-05	0	2.82064E-05	4.23204E-06	0.00000505	3.75E-05	2.34E-05	0.00E+00	3.51E-06	4.19E-06	*3.11E-05*	0.75240227	0	0.11288941	0.13470832
	Endrin Aldehyde	0.0047	0.00005	0.0022	1.44E-03	0.04	6.567E-05	0.000726751	0.000792417	1.10121E-05	0.00000505	8.08E-04	1.64E-03	1.82E-02	2.75E-04	1.26E-04	*2.02E-02*	0.08122115	0.89891179	0.01362076	0.0062463
	gamma-Chlordane	0.0080217	2.163E-05	0.0003	7.70E-04	1.99	7.611E-06	0.000387414	0.000395025	1.87948E-05	2.18449E-06	4.16E-04	3.82E-06	1.94E-04	9.43E-06	1.10E-06	*2.09E-04*	0.01829605	0.93127361	0.04517923	0.00525112
	Inorganics																				
X	Aluminum	23990	0.3861143	47.9000	3.99E+02	41.82	1.4297192	200.9166372	202.3463564	56.20857	0.038997543	2.59E+02	3.42E-02	4.80E+00	1.34E+00	9.33E-04	*6.18E+00*	0.00552882	0.77695807	0.2173623	0.00015081
	Antimony	14.6	0.0006929	0.0498		0.05	0.0014849	0	0.001484938	0.0342078	6.99786E-05	3.58E-02	2.73E-02	0.00E+00	6.29E-01	1.29E-03	*6.58E-01*	0.04152196	0	0.9565213	0.00195675
X	Arsenic	862.91667	0.0245857	3.7500	45.48	0.05	0.11193	22.8843398	22.9962698	1.031125013	0.002483157	2.40E+01	2.04E+00	4.17E+02	1.88E+01	4.53E-02	*4.38E+02*	0.00465795	0.95232859	0.04291012	0.00010334
	Barium	68.891667	0.0373429	8.8000	6.72	4.33	0.2626624	3.379972503	3.642634903	0.161413175	0.003771629	3.81E+00	6.07E-02	7.81E-01	3.73E-02	8.71E-04	*8.79E-01*	0.06897974	0.88763985	0.04238992	0.0009905
	Beryllium	1.5383333	6.379E-05	0.0060		0.53	0.0001791	0	0.000179088	0.003604315	6.44236E-06	3.79E-03	3.37E-04	0.00E+00	6.79E-03	1.21E-05	*7.14E-03*	0.0472547	0	0.9510454	0.0016999
	Cadmium	13.441667	0.00043	0.0570	1.44	0.78	0.0017013	0.724509118	0.726210454	0.031493825	0.00004343	7.58E-01	2.19E-03	9.34E-01	4.06E-02	5.60E-05	*9.77E-01*	0.00224525	0.95613502	0.04156242	5.7315E-05
X	Chromium	1375.5	0.0257857	0.8950	25.70	7.24	0.026714	12.9333835	12.96009746	3.2227965	0.002604357	1.62E+01	3.69E-03	1.79E+00	4.45E-01	3.60E-04	*2.24E+00*	0.00165049	0.79907231	0.1991163	0.00016091
	Cobalt	22.025	0.0014686	0.4850	1.96	4.02	0.0144763	0.984258894	0.998735174	0.051604575	0.000148326	1.05E+00	3.60E-03	2.45E-01	1.28E-02	3.69E-05	*2.61E-01*	0.01378053	0.9369539	0.04912438	0.0001412
X	Copper	1707.1667	0.0215429	54.3500	86.46	12.23	1.6222388	43.50434865	45.12658745	3.9998915	0.002175829	4.91E+01	1.33E-01	3.56E+00	3.27E-01	1.78E-04	*4.02E+00*	0.03302022	0.88551882	0.08141667	4.4288E-05
	Cyanide	0.455	0.0025	0.2675		51.90	0.0079843	0	0.00798434	0.001066065	0.0002525	9.30E-03	1.54E-04	0.00E+00	2.05E-05	4.87E-06	*1.79E-04*	0.85826309	0	0.11459485	0.02714206
X	Iron	33225	2.401	577.5000	2750.36	2.57	17.23722	1383.84851	1401.08573	77.846175	0.242501	1.48E+03	6.72E+00	5.39E+02	3.03E+01	9.45E-02	*5.77E+02*	0.01165327	0.93555466	0.05262812	0.00016394
X	Lead	589.5	0.0130729	0.5150	53.76	6.43	0.0153717	27.04917989	27.06455161	1.3811985	0.001320358	2.84E+01	2.39E-03	4.20E+00	2.15E-01	2.05E-04	*4.42E+00*	0.00054036	0.95085995	0.04855328	4.6415E-05
X	Manganese	531.5	0.4697143	88.7000	299.72	70.76	2.6475176	150.803507	153.4510246	1.2453045	0.047441143	1.55E+02	3.74E-02	2.13E+00	1.76E-02	6.70E-04	*2.19E+00*	0.01710904	0.97453685	0.00804753	0.00030658
X	Mercury	10.546667	0.0002039	0.0090	0.37	0.03	0.0002686	0.185888743	0.186157375	0.02471084	2.05968E-05	2.11E-01	1.04E-02	7.22E+00	9.60E-01	8.00E-04	*8.20E+00*	0.00127381	0.88145379	0.11717473	9.7667E-05
	Nickel	27.058333	0.0028429	0.0675	0.70	32.17	0.0020147	0.351706763	0.353721503	0.063397675	0.000287129	4.17E-01	6.26E-05	1.09E-02	1.97E-03	8.93E-06	*1.30E-02*	0.00482681	0.8426005	0.1518848	0.00068789
X	Selenium	6.8083333	0.0008571	0.3300	0.59	0.16	0.0098498	0.294347091	0.304196931	0.015951925	8.65714E-05	3.20E-01	6.12E-02	1.83E+00	9.92E-02	5.38E-04	*1.99E+00*	0.03075812	0.91915842	0.04981312	0.00027034
	Silver	0.4375	0.00025	0.0370		145.71	0.0011044	0	0.001104376	0.001025063	0.00002525	2.15E-03	7.58E-06	0.00E+00	7.03E-06	1.73E-07	*1.48E-05*	0.51254555	0	0.47573582	0.01171863
	Thallium	0.675	0.0007786	0.0675		0.06	0.0020147	0	0.00201474	0.001581525	7.86357E-05	3.67E-03	3.35E-02	0.00E+00	2.63E-02	1.31E-03	*6.11E-02*	0.54824338	0	0.43035857	0.02139805
X	Vanadium	52.683333	0.0018789	0.1375	1.83	0.16	0.0041041	0.922355129	0.926459229	0.12343705	0.000189772	1.05E+00	2.62E-02	5.88E+00	7.87E-01	1.21E-03	*6.70E+00*	0.00390835	0.87836147	0.11754946	0.00018072
	Zinc	2190.8333	0.1277857	28.7500	84.81	128.66	0.85813	42.67357977	43.53170977	5.1331225	0.012906357	4.87E+01	6.67E-03	3.32E-01	3.99E-02	1.00E-04	*3.78E-01*	0.0176288	0.87665493	0.10545113	0.00026514

Table E.1-11. Exposure Calculations for Muskrat - Station 11

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0.107	0.0025			9.730183192	0	0	0	0.0002507	0.0002525	5.03E-04	0.00E+00	0.00E+00	2.58E-05	2.60E-05	*5.17E-05*	0	0	0.49821244	0.50178756
	Acetone	0.13	0.0025			1367.050531	0	0	0	0.0003046	0.0002525	5.57E-04	0.00E+00	0.00E+00	2.23E-07	1.85E-07	*4.08E-07*	0	0	0.54675187	0.45324813
	cis-1,2-Dichloroethene	0.17	0.00058333			2504.114914	0	0	0	0.0003983	5.89167E-05	4.57E-04	0.00E+00	0.00E+00	1.59E-07	2.35E-08	*1.83E-07*	0	0	0.87114342	0.12885658
	Tetrachloroethene	0.04975	0.0005			6.09153838	0	0	0	0.0001166	0.0000505	1.67E-04	0.00E+00	0.00E+00	1.91E-05	8.29E-06	*2.74E-05*	0	0	0.69772109	0.30227891
	Trichloroethene	0.03275	0.0005			3.04576919	0	0	0	7.673E-05	0.0000505	1.27E-04	0.00E+00	0.00E+00	2.52E-05	1.66E-05	*4.18E-05*	0	0	0.60309117	0.39690883
	Semivolatile Organics																				
	2-Methylnaphthalene	0.2355	0.0025			62.53	0	0	0	0.0005518	0.0002525	8.04E-04	0.00E+00	0.00E+00	8.82E-06	4.04E-06	*1.29E-05*	0	0	0.68605324	0.31394676
	Acenaphthylene	0.232	0.0025			58.00	0	0	0	0.0005436	0.0002525	7.96E-04	0.00E+00	0.00E+00	9.37E-06	4.35E-06	*1.37E-05*	0	0	0.68281923	0.31718077
	Anthracene	0.2545	0.0025			435.11	0	0	0	0.0005963	0.0002525	8.49E-04	0.00E+00	0.00E+00	1.37E-06	5.80E-07	*1.95E-06*	0	0	0.70251893	0.29748107
	Benzo(a)anthracene	0.28	0.0025			0.57	0	0	0	0.000656	0.0002525	9.09E-04	0.00E+00	0.00E+00	1.16E-03	4.46E-04	*1.61E-03*	0	0	0.72208158	0.27791842
	Benzo(a)pyrene	0.3983333	0.0025		0.06	0.57	0	0.031798911	0.031798911	0.0009333	0.0002525	3.30E-02	0.00E+00	5.62E-02	1.65E-03	4.46E-04	*5.83E-02*	0	0.96405016	0.02829478	0.00765506
	Benzo(b)fluoranthene	0.6666667	0.0025		0.05	0.57	0	0.025523568	0.025523568	0.001562	0.0002525	2.73E-02	0.00E+00	4.51E-02	2.76E-03	4.46E-04	*4.83E-02*	0	0.93362735	0.05713644	0.0092362
	Benzo(g,h,i)perylene	0.3383333	0.0025			58.00	0	0	0	0.0007927	0.0002525	1.05E-03	0.00E+00	0.00E+00	1.37E-05	4.35E-06	*1.80E-05*	0	0	0.75842291	0.24157709
	Benzo(k)fluoranthene	0.63	0.0025		0.13	0.57	0	0.06308178	0.06308178	0.0014761	0.0002525	6.48E-02	0.00E+00	1.12E-01	2.61E-03	4.46E-04	*1.15E-01*	0	0.9733285	0.02277552	0.00389598
	Carbazole	0.455	0			58.00014758	0	0	0	0.0010661	0	1.07E-03	0.00E+00	0.00E+00	1.84E-05	0.00E+00	*1.84E-05*	0	0	1	0
	Chrysene	0.4166667	0.0025		0.05	0.57	0	0.024452958	0.024452958	0.0009763	0.0002525	2.57E-02	0.00E+00	4.32E-02	1.73E-03	4.46E-04	*4.54E-02*	0	0.95215466	0.03801344	0.0098319
	Dibenz(a,h)anthracene	0.277	0.0025			0.57	0	0	0	0.000649	0.0002525	9.02E-04	0.00E+00	0.00E+00	1.15E-03	4.46E-04	*1.59E-03*	0	0	0.71991468	0.28008532
	Dibenzofuran	0.455	0.0025			58.00	0	0	0	0.0010661	0.0002525	1.32E-03	0.00E+00	0.00E+00	1.84E-05	4.35E-06	*2.27E-05*	0	0	0.80850394	0.19149606
	Fluoranthene	0.67	0.0025		0.03	54.39	0	0.015926443	0.015926443	0.0015698	0.0002525	1.77E-02	0.00E+00	2.93E-04	2.89E-05	4.64E-06	*3.26E-04*	0	0.89732743	0.08844622	0.01422635
	Fluorene	0.256	0.0025			54.39	0	0	0	0.0005998	0.0002525	8.52E-04	0.00E+00	0.00E+00	1.10E-05	4.64E-06	*1.57E-05*	0	0	0.70374559	0.29625441
	Indeno(1,2,3-cd)pyrene	0.3616667	0.0025		0.15	0.57	0	0.07661346	0.07661346	0.0008474	0.0002525	7.77E-02	0.00E+00	1.35E-01	1.50E-03	4.46E-04	*1.37E-01*	0	0.9858469	0.01090398	0.00324912
	Naphthalene	0.2435	0.0025			60.92	0	0	0	0.0005705	0.0002525	8.23E-04	0.00E+00	0.00E+00	9.37E-06	4.15E-06	*1.35E-05*	0	0	0.69320327	0.30679673
	N-nitrosodiphenylamine	0.4975	0.0025			120.62	0	0	0	0.0011656	0.0002525	1.42E-03	0.00E+00	0.00E+00	9.66E-06	2.09E-06	*1.18E-05*	0	0	0.82195019	0.17804981
	Phenanthrene	0.2033333	0.0025		0.05	58.00	0	0.027535796	0.027535796	0.0004764	0.0002525	2.83E-02	0.00E+00	4.75E-04	8.21E-06	4.35E-06	*4.87E-04*	0	0.9742113	0.0168553	0.0089334
	Pyrene	0.6066667	0.0025		0.04	58.00	0	0.018702575	0.018702575	0.0014214	0.0002525	2.04E-02	0.00E+00	3.22E-04	2.45E-05	4.35E-06	*3.51E-04*	0	0.91785044	0.06975783	0.01239173
	Pesticides and PCBs																				
	4,4'-DDD	0.0248	0.00005	0.0006	1.28E-03	6.84	1.925E-05	0.000644639	0.000663891	5.811E-05	0.00000505	7.27E-04	2.82E-06	9.43E-05	8.50E-06	7.39E-07	*1.06E-04*	0.02647964	0.88665341	0.07992105	0.0069459
	4,4'-DDE	0.00802	0.00005	0.0010	3.48E-04	0.83	2.91E-05	0.000175218	0.00020432	1.879E-05	0.00000505	2.28E-04	3.52E-05	2.12E-04	2.27E-05	6.11E-06	*2.76E-04*	0.12754964	0.76795878	0.08235805	0.02213353
	4,4'-DDT	0.0012667	0.00005	0.0011	2.03E-04	0.64	3.209E-05	0.00010236	0.000134447	2.968E-06	0.00000505	1.42E-04	4.99E-05	1.59E-04	4.61E-06	7.85E-06	*2.21E-04*	0.22522535	0.71849534	0.02083187	0.03544745
	Aldrin	0.000335	0.000025	0.0003		0.16	9.104E-06	0	9.10364E-06	7.849E-07	0.000002525	1.24E-05	5.66E-05	0.00E+00	4.88E-06	1.57E-05	*7.72E-05*	0.73336343	0	0.06322972	0.20340684
	alpha-Chlordane	0.0038067	2.1729E-05	0.0006	3.90E-04	1.99	1.866E-05	0.000196021	0.000214676	8.919E-06	2.19459E-06	2.26E-04	9.36E-06	9.84E-05	4.48E-06	1.10E-06	*1.13E-04*	0.0826211	0.86815786	0.03950143	0.00971961
	Aroclor 1248	0.113	0.0005	0.0025		0.57	7.462E-05	0	0.00007462	0.0002648	0.0000505	3.90E-04	1.32E-04	0.00E+00	4.68E-04	8.93E-05	*6.89E-04*	0.19139271	0	0.67907992	0.12952737
	Aroclor 1254	0.023825	0.0005	0.0195		0.15	0.000582	0	0.000582036	5.582E-05	0.0000505	6.88E-04	3.98E-03	0.00E+00	3.81E-04	3.45E-04	*4.70E-03*	0.84554261	0	0.0810944	0.07336299
	Aroclor 1260	0.1123333	0.0005	0.0215	7.02E-03	0.28	0.0006417	0.003529974	0.004171706	0.0002632	0.0000505	4.49E-03	2.31E-03	1.27E-02	9.49E-04	1.82E-04	*1.62E-02*	0.14307122	0.78699147	0.05867857	0.01125874
	beta-BHC	0.001215	0.000025	0.0003		3.22	7.611E-06	0	7.61124E-06	2.847E-06	0.000002525	1.30E-05	2.37E-06	0.00E+00	8.85E-07	7.85E-07	*4.04E-06*	0.58624731	0	0.21926737	0.19448532
	delta-BHC	0.001215	0.000025	0.0003		1.29	7.611E-06	0	7.61124E-06	2.847E-06	0.000002525	1.30E-05	5.92E-06	0.00E+00	2.21E-06	1.96E-06	*1.01E-05*	0.58624731	0	0.21926737	0.19448532
	Endosulfan I	0.001395	0.000025	0.0006	2.30E-04	1.21	1.866E-05	0.000115503	0.000134158	3.268E-06	0.000002525	1.40E-04	1.55E-05	9.58E-05	2.71E-06	2.09E-06	*1.16E-04*	0.13329613	0.82530751	0.0233544	0.01804196
	Endosulfan Sulfate	0.00266	0.00005	0.0009		1.21	2.821E-05	0	2.82064E-05	6.232E-06	0.00000505	3.95E-05	2.34E-05	0.00E+00	5.17E-06	4.19E-06	*3.27E-05*	0.71428868	0	0.15782676	0.12788456
	Endrin Aldehyde	0.00315	0.00005	0.0022	9.68E-04	0.04	6.567E-05	0.000487078	0.000552744	7.38E-06	0.00000505	5.65E-04	1.64E-03	1.22E-02	1.84E-04	1.26E-04	*1.41E-02*	0.1161865	0.86181948	0.01305872	0.0089353
	gamma-Chlordane	0.0029367	2.1629E-05	0.0003	2.82E-04	1.99	7.611E-06	0.000141829	0.00014944	6.881E-06	2.18449E-06	1.59E-04	3.82E-06	7.12E-05	3.45E-06	1.10E-06	*7.95E-05*	0.04801878	0.89479014	0.04340929	0.01378179
	Inorganics																				
X	Aluminum	9296.6667	0.38611429	47.9000	1.55E+02	41.82	1.4297192	77.85973338	79.28945258	21.78209	0.038997543	1.01E+02	3.42E-02	1.86E+00	5.21E-01	9.33E-04	*2.42E+00*	0.01414016	0.77004567	0.21542848	0.00038569
	Antimony	1.55	0.00069286	0.0498		0.05	0.0014849	0	0.001484938	0.0036317	6.99786E-05	5.19E-03	2.73E-02	0.00E+00	6.68E-02	1.29E-03	*9.54E-02*	0.28630463	0	0.7002031	0.01349227
X	Arsenic	287.33333	0.02458571	3.7500	15.14	0.05	0.11193	7.620010007	7.731940007	0.3433432	0.002483157	8.08E+00	2.04E+00	1.39E+02	6.26E+00	4.53E-02	*1.47E+02*	0.01385655	0.94333132	0.04250472	0.00030741
	Barium	78.833333	0.03734286	8.8000	7.69	4.33	0.2626624	3.867731928	4.130394328	0.1847065	0.003771629	4.32E+00	6.07E-02	8.93E-01	4.27E-02	8.71E-04	*9.97E-01*	0.06081736	0.89554206	0.0427673	0.00087329
	Beryllium	0.6233333	6.3786E-05	0.0060		0.53	0.0001791	0	0.000179088	0.0014605	6.44236E-06	1.65E-03	3.37E-04	0.00E+00	2.75E-03	1.21E-05	*3.10E-03*	0.10880193	0	0.88728413	0.00391395
	Cadmium	5.4	0.00043	0.0570	0.58	0.78	0.0017013	0.291061319	0.292762655	0.0126522	0.00004343	3.05E-01	2.19E-03	3.75E-01	1.63E-02	5.60E-05	*3.94E-01*	0.00556978	0.95286765	0.04142039	0.00014218
	Chromium	506.66667	0.02578571	0.8950	9.47	7.24	0.026714	4.764023488	4.790737448	1.18712	0.002604357	5.98E+00	3.69E-03	6.58E-01	1.64E-01	3.60E-04	*8.26E-01*	0.00446687	0.79659793	0.19849972	0.00043548
	Cobalt	17.733333	0.00146857	0.4850	1.58	4.02	0.0144763	0.792471783	0.806948063	0.0415492	0.000148326	8.49E-01	3.60E-03	1.97E-01	1.03E-02	3.69E-05	*2.11E-01*	0.0170581	0.9338077	0.04895942	0.00017478
	Copper	285.66667	0.02154286	54.3500	14.47	12.23	1.6222388	7.279747496	8.901986296	0.669317	0.002175829	9.57E+00	1.33E-01	5.95E-01	5.47E-02	1.78E-04	*7.83E-01*	0.16945133	0.76040773	0.06991366	0.00022728
	Cyanide	0.7425	0.0025	0.2675		51.90	0.0079843	0	0.00798434	0.0017397	0.0002525	9.98E-03	1.54E-04	0.00E+00	3.35E-05	4.87E-06	*1.92E-04*	0.80031334	0	0.17437723	0.02530943
X	Iron	30433.333	2.401	577.5000	2519.27	2.57	17.23722	1267.573303	1284.810523	71.3053	0.242501	1.36E+03	6.72E+00	4.94E+02	2.78E+01	9.45E-02	*5.29E+02*	0.01270846	0.93454162	0.05257114	0.00017879
X	Lead	274.66667	0.01307286	0.5150	25.05	6.43	0.0153717	12.60306714	12.61843886	0.643544	0.001320358	1.33E+01	2.39E-03	1.96E+00	1.00E-01	2.05E-04	*2.06E+00*	0.00115897	0.95022084	0.04852064	9.955E-05
X	Manganese	859.66667	0.46971429	88.7000	484.77	70.76	2.6475176	243.9148602	246.5623778	2.014199	0.047441143	2.49E+02	3.74E-02	3.45E+00	2.85E-02	6.70E-04	*3.51E+00*	0.01064868	0.98105912	0.00810139	0.00019081
X	Mercury	2.2333333	0.00020393	0.0090	0.08	0.03	0.0002686	0.039363292	0.039631924	0.0052327	2.05968E-05	4.49E-02	1.04E-02	1.53E+00	2.03E-01	8.00E-04	*1.74E+00*	0.00598487	0.87697668	0.11657957	0.00045888
	Nickel	18.666667	0.00284286	0.0675	0.48	32.17	0.0020147	0.242631091	0.244645831	0.043736	0.000287129	2.89E-01	6.26E-05	7.54E-03	1.36E-03	8.93E-06	*8.97E-03*	0.00697941	0.84051673	0.15150919	0.00099466
	Selenium	2.6666667	0.00085714	0.3300	0.23	0.16	0.0098498	0.115288948	0.125138788	0.006248	8.65714E-05	1.31E-01	6.12E-02	7.17E-01	3.88E-02	5.38E-04	*8.17E-01*	0.0749189	0.87689969	0.04752294	0.00065847
	Silver	0.5533333	0.00025	0.0370		145.71	0.0011044	0	0.001104376	0.0012965	0.00002525	2.43E-03	7.58E-06	0.00E+00	8.90E-06	1.73E-07	*1.66E-05*	0.45520894	0	0.53438335	0.01040771
	Thallium	0.6566667	0.00077857	0.0675		0.06	0.0020147	0	0.00201474	0.0015386	7.86357E-05	3.63E-03	3.35E-02	0.00E+00	2.56E-02	1.31E-03	*6.04E-02*	0.55472744	0	0.42362143	0.02165112
X	Vanadium	32.766667	0.00187893	0.1375	1.14	0.16	0.0041041	0.573663456	0.577767556	0.0767723	0.000189772	6.55E-01	2.62E-02	3.66E+00	4.90E-01	1.21E-03	*4.18E+00*	0.00626839	0.87618374	0.11725802	0.00028985
	Zinc	1480	0.12778571	28.7500	57.29	128.66	0.85813	28.82779676	29.68592676	3.46764	0.012906357	3.32E+01	6.67E-03	2.24E-01	2.70E-02	1.00E-04	*2.58E-01*	0.02587342	0.86918487	0.10455257	0.00038914

Table E.1-12. Exposure Calculations for Muskrat - Station 12

	Mean Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0.049	0.0025			9.730183192	0	0	0	0.0001148	0.0002525	3.67E-04	0.00E+00	0.00E+00	1.18E-05	2.60E-05	*3.77E-05*	0	0	0.31256415	0.68743585
	Acetone	0.199	0.0025			1367.050531	0	0	0	0.0004663	0.0002525	7.19E-04	0.00E+00	0.00E+00	3.41E-07	1.85E-07	*5.26E-07*	0	0	0.64869907	0.35130093
	cis-1,2-Dichloroethene	0.025	0.0005833			2504.114914	0	0	0	5.858E-05	5.89167E-05	1.17E-04	0.00E+00	0.00E+00	2.34E-08	2.35E-08	*4.69E-08*	0	0	0.49854601	0.50145399
	Tetrachloroethene	0.0365	0.0005			6.09153838	0	0	0	8.552E-05	0.0000505	1.36E-04	0.00E+00	0.00E+00	1.40E-05	8.29E-06	*2.23E-05*	0	0	0.6287297	0.3712703
	Trichloroethene	0.01575	0.0005			3.04576919	0	0	0	3.69E-05	0.0000505	8.74E-05	0.00E+00	0.00E+00	1.21E-05	1.66E-05	*2.87E-05*	0	0	0.42221167	0.57778833
	Semivolatile Organics																				
	2-Methylnaphthalene	0.195	0.0025			62.53	0	0	0	0.0004569	0.0002525	7.09E-04	0.00E+00	0.00E+00	7.31E-06	4.04E-06	*1.13E-05*	0	0	0.64405788	0.35594212
	Acenaphthylene	0.1943333	0.0025			58.00	0	0	0	0.0004553	0.0002525	7.08E-04	0.00E+00	0.00E+00	7.85E-06	4.35E-06	*1.22E-05*	0	0	0.6432724	0.3567276
	Anthracene	0.213	0.0025			435.11	0	0	0	0.0004991	0.0002525	7.52E-04	0.00E+00	0.00E+00	1.15E-06	5.80E-07	*1.73E-06*	0	0	0.6640317	0.3359683
	Benzo(a)anthracene	0.256	0.0025			0.57	0	0	0	0.0005998	0.0002525	8.52E-04	0.00E+00	0.00E+00	1.06E-03	4.46E-04	*1.51E-03*	0	0	0.70374559	0.29625441
	Benzo(a)pyrene	0.316	0.0025		0.05	0.57	0	0.025226249	0.025226249	0.0007404	0.0002525	2.62E-02	0.00E+00	4.46E-02	1.31E-03	4.46E-04	*4.64E-02*	0	0.96213117	0.02823846	0.00963037
	Benzo(b)fluoranthene	0.658	0.0025		0.05	0.57	0	0.025191762	0.025191762	0.0015417	0.0002525	2.70E-02	0.00E+00	4.45E-02	2.73E-03	4.46E-04	*4.77E-02*	0	0.93351379	0.05712949	0.00935672
	Benzo(g,h,i)perylene	0.3116667	0.0025			58.00	0	0	0	0.0007302	0.0002525	9.83E-04	0.00E+00	0.00E+00	1.26E-05	4.35E-06	*1.69E-05*	0	0	0.743064	0.256936
	Benzo(k)fluoranthene	0.468	0.0025		0.09	0.57	0	0.046860751	0.046860751	0.0010965	0.0002525	4.82E-02	0.00E+00	8.28E-02	1.94E-03	4.46E-04	*8.52E-02*	0	0.97201762	0.02274485	0.00523753
	Carbazole	0.28	0			58.00014758	0	0	0	0.000656	0	6.56E-04	0.00E+00	0.00E+00	1.13E-05	0.00E+00	*1.13E-05*	0	0	1	0
	Chrysene	0.39	0.0025		0.05	0.57	0	0.022887969	0.022887969	0.0009138	0.0002525	2.41E-02	0.00E+00	4.05E-02	1.62E-03	4.46E-04	*4.25E-02*	0	0.95151499	0.0379879	0.01049711
	Dibenz(a,h)anthracene	0.2366667	0.0025			0.57	0	0	0	0.0005545	0.0002525	8.07E-04	0.00E+00	0.00E+00	9.80E-04	4.46E-04	*1.43E-03*	0	0	0.68711664	0.31288336
	Dibenzofuran	0.28	0.0025			58.00	0	0	0	0.000656	0.0002525	9.09E-04	0.00E+00	0.00E+00	1.13E-05	4.35E-06	*1.57E-05*	0	0	0.72208158	0.27791842
	Fluoranthene	0.586	0.0025		0.03	54.39	0	0.013929695	0.013929695	0.001373	0.0002525	1.56E-02	0.00E+00	2.56E-04	2.52E-05	4.64E-06	*2.86E-04*	0	0.89550126	0.08826622	0.01623252
	Fluorene	0.2126667	0.0025			54.39	0	0	0	0.0004983	0.0002525	7.51E-04	0.00E+00	0.00E+00	9.16E-06	4.64E-06	*1.38E-05*	0	0	0.66368221	0.33631779
	Indeno(1,2,3-cd)pyrene	0.20725	0.0025		0.09	0.57	0	0.04390269	0.04390269	0.0004856	0.0002525	4.46E-02	0.00E+00	7.76E-02	8.58E-04	4.46E-04	*7.89E-02*	0	0.98346609	0.01087765	0.00565626
	Naphthalene	0.226667	0.0025			60.92	0	0	0	0.0005311	0.0002525	7.84E-04	0.00E+00	0.00E+00	8.72E-06	4.15E-06	*1.29E-05*	0	0	0.67776137	0.32223863
	N-nitrosodiphenylamine	0.1475	0.0025			120.62	0	0	0	0.0003456	0.0002525	5.98E-04	0.00E+00	0.00E+00	2.87E-06	2.09E-06	*4.96E-06*	0	0	0.5778245	0.4221755
	Phenanthrene	0.32375	0.0025		0.09	58.00	0	0.043842856	0.043842856	0.0007585	0.0002525	4.49E-02	0.00E+00	7.56E-04	1.31E-05	4.35E-06	*7.73E-04*	0	0.97745912	0.01691149	0.00562939
	Pyrene	0.546	0.0025		0.03	58.00	0	0.016832317	0.016832317	0.0012793	0.0002525	1.84E-02	0.00E+00	2.90E-04	2.21E-05	4.35E-06	*3.17E-04*	0	0.91658843	0.06966191	0.01374966
	Pesticides and PCBs																				
	4,4'-DDD	0.00195	0.00005	0.0006	1.01E-04	6.84	1.925E-05	5.06874E-05	6.99393E-05	4.569E-06	0.00000505	7.96E-05	2.82E-06	7.42E-06	6.68E-07	7.39E-07	*1.16E-05*	0.24198598	0.63711065	0.0574278	0.06347557
	4,4'-DDE	0.001764	0.00005	0.0010	7.66E-05	0.83	2.91E-05	3.85392E-05	6.7641E-05	4.133E-06	0.00000505	7.68E-05	3.52E-05	4.66E-05	5.00E-06	6.11E-06	*9.29E-05*	0.37881103	0.50165542	0.05379893	0.06573462
	4,4'-DDT	0.0017075	0.00005	0.0011	2.74E-04	0.64	3.209E-05	0.000137984	0.000170071	4.001E-06	0.00000505	1.79E-04	4.99E-05	2.14E-04	6.22E-06	7.85E-06	*2.78E-04*	0.17913338	0.77033844	0.02233499	0.02819319
	Aldrin	0.0004633	0.000025	0.0003		0.16	9.104E-06	0	9.10364E-06	1.086E-06	0.000002525	1.27E-05	5.66E-05	0.00E+00	6.75E-06	1.57E-05	*7.91E-05*	0.71601977	0	0.08538385	0.19859638
	alpha-Chlordane	0.001325	2.173E-05	0.0006	1.36E-04	1.99	1.866E-05	6.82298E-05	8.68848E-05	3.104E-06	2.19459E-06	9.22E-05	9.36E-06	3.42E-05	1.56E-06	1.10E-06	*4.63E-05*	0.20236733	0.74014903	0.03367699	0.02380665
	Aroclor 1248	0.0223333	0.0005	0.0025		0.57	7.462E-05	0	0.00007462	5.233E-05	0.0000505	1.77E-04	1.32E-04	0.00E+00	9.25E-05	8.93E-05	*3.14E-04*	0.42051993	0	0.29488805	0.28459202
	Aroclor 1254	0.017867	0.0005	0.0195		0.15	0.000582	0	0.000582036	4.186E-05	0.0000505	6.74E-04	3.98E-03	0.00E+00	2.86E-04	3.45E-04	*4.61E-03*	0.86304478	0	0.06207367	0.07488156
	Aroclor 1260	0.0233333	0.0005	0.0215	1.46E-03	0.28	0.0006417	0.000733229	0.001374961	5.467E-05	0.0000505	1.48E-03	2.31E-03	2.64E-03	1.97E-04	1.82E-04	*5.34E-03*	0.43356435	0.49538112	0.03693592	0.0341186
	beta-BHC	0.001038	0.000025	0.0003		3.22	7.611E-06	0	7.61124E-06	2.432E-06	0.000002525	1.26E-05	2.37E-06	0.00E+00	7.56E-07	7.85E-07	*3.91E-06*	0.60559151	0	0.19350581	0.20090269
	delta-BHC	0.0009267	0.000025	0.0003		1.29	7.611E-06	0	7.61124E-06	2.171E-06	0.000002525	1.23E-05	5.92E-06	0.00E+00	1.69E-06	1.96E-06	*9.57E-06*	0.61842693	0	0.17641228	0.20516079
	Endosulfan I	0.0005	0.000025	0.0006	8.23E-05	1.21	1.866E-05	4.13989E-05	6.00539E-05	1.172E-06	0.000002525	6.38E-05	1.55E-05	3.43E-05	9.71E-07	2.09E-06	*5.29E-05*	0.29262539	0.6493907	0.01837634	0.03960756
	Endosulfan Sulfate	0.0017867	0.00005	0.0009		1.21	2.821E-05	0	2.82064E-05	4.186E-06	0.00000505	3.74E-05	2.34E-05	0.00E+00	3.47E-06	4.19E-06	*3.10E-05*	0.75332429	0	0.11180231	0.1348734
	Endrin Aldehyde	0.00114	0.00005	0.0022	3.50E-04	0.04	6.567E-05	0.000176276	0.000241941	2.671E-06	0.00000505	2.50E-04	1.64E-03	4.40E-03	6.67E-05	1.26E-04	*6.24E-03*	0.26301749	0.70605668	0.01069852	0.02022731
	gamma-Chlordane	0.000994	2.163E-05	0.0003	9.54E-05	1.99	7.611E-06	4.80062E-05	5.56174E-05	2.329E-06	2.18449E-06	6.01E-05	3.82E-06	2.41E-05	1.17E-06	1.10E-06	*3.02E-05*	0.12657795	0.79836191	0.03873123	0.03632891
	Inorganics																				
X	Aluminum	13136	0.3861143	47.9000	2.19E+02	41.82	1.4297192	110.014212	111.4439312	30.777648	0.038997543	1.42E+02	3.42E-02	2.63E+00	7.36E-01	9.33E-04	*3.40E+00*	0.01005	0.77332888	0.21634699	0.00027413
X	Antimony	39.76875	0.0006929	0.0498		0.05	0.0014849	0	0.001484938	0.0931782	6.99786E-05	9.47E-02	2.73E-02	0.00E+00	1.71E+00	1.29E-03	*1.74E+00*	0.01567497	0	0.98358634	0.00073869
X	Arsenic	1437.48	0.0245857	3.7500	75.77	0.05	0.11193	38.12161944	38.23354944	1.717688	0.002483157	4.00E+01	2.04E+00	6.95E+02	3.13E+01	4.53E-02	*7.29E+02*	0.00280149	0.95414442	0.04299194	6.2151E-05
	Barium	52.44	0.0373429	8.8000	5.11	4.33	0.2626624	2.57281855	2.83548095	0.1228669	0.003771629	2.96E+00	6.07E-02	5.94E-01	2.84E-02	8.71E-04	*6.84E-01*	0.0886738	0.86857352	0.04147939	0.00127329
	Beryllium	0.94875	6.379E-05	0.0060		0.53	0.0001791	0	0.000179088	0.0022229	6.44236E-06	2.41E-03	3.37E-04	0.00E+00	4.19E-03	1.21E-05	*4.54E-03*	0.07435815	0	0.92296696	0.0026749
	Cadmium	6.44	0.00043	0.0570	0.69	0.78	0.0017013	0.347117573	0.348818909	0.0150889	0.00004343	3.64E-01	2.19E-03	4.48E-01	1.95E-02	5.60E-05	*4.69E-01*	0.00467463	0.95374742	0.04145863	0.00011933
	Chromium	550.22	0.0257857	0.8950	10.28	7.24	0.026714	5.173541454	5.200255414	1.2891655	0.002604357	6.49E+00	3.69E-03	7.15E-01	1.78E-01	3.60E-04	*8.97E-01*	0.00411489	0.79690717	0.19857678	0.00040116
	Cobalt	25.78	0.0014686	0.4850	2.29	4.02	0.0144763	1.152063304	1.166539584	0.0604025	0.000148326	1.23E+00	3.60E-03	2.87E-01	1.50E-02	3.69E-05	*3.05E-01*	0.01179724	0.93885769	0.0492242	0.00012088
X	Copper	642.62	0.0215429	54.3500	32.55	12.23	1.6222388	16.37611903	17.99835783	1.5056587	0.002175829	1.95E+01	1.33E-01	1.34E+00	1.23E-01	1.78E-04	*1.59E+00*	0.08316532	0.83953438	0.07718875	0.00011155
	Cyanide	0.575	0.0025	0.2675		51.90	0.0079843	0	0.00798434	0.0013472	0.0002525	9.58E-03	1.54E-04	0.00E+00	2.60E-05	4.87E-06	*1.85E-04*	0.83308492	0	0.14056927	0.02634581
X	Iron	56406	2.401	577.5000	4669.28	2.57	17.23722	2349.356179	2366.593399	132.15926	0.242501	2.50E+03	6.72E+00	9.16E+02	5.15E+01	9.45E-02	*9.74E+02*	0.00689766	0.94012034	0.05288496	9.7039E-05
X	Lead	386.54	0.0130729	0.5150	35.25	6.43	0.0153717	17.7363698	17.75174152	0.9056632	0.001320358	1.87E+01	2.39E-03	2.76E+00	1.41E-01	2.05E-04	*2.90E+00*	0.00082384	0.95056708	0.04853832	7.0764E-05
X	Manganese	519	0.4697143	88.7000	292.67	70.76	2.6475176	147.2568582	149.9043758	1.216017	0.047441143	1.51E+02	3.74E-02	2.08E+00	1.72E-02	6.70E-04	*2.14E+00*	0.01751376	0.97412825	0.00804415	0.00031383
X	Mercury	10.075	0.0002039	0.0090	0.35	0.03	0.0002686	0.17757545	0.177844082	0.0236057	2.05968E-05	2.01E-01	1.04E-02	6.90E+00	9.17E-01	8.00E-04	*7.83E+00*	0.00133336	0.8813972	0.11716721	0.00010223
	Nickel	15.66	0.0028429	0.0675	0.40	32.17	0.0020147	0.203550154	0.205564894	0.0366914	0.000287129	2.43E-01	6.26E-05	6.33E-03	1.14E-03	8.93E-06	*7.54E-03*	0.00830672	0.83923187	0.15127758	0.00118382
X	Selenium	8.72	0.0008571	0.3300	0.75	0.16	0.0098498	0.376994857	0.386844697	0.020431	8.65714E-05	4.07E-01	6.12E-02	2.34E+00	1.27E-01	5.38E-04	*2.53E+00*	0.02417956	0.92545364	0.05015428	0.00021252
	Silver	0.8825	0.00025	0.0370		145.71	0.0011044	0	0.001104376	0.0020677	0.00002525	3.20E-03	7.58E-06	0.00E+00	1.42E-05	1.73E-07	*2.19E-05*	0.3454064	0	0.64669637	0.00789723
	Thallium	0.85	0.0007786	0.0675		0.06	0.0020147	0	0.00201474	0.0019916	7.86357E-05	4.08E-03	3.35E-02	0.00E+00	3.31E-02	1.31E-03	*6.79E-02*	0.49321338	0	0.48753641	0.01925022
X	Vanadium	50.74	0.0018789	0.1375	1.77	0.16	0.0041041	0.888332159	0.892436259	0.1188838	0.000189772	1.01E+00	2.62E-02	5.67E+00	7.58E-01	1.21E-03	*6.45E+00*	0.0040574	0.87822393	0.11753106	0.00018761
	Zinc	2488	0.1277857	28.7500	96.32	128.66	0.85813	48.46186373	49.31999373	5.829384	0.012906357	5.52E+01	6.67E-03	3.77E-01	4.53E-02	1.00E-04	*4.29E-01*	0.01555646	0.87853258	0.10567699	0.00023397

Table E.1-13. Exposure Calculations for Muskrat - Station 13

	Mean Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0.1203333	0.0025			9.730183192	0	0	0	0.0002819	0.0002525	5.34E-04	0.00E+00	0.00E+00	2.90E-05	2.60E-05	*5.49E-05*	0	0	0.52754373	0.47245627
	Acetone	2.465	0.0025			1367.050531	0	0	0	0.0057755	0.0002525	6.03E-03	0.00E+00	0.00E+00	4.22E-06	1.85E-07	*4.41E-06*	0	0	0.95811211	0.04188789
	cis-1,2-Dichloroethene	0.0171667	0.0005833			2504.114914	0	0	0	4.022E-05	5.89167E-05	9.91E-05	0.00E+00	0.00E+00	1.61E-08	2.35E-08	*3.96E-08*	0	0	0.40571157	0.59428843
	Tetrachloroethene	0.0378333	0.0005			6.09153838	0	0	0	8.864E-05	0.0000505	1.39E-04	0.00E+00	0.00E+00	1.46E-05	8.29E-06	*2.28E-05*	0	0	0.63706533	0.36293467
	Trichloroethene	0.0218333	0.0005			3.04576919	0	0	0	5.116E-05	0.0000505	1.02E-04	0.00E+00	0.00E+00	1.68E-05	1.66E-05	*3.34E-05*	0	0	0.50322412	0.49677588
	Semivolatile Organics																				
	2-Methylnaphthalene	0.0786667	0.0025			62.53	0	0	0	0.0001843	0.0002525	4.37E-04	0.00E+00	0.00E+00	2.95E-06	4.04E-06	*6.99E-06*	0	0	0.42195341	0.57804659
	Acenaphthylene	0.0656667	0.0025			58.00	0	0	0	0.0001539	0.0002525	4.06E-04	0.00E+00	0.00E+00	2.65E-06	4.35E-06	*7.01E-06*	0	0	0.3786252	0.6213748
	Anthracene	0.1796667	0.0025			435.11	0	0	0	0.000421	0.0002525	6.73E-04	0.00E+00	0.00E+00	9.67E-07	5.80E-07	*1.55E-06*	0	0	0.62506997	0.37493003
	Benzo(a)anthracene	0.825	0.0025			0.57	0	0	0	0.001933	0.0002525	2.19E-03	0.00E+00	0.00E+00	3.42E-03	4.46E-04	*3.86E-03*	0	0	0.88446448	0.11553552
	Benzo(a)pyrene	0.9083333	0.0025		0.14	0.57	0	0.07251216	0.07251216	0.0021282	0.0002525	7.49E-02	0.00E+00	1.28E-01	3.76E-03	4.46E-04	*1.32E-01*	0	0.9682116	0.02841692	0.00337148
	Benzo(b)fluoranthene	1.6616667	0.0025		0.13	0.57	0	0.063617493	0.063617493	0.0038933	0.0002525	6.78E-02	0.00E+00	1.12E-01	6.88E-03	4.46E-04	*1.20E-01*	0	0.93881959	0.0574542	0.00372621
	Benzo(g,h,i)perylene	0.4116667	0.0025			58.00	0	0	0	0.0009645	0.0002525	1.22E-03	0.00E+00	0.00E+00	1.66E-05	4.35E-06	*2.10E-05*	0	0	0.79252856	0.20747144
	Benzo(k)fluoranthene	1.31	0.0025		0.26	0.57	0	0.13117005	0.13117005	0.0030693	0.0002525	1.34E-01	0.00E+00	2.32E-01	5.43E-03	4.46E-04	*2.38E-01*	0	0.97530089	0.02282168	0.00187744
	Carbazole	0.155	0			58.00014758	0	0	0	0.0003632	0	3.63E-04	0.00E+00	0.00E+00	6.26E-06	0.00E+00	*6.26E-06*	0	0	1	0
	Chrysene	1.0166667	0.0025		0.12	0.57	0	0.059665218	0.059665218	0.0023821	0.0002525	6.23E-02	0.00E+00	1.05E-01	4.21E-03	4.46E-04	*1.10E-01*	0	0.95771172	0.03823529	0.00405298
	Dibenz(a,h)anthracene	0.2175	0.0025			0.57	0	0	0	0.0005096	0.0002525	7.62E-04	0.00E+00	0.00E+00	9.01E-04	4.46E-04	*1.35E-03*	0	0	0.66867974	0.33132026
	Dibenzofuran	0.14	0.0025			58.00	0	0	0	0.000328	0.0002525	5.81E-04	0.00E+00	0.00E+00	5.66E-06	4.35E-06	*1.00E-05*	0	0	0.56504513	0.43495487
	Fluoranthene	2.1883333	0.0025		0.10	54.39	0	0.052018456	0.052018456	0.0051273	0.0002525	5.74E-02	0.00E+00	9.56E-04	9.43E-05	4.64E-06	*1.06E-03*	0	0.90627297	0.08932794	0.00439909
	Fluorene	0.1423333	0.0025			54.39	0	0	0	0.0003335	0.0002525	5.86E-04	0.00E+00	0.00E+00	6.13E-06	4.64E-06	*1.08E-05*	0	0	0.56910307	0.43089693
	Indeno(1,2,3-cd)pyrene	0.6433333	0.0025		0.27	0.57	0	0.136280163	0.136280163	0.0015073	0.0002525	1.38E-01	0.00E+00	2.41E-01	2.66E-03	4.46E-04	*2.44E-01*	0	0.9872513	0.01091952	0.00182918
	Naphthalene	0.0823333	0.0025			60.92	0	0	0	0.0001929	0.0002525	4.45E-04	0.00E+00	0.00E+00	3.17E-06	4.15E-06	*7.31E-06*	0	0	0.43310266	0.56689734
	N-nitrosodiphenylamine	0.14	0.0025			120.62	0	0	0	0.000328	0.0002525	5.81E-04	0.00E+00	0.00E+00	2.72E-06	2.09E-06	*4.81E-06*	0	0	0.56504513	0.43495487
	Phenanthrene	0.945	0.0025		0.25	58.00	0	0.127973741	0.127973741	0.0022141	0.0002525	1.30E-01	0.00E+00	2.21E-03	3.82E-05	4.35E-06	*2.25E-03*	0	0.98108994	0.01697431	0.00193575
	Pyrene	1.6716667	0.0025		0.10	58.00	0	0.051534842	0.051534842	0.0039167	0.0002525	5.57E-02	0.00E+00	8.89E-04	6.75E-05	4.35E-06	*9.60E-04*	0	0.92515419	0.07031292	0.00453288
	Pesticides and PCBs																				
	4,4'-DDD	0.0591167	0.00005	0.0006	3.05E-03	6.84	1.925E-05	0.00153665	0.001555902	0.0001385	0.00000505	1.70E-03	2.82E-06	2.25E-04	2.03E-05	7.39E-07	*2.49E-04*	0.01132827	0.90419775	0.08150246	0.00297153
	4,4'-DDE	0.0278333	0.00005	0.0010	1.21E-03	0.83	2.91E-05	0.000608092	0.000637194	6.521E-05	0.00000505	7.07E-04	3.52E-05	7.36E-04	7.89E-05	6.11E-06	*8.56E-04*	0.04113576	0.8595459	0.0921801	0.00713824
	4,4'-DDT	0.0036083	0.00005	0.0011	5.80E-04	0.64	3.209E-05	0.000291591	0.000323678	8.454E-06	0.00000505	3.37E-04	4.99E-05	4.53E-04	1.31E-05	7.85E-06	*5.24E-04*	0.09516098	0.8647885	0.02507345	0.01497706
	Aldrin	0.0008167	0.000025	0.0003		0.16	9.104E-06	0	9.10364E-06	1.913E-06	0.000002525	1.35E-05	5.66E-05	0.00E+00	1.19E-05	1.57E-05	*8.42E-05*	0.67224778	0	0.14129651	0.18645571
	alpha-Chlordane	0.024925	2.173E-05	0.0006	2.55E-03	1.99	1.866E-05	0.001283492	0.001302147	5.84E-05	2.19459E-06	1.36E-03	9.36E-06	6.44E-04	2.93E-05	1.10E-06	*6.84E-04*	0.01368932	0.941846	0.04285426	0.00161042
	Aroclor 1248	0.0686667	0.0005	0.0025		0.57	7.462E-05	0	0.00007462	0.0001609	0.0000505	2.86E-04	1.32E-04	0.00E+00	2.84E-04	8.93E-05	*5.06E-04*	0.26090362	0	0.56252666	0.17656972
	Aroclor 1254	0.016067	0.0005	0.0195		0.15	0.000582	0	0.000582036	3.764E-05	0.0000505	6.70E-04	3.98E-03	0.00E+00	2.57E-04	3.45E-04	*4.58E-03*	0.86847585	0	0.05617137	0.07535278
	Aroclor 1260	0.1625	0.0005	0.0215	1.01E-02	0.28	0.0006417	0.005106416	0.005748148	0.0003807	0.0000505	6.18E-03	2.31E-03	1.84E-02	1.37E-03	1.82E-04	*2.23E-02*	0.10385046	0.82636307	0.06161414	0.00817233
	beta-BHC	0.001355	0.000025	0.0003		3.22	7.611E-06	0	7.61124E-06	3.175E-06	0.000002525	1.33E-05	2.37E-06	0.00E+00	9.87E-07	7.85E-07	*4.14E-06*	0.57180055	0	0.23850678	0.18969266
	delta-BHC	0.00521	0.000025	0.0003		1.29	7.611E-06	0	7.61124E-06	1.221E-05	0.000002525	2.23E-05	5.92E-06	0.00E+00	9.49E-06	1.96E-06	*1.74E-05*	0.34065023	0	0.54634035	0.11300942
	Endosulfan I	0.0004767	0.000025	0.0006	7.84E-05	1.21	1.866E-05	3.9467E-05	5.8122E-05	1.117E-06	0.000002525	6.18E-05	1.55E-05	3.27E-05	9.26E-07	2.09E-06	*5.12E-05*	0.30203761	0.63899859	0.01808227	0.04088153
	Endosulfan Sulfate	0.0010433	0.00005	0.0009		1.21	2.821E-05	0	2.82064E-05	2.445E-06	0.00000505	3.57E-05	2.34E-05	0.00E+00	2.03E-06	4.19E-06	*2.96E-05*	0.79007442	0	0.06847252	0.14145306
	Endrin Aldehyde	0.00468	0.00005	0.0022	1.44E-03	0.04	6.567E-05	0.000723659	0.000789324	1.097E-05	0.00000505	8.05E-04	1.64E-03	1.81E-02	2.74E-04	1.26E-04	*2.01E-02*	0.08153777	0.89857591	0.01361567	0.00627065
	gamma-Chlordane	0.1148083	2.163E-05	0.0003	1.10E-02	1.99	7.611E-06	0.005544778	0.00555239	0.000269	2.18449E-06	5.82E-03	3.82E-06	2.78E-03	1.35E-04	1.10E-06	*2.92E-03*	0.00130697	0.95212702	0.0461909	0.00037511
	Inorganics																				
X	Aluminum	21638.333	0.3861143	47.9000	3.60E+02	41.82	1.4297192	181.2213909	182.6511101	50.698615	0.038997543	2.33E+02	3.42E-02	4.33E+00	1.21E+00	9.33E-04	*5.58E+00*	0.00612591	0.77647878	0.21722821	0.00016709
X	Antimony	23.4	0.0006929	0.0498		0.05	0.0014849	0	0.001484938	0.0548262	6.99786E-05	5.64E-02	2.73E-02	0.00E+00	1.01E+00	1.29E-03	*1.04E+00*	0.02633751	0	0.97242132	0.00124117
X	Arsenic	1266.8167	0.0245857	3.7500	66.77	0.05	0.11193	33.59566941	33.70759941	2.9681515	0.002483157	3.67E+01	2.04E+00	6.13E+02	5.41E+01	4.53E-02	*6.69E+02*	0.00305167	0.91595657	0.08092406	6.7701E-05
X	Barium	102.98333	0.0373429	8.8000	10.04	4.33	0.2626624	5.052582576	5.315244976	0.2412899	0.003771629	5.56E+00	6.07E-02	1.17E+00	5.57E-02	8.71E-04	*1.28E+00*	0.04723883	0.90868777	0.04339508	0.00067831
	Beryllium	1.3083333	6.379E-05	0.0060		0.53	0.0001791	0	0.000179088	0.0030654	6.44236E-06	3.25E-03	3.37E-04	0.00E+00	5.78E-03	1.21E-05	*6.13E-03*	0.05508781	0	0.94293051	0.00198168
	Cadmium	8.2666667	0.00043	0.0570	0.89	0.78	0.0017013	0.445575354	0.44727669	0.0193688	0.00004343	4.67E-01	2.19E-03	5.74E-01	2.50E-02	5.60E-05	*6.02E-01*	0.00364555	0.9547588	0.04150259	9.306E-05
	Chromium	512.86667	0.0257857	0.8950	9.58	7.24	0.026714	4.822320091	4.849034051	1.2016466	0.002604357	6.05E+00	3.69E-03	6.66E-01	1.66E-01	3.60E-04	*8.36E-01*	0.00441313	0.79664514	0.19851149	0.00043024
	Cobalt	18.933333	0.0014686	0.4850	1.68	4.02	0.0144763	0.846097693	0.860573973	0.0443608	0.000148326	9.05E-01	3.60E-03	2.10E-01	1.10E-02	3.69E-05	*2.25E-01*	0.01599442	0.93482874	0.04901296	0.00016388
X	Copper	1015.3333	0.0215429	54.3500	51.42	12.23	1.6222388	25.87410836	27.49634716	2.378926	0.002175829	2.99E+01	1.33E-01	2.12E+00	1.94E-01	1.78E-04	*2.44E+00*	0.05429643	0.86600795	0.0796228	7.2825E-05
	Cyanide	0	0.0025	0.2675		51.90	0.0079843	0	0.00798434	0	0.0002525	0.00E+00	1.54E-04	0.00E+00	0.00E+00	4.87E-06	*1.59E-04*	0.96934504	0	0	0.03065496
X	Iron	41216.667	2.401	577.5000	3411.91	2.57	17.23722	1716.707983	1733.945203	96.57065	0.242501	1.83E+03	6.72E+00	6.69E+02	3.76E+01	9.45E-02	*7.14E+02*	0.00941534	0.93770321	0.05274899	0.00013246
X	Lead	871.33333	0.0130729	0.5150	79.46	6.43	0.0153717	39.98108919	39.99646091	2.041534	0.001320358	4.20E+01	2.39E-03	6.21E+00	3.17E-01	2.05E-04	*6.53E+00*	0.00036565	0.95104045	0.04856249	3.1408E-05
X	Manganese	664	0.4697143	88.7000	374.44	70.76	2.6475176	188.3979843	191.0455019	1.555752	0.047441143	1.93E+02	3.74E-02	2.66E+00	2.20E-02	6.70E-04	*2.72E+00*	0.01374272	0.97793543	0.00807559	0.00024626
X	Mercury	7.4716667	0.0002039	0.0090	0.26	0.03	0.0002686	0.131690777	0.131959409	0.0175061	2.05968E-05	1.49E-01	1.04E-02	5.12E+00	6.80E-01	8.00E-04	*5.81E+00*	0.00179704	0.88095655	0.11710863	0.00013778
	Nickel	26.4	0.0028429	0.0675	0.68	32.17	0.0020147	0.343149685	0.345164425	0.0618552	0.000287129	4.07E-01	6.26E-05	1.07E-02	1.92E-03	8.93E-06	*1.27E-02*	0.00494649	0.84248464	0.15186392	0.00070494
X	Selenium	9.8883333	0.0008571	0.3300	0.85	0.16	0.0098498	0.427505825	0.437355665	0.0231684	8.65714E-05	4.61E-01	6.12E-02	2.66E+00	1.44E-01	5.38E-04	*2.86E+00*	0.02138431	0.9281285	0.05029924	0.00018795
	Silver	0.905	0.00025	0.0370		145.71	0.0011044	0	0.001104376	0.0021204	0.00002525	3.25E-03	7.58E-06	0.00E+00	1.46E-05	1.73E-07	*2.23E-05*	0.33980371	0	0.65242715	0.00776913
	Thallium	1.576	0.0007786	0.0675		0.06	0.0020147	0	0.00201474	0.0036926	7.86357E-05	5.79E-03	3.35E-02	0.00E+00	6.14E-02	1.31E-03	*9.62E-02*	0.34821286	0	0.63819632	0.01359082
X	Vanadium	74.75	0.0018789	0.1375	2.60	0.16	0.0041041	1.308687996	1.312792096	0.1751393	0.000189772	1.49E+00	2.62E-02	8.35E+00	1.12E+00	1.21E-03	*9.49E+00*	0.00275791	0.87942304	0.11769153	0.00012752
	Zinc	1681	0.1277857	28.7500	65.08	128.66	0.85813	32.74292321	33.60105321	3.938583	0.012906357	3.76E+01	6.67E-03	2.54E-01	3.06E-02	1.00E-04	*2.92E-01*	0.02285145	0.87192294	0.10488193	0.00034369

Table E.1-14. Exposure Calculations for Muskrat - Station 14

	Mean Concentrations																			
	Compound	C_{soil} (mg/Kg)	C_{water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0.00633333	0.0025			9.730183192	0	0	0	1.484E-05	0.0002525	2.67E-04	0.00E+00	0.00E+00	1.53E-06	2.60E-05	*2.75E-05*	0	0	0.0555063	0.9444937
	Acetone	0.068	0.0025			1367.050531	0	0	0	0.0001593	0.0002525	4.12E-04	0.00E+00	0.00E+00	1.17E-07	1.85E-07	*3.01E-07*	0	0	0.386874	0.613126
	cis-1,2-Dichloroethene	0	0.0005833			2504.114914	0	0	0	0	5.89167E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.35E-08	*2.35E-08*	0	0	0	1
	Tetrachloroethene	0.00633333	0.0005			6.09153838	0	0	0	1.484E-05	0.0000505	6.53E-05	0.00E+00	0.00E+00	2.44E-06	8.29E-06	*1.07E-05*	0	0	0.22710785	0.77289215
	Trichloroethene	0.00633333	0.0005			3.04576919	0	0	0	1.484E-05	0.0000505	6.53E-05	0.00E+00	0.00E+00	4.87E-06	1.66E-05	*2.15E-05*	0	0	0.22710785	0.77289215
	Semivolatile Organics																				
	2-Methylnaphthalene	1.08333333	0.0025			62.53	0	0	0	0.0025382	0.0002525	2.79E-03	0.00E+00	0.00E+00	4.06E-05	4.04E-06	*4.46E-05*	0	0	0.90952253	0.09047747
	Acenaphthylene	1.08333333	0.0025			58.00	0	0	0	0.0025382	0.0002525	2.79E-03	0.00E+00	0.00E+00	4.38E-05	4.35E-06	*4.81E-05*	0	0	0.90952253	0.09047747
	Anthracene	0.95333333	0.0025			435.11	0	0	0	0.0022337	0.0002525	2.49E-03	0.00E+00	0.00E+00	5.13E-06	5.80E-07	*5.71E-06*	0	0	0.89843775	0.10156225
	Benzo(a)anthracene	0.96666667	0.0025			0.57	0	0	0	0.0022649	0.0002525	2.52E-03	0.00E+00	0.00E+00	4.00E-03	4.46E-04	*4.45E-03*	0	0	0.8996981	0.1003019
	Benzo(a)pyrene	0.99666667	0.0025		0.16	0.57	0	0.079563802	0.079563802	0.0023352	0.0002525	8.22E-02	0.00E+00	1.41E-01	4.13E-03	4.46E-04	*1.45E-01*	0	0.968501	0.02842541	0.00307359
	Benzo(b)fluoranthene	1.44	0.0025		0.11	0.57	0	0.055130907	0.055130907	0.0033739	0.0002525	5.88E-02	0.00E+00	9.75E-02	5.96E-03	4.46E-04	*1.04E-01*	0	0.9382814	0.05742126	0.00429734
	Benzo(g,h,i)perylene	1.08333333	0.0025			58.00	0	0	0	0.0025382	0.0002525	2.79E-03	0.00E+00	0.00E+00	4.38E-05	4.35E-06	*4.81E-05*	0	0	0.90952253	0.09047747
	Benzo(k)fluoranthene	1.1	0.0025		0.22	0.57	0	0.11014279	0.11014279	0.0025773	0.0002525	1.13E-01	0.00E+00	1.95E-01	4.56E-03	4.46E-04	*2.00E-01*	0	0.97495145	0.0228135	0.00223506
	Carbazole	1.08333333	0			58.00014758	0	0	0	0.0025382	0	2.54E-03	0.00E+00	0.00E+00	4.38E-05	0.00E+00	*4.38E-05*	0	0	1	0
	Chrysene	1.17	0.0025		0.14	0.57	0	0.068663907	0.068663907	0.0027413	0.0002525	7.17E-02	0.00E+00	1.21E-01	4.85E-03	4.46E-04	*1.27E-01*	0	0.95822069	0.03825561	0.0035237
	Dibenz(a,h)anthracene	1.08333333	0.0025			0.57	0	0	0	0.0025382	0.0002525	2.79E-03	0.00E+00	0.00E+00	4.49E-03	4.46E-04	*4.93E-03*	0	0	0.90952253	0.09047747
	Dibenzofuran	1.08333333	0.0025			58.00	0	0	0	0.0025382	0.0002525	2.79E-03	0.00E+00	0.00E+00	4.38E-05	4.35E-06	*4.81E-05*	0	0	0.90952253	0.09047747
	Fluoranthene	2.46666667	0.0025		0.12	54.39	0	0.058634665	0.058634665	0.0057794	0.0002525	6.47E-02	0.00E+00	1.08E-03	1.06E-04	4.64E-06	*1.19E-03*	0	0.90672305	0.08937231	0.00390465
	Fluorene	1.08333333	0.0025			54.39	0	0	0	0.0025382	0.0002525	2.79E-03	0.00E+00	0.00E+00	4.67E-05	4.64E-06	*5.13E-05*	0	0	0.90952253	0.09047747
	Indeno(1,2,3-cd)pyrene	1.08333333	0.0025		0.46	0.57	0	0.229487322	0.229487322	0.0025382	0.0002525	2.32E-01	0.00E+00	4.06E-01	4.49E-03	4.46E-04	*4.11E-01*	0	0.98798531	0.01092764	0.00108706
	Naphthalene	1.08333333	0.0025			60.92	0	0	0	0.0025382	0.0002525	2.79E-03	0.00E+00	0.00E+00	4.17E-05	4.15E-06	*4.58E-05*	0	0	0.90952253	0.09047747
	N-nitrosodiphenylamine	1.08333333	0.0025			120.62	0	0	0	0.0025382	0.0002525	2.79E-03	0.00E+00	0.00E+00	2.10E-05	2.09E-06	*2.31E-05*	0	0	0.90952253	0.09047747
	Phenanthrene	1.50333333	0.0025		0.40	58.00	0	0.203584329	0.203584329	0.0035223	0.0002525	2.07E-01	0.00E+00	3.51E-03	6.07E-05	4.35E-06	*3.58E-03*	0	0.98179579	0.01698652	0.00121769
	Pyrene	1.66666667	0.0025		0.10	58.00	0	0.0513807	0.0513807	0.003905	0.0002525	5.55E-02	0.00E+00	8.86E-04	6.73E-05	4.35E-06	*9.58E-04*	0	0.92514161	0.07031197	0.00454642
	Pesticides and PCBs																				
	4,4'-DDD	0.01056667	0.00005	0.0006	5.46E-04	6.84	1.925E-05	0.000274665	0.000293917	2.476E-05	0.00000505	3.24E-04	2.82E-06	4.02E-05	3.62E-06	7.39E-07	*4.74E-05*	0.0594702	0.84845242	0.07647769	0.01559969
	4,4'-DDE	0.01006667	0.00005	0.0010	4.37E-04	0.83	2.91E-05	0.000219933	0.000249035	2.359E-05	0.00000505	2.78E-04	3.52E-05	2.66E-04	2.85E-05	6.11E-06	*3.36E-04*	0.10480687	0.79206306	0.08494306	0.01818701
	4,4'-DDT	0.01083333	0.00005	0.0011	1.74E-03	0.64	3.209E-05	0.000875448	0.000907534	2.538E-05	0.00000505	9.38E-04	4.99E-05	1.36E-03	3.95E-05	7.85E-06	*1.46E-03*	0.03420868	0.93334614	0.0270612	0.00538399
	Aldrin	0.00566667	0.000025	0.0003		0.16	9.104E-06	0	9.10364E-06	1.328E-05	0.000002525	2.49E-05	5.66E-05	0.00E+00	8.26E-05	1.57E-05	*1.55E-04*	0.36552524	0	0.5330921	0.10138266
	alpha-Chlordane	0.00413333	2.173E-05	0.0006	4.23E-04	1.99	1.866E-05	0.000212843	0.000231498	9.684E-06	2.19459E-06	2.43E-04	9.36E-06	1.07E-04	4.86E-06	1.10E-06	*1.22E-04*	0.07665076	0.87454016	0.03979183	0.00901725
	Aroclor 1248	0.10833333	0.0005	0.0025		0.57	7.462E-05	0	0.00007462	0.0002538	0.0000505	3.79E-04	1.32E-04	0.00E+00	4.49E-04	8.93E-05	*6.70E-04*	0.19691512	0	0.66982016	0.13326472
	Aroclor 1254	0.10833	0.0005	0.0195		0.15	0.000582	0	0.000582036	0.0002538	0.0000505	8.86E-04	3.98E-03	0.00E+00	1.73E-03	3.45E-04	*6.06E-03*	0.65666374	0	0.28636123	0.05697503
	Aroclor 1260	0.10833333	0.0005	0.0215	6.77E-03	0.28	0.0006417	0.003404277	0.004046009	0.0002538	0.0000505	4.35E-03	2.31E-03	1.23E-02	9.15E-04	1.82E-04	*1.57E-02*	0.14751327	0.78253234	0.05834609	0.0116083
	beta-BHC	0.00566667	0.000025	0.0003		3.22	7.611E-06	0	7.61124E-06	1.328E-05	0.000002525	2.34E-05	2.37E-06	0.00E+00	4.13E-06	7.85E-07	*7.28E-06*	0.32508273	0	0.56707231	0.10784496
	delta-BHC	0.00566667	0.000025	0.0003		1.29	7.611E-06	0	7.61124E-06	1.328E-05	0.000002525	2.34E-05	5.92E-06	0.00E+00	1.03E-05	1.96E-06	*1.82E-05*	0.32508273	0	0.56707231	0.10784496
	Endosulfan I	0.0114	0.000025	0.0006	1.88E-03	1.21	1.866E-05	0.000943896	0.000962551	2.671E-05	0.000002525	9.92E-04	1.55E-05	7.83E-04	2.21E-05	2.09E-06	*8.22E-04*	0.0188095	0.95171318	0.02693141	0.00254591
	Endosulfan Sulfate	0.01083333	0.00005	0.0009		1.21	2.821E-05	0	2.82064E-05	2.538E-05	0.00000505	5.86E-05	2.34E-05	0.00E+00	2.10E-05	4.19E-06	*4.86E-05*	0.48101822	0	0.43286142	0.08612036
	Endrin Aldehyde	0.01083333	0.00005	0.0022	3.33E-03	0.04	6.567E-05	0.001675136	0.001740802	2.538E-05	0.00000505	1.77E-03	1.64E-03	4.18E-02	6.34E-04	1.26E-04	*4.42E-02*	0.03707336	0.94574512	0.0143304	0.00285112
	gamma-Chlordane	0.00566667	2.163E-05	0.0003	5.44E-04	1.99	7.611E-06	0.000273677	0.000281288	1.328E-05	2.18449E-06	2.97E-04	3.82E-06	1.37E-04	6.66E-06	1.10E-06	*1.49E-04*	0.02564868	0.92224855	0.04474139	0.00736138
	Inorganics																				
	Aluminum	3686.66667	0.3861143	47.9000	6.14E+01	41.82	1.4297192	30.87589284	32.30561204	8.63786	0.038997543	4.10E+01	3.42E-02	7.38E-01	2.07E-01	9.33E-04	*9.80E-01*	0.03488612	0.75339269	0.21076963	0.00095157
	Antimony	0.91	0.0006929	0.0498		0.05	0.0014849	0	0.001484938	0.0021321	6.99786E-05	3.69E-03	2.73E-02	0.00E+00	3.92E-02	1.29E-03	*6.78E-02*	0.40274457	0	0.57827585	0.01897957
X	Arsenic	61.2	0.0245857	3.7500	3.23	0.05	0.11193	1.623009092	1.734939092	0.0731297	0.002483157	1.81E+00	2.04E+00	2.96E+01	1.33E+00	4.53E-02	*3.30E+01*	0.06182093	0.89641674	0.04039084	0.00137149
	Barium	15.9	0.0373429	8.8000	1.55	4.33	0.2626624	0.780088004	1.042750404	0.0372537	0.003771629	1.08E+00	6.07E-02	1.80E-01	8.60E-03	8.71E-04	*2.50E-01*	0.24235863	0.7197873	0.03437399	0.00348008
	Beryllium	0.135	6.379E-05	0.0060		0.53	0.0001791	0	0.000179088	0.0003163	6.44236E-06	5.02E-04	3.37E-04	0.00E+00	5.96E-04	1.21E-05	*9.46E-04*	0.35686605	0	0.63029636	0.01283759
	Cadmium	0.6433333	0.00043	0.0570	0.07	0.78	0.0017013	0.034675822	0.036377158	0.0015073	0.00004343	3.79E-02	2.19E-03	4.47E-02	1.94E-03	5.60E-05	*4.89E-02*	0.04485709	0.91425588	0.03974196	0.00114507
	Chromium	104.033333	0.0257857	0.8950	1.94	7.24	0.026714	0.978191928	1.004905888	0.2437501	0.002604357	1.25E+00	3.69E-03	1.35E-01	3.37E-02	3.60E-04	*1.73E-01*	0.02134964	0.78176531	0.19480366	0.00208139
	Cobalt	4.1	0.0014686	0.4850	0.36	4.02	0.0144763	0.18322186	0.19769814	0.0096063	0.000148326	2.07E-01	3.60E-03	4.56E-02	2.39E-03	3.69E-05	*5.16E-02*	0.06978109	0.88319796	0.04630596	0.00071498
	Copper	57	0.0215429	54.3500	2.89	12.23	1.6222388	1.452551717	3.074790517	0.133551	0.002175829	3.21E+00	1.33E-01	1.19E-01	1.09E-02	1.78E-04	*2.62E-01*	0.50528891	0.45243541	0.04159797	0.00067772
	Cyanide	0.29	0.0025	0.2675		51.90	0.0079843	0	0.00798434	0.0006795	0.0002525	8.92E-03	1.54E-04	0.00E+00	1.31E-05	4.87E-06	*1.72E-04*	0.89547582	0	0.07620529	0.02831889
X	Iron	14010	2.401	577.5000	1159.74	2.57	17.23722	583.5279946	600.7652146	32.82543	0.242501	6.34E+02	6.72E+00	2.27E+02	1.28E+01	9.45E-02	*2.47E+02*	0.0271952	0.92063345	0.05178876	0.00038259
	Lead	68.3333333	0.0130729	0.5150	6.23	6.43	0.0153717	3.135471798	3.150843518	0.160105	0.001320358	3.31E+00	2.39E-03	4.87E-01	2.49E-02	2.05E-04	*5.15E-01*	0.00464084	0.94662357	0.04833696	0.00039863
	Manganese	132.633333	0.4697143	88.7000	74.79	70.76	2.6475176	37.6323082	40.2798258	0.3107599	0.047441143	4.06E+01	3.74E-02	5.32E-01	4.39E-03	6.70E-04	*5.74E-01*	0.06514877	0.9260368	0.00764702	0.00116741
	Mercury	0.5866667	0.0002039	0.0090	0.02	0.03	0.0002686	0.010340209	0.010608841	0.0013746	2.05968E-05	1.20E-02	1.04E-02	4.02E-01	5.34E-02	8.00E-04	*4.66E-01*	0.02237854	0.8613971	0.11450853	0.00171583
	Nickel	7.3333333	0.0028429	0.0675	0.19	32.17	0.0020147	0.095319356	0.097334096	0.017182	0.000287129	1.15E-01	6.26E-05	2.96E-03	5.34E-04	8.93E-06	*3.57E-03*	0.01754951	0.83028466	0.14966478	0.00250105
	Selenium	0.5483333	0.0008571	0.3300	0.05	0.16	0.0098498	0.023706288	0.033556128	0.0012847	8.65714E-05	3.49E-02	6.12E-02	1.47E-01	7.99E-03	5.38E-04	*2.17E-01*	0.28200861	0.67872954	0.03678325	0.00247861
	Silver	0.1366667	0.00025	0.0370		145.71	0.0011044	0	0.001104376	0.0003202	0.00002525	1.45E-03	7.58E-06	0.00E+00	2.20E-06	1.73E-07	*9.95E-06*	0.76172473	0	0.2208595	0.01741576
	Thallium	0.49	0.0007786	0.0675		0.06	0.0020147	0	0.00201474	0.0011481	7.86357E-05	3.24E-03	3.35E-02	0.00E+00	1.91E-02	1.31E-03	*5.39E-02*	0.62155599	0	0.35418455	0.02425946
X	Vanadium	11.4666667	0.0018789	0.1375	0.40	0.16	0.0041041	0.200753031	0.204857131	0.0268664	0.000189772	2.32E-01	2.62E-02	1.28E+00	1.71E-01	1.21E-03	*1.48E+00*	0.0176967	0.86563827	0.11584674	0.00081829
	Zinc	221	0.1277857	28.7500	8.56	128.66	0.85813	4.304691272	5.162821272	0.517803	0.012906357	5.69E+00	6.67E-03	3.35E-02	4.02E-03	1.00E-04	*4.43E-02*	0.15072019	0.75606711	0.09094585	0.00226685

Table E.1-15. Exposure Calculations for Muskrat - Station 15

	Mean Concentrations Compound	C_{soil} (mg/Kg)	C_{water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0	0.0025			9.730183192	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E-05	*2.60E-05*	0	0	0	1
	Acetone	0.25	0.0025			1367.050531	0	0	0	0.0005858	0.0002525	8.38E-04	0.00E+00	0.00E+00	4.28E-07	1.85E-07	*6.13E-07*	0	0	0.69877721	0.30122279
	cis-1,2-Dichloroethene	0.187	0.0005833			2504.114914	0	0	0	0.0004381	5.89167E-05	4.97E-04	0.00E+00	0.00E+00	1.75E-07	2.35E-08	*1.98E-07*	0	0	0.88146916	0.11853084
	Tetrachloroethene	0.068	0.0005			6.09153838	0	0	0	0.0001593	0.0000505	2.10E-04	0.00E+00	0.00E+00	2.62E-05	8.29E-06	*3.44E-05*	0	0	0.7593221	0.2406779
	Trichloroethene	0.0933333	0.0005			3.04576919	0	0	0	0.0002187	0.0000505	2.69E-04	0.00E+00	0.00E+00	7.18E-05	1.66E-05	*8.84E-05*	0	0	0.81239319	0.18760681
	Semivolatile Organics																				
	2-Methylnaphthalene	0.01	0.0025			62.53	0	0	0	2.343E-05	0.0002525	2.76E-04	0.00E+00	0.00E+00	3.75E-07	4.04E-06	*4.41E-06*	0	0	0.08491284	0.91508716
	Acenaphthylene	0.007	0.0025			58.00	0	0	0	1.64E-05	0.0002525	2.69E-04	0.00E+00	0.00E+00	2.83E-07	4.35E-06	*4.64E-06*	0	0	0.06099271	0.93900729
	Anthracene	0.05	0.0025			435.11	0	0	0	0.0001172	0.0002525	3.70E-04	0.00E+00	0.00E+00	2.69E-07	5.80E-07	*8.50E-07*	0	0	0.31692141	0.68307859
	Benzo(a)anthracene	0.2	0.0025			0.57	0	0	0	0.0004686	0.0002525	7.21E-04	0.00E+00	0.00E+00	8.28E-04	4.46E-04	*1.27E-03*	0	0	0.64984052	0.35015948
	Benzo(a)pyrene	0.18	0.0025		0.03	0.57	0	0.014369382	0.014369382	0.0004217	0.0002525	1.50E-02	0.00E+00	2.54E-02	7.46E-04	4.46E-04	*2.66E-02*	0	0.95518101	0.02803447	0.01678452
	Benzo(b)fluoranthene	0.44	0.0025		0.03	0.57	0	0.016845555	0.016845555	0.0010309	0.0002525	1.81E-02	0.00E+00	2.98E-02	1.82E-03	4.46E-04	*3.21E-02*	0	0.92920615	0.05686587	0.01392798
	Benzo(g,h,i)perylene	0.15	0.0025			58.00	0	0	0	0.0003515	0.0002525	6.04E-04	0.00E+00	0.00E+00	6.06E-06	4.35E-06	*1.04E-05*	0	0	0.58191903	0.41808097
	Benzo(k)fluoranthene	0.27	0.0025		0.05	0.57	0	0.027035048	0.027035048	0.0006326	0.0002525	2.79E-02	0.00E+00	4.78E-02	1.12E-03	4.46E-04	*4.94E-02*	0	0.96829853	0.02265782	0.00904364
	Carbazole	0	0			58.00014758	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0	0
	Chrysene	0.41	0.0025		0.05	0.57	0	0.024061711	0.024061711	0.0009606	0.0002525	2.53E-02	0.00E+00	4.25E-02	1.70E-03	4.46E-04	*4.47E-02*	0	0.95200247	0.03800736	0.00999017
	Dibenz(a,h)anthracene	0.06	0.0025			0.57	0	0	0	0.0001406	0.0002525	3.93E-04	0.00E+00	0.00E+00	2.49E-04	4.46E-04	*6.95E-04*	0	0	0.35763712	0.64236288
	Dibenzofuran	0	0.0025			58.00	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.35E-06	*4.35E-06*	0	0	0	1
	Fluoranthene	0.99	0.0025		0.05	54.39	0	0.023533102	0.023533102	0.0023196	0.0002525	2.61E-02	0.00E+00	4.33E-04	4.26E-05	4.64E-06	*4.80E-04*	0	0.90147278	0.08885481	0.00967241
	Fluorene	0.069	0.0025			54.39	0	0	0	0.0001617	0.0002525	4.14E-04	0.00E+00	0.00E+00	2.97E-06	4.64E-06	*7.61E-06*	0	0	0.39034254	0.60965746
	Indeno(1,2,3-cd)pyrene	0.17	0.0025		0.07	0.57	0	0.036011857	0.036011857	0.0003983	0.0002525	3.67E-02	0.00E+00	6.37E-02	7.04E-04	4.46E-04	*6.48E-02*	0	0.9822487	0.01086419	0.00688711
	Naphthalene	0.015	0.0025			60.92	0	0	0	3.515E-05	0.0002525	2.88E-04	0.00E+00	0.00E+00	5.77E-07	4.15E-06	*4.72E-06*	0	0	0.12218186	0.87781814
	N-nitrosodiphenylamine	0	0.0025			120.62	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.09E-06	*2.09E-06*	0	0	0	1
	Phenanthrene	0.4	0.0025		0.11	58.00	0	0.054168779	0.054168779	0.0009372	0.0002525	5.54E-02	0.00E+00	9.34E-04	1.62E-05	4.35E-06	*9.54E-04*	0	0.97850916	0.01692966	0.00456118
	Pyrene	0.59	0.0025		0.04	58.00	0	0.018188768	0.018188768	0.0013824	0.0002525	1.98E-02	0.00E+00	3.14E-04	2.38E-05	4.35E-06	*3.42E-04*	0	0.91752926	0.06973342	0.01273732
	Pesticides and PCBs																				
	4,4'-DDD	0.0069	0.00005	0.0006	3.56E-04	6.84	1.925E-05	0.000179355	0.000198607	1.617E-05	0.00000505	2.20E-04	2.82E-06	2.62E-05	2.37E-06	7.39E-07	*3.22E-05*	0.08757901	0.8159042	0.07354386	0.02297293
	4,4'-DDE	0.0038	0.00005	0.0010	1.65E-04	0.83	2.91E-05	8.3021E-05	0.000112123	8.903E-06	0.00000505	1.26E-04	3.52E-05	1.00E-04	1.08E-05	6.11E-06	*1.53E-04*	0.23082714	0.65849849	0.07061922	0.04005515
	4,4'-DDT	0.0018	0.00005	0.0011	2.89E-04	0.64	3.209E-05	0.000145459	0.000177546	4.217E-06	0.00000505	1.87E-04	4.99E-05	2.26E-04	6.56E-06	7.85E-06	*2.90E-04*	0.17175787	0.77863423	0.02257552	0.02703238
	Aldrin	0.000085	0.000025	0.0003		0.16	9.104E-06	0	9.10364E-06	1.992E-07	0.000002525	1.18E-05	5.66E-05	0.00E+00	1.24E-06	1.57E-05	*7.35E-05*	0.76968192	0	0.01683788	0.2134802
	alpha-Chlordane	0.006	2.173E-05	0.0006	6.14E-04	1.99	1.866E-05	0.000308965	0.00032762	1.406E-05	2.19459E-06	3.44E-04	9.36E-06	1.55E-04	7.05E-06	1.10E-06	*1.73E-04*	0.05424973	0.89848688	0.04088141	0.00638198
	Aroclor 1248	0.043	0.0005	0.0025		0.57	7.462E-05	0	0.00007462	0.0001007	0.0000505	2.26E-04	1.32E-04	0.00E+00	1.78E-04	8.93E-05	*3.99E-04*	0.33036849	0	0.44605059	0.22358093
	Aroclor 1254	0.00165	0.0005	0.0195		0.15	0.000582	0	0.000582036	3.866E-06	0.0000505	6.36E-04	3.98E-03	0.00E+00	2.64E-05	3.45E-04	*4.35E-03*	0.91457294	0	0.0060747	0.07935237
	Aroclor 1260	0.083	0.0005	0.0215	5.18E-03	0.28	0.0006417	0.0026082	0.003249932	0.0001945	0.0000505	3.49E-03	2.31E-03	9.40E-03	7.01E-04	1.82E-04	*1.26E-02*	0.18361951	0.74628723	0.05564364	0.01444962
	beta-BHC	0.000085	0.000025	0.0003		3.22	7.611E-06	0	7.61124E-06	1.992E-07	0.000002525	1.03E-05	2.37E-06	0.00E+00	6.19E-08	7.85E-07	*3.21E-06*	0.73642468	0	0.01926922	0.2443061
	delta-BHC	0.000085	0.000025	0.0003		1.29	7.611E-06	0	7.61124E-06	1.992E-07	0.000002525	1.03E-05	5.92E-06	0.00E+00	1.55E-07	1.96E-06	*8.03E-06*	0.73642468	0	0.01926922	0.2443061
	Endosulfan I	0.0075875	0.000025	0.0006	1.25E-03	1.21	1.866E-05	0.000628229	0.000646884	1.778E-05	0.000002525	6.67E-04	1.55E-05	5.21E-04	1.47E-05	2.09E-06	*5.53E-04*	0.0279607	0.94160927	0.02664549	0.00378455
	Endosulfan Sulfate	0.000165	0.00005	0.0009		1.21	2.821E-05	0	2.82064E-05	3.866E-07	0.00000505	3.36E-05	2.34E-05	0.00E+00	3.21E-07	4.19E-06	*2.79E-05*	0.83840317	0	0.01149111	0.15010572
	Endrin Aldehyde	0.002	0.00005	0.0022	6.15E-04	0.04	6.567E-05	0.000309256	0.000374921	4.686E-06	0.00000505	3.85E-04	1.64E-03	7.73E-03	1.17E-04	1.26E-04	*9.61E-03*	0.17071187	0.8039773	0.01218227	0.01312856
	gamma-Chlordane	0.00098	2.163E-05	0.0003	9.41E-05	1.99	7.611E-06	4.733E-05	5.49413E-05	2.296E-06	2.18449E-06	5.94E-05	3.82E-06	2.38E-05	1.15E-06	1.10E-06	*2.98E-05*	0.12808811	0.79650824	0.0386413	0.03676234
	Inorganics																				
X	Aluminum	5960	0.3861143	47.9000	9.92E+01	41.82	1.4297192	49.91509619	51.34481539	13.96428	0.038997543	6.53E+01	3.42E-02	1.19E+00	3.34E-01	9.33E-04	*1.56E+00*	0.02187851	0.76383401	0.2136907	0.00059677
	Antimony	4.6333333	0.0006929	0.0498		0.05	0.0014849	0	0.001484938	0.0108559	6.99786E-05	1.24E-02	2.73E-02	0.00E+00	2.00E-01	1.29E-03	*2.28E-01*	0.1196487	0	0.87471279	0.00563851
X	Arsenic	166.5	0.0245857	3.7500	8.78	0.05	0.11193	4.415539442	4.527469442	0.1989558	0.002483157	4.73E+00	2.04E+00	8.05E+01	3.63E+00	4.53E-02	*8.63E+01*	0.02366931	0.93373333	0.04207226	0.0005251
	Barium	57.45	0.0373429	8.8000	5.60	4.33	0.2626624	2.818619865	3.081282265	0.1346054	0.003771629	3.22E+00	6.07E-02	6.51E-01	3.11E-02	8.71E-04	*7.44E-01*	0.08158081	0.87544043	0.04180733	0.00117144
	Beryllium	0.93	6.379E-05	0.0060		0.53	0.0001791	0	0.000179088	0.002179	6.44236E-06	2.36E-03	3.37E-04	0.00E+00	4.11E-03	1.21E-05	*4.46E-03*	0.07573967	0	0.92153573	0.00272459
X	Cadmium	28.125	0.00043	0.0570	3.01	0.78	0.0017013	1.515944368	1.517645704	0.0658969	0.00004343	1.58E+00	2.19E-03	1.95E+00	8.50E-02	5.60E-05	*2.04E+00*	0.00107436	0.95728578	0.04161244	2.7425E-05
	Chromium	267.75	0.0257857	0.8950	5.00	7.24	0.026714	2.517567018	2.544280978	0.6273383	0.002604357	3.17E+00	3.69E-03	3.48E-01	8.67E-02	3.60E-04	*4.39E-01*	0.0084159	0.79312845	0.19763518	0.00082047
	Cobalt	17.8	0.0014686	0.4850	1.58	4.02	0.0144763	0.795451001	0.809927281	0.0417054	0.000148326	8.52E-01	3.60E-03	1.98E-01	1.04E-02	3.69E-05	*2.12E-01*	0.01699531	0.93386797	0.04896259	0.00017414
	Copper	352.25	0.0215429	54.3500	17.84	12.23	1.6222388	8.976514779	10.59875358	0.8253218	0.002175829	1.14E+01	1.33E-01	7.34E-01	6.75E-02	1.78E-04	*9.34E-01*	0.14197472	0.78560454	0.07223032	0.00019042
	Cyanide	0	0.0025	0.2675		51.90	0.0079843	0	0.00798434	0	0.0002525	0.00E+00	1.54E-04	0.00E+00	0.00E+00	4.87E-06	*1.59E-04*	0.96934504	0	0	0.03065496
X	Iron	17125	2.401	577.5000	1417.60	2.57	17.23722	713.2703004	730.5075204	40.123875	0.242501	7.71E+02	6.72E+00	2.78E+02	1.56E+01	9.45E-02	*3.01E+02*	0.02236062	0.92527494	0.05204986	0.00031458
	Lead	100.275	0.0130729	0.5150	9.14	6.43	0.0153717	4.601113679	4.616485399	0.2349443	0.001320358	4.85E+00	2.39E-03	7.15E-01	3.65E-02	2.05E-04	*7.54E-01*	0.00316763	0.94814561	0.04841468	0.00027208
X	Manganese	1111.25	0.4697143	88.7000	626.64	70.76	2.6475176	315.2970784	317.944596	2.6036588	0.047441143	3.21E+02	3.74E-02	4.46E+00	3.68E-02	6.70E-04	*4.53E+00*	0.00825812	0.98347259	0.00812132	0.00014798
	Mercury	0.8966667	0.0002039	0.0090	0.03	0.03	0.0002686	0.015804069	0.016072701	0.0021009	2.05968E-05	1.82E-02	1.04E-02	6.14E-01	8.16E-02	8.00E-04	*7.07E-01*	0.01476472	0.86863283	0.1154704	0.00113205
	Nickel	16.625	0.0028429	0.0675	0.43	32.17	0.0020147	0.216093315	0.218108055	0.0389524	0.000287129	2.57E-01	6.26E-05	6.72E-03	1.21E-03	8.93E-06	*8.00E-03*	0.00782887	0.83969444	0.15136097	0.00111572
X	Selenium	5.2333333	0.0008571	0.3300	0.45	0.16	0.0098498	0.226254557	0.236104397	0.0122617	8.65714E-05	2.48E-01	6.12E-02	1.41E+00	7.62E-02	5.38E-04	*1.54E+00*	0.03964473	0.91065457	0.04935226	0.00034844
	Silver	0.29	0.00025	0.0370		145.71	0.0011044	0	0.001104376	0.0006795	0.00002525	1.81E-03	7.58E-06	0.00E+00	4.66E-06	1.73E-07	*1.24E-05*	0.01045738	0	0.37558538	0.01395725
	Thallium	2.4	0.0007786	0.0675		0.06	0.0020147	0	0.00201474	0.0056232	7.86357E-05	7.72E-03	3.35E-02	0.00E+00	9.35E-02	1.31E-03	*1.28E-01*	0.26109249	0	0.72871701	0.01019049
X	Vanadium	19.7	0.0018789	0.1375	0.69	0.16	0.0041041	0.344898375	0.349002475	0.0461571	0.000189772	3.95E-01	2.62E-02	2.20E+00	2.94E-01	1.21E-03	*2.52E+00*	0.01038095	0.87238888	0.11675016	0.00048001
	Zinc	2622.5	0.1277857	28.7500	101.52	128.66	0.85813	51.08168716	51.93981716	6.1445175	0.012906357	5.81E+01	6.67E-03	3.97E-01	4.78E-02	1.00E-04	*4.52E-01*	0.01477058	0.87924463	0.10576264	0.00022215

Table E.1-16. Exposure Calculations for Muskrat - Station 16

	Mean Concentrations																			
	Compound	C_{soil} (mg/Kg)	C_{water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach 2																	
	Volatile Organics																				
	2-Butanone	0.0086667	0.0025			9.730183192	0	0	0	2.031E-05	0.0002525	2.73E-04	0.00E+00	0.00E+00	2.09E-06	2.60E-05	*2.80E-05*	0	0	0.07443385	0.92556615
	Acetone	0.0125	0.0025			1367.050531	0	0	0	2.929E-05	0.0002525	2.82E-04	0.00E+00	0.00E+00	2.14E-08	1.85E-07	*2.06E-07*	0	0	0.1039347	0.8960653
	cis-1,2-Dichloroethene	0	0.0025			2504.114914	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E-07	*1.01E-07*	0	0	0	1
	Tetrachloroethene	0.0086667	0.0005			6.09153838	0	0	0	2.031E-05	0.0000505	7.08E-05	0.00E+00	0.00E+00	3.33E-06	8.29E-06	*1.16E-05*	0	0	0.28678361	0.71321639
	Trichloroethene	0.0086667	0.0015			3.04576919	0	0	0	2.031E-05	0.0001515	1.72E-04	0.00E+00	0.00E+00	6.67E-06	4.97E-05	*5.64E-05*	0	0	0.11819145	0.88180855
	Semivolatile Organics																				
	2-Methylnaphthalene	0.28	0.0025			62.53	0	0	0	0.000656	0.0002525	9.09E-04	0.00E+00	0.00E+00	1.05E-05	4.04E-06	*1.45E-05*	0	0	0.72208158	0.27791842
	Acenaphthylene	0.28	0.0025			58.00	0	0	0	0.000656	0.0002525	9.09E-04	0.00E+00	0.00E+00	1.13E-05	4.35E-06	*1.57E-05*	0	0	0.72208158	0.27791842
	Anthracene	0.28	0.0025			435.11	0	0	0	0.000656	0.0002525	9.09E-04	0.00E+00	0.00E+00	1.51E-06	5.80E-07	*2.09E-06*	0	0	0.72208158	0.27791842
	Benzo(a)anthracene	0.28	0.0025			0.57	0	0	0	0.000656	0.0002525	9.09E-04	0.00E+00	0.00E+00	1.16E-03	4.46E-04	*1.61E-03*	0	0	0.72208158	0.27791842
	Benzo(a)pyrene	0.28	0.0025		0.04	0.57	0	0.022352372	0.022352372	0.000656	0.0002525	2.33E-02	0.00E+00	3.95E-02	1.16E-03	4.46E-04	*4.11E-02*	0	0.96094134	0.02820354	0.01085512
	Benzo(b)fluoranthene	0.225	0.0025		0.02	0.57	0	0.008614204	0.008614204	0.0005272	0.0002525	9.39E-03	0.00E+00	1.52E-02	9.32E-04	4.46E-04	*1.66E-02*	0	0.91700181	0.05611899	0.0268792
	Benzo(g,h,i)perylene	0.28	0.0025			58.00	0	0	0	0.000656	0.0002525	9.09E-04	0.00E+00	0.00E+00	1.13E-05	4.35E-06	*1.57E-05*	0	0	0.72208158	0.27791842
	Benzo(k)fluoranthene	0.225	0.0025		0.04	0.57	0	0.022529207	0.022529207	0.0005272	0.0002525	2.33E-02	0.00E+00	3.98E-02	9.32E-04	4.46E-04	*4.12E-02*	0	0.9665503	0.02261691	0.01083278
	Carbazole	0.28	0			58.00014758	0	0	0	0.000656	0	6.56E-04	0.00E+00	0.00E+00	1.13E-05	0.00E+00	*1.13E-05*	0	0	1	0
	Chrysene	0.28	0.0025		0.03	0.57	0	0.016432388	0.016432388	0.000656	0.0002525	1.73E-02	0.00E+00	2.91E-02	1.16E-03	4.46E-04	*3.07E-02*	0	0.94760719	0.03783189	0.01456093
	Dibenz(a,h)anthracene	0.28	0.0025			0.57	0	0	0	0.000656	0.0002525	9.09E-04	0.00E+00	0.00E+00	1.16E-03	4.46E-04	*1.61E-03*	0	0	0.72208158	0.27791842
	Dibenzofuran	0.28	0.0025			58.00	0	0	0	0.000656	0.0002525	9.09E-04	0.00E+00	0.00E+00	1.13E-05	4.35E-06	*1.57E-05*	0	0	0.72208158	0.27791842
	Fluoranthene	0.116	0.0025		0.01	54.39	0	0.002757414	0.002757414	0.0002718	0.0002525	3.28E-03	0.00E+00	5.07E-05	5.00E-06	4.64E-06	*6.03E-05*	0	0.840239	0.08281922	0.07694178
	Fluorene	0.28	0.0025			54.39	0	0	0	0.000656	0.0002525	9.09E-04	0.00E+00	0.00E+00	1.21E-05	4.64E-06	*1.67E-05*	0	0	0.72208158	0.27791842
	Indeno(1,2,3-cd)pyrene	0.28	0.0025		0.12	0.57	0	0.059313646	0.059313646	0.000656	0.0002525	6.02E-02	0.00E+00	1.05E-01	1.16E-03	4.46E-04	*1.06E-01*	0	0.98491353	0.01089366	0.00419281
	Naphthalene	0.28	0.0025			60.92	0	0	0	0.000656	0.0002525	9.09E-04	0.00E+00	0.00E+00	1.08E-05	4.15E-06	*1.49E-05*	0	0	0.72208158	0.27791842
	N-nitrosodiphenylamine	0.28	0.0025			120.62	0	0	0	0.000656	0.0002525	9.09E-04	0.00E+00	0.00E+00	5.44E-06	2.09E-06	*7.53E-06*	0	0	0.72208158	0.27791842
	Phenanthrene	0.28	0.0025		0.08	58.00	0	0.037918146	0.037918146	0.000656	0.0002525	3.88E-02	0.00E+00	6.54E-04	1.13E-05	4.35E-06	*6.69E-04*	0	0.97660011	0.01689663	0.00650326
	Pyrene	0.127	0.0025		0.01	58.00	0	0.003915209	0.003915209	0.0002976	0.0002525	4.47E-03	0.00E+00	6.75E-05	5.13E-06	4.35E-06	*7.70E-05*	0	0.8768135	0.06663897	0.05654753
	Pesticides and PCBs																				
	4,4'-DDD	0.0087	0.00005	0.0033	4.49E-04	6.84	9.85E-05	0.000226144	0.000324642	2.038E-05	0.00000505	3.50E-04	1.44E-05	3.31E-05	2.98E-06	7.39E-07	*5.12E-05*	0.28136284	0.64598409	0.05822763	0.01442544
	4,4'-DDE	0.0022733	0.00005	0.0080	9.87E-05	0.83	0.0002388	4.96669E-05	0.000288451	5.326E-06	0.00000505	2.99E-04	2.89E-04	6.01E-05	6.44E-06	6.11E-06	*3.61E-04*	0.79907011	0.16620609	0.01782441	0.01689939
	4,4'-DDT	0.0029733	0.00005	0.0011	4.78E-04	0.64	3.134E-05	0.000240277	0.000271617	6.967E-06	0.00000505	2.84E-04	4.87E-05	3.73E-04	1.08E-05	7.85E-06	*4.41E-04*	0.11049607	0.84713758	0.02456169	0.01780466
	Aldrin	0.0014333	0.000025	0.0003		0.16	8.059E-06	0	8.05896E-06	3.358E-06	0.000002525	1.39E-05	5.01E-05	0.00E+00	2.09E-05	1.57E-05	*8.67E-05*	0.57802394	0	0.24087199	0.18110407
	alpha-Chlordane	0.0010733	0.000025	0.0006	1.10E-04	1.99	1.851E-05	5.52704E-05	7.37762E-05	2.515E-06	0.000002525	7.88E-05	9.29E-06	2.77E-05	1.26E-06	1.27E-06	*3.96E-05*	0.234797	0.70125887	0.03190748	0.03203664
	Aroclor 1248	0.028	0.0005	0.0025		0.57	7.462E-05	0	0.00007462	6.56E-05	0.0000505	1.91E-04	1.32E-04	0.00E+00	1.16E-04	8.93E-05	*3.37E-04*	0.39124599	0	0.34397349	0.26478052
	Aroclor 1254	0.028	0.0005	0.0220		0.15	0.0006567	0	0.000656656	6.56E-05	0.0000505	7.73E-04	4.49E-03	0.00E+00	4.48E-04	3.45E-04	*5.28E-03*	0.84975413	0	0.0848957	0.06535017
	Aroclor 1260	0.028	0.0005	0.0410	1.75E-03	0.28	0.0012238	0.000879875	0.002103643	6.56E-05	0.0000505	2.22E-03	4.41E-03	3.17E-03	2.36E-04	1.82E-04	*8.00E-03*	0.55130975	0.39638518	0.02955472	0.02275034
	beta-BHC	0.0014333	0.000025	0.0003		3.22	7.462E-06	0	0.00000746	3.358E-06	0.000002525	1.33E-05	2.32E-06	0.00E+00	1.04E-06	7.85E-07	*4.15E-06*	0.55914817	0	0.25164664	0.18920519
	delta-BHC	0.00118	0.000025	0.0003		1.29	7.462E-06	0	0.00000746	2.765E-06	0.000002525	1.28E-05	5.80E-06	0.00E+00	2.15E-06	1.96E-06	*9.91E-06*	0.58517504	0	0.21681276	0.19801219
	Endosulfan I	0.0014333	0.000025	0.0003	2.36E-04	1.21	7.462E-06	0.000118677	0.000126139	3.358E-06	0.000002525	1.32E-04	6.19E-06	9.84E-05	2.78E-06	2.09E-06	*1.09E-04*	0.05652076	0.89891631	0.02543737	0.01912556
	Endosulfan Sulfate	0.0028	0.00005	0.0007		1.21	2.134E-05	0	2.13413E-05	6.56E-06	0.00000505	3.30E-05	1.77E-05	0.00E+00	5.44E-06	4.19E-06	*2.73E-05*	0.6476542	0	0.19909128	0.15325452
	Endrin Aldehyde	0.0028	0.00005	0.0030	8.60E-04	0.04	8.805E-05	0.000432958	0.00052101	6.56E-06	0.00000505	5.33E-04	2.20E-03	1.08E-02	1.64E-04	1.26E-04	*1.33E-02*	0.16531778	0.81288357	0.01231722	0.00948143
	gamma-Chlordane	0.0004367	0.000025	0.0003	4.19E-05	1.99	7.462E-06	2.10892E-05	2.85512E-05	1.023E-06	0.000002525	3.21E-05	3.74E-06	1.06E-05	5.13E-07	1.27E-06	*1.61E-05*	0.23246579	0.65699894	0.03187324	0.07866204
	Inorganics																				
	Aluminum	2990	0.1403333	52.7000	4.98E+01	41.82	1.5729896	25.04129826	26.61428786	7.00557	0.014173667	3.36E+01	3.76E-02	5.99E-01	1.68E-01	3.39E-04	*8.04E-01*	0.0467678	0.74452265	0.20828814	0.00042141
	Antimony	0.3366667	0.0006	0.0550		0.05	0.0016416	0	0.00164164	0.0007888	0.0000606	2.49E-03	3.02E-02	0.00E+00	1.45E-02	1.11E-03	*4.58E-02*	0.65901525	0	0.31665766	0.02432709
X	Arsenic	10.9	0.0126833	2.7000	0.57	0.05	0.0805896	0.289065345	0.369654945	0.0130247	0.001281017	3.84E-01	1.47E+00	5.27E+00	2.38E-01	2.34E-02	*7.00E+00*	0.20989023	0.75285139	0.03392206	0.00333632
	Barium	14.733333	0.0320833	9.9750	1.44	4.33	0.2977338	0.722848841	1.020582641	0.0345202	0.003240417	1.06E+00	6.88E-02	1.67E-01	7.97E-03	7.48E-04	*2.44E-01*	0.28132064	0.68300037	0.03261721	0.00306178
	Beryllium	0.0626667	4.567E-05	0.0065		0.53	0.000194	0	0.000194012	0.0001468	4.61234E-06	3.45E-04	3.66E-04	0.00E+00	2.77E-04	8.69E-06	*6.51E-04*	0.56161715	0	0.42503127	0.01335158
	Cadmium	0.2066667	0.00056	0.1105	0.02	0.78	0.0032982	0.011139386	0.01443759	0.0004842	0.00005656	1.50E-02	4.25E-03	1.44E-02	6.24E-04	7.29E-05	*1.93E-02*	0.2201978	0.74369814	0.03232796	0.00377611
	Chromium	20.866667	0.0062	2.2000	0.39	7.24	0.0656656	0.196202547	0.261868147	0.0488906	0.0006262	3.11E-01	9.07E-03	2.71E-02	6.76E-03	8.65E-05	*4.30E-02*	0.21088238	0.63009644	0.15701016	0.00201102
	Cobalt	4.0333333	0.000985	0.5400	0.36	4.02	0.0161179	0.180242641	0.196360561	0.0094501	0.000099485	2.06E-01	4.01E-03	4.48E-02	2.35E-03	2.47E-05	*5.12E-02*	0.07827647	0.87534609	0.04589429	0.00048315
	Copper	21.466667	0.0071833	62.2500	1.09	12.23	1.858038	0.54704287	2.40508087	0.0502964	0.000725517	2.46E+00	1.52E-01	4.47E-02	4.11E-03	5.93E-05	*2.01E-01*	0.75649847	0.222728	0.02047813	0.00029539
	Cyanide	0.2533333	0.0025	0.2250		51.90	0.0067158	0	0.0067158	0.0005936	0.0002525	7.56E-03	1.29E-04	0.00E+00	1.14E-05	4.87E-06	*1.46E-04*	0.88811484	0	0.07849391	0.03339126
X	Iron	5606.6667	1.2093333	342.5000	464.12	2.57	10.22294	233.5222667	243.7452087	13.13642	0.122142667	2.57E+02	3.99E+00	9.10E+01	5.12E+00	4.76E-02	*1.00E+02*	0.03977739	0.90863363	0.05111373	0.00047526
	Lead	9.1333333	0.0033083	0.9700	0.83	6.43	0.0289526	0.419082571	0.448035131	0.0213994	0.000334142	4.70E-01	4.50E-03	6.51E-02	3.33E-03	5.19E-05	*7.30E-02*	0.06163153	0.89210413	0.04555306	0.00071129
	Manganese	111.76667	0.5925	120.0000	63.03	70.76	3.58176	31.71176916	35.29352916	0.2618693	0.0598425	3.56E+01	5.06E-02	4.48E-01	3.70E-03	8.46E-04	*5.03E-01*	0.10056818	0.89039884	0.00735273	0.00168025
	Mercury	0.1743333	0.0001158	0.0140	0.01	0.03	0.0004179	0.003072686	0.003490558	0.0004085	1.16992E-05	3.91E-03	1.62E-02	1.19E-01	1.59E-02	4.55E-04	*1.52E-01*	0.10685295	0.78570851	0.10444698	0.00299156
	Nickel	3.8333333	0.0016333	0.1025	0.10	32.17	0.0030594	0.049826027	0.052885447	0.0089815	0.000164967	6.20E-02	9.51E-05	1.55E-03	2.79E-04	5.13E-06	*1.93E-03*	0.0493201	0.80323215	0.14478837	0.00265938
	Selenium	0.2783333	0.00075	0.3950	0.02	0.16	0.01179	0.012033282	0.023823242	0.0006521	0.00007575	2.46E-02	7.33E-02	7.48E-02	4.05E-03	4.71E-04	*1.53E-01*	0.48022072	0.49013156	0.02656232	0.0030854
	Silver	0.1383333	0.000375	0.0195		145.71	0.000582	0	0.000582036	0.0003241	0.000037875	9.44E-04	3.99E-06	0.00E+00	2.22E-06	2.60E-07	*6.48E-06*	0.61654663	0	0.34333265	0.04012072
	Thallium	0.325	0.00085	0.1325		0.06	0.0039549	0	0.00395486	0.0007615	0.00008585	4.80E-03	6.58E-02	0.00E+00	1.27E-02	1.43E-03	*7.99E-02*	0.82355428	0	0.15856844	0.01787728
	Vanadium	7.0666667	0.0009333	0.1575	0.25	0.16	0.0047011	0.123719891	0.128420951	0.0165572	9.42667E-05	1.45E-01	3.00E-02	7.89E-01	1.06E-01	6.01E-04	*9.25E-01*	0.03240492	0.8528147	0.11413059	0.00064979
	Zinc	89.966667	0.05855	27.7500	3.48	128.66	0.828282	1.752392421	2.580674421	0.2107919	0.00591355	2.80E+00	6.44E-03	1.36E-02	1.64E-03	4.60E-05	*2.17E-02*	0.29609207	0.62644063	0.07535333	0.00211396

Table E.1-17. Exposure Calculations for Muskrat - Station 18

	Mean Concentrations Compound	C_{soil} (mg/Kg)	C_{water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0.0646667	0.0025			9.730183192	0	0	0	0.0001515	0.0002525	4.04E-04	0.00E+00	0.00E+00	1.56E-05	2.60E-05	*4.15E-05*	0	0	0.37502166	0.62497834
	Acetone	0.243	0.0025			1367.050531	0	0	0	0.0005693	0.0002525	8.22E-04	0.00E+00	0.00E+00	4.16E-07	1.85E-07	*6.01E-07*	0	0	0.69276595	0.30723405
	cis-1,2-Dichloroethene	0.0375	0.0005833			2504.114914	0	0	0	8.786E-05	5.89167E-05	1.47E-04	0.00E+00	0.00E+00	3.51E-08	2.35E-08	*5.86E-08*	0	0	0.59860336	0.40139664
	Tetrachloroethene	0.0565	0.0005			6.09153838	0	0	0	0.0001324	0.0000505	1.83E-04	0.00E+00	0.00E+00	2.17E-05	8.29E-06	*3.00E-05*	0	0	0.72386189	0.27613811
	Trichloroethene	0.0225	0.0005			3.04576919	0	0	0	5.272E-05	0.0000505	1.03E-04	0.00E+00	0.00E+00	1.73E-05	1.66E-05	*3.39E-05*	0	0	0.51074188	0.48925812
	Semivolatile Organics																				
	2-Methylnaphthalene	0.1972	0.0025			62.53	0	0	0	0.000462	0.0002525	7.15E-04	0.00E+00	0.00E+00	7.39E-06	4.04E-06	*1.14E-05*	0	0	0.6466256	0.3533744
	Acenaphthylene	0.1978	0.0025			58.00	0	0	0	0.0004634	0.0002525	7.16E-04	0.00E+00	0.00E+00	7.99E-06	4.35E-06	*1.23E-05*	0	0	0.64731947	0.35268053
	Anthracene	0.246	0.0025			435.11	0	0	0	0.0005764	0.0002525	8.29E-04	0.00E+00	0.00E+00	1.32E-06	5.80E-07	*1.90E-06*	0	0	0.69537133	0.30462867
	Benzo(a)anthracene	0.75	0.0025			0.57	0	0	0	0.0017573	0.0002525	2.01E-03	0.00E+00	0.00E+00	3.11E-03	4.46E-04	*3.55E-03*	0	0	0.87436248	0.12563752
	Benzo(a)pyrene	1.13625	0.0025		0.18	0.57	0	0.090706725	0.090706725	0.0026622	0.0002525	9.36E-02	0.00E+00	1.60E-01	4.71E-03	4.46E-04	*1.66E-01*	0	0.96886682	0.02843615	0.00269703
	Benzo(b)fluoranthene	1.1	0.0025		0.08	0.57	0	0.042113887	0.042113887	0.0025773	0.0002525	4.49E-02	0.00E+00	7.45E-02	4.56E-03	4.46E-04	*7.95E-02*	0	0.93703676	0.05734509	0.00561814
	Benzo(g,h,i)perylene	0.79	0.0025			58.00	0	0	0	0.001851	0.0002525	2.10E-03	0.00E+00	0.00E+00	3.19E-05	4.35E-06	*3.63E-05*	0	0	0.87996026	0.12003974
	Benzo(k)fluoranthene	0.588	0.0025		0.12	0.57	0	0.058876328	0.058876328	0.0013777	0.0002525	6.05E-02	0.00E+00	1.04E-01	2.44E-03	4.46E-04	*1.07E-01*	0	0.97305771	0.02276919	0.0041731
	Carbazole	0.3166667	0			58.00014758	0	0	0	0.000742	0	7.42E-04	0.00E+00	0.00E+00	1.28E-05	0.00E+00	*1.28E-05*	0	0	1	0
	Chrysene	1.03	0.0025		0.12	0.57	0	0.060447713	0.060447713	0.0024133	0.0002525	6.31E-02	0.00E+00	1.07E-01	4.27E-03	4.46E-04	*1.12E-01*	0	0.95776197	0.0382373	0.00400073
	Dibenz(a,h)anthracene	0.358	0.0025			0.57	0	0	0	0.0008388	0.0002525	1.09E-03	0.00E+00	0.00E+00	1.48E-03	4.46E-04	*1.93E-03*	0	0	0.7686233	0.2313767
	Dibenzofuran	0.3166667	0.0025			58.00	0	0	0	0.000742	0.0002525	9.94E-04	0.00E+00	0.00E+00	1.28E-05	4.35E-06	*1.71E-05*	0	0	0.7460908	0.2539092
	Fluoranthene	1.613	0.0025		0.08	54.39	0	0.038342317	0.038342317	0.0037793	0.0002525	4.24E-02	0.00E+00	7.05E-04	6.95E-05	4.64E-06	*7.79E-04*	0	0.90485317	0.089188	0.00595883
	Fluorene	0.2308	0.0025			54.39	0	0	0	0.0005408	0.0002525	7.93E-04	0.00E+00	0.00E+00	9.94E-06	4.64E-06	*1.46E-05*	0	0	0.68169503	0.31830497
	Indeno(1,2,3-cd)pyrene	0.77	0.0025		0.32	0.57	0	0.163112527	0.163112527	0.0018041	0.0002525	1.65E-01	0.00E+00	2.88E-01	3.19E-03	4.46E-04	*2.92E-01*	0	0.98754846	0.0109228	0.00152874
	Naphthalene	0.2026	0.0025			60.92	0	0	0	0.0004747	0.0002525	7.27E-04	0.00E+00	0.00E+00	7.79E-06	4.15E-06	*1.19E-05*	0	0	0.65277386	0.34722614
	N-nitrosodiphenylamine	0.305	0.0025			120.62	0	0	0	0.0007146	0.0002525	9.67E-04	0.00E+00	0.00E+00	5.92E-06	2.09E-06	*8.02E-06*	0	0	0.73891419	0.26108581
	Phenanthrene	0.71	0.0025		0.19	58.00	0	0.096149583	0.096149583	0.0016635	0.0002525	9.81E-02	0.00E+00	1.66E-03	2.87E-05	4.35E-06	*1.69E-03*	0	0.98046175	0.01696344	0.00257481
	Pyrene	1.26	0.0025		0.08	58.00	0	0.038843809	0.038843809	0.0029522	0.0002525	4.20E-02	0.00E+00	6.70E-04	5.09E-05	4.35E-06	*7.25E-04*	0	0.92378608	0.07020894	0.00600497
	Pesticides and PCBs																				
	4,4'-DDD	0.0070167	0.00005	0.0006	3.62E-04	6.84	1.925E-05	0.000182388	0.00020164	1.644E-05	0.00000505	2.23E-04	2.82E-06	2.67E-05	2.41E-06	7.39E-07	*3.26E-05*	0.08628142	0.81740672	0.0736793	0.02263256
	4,4'-DDE	0.0111717	0.00005	0.0010	4.85E-04	0.83	2.91E-05	0.000244074	0.000273176	2.618E-05	0.00000505	3.04E-04	3.52E-05	2.95E-04	3.17E-05	6.11E-06	*3.68E-04*	0.09560338	0.80181753	0.08598915	0.01658994
	4,4'-DDT	0.001642	0.00005	0.0011	2.64E-04	0.64	3.209E-05	0.000132691	0.000164778	3.847E-06	0.00000505	1.74E-04	4.99E-05	2.06E-04	5.98E-06	7.85E-06	*2.70E-04*	0.18475112	0.76401974	0.02215179	0.02907735
	Aldrin	0.000963	0.000025	0.0003		0.16	9.104E-06	0	9.10364E-06	2.256E-06	0.000002525	1.39E-05	5.66E-05	0.00E+00	1.40E-05	1.57E-05	*8.63E-05*	0.65564807	0	0.16250034	0.18185159
	alpha-Chlordane	0.00617	2.173E-05	0.0006	6.31E-04	1.99	1.866E-05	0.000317719	0.000336374	1.446E-05	2.19459E-06	3.53E-04	9.36E-06	1.59E-04	7.25E-06	1.10E-06	*1.77E-04*	0.05284328	0.89999037	0.04094982	0.00621652
	Aroclor 1248	0.0642	0.0005	0.0025		0.57	7.462E-05	0	0.00007462	0.0001504	0.0000505	2.76E-04	1.32E-04	0.00E+00	2.66E-04	8.93E-05	*4.87E-04*	0.27081309	0	0.54591084	0.18327608
	Aroclor 1254	0.01887	0.0005	0.0195		0.15	0.000582	0	0.000582036	4.421E-05	0.0000505	6.77E-04	3.98E-03	0.00E+00	3.02E-04	3.45E-04	*4.62E-03*	0.86004783	0	0.06533064	0.07462153
	Aroclor 1260	0.0687	0.0005	0.0215	4.29E-03	0.28	0.0006417	0.002158835	0.002800567	0.000161	0.0000505	3.01E-03	2.31E-03	7.78E-03	5.80E-04	1.82E-04	*1.09E-02*	0.2130562	0.71673733	0.05344038	0.01676609
	beta-BHC	0.000963	0.000025	0.0003		3.22	7.611E-06	0	7.61124E-06	2.256E-06	0.000002525	1.24E-05	2.37E-06	0.00E+00	7.01E-07	7.85E-07	*3.85E-06*	0.61417873	0	0.18206981	0.20375146
	delta-BHC	0.000963	0.000025	0.0003		1.29	7.611E-06	0	7.61124E-06	2.256E-06	0.000002525	1.24E-05	5.92E-06	0.00E+00	1.75E-06	1.96E-06	*9.63E-06*	0.61417873	0	0.18206981	0.20375146
	Endosulfan I	0.000963	0.000025	0.0006	1.58E-04	1.21	1.866E-05	7.97344E-05	9.83894E-05	2.256E-06	0.000002525	1.03E-04	1.55E-05	6.61E-05	1.87E-06	2.09E-06	*8.55E-05*	0.18081687	0.77283945	0.02186967	0.02447401
	Endosulfan Sulfate	0.001935	0.00005	0.0009		1.21	2.821E-05	0	2.82064E-05	4.534E-06	0.00000505	3.78E-05	2.34E-05	0.00E+00	3.76E-06	4.19E-06	*3.13E-05*	0.74639618	0	0.11997082	0.13363301
	Endrin Aldehyde	0.00302	0.00005	0.0022	9.28E-04	0.04	6.567E-05	0.000466976	0.000532642	7.076E-06	0.00000505	5.45E-04	1.64E-03	1.17E-02	1.77E-04	1.26E-04	*1.36E-02*	0.12053868	0.85720255	0.01298876	0.00927
	gamma-Chlordane	0.005842	2.163E-05	0.0003	5.61E-04	1.99	7.611E-06	0.000282145	0.000289756	1.369E-05	2.18449E-06	3.06E-04	3.82E-06	1.42E-04	6.87E-06	1.10E-06	*1.53E-04*	0.02490357	0.92316314	0.04478576	0.00714753
	Inorganics																				
X	Aluminum	14317.143	0.3861143	47.9000	2.38E+02	41.82	1.4297192	119.9063025	121.3360217	33.545066	0.038997543	1.55E+02	3.42E-02	2.87E+00	8.02E-01	9.33E-04	*3.70E+00*	0.00922875	0.7739881	0.21653142	0.00025173
	Antimony	10.542857	0.0006929	0.0498		0.05	0.0014849	0	0.001484938	0.0247019	6.99786E-05	2.63E-02	2.73E-02	0.00E+00	4.54E-01	1.29E-03	*4.83E-01*	0.05655435	0	0.94078049	0.00266516
X	Arsenic	721.12857	0.0245857	3.7500	38.01	0.05	0.11193	19.12415405	19.23608405	0.8616982	0.002483157	2.01E+01	2.04E+00	3.49E+02	1.57E+01	4.53E-02	*3.67E+02*	0.00556858	0.95143789	0.04286999	0.00012354
X	Barium	81.771429	0.0373429	8.8000	7.97	4.33	0.2626624	4.011881167	4.274543567	0.1915905	0.003771629	4.47E+00	6.07E-02	9.26E-01	4.42E-02	8.71E-04	*1.03E+00*	0.0587624	0.89753151	0.0428623	0.00084378
	Beryllium	1.2557143	6.379E-05	0.0060		0.53	0.0001791	0	0.000179088	0.0029421	6.44236E-06	3.13E-03	3.37E-04	0.00E+00	5.54E-03	1.21E-05	*5.89E-03*	0.05725926	0	0.94068095	0.00205979
	Cadmium	11.085714	0.00043	0.0570	1.19	0.78	0.0017013	0.597522708	0.599224044	0.0259738	0.00004343	6.25E-01	2.19E-03	7.70E-01	3.35E-02	5.60E-05	*8.06E-01*	0.00272109	0.95566736	0.04154209	6.9461E-05
X	Chromium	1719	0.0257857	0.8950	32.12	7.24	0.026714	16.16320337	16.18991733	4.027617	0.002604357	2.02E+01	3.69E-03	2.23E+00	5.57E-01	3.60E-04	*2.79E+00*	0.00132116	0.79936165	0.1991884	0.0001288
	Cobalt	26.557143	0.0014686	0.4850	2.36	4.02	0.0144763	1.186792467	1.201268747	0.0622234	0.000148326	1.26E+00	3.60E-03	2.95E-01	1.55E-02	3.69E-05	*3.14E-01*	0.01145601	0.93918524	0.04924137	0.00011738
X	Copper	838.28571	0.0215429	54.3500	42.46	12.23	1.6222388	21.36233954	22.98457834	1.9641034	0.002175829	2.50E+01	1.33E-01	1.75E+00	1.61E-01	1.78E-04	*2.04E+00*	0.06501736	0.85617656	0.07871887	8.7205E-05
	Cyanide	0.6	0.0025	0.2675		51.90	0.0079843	0	0.00798434	0.0014058	0.0002525	9.64E-03	1.54E-04	0.00E+00	2.71E-05	4.87E-06	*1.86E-04*	0.82802428	0	0.14578995	0.02618577
X	Iron	55680	2.401	577.5000	4609.18	2.57	17.23722	2319.117683	2336.354903	130.45824	0.242501	2.47E+03	6.72E+00	9.04E+02	5.09E+01	9.45E-02	*9.62E+02*	0.00698696	0.94003461	0.05288014	9.8296E-05
X	Lead	353.77143	0.0130729	0.5150	32.26	6.43	0.0153717	16.23278543	16.24815715	0.8288865	0.001320358	1.71E+01	2.39E-03	2.52E+00	1.29E-01	2.05E-04	*2.65E+00*	0.00090007	0.95048832	0.0485343	7.7312E-05
X	Manganese	846.28571	0.4697143	88.7000	477.23	70.76	2.6475176	240.1182571	242.7657747	1.9828474	0.047441143	2.45E+02	3.74E-02	3.39E+00	2.80E-02	6.70E-04	*3.46E+00*	0.0108152	0.98089101	0.0081	0.0001938
X	Mercury	3.7342843	0.0002039	0.0090	0.13	0.03	0.0002686	0.065818086	0.066086718	0.0087494	2.05968E-05	7.49E-02	1.04E-02	2.56E+00	3.40E-01	8.00E-04	*2.91E+00*	0.00358861	0.87925394	0.1168823	0.00027515
	Nickel	22.614286	0.0028429	0.0675	0.58	32.17	0.0020147	0.293942614	0.295957354	0.0529853	0.000287129	3.49E-01	6.26E-05	9.14E-03	1.65E-03	8.93E-06	*1.09E-02*	0.0057691	0.84168835	0.15172038	0.00082218
X	Selenium	5.4	0.0008571	0.3300	0.46	0.16	0.0098498	0.233460118	0.243309958	0.0126522	8.65714E-05	2.56E-01	6.12E-02	1.45E+00	7.87E-02	5.38E-04	*1.59E+00*	0.03846862	0.91178003	0.04941325	0.00033811
	Silver	0.501	0.00025	0.0370		145.71	0.0011044	0	0.001104376	0.0011738	0.00002525	2.30E-03	7.58E-06	0.00E+00	8.06E-06	1.73E-07	*1.58E-05*	0.47944036	0	0.50959792	0.01096173
	Thallium	0.7	0.0007786	0.0675		0.06	0.0020147	0	0.00201474	0.0016401	7.86357E-05	3.73E-03	3.35E-02	0.00E+00	2.73E-02	1.31E-03	*6.21E-02*	0.53964192	0	0.43929575	0.02106233
X	Vanadium	46.014286	0.0018789	0.1375	1.60	0.16	0.0041041	0.805596566	0.809700666	0.1078115	0.000189772	9.18E-01	2.62E-02	5.14E+00	6.88E-01	1.21E-03	*5.85E+00*	0.00447215	0.87784122	0.11747984	0.00020679
	Zinc	2367.1429	0.1277857	28.7500	91.64	128.66	0.85813	46.10777917	46.96590917	5.5462157	0.012906357	5.25E+01	6.67E-03	3.58E-01	4.31E-02	1.00E-04	*4.08E-01*	0.01633754	0.87782488	0.10559186	0.00024572

Table E.1-18. Exposure Calculations for Muskrat - Station 19

	Mean Concentrations																			
	Compound	C_{soil} (mg/Kg)	C_{water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0.225	0.0025			9.730183192	0	0	0	0.000527175	0.0002525	7.80E-04	0.00E+00	0.00E+00	5.42E-05	2.60E-05	*8.01E-05*	0	0	0.67614711	0.32385289
	Acetone	0.31	0.0025			1367.050531	0	0	0	0.00072633	0.0002525	9.79E-04	0.00E+00	0.00E+00	5.31E-07	1.85E-07	*7.16E-07*	0	0	0	0
	cis-1,2-Dichloroethene	0	0.0005833			2504.114914	0	0	0	0	5.89167E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.35E-08	*2.35E-08*	0	0	0	1
	Tetrachloroethene	0	0.0005			6.09153838	0	0	0	0	0.0000505	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.29E-06	*8.29E-06*	0	0	0	1
	Trichloroethene	0	0.0005			3.04576919	0	0	0	0	0.0000505	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-05	*1.66E-05*	0	0	0	1
	Semivolatile Organics																				
	2-Methylnaphthalene	0.2	0.0025			62.53	0	0	0	0.0004686	0.0002525	7.21E-04	0.00E+00	0.00E+00	7.49E-06	4.04E-06	*1.15E-05*	0	0	0.64984052	0.35015948
	Acenaphthylene	0.2	0.0025			58.00	0	0	0	0.0004686	0.0002525	7.21E-04	0.00E+00	0.00E+00	8.08E-06	4.35E-06	*1.24E-05*	0	0	0.64984052	0.35015948
	Anthracene	0.2	0.0025			435.11	0	0	0	0.0004686	0.0002525	7.21E-04	0.00E+00	0.00E+00	1.08E-06	5.80E-07	*1.66E-06*	0	0	0.64984052	0.35015948
	Benzo(a)anthracene	0.215	0.0025			0.57	0	0	0	0.000503745	0.0002525	7.56E-04	0.00E+00	0.00E+00	8.91E-04	4.46E-04	*1.34E-03*	0	0	0.66611349	0.33388651
	Benzo(a)pyrene	0.2583333	0.0025		0.04	0.57	0	0.020622725	0.020622725	0.000605275	0.0002525	2.15E-02	0.00E+00	3.65E-02	1.07E-03	4.46E-04	*3.80E-02*	0	0.96006727	0.02817788	0.01175485
	Benzo(b)fluoranthene	0.6816667	0.0025		0.05	0.57	0	0.026097848	0.026097848	0.001597145	0.0002525	2.79E-02	0.00E+00	4.61E-02	2.82E-03	4.46E-04	*4.94E-02*	0	0.93381714	0.05714806	0.0090348
	Benzo(g,h,i)perylene	0.2	0.0025			58.00	0	0	0	0.0004686	0.0002525	7.21E-04	0.00E+00	0.00E+00	8.08E-06	4.35E-06	*1.24E-05*	0	0	0.64984052	0.35015948
	Benzo(k)fluoranthene	0.6633333	0.0025		0.13	0.57	0	0.06641944	0.06641944	0.00155419	0.0002525	6.82E-02	0.00E+00	1.17E-01	2.75E-03	4.46E-04	*1.21E-01*	0	0.97351909	0.02277998	0.00370093
	Carbazole	0.2	0			58.00014758	0	0	0	0.0004686	0	4.69E-04	0.00E+00	0.00E+00	8.08E-06	0.00E+00	*8.08E-06*	0	0	1	0
	Chrysene	0.2916667	0.0025		0.03	0.57	0	0.017117071	0.017117071	0.000683375	0.0002525	1.81E-02	0.00E+00	3.03E-02	1.21E-03	4.46E-04	*3.19E-02*	0	0.94815943	0.03785393	0.01398664
	Dibenz(a,h)anthracene	0.2	0.0025			0.57	0	0	0	0.0004686	0.0002525	7.21E-04	0.00E+00	0.00E+00	8.28E-04	4.46E-04	*1.27E-03*	0	0	0.64984052	0.35015948
	Dibenzofuran	0.2	0.0025			58.00	0	0	0	0.0004686	0.0002525	7.21E-04	0.00E+00	0.00E+00	8.08E-06	4.35E-06	*1.24E-05*	0	0	0.64984052	0.35015948
	Fluoranthene	0.4033333	0.0025		0.02	54.39	0	0.00958756	0.00958756	0.00094501	0.0002525	1.08E-02	0.00E+00	1.76E-04	1.74E-05	4.64E-06	*1.98E-04*	0	0.88896595	0.08762205	0.02341199
	Fluorene	0.2	0.0025			54.39	0	0	0	0.0004686	0.0002525	7.21E-04	0.00E+00	0.00E+00	8.62E-06	4.64E-06	*1.33E-05*	0	0	0.64984052	0.35015948
	Indeno(1,2,3-cd)pyrene	0.19	0.0025		0.08	0.57	0	0.040248546	0.040248546	0.00044517	0.0002525	4.09E-02	0.00E+00	7.12E-02	7.87E-04	4.46E-04	*7.24E-02*	0	0.98296131	0.01087207	0.00616663
	Naphthalene	0.2	0.0025			60.92	0	0	0	0.0004686	0.0002525	7.21E-04	0.00E+00	0.00E+00	7.69E-06	4.15E-06	*1.18E-05*	0	0	0.64984052	0.35015948
	N-nitrosodiphenylamine	0	0.0025			120.62	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.09E-06	*2.09E-06*	0	0	0	0
	Phenanthrene	0.2	0.0025		0.05	58.00	0	0.02708439	0.02708439	0.0004686	0.0002525	2.78E-02	0.00E+00	4.67E-04	8.08E-06	4.35E-06	*4.79E-04*	0	0.97406627	0.01685279	0.00908094
	Pyrene	0.3416667	0.0025		0.02	58.00	0	0.010533043	0.010533043	0.000800525	0.0002525	1.16E-02	0.00E+00	1.82E-04	1.38E-05	4.35E-06	*2.00E-04*	0	0.90911283	0.06909376	0.02179342
	Pesticides and PCBs																				
	4,4'-DDD	0.0056375	0.00005	0.0006	2.91E-04	6.84	1.925E-05	0.000146538	0.00016579	1.32087E-05	0.00000505	1.84E-04	2.82E-06	2.14E-05	1.93E-06	7.39E-07	*2.69E-05*	0.10460233	0.79619227	0.07176707	0.02743834
	4,4'-DDE	0.009275	0.00005	0.0010	4.03E-04	0.83	2.91E-05	0.000202637	0.000231738	2.17313E-05	0.00000505	2.59E-04	3.52E-05	2.45E-04	2.63E-05	6.11E-06	*3.13E-04*	0.11257087	0.78383427	0.08406058	0.01953429
	4,4'-DDT	0.00225	0.00005	0.0011	3.61E-04	0.64	3.209E-05	0.000181824	0.00021391	5.27175E-06	0.00000505	2.24E-04	4.99E-05	2.83E-04	8.19E-06	7.85E-06	*3.49E-04*	0.1430955	0.81087296	0.02351024	0.02252131
	Aldrin	0.000735	0.000025	0.0003		0.16	9.104E-06	0	9.10364E-06	1.72211E-06	0.0000025	1.34E-05	5.66E-05	0.00E+00	1.07E-05	1.57E-05	*8.30E-05*	0.68188255	0	0.12898943	0.18912802
	alpha-Chlordane	0.0030375	2.173E-05	0.0006	3.11E-04	1.99	1.866E-05	0.000156414	0.00017506 9	7.11686E-06	2.19459E-06	1.84E-04	9.36E-06	7.85E-05	3.57E-06	1.10E-06	*9.25E-05*	0.10117691	0.84832168	0.03859888	0.01190253
	Aroclor 1248	0.0155	0.0005	0.0025		0.57	7.462E-05	0	0.00007462	3.63165E-05	0.0000505	1.61E-04	1.32E-04	0.00E+00	6.42E-05	8.93E-05	*2.85E-04*	0.46222509	0	0.22495842	0.31281649
	Aroclor 1254	0.0155	0.0005	0.0195		0.15	0.000582	0	0.000582036	3.63165E-05	0.0000505	6.69E-04	3.98E-03	0.00E+00	2.48E-04	3.45E-04	*4.57E-03*	0.87020083	0	0.05429672	0.07550245
	Aroclor 1260	0.0155	0.0005	0.0215	9.68E-04	0.28	0.0006417	0.000487073	0.001128805	3.63165E-05	0.0000505	1.22E-03	2.31E-03	1.76E-03	1.31E-04	1.82E-04	*4.38E-03*	0.52790424	0.40067842	0.02987483	0.04154252
	beta-BHC	0.0017833	0.000025	0.0003		3.22	7.611E-06	0	7.61124E-06	4.17835E-06	0.000002525	1.43E-05	2.37E-06	0.00E+00	1.30E-06	7.85E-07	*4.45E-06*	0.53171205	0	0.29189449	0.17639346
	delta-BHC	0.0008	0.000025	0.0003		1.29	7.611E-06	0	7.61124E-06	1.8744E-06	0.000002525	1.20E-05	5.92E-06	0.00E+00	1.46E-06	1.96E-06	*9.33E-06*	0.6370811	0	0.15606163	0.21023026
	Endosulfan I	0.0008617	0.000025	0.0006	1.42E-04	1.21	1.866E-05	7.13442E-05	8.99992E-05	2.01889E-06	0.000002525	9.45E-05	1.55E-05	5.91E-05	1.67E-06	2.09E-06	*7.84E-05*	0.19731746	0.754621	0.02135413	0.0267074
	Endosulfan Sulfate	0.00155	0.00005	0.0009		1.21	2.821E-05	0	2.82064E-05	3.63165E-06	0.00000505	3.69E-05	2.34E-05	0.00E+00	3.01E-06	4.19E-06	*3.06E-05*	0.76464846	0	0.09845069	0.13690085
	Endrin Aldehyde	0.00185	0.00005	0.0022	5.69E-04	0.04	6.567E-05	0.000286062	0.000351727	4.33455E-06	0.00000505	3.61E-04	1.64E-03	7.15E-03	1.08E-04	1.26E-04	*9.02E-03*	0.18184283	0.79216924	0.01200334	0.01398459
	gamma-Chlordane	0.003225	2.163E-05	0.0003	3.10E-04	1.99	7.611E-06	0.000155754	0.000163366	7.55618E-06	2.18449E-06	1.73E-04	3.82E-06	7.82E-05	3.79E-06	1.10E-06	*8.69E-05*	0.04396857	0.89976161	0.04365047	0.01261934
	Inorganics																				
X	Aluminum	11462.5	0.3861143	47.9000	1.91E+02	41.82	1.4297192	95.99862251	97.42834171	26.8566375	0.038997543	1.24E+02	3.42E-02	2.30E+00	6.42E-01	9.33E-04	*2.97E+00*	0.01149995	0.77216499	0.21602138	0.00031368
	Antimony	13.1625	0.0006929	0.0498		0.05	0.0014849	0	0.001484938	0.030839738	6.99786E-05	3.24E-02	2.73E-02	0.00E+00	5.67E-01	1.29E-03	*5.96E-01*	0.04583898	0	0.95200083	0.00216019
X	Arsenic	2517.5	0.0245857	3.7500	132.69	0.05	0.11193	66.76348675	66.87541675	3.008236275	0.002483157	6.99E+01	2.04E+00	1.22E+03	5.49E+01	4.53E-02	*1.27E+03*	0.00160161	0.95531804	0.04304482	3.5531E-05
X	Barium	105.9	0.0373429	8.8000	10.33	4.33	0.2626624	5.195680482	5.458342882	0.2481237	0.003771629	5.71E+00	6.07E-02	1.20E+00	5.73E-02	8.71E-04	*1.32E+00*	0.0459985	0.90988857	0.04345243	0.0006605
	Beryllium	1.2266667	6.379E-05	0.0060		0.53	0.0001791	0	0.000179088	0.00287408	6.44236E-06	3.06E-03	3.37E-04	0.00E+00	5.42E-03	1.21E-05	*5.76E-03*	0.05853294	0	0.93936144	0.00210561
	Cadmium	12.8375	0.00043	0.0570	1.38	0.78	0.0017013	0.691944385	0.693645721	0.030078263	0.00004343	7.24E-01	2.19E-03	8.92E-01	3.88E-02	5.60E-05	*9.33E-01*	0.00235067	0.95603142	0.04155791	6.0005E-05
X	Chromium	1208.675	0.0257857	0.8950	22.59	7.24	0.026714	11.36478176	11.39149572	2.831925525	0.002604357	1.42E+01	3.69E-03	1.57E+00	3.91E-01	3.60E-04	*1.97E+00*	0.00187782	0.79887258	0.19906653	0.00018307
	Cobalt	27.9375	0.0014686	0.4850	2.48	4.02	0.0144763	1.248478222	1.262954502	0.065457563	0.000148326	1.33E+00	3.60E-03	3.11E-01	1.63E-02	3.69E-05	*3.30E-01*	0.01089622	0.9397226	0.04926954	0.00011164
X	Copper	655.9	0.0215429	54.3500	33.22	12.23	1.6222388	16.71453809	18.33677689	1.5367737	0.002175829	1.99E+01	1.33E-01	1.37E+00	1.26E-01	1.78E-04	*1.62E+00*	0.08161909	0.84095231	0.07731912	0.00010947
	Cyanide	0	0.0025	0.2675		51.90	0.0079843	0	0.00798434	0	0.0002525	0.00E+00	1.54E-04	0.00E+00	0.00E+00	4.87E-06	*1.59E-04*	0.96934504	0	0	0.03065496
X	Iron	131325	2.401	577.5000	10871.06	2.57	17.23722	5469.793997	5487.031217	307.694475	0.242501	5.79E+03	6.72E+00	2.13E+03	1.20E+02	9.45E-02	*2.26E+03*	0.00297452	0.9438868	0.05309684	4.1847E-05
X	Lead	301.7	0.0130729	0.5150	27.51	6.43	0.0153717	13.84349037	13.85886209	0.7068831	0.001320358	1.46E+01	2.39E-03	2.15E+00	1.10E-01	2.05E-04	*2.26E+00*	0.00105524	0.95032801	0.04852612	9.064E-05
X	Manganese	1067.75	0.4697143	88.7000	602.11	70.76	2.6475176	302.9547406	305.6022582	2.50173825	0.047441143	3.08E+02	3.74E-02	4.28E+00	3.54E-02	6.70E-04	*4.35E+00*	0.00859161	0.9831359	0.00811854	0.00015395
X	Mercury	2.30875	0.0002039	0.0090	0.08	0.03	0.0002686	0.040692538	0.04096117	0.005409401	2.05968E-05	4.64E-02	1.04E-02	1.58E+00	2.10E-01	8.00E-04	*1.80E+00*	0.00579058	0.87716132	0.11660412	0.00044398
	Nickel	16.3375	0.0028429	0.0675	0.42	32.17	0.0020147	0.212356363	0.214371103	0.038278763	0.000287129	2.53E-01	6.26E-05	6.60E-03	1.19E-03	8.93E-06	*7.86E-03*	0.00796538	0.83956229	0.15133714	0.00113518
X	Selenium	6.2875	0.0008571	0.3300	0.54	0.16	0.0098498	0.27182972	0.28167956	0.014731613	8.65714E-05	2.96E-01	6.12E-02	1.69E+00	9.16E-02	5.38E-04	*1.84E+00*	0.03322062	0.91680198	0.04968541	0.00029198
	Silver	0.5	0.00025	0.0370		145.71	0.0011044	0	0.001104376	0.0011715	0.00002525	2.30E-03	7.58E-06	0.00E+00	8.04E-06	1.73E-07	*1.58E-05*	0.47992852	0	0.50909859	0.01097289
	Thallium	0.55	0.0007786	0.0675		0.06	0.0020147	0	0.00201474	0.00128865	7.86357E-05	3.38E-03	3.35E-02	0.00E+00	2.14E-02	1.31E-03	*5.62E-02*	0.59571989	0	0.38102904	0.02325107
X	Vanadium	46.6125	0.0018789	0.1375	1.62	0.16	0.0041041	0.816069822	0.820173922	0.109213088	0.000189772	9.30E-01	2.62E-02	5.21E+00	6.97E-01	1.21E-03	*5.93E+00*	0.00441502	0.87789394	0.11748689	0.00020415
	Zinc	2127.5	0.1277857	28.7500	82.36	128.66	0.85813	41.43995784	42.29808784	4.9847325	0.012906357	4.73E+01	6.67E-03	3.22E-01	3.87E-02	1.00E-04	*3.68E-01*	0.01814392	0.8761882	0.10539499	0.00027289

Table E.1-19. Exposure Calculations for Muskrat - Station 20

	Mean Concentrations Compound	C_{soil} (mg/Kg)	C_{water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0.1075	0.0025			9.730183192	0	0	0	0.0002519	0.0002525	5.04E-04	0.00E+00	0.00E+00	2.59E-05	2.60E-05	*5.18E-05*	0	0	0.49937794	0.50062206
	Acetone	0.342	0.0025			1367.050531	0	0	0	0.0008013	0.0002525	1.05E-03	0.00E+00	0.00E+00	5.86E-07	1.85E-07	*7.71E-07*	0	0	0.76039233	0.23960767
	cis-1,2-Dichloroethene	0.562	0.0005833			2504.114914	0	0	0	0.0013168	5.89167E-05	1.38E-03	0.00E+00	0.00E+00	5.26E-07	2.35E-08	*5.49E-07*	0	0	0.95717278	0.04282722
	Tetrachloroethene	0.395	0.0005			6.09153838	0	0	0	0.0009255	0.0000505	9.76E-04	0.00E+00	0.00E+00	1.52E-04	8.29E-06	*1.60E-04*	0	0	0.9482574	0.0517426
	Trichloroethene	2.025	0.0005			3.04576919	0	0	0	0.0047446	0.0000505	4.80E-03	0.00E+00	0.00E+00	1.56E-03	1.66E-05	*1.57E-03*	0	0	0.98946836	0.01053164
	Semivolatile Organics																				
	2-Methylnaphthalene	0.013	0.0025			62.53	0	0	0	3.046E-05	0.0002525	2.83E-04	0.00E+00	0.00E+00	4.87E-07	4.04E-06	*4.53E-06*	0	0	0.10764457	0.89235543
	Acenaphthylene	0.006	0.0025			58.00	0	0	0	1.406E-05	0.0002525	2.67E-04	0.00E+00	0.00E+00	2.42E-07	4.35E-06	*4.60E-06*	0	0	0.05273899	0.94726101
	Anthracene	0.026	0.0025			435.11	0	0	0	6.092E-05	0.0002525	3.13E-04	0.00E+00	0.00E+00	1.40E-07	5.80E-07	*7.20E-07*	0	0	0.19436663	0.80563337
	Benzo(a)anthracene	0.77	0.0025			0.57	0	0	0	0.0018041	0.0002525	2.06E-03	0.00E+00	0.00E+00	3.19E-03	4.46E-04	*3.64E-03*	0	0	0.87722514	0.12277486
	Benzo(a)pyrene	0.74	0.0025		0.12	0.57	0	0.059074127	0.059074127	0.0017338	0.0002525	6.11E-02	0.00E+00	1.04E-01	3.07E-03	4.46E-04	*1.08E-01*	0	0.96746961	0.02839514	0.00413525
	Benzo(b)fluoranthene	2.16125	0.0025		0.16	0.57	0	0.082744217	0.082744217	0.0050638	0.0002525	8.81E-02	0.00E+00	1.46E-01	8.95E-03	4.46E-04	*1.56E-01*	0	0.93962892	0.05750373	0.00286735
	Benzo(g,h,i)perylene	0.21	0.0025			58.00	0	0	0	0.000492	0.0002525	7.45E-04	0.00E+00	0.00E+00	8.48E-06	4.35E-06	*1.28E-05*	0	0	0.66085987	0.33914013
	Benzo(k)fluoranthene	0.37	0.0025		0.07	0.57	0	0.037048029	0.037048029	0.0008669	0.0002525	3.82E-02	0.00E+00	6.55E-02	1.53E-03	4.46E-04	*6.75E-02*	0	0.97067107	0.02271334	0.00661559
	Carbazole	0	0			58.00014758	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0	0
	Chrysene	1.1	0.0025		0.13	0.57	0	0.06455581	0.06455581	0.0025773	0.0002525	6.74E-02	0.00E+00	1.14E-01	4.56E-03	4.46E-04	*1.19E-01*	0	0.95800587	0.03824704	0.00374709
	Dibenz(a,h)anthracene	0.097	0.0025			0.57	0	0	0	0.0002273	0.0002525	4.80E-04	0.00E+00	0.00E+00	4.02E-04	4.46E-04	*8.48E-04*	0	0	0.47370725	0.52629275
	Dibenzofuran	0	0.0025			58.00	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.35E-06	*4.35E-06*	0	0	0	1
	Fluoranthene	1.8475	0.0025		0.09	54.39	0	0.043916572	0.043916572	0.0043287	0.0002525	4.85E-02	0.00E+00	8.07E-04	7.96E-05	4.64E-06	*8.92E-04*	0	0.90553807	0.08925551	0.00520643
	Fluorene	0.036	0.0025			54.39	0	0	0	8.435E-05	0.0002525	3.37E-04	0.00E+00	0.00E+00	1.55E-06	4.64E-06	*6.19E-06*	0	0	0.25040374	0.74959626
	Indeno(1,2,3-cd)pyrene	0.52	0.0025		0.22	0.57	0	0.110153914	0.110153914	0.0012184	0.0002525	1.12E-01	0.00E+00	1.95E-01	2.15E-03	4.46E-04	*1.97E-01*	0	0.98682318	0.01091478	0.00226204
	Naphthalene	0.014	0.0025			60.92	0	0	0	3.28E-05	0.0002525	2.85E-04	0.00E+00	0.00E+00	5.38E-07	4.15E-06	*4.68E-06*	0	0	0.11497291	0.88502709
	N-nitrosodiphenylamine	0	0.0025			120.62	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.09E-06	*2.09E-06*	0	0	0	1
	Phenanthrene	0.5933333	0.0025		0.16	58.00	0	0.080350356	0.080350356	0.0013902	0.0002525	8.20E-02	0.00E+00	1.39E-03	2.40E-05	4.35E-06	*1.41E-03*	0	0.97996562	0.01695485	0.00307953
	Pyrene	1.48	0.0025		0.09	58.00	0	0.045626061	0.045626061	0.0034676	0.0002525	4.93E-02	0.00E+00	7.87E-04	5.98E-05	4.35E-06	*8.51E-04*	0	0.92461142	0.07027167	0.00511691
	Pesticides and PCBs																				
	4,4'-DDD	0.0201	0.00005	0.0006	1.04E-03	6.84	1.925E-05	0.00052247	0.000541722	4.709E-05	0.00000505	5.94E-04	2.82E-06	7.64E-05	6.89E-06	7.39E-07	*8.69E-05*	0.03241803	0.87977714	0.07930124	0.0085036
	4,4'-DDE	0.01985	0.00005	0.0010	8.62E-04	0.83	2.91E-05	0.000433675	0.000462777	4.651E-05	0.00000505	5.14E-04	3.52E-05	5.25E-04	5.63E-05	6.11E-06	*6.22E-04*	0.05658134	0.84317565	0.09042451	0.00981849
	4,4'-DDT	0.0046	0.00005	0.0011	7.39E-04	0.64	3.209E-05	0.000371729	0.000403815	1.078E-05	0.00000505	4.20E-04	4.99E-05	5.78E-04	1.68E-05	7.85E-06	*6.52E-04*	0.07646168	0.88582102	0.02568326	0.01203404
	Aldrin	0	0.000025	0.0003		0.16	9.104E-06	0	9.10364E-06	0	0.000002525	0.00E+00	5.66E-05	0.00E+00	0.00E+00	1.57E-05	*7.23E-05*	0.78286369	0	0	0.21713631
	alpha-Chlordane	0.029375	2.173E-05	0.0006	3.01E-03	1.99	1.866E-05	0.001512642	0.001531297	6.883E-05	2.19459E-06	1.60E-03	9.36E-06	7.59E-04	3.45E-05	1.10E-06	*8.04E-04*	0.01164252	0.94403403	0.04295382	0.00136963
	Aroclor 1248	0.028	0.0005	0.0025		0.57	7.462E-05	0	0.00007462	6.56E-05	0.0000505	1.91E-04	1.32E-04	0.00E+00	1.16E-04	8.93E-05	*3.37E-04*	0.39124599	0	0.34397349	0.26478052
	Aroclor 1254	0.00155	0.0005	0.0195		0.15	0.000582	0	0.000582036	3.632E-06	0.0000505	6.36E-04	3.98E-03	0.00E+00	2.48E-05	3.45E-04	*4.35E-03*	0.91490977	0	0.00570864	0.07938159
	Aroclor 1260	0.079	0.0005	0.0215	4.93E-03	0.28	0.0006417	0.002482504	0.003124236	0.0001851	0.0000505	3.36E-03	2.31E-03	8.95E-03	6.67E-04	1.82E-04	*1.21E-02*	0.19100118	0.73887717	0.05509114	0.01503051
	beta-BHC	0.00008	0.000025	0.0003		3.22	7.611E-06	0	7.61124E-06	1.874E-07	0.000002525	1.03E-05	2.37E-06	0.00E+00	5.83E-08	7.85E-07	*3.21E-06*	0.73726036	0	0.01815632	0.24458333
	delta-BHC	0.00008	0.000025	0.0003		1.29	7.611E-06	0	7.61124E-06	1.874E-07	0.000002525	1.03E-05	5.92E-06	0.00E+00	1.46E-07	1.96E-06	*8.02E-06*	0.73726036	0	0.01815632	0.24458333
	Endosulfan I	0.0266933	0.000025	0.0006	4.39E-03	1.21	1.866E-05	0.002210152	0.002228807	6.254E-05	0.000002525	2.29E-03	1.55E-05	1.83E-03	5.18E-05	2.09E-06	*1.90E-03*	0.00813253	0.96350171	0.027265	0.00110076
	Endosulfan Sulfate	0.000155	0.00005	0.0009		1.21	2.821E-05	0	2.82064E-05	3.632E-07	0.00000505	3.36E-05	2.34E-05	0.00E+00	3.01E-07	4.19E-06	*2.79E-05*	0.83898746	0	0.0108022	0.15021033
	Endrin Aldehyde	0.0013	0.00005	0.0022	4.00E-04	0.04	6.567E-05	0.000201016	0.000266682	3.046E-06	0.00000505	2.75E-04	1.64E-03	5.02E-03	7.61E-05	1.26E-04	*6.86E-03*	0.23897706	0.7315595	0.01108496	0.01837848
	gamma-Chlordane	0.00935	2.163E-05	0.0003	8.97E-04	1.99	7.611E-06	0.000451567	0.000459178	2.191E-05	2.18449E-06	4.83E-04	3.82E-06	2.27E-04	1.10E-05	1.10E-06	*2.43E-04*	0.01574946	0.93439945	0.04533087	0.00452022
	Inorganics																				
X	Aluminum	22112.5	0.3861143	47.9000	3.68E+02	41.82	1.4297192	185.1925444	186.6222636	51.809588	0.038997543	2.38E+02	3.42E-02	4.43E+00	1.24E+00	9.33E-04	*5.70E+00*	0.00599536	0.77658358	0.21725753	0.00016353
	Antimony	4.3625	0.0006929	0.0498		0.05	0.0014849	0	0.001484938	0.0102213	6.99786E-05	1.18E-02	2.73E-02	0.00E+00	1.88E-01	1.29E-03	*2.17E-01*	0.12609595	0	0.8679617	0.00594235
X	Arsenic	283.125	0.0245857	3.7500	14.92	0.05	0.11193	7.508406033	7.620336033	0.3383146	0.002483157	7.96E+00	2.04E+00	1.37E+02	6.17E+00	4.53E-02	*1.45E+02*	0.01405956	0.94313276	0.04249578	0.00031191
X	Barium	91.1125	0.0373429	8.8000	8.88	4.33	0.2626624	4.470174107	4.732836507	0.2134766	0.003771629	4.95E+00	6.07E-02	1.03E+00	4.93E-02	8.71E-04	*1.14E+00*	0.0530622	0.90305002	0.04312585	0.00076193
	Beryllium	1.6375	6.379E-05	0.0060		0.53	0.0001791	0	0.000179088	0.0038367	6.44236E-06	4.02E-03	3.37E-04	0.00E+00	7.23E-03	1.21E-05	*7.58E-03*	0.04452497	0	0.95387333	0.0016017
X	Cadmium	16.0625	0.00043	0.0570	1.72	0.78	0.0017013	0.865772673	0.867474009	0.0376344	0.00004343	9.05E-01	2.19E-03	1.12E+00	4.85E-02	5.60E-05	*1.17E+00*	0.00187961	0.95649437	0.04157804	4.7981E-05
X	Chromium	1462.5	0.0257857	0.8950	27.33	7.24	0.026714	13.75141648	13.77813044	3.4266375	0.002604357	1.72E+01	3.69E-03	1.90E+00	4.73E-01	3.60E-04	*2.38E+00*	0.00155247	0.79915842	0.19913776	0.00015135
	Cobalt	35.475	0.0014686	0.4850	3.15	4.02	0.0144763	1.58531597	1.59979225	0.0831179	0.000148326	1.68E+00	3.60E-03	3.94E-01	2.07E-02	3.69E-05	*4.19E-01*	0.00860117	0.94192565	0.04938505	8.8129E-05
X	Copper	1013.25	0.0215429	54.3500	51.32	12.23	1.6222388	25.82101803	27.44325683	2.3740448	0.002175829	2.98E+01	1.33E-01	2.11E+00	1.94E-01	1.78E-04	*2.44E+00*	0.05440199	0.86591115	0.0796139	7.2967E-05
	Cyanide	0	0.0025	0.2675		51.90	0.0079843	0	0.00798434	0	0.0002525	0.00E+00	1.54E-04	0.00E+00	0.00E+00	4.87E-06	*1.59E-04*	0.96934504	0	0	0.03065496
X	Iron	30325	2.401	577.5000	2510.30	2.57	17.23722	1263.06113	1280.29835	71.051475	0.242501	1.35E+03	6.72E+00	4.92E+02	2.77E+01	9.45E-02	*5.27E+02*	0.01275327	0.9344986	0.05256872	0.00017942
X	Lead	769.875	0.0130729	0.5150	70.21	6.43	0.0153717	35.32567832	35.34105004	1.8038171	0.001320358	3.71E+01	2.39E-03	5.49E+00	2.80E-01	2.05E-04	*5.77E+00*	0.00041382	0.95099069	0.04855995	3.5545E-05
X	Manganese	729.125	0.4697143	88.7000	411.16	70.76	2.6475176	206.8760246	209.5235422	1.7083399	0.047441143	2.11E+02	3.74E-02	2.92E+00	2.41E-02	6.70E-04	*2.99E+00*	0.01253089	0.97915888	0.00808569	0.00022454
X	Mercury	2.05	0.0002039	0.0090	0.07	0.03	0.0002686	0.036131977	0.036400609	0.0048032	2.05968E-05	4.12E-02	1.04E-02	1.40E+00	1.87E-01	8.00E-04	*1.60E+00*	0.00651634	0.8764716	0.11651243	0.00049963
	Nickel	42.6125	0.0028429	0.0675	1.10	32.17	0.0020147	0.553881286	0.555896026	0.0998411	0.000287129	6.56E-01	6.26E-05	1.72E-02	3.10E-03	8.93E-06	*2.04E-02*	0.00307114	0.84430003	0.15219116	0.00043768
X	Selenium	7.075	0.0008571	0.3300	0.61	0.16	0.0098498	0.305875987	0.315725827	0.0165767	8.65714E-05	3.32E-01	6.12E-02	1.90E+00	1.03E-01	5.38E-04	*2.07E+00*	0.02963346	0.92023465	0.04987144	0.00026045
	Silver	0.945	0.00025	0.0370		145.71	0.0011044	0	0.001104376	0.0022141	0.00002525	3.34E-03	7.58E-06	0.00E+00	1.52E-05	1.73E-07	*2.29E-05*	0.33027959	0	0.66216904	0.00755138
	Thallium	2.31	0.0007786	0.0675		0.06	0.0020147	0	0.00201474	0.0054123	7.86357E-05	7.51E-03	3.35E-02	0.00E+00	9.00E-02	1.31E-03	*1.25E-01*	0.26842779	0	0.72109542	0.01047679
X	Vanadium	77.25	0.0018789	0.1375	2.69	0.16	0.0041041	1.352456825	1.356560925	0.1809968	0.000189772	1.54E+00	2.62E-02	8.63E+00	1.15E+00	1.21E-03	*9.81E+00*	0.0026689	0.87950517	0.11770252	0.00012341
	Zinc	2725	0.1277857	28.7500	105.49	128.66	0.85813	53.07820686	53.93633686	6.384675	0.012906357	6.03E+01	6.67E-03	4.13E-01	4.96E-02	1.00E-04	*4.69E-01*	0.01422301	0.87974076	0.10582232	0.00021392

Table E.1-20. Exposure Calculations for Muskrat - Station 21

	Mean Concentrations Compound	C_{soil} (mg/Kg)	C_{water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0	0.0025			9.730183192	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E-05	*2.60E-05*	0	0	0	1
	Acetone	0	0.0025			1367.050531	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-07	*1.85E-07*	0	0	0	1
	cis-1,2-Dichloroethene	0.038	0.0005833			2504.114914	0	0	0	8.903E-05	5.89167E-05	1.48E-04	0.00E+00	0.00E+00	3.56E-08	2.35E-08	*5.91E-08*	0	0	0.60178169	0.39821831
	Tetrachloroethene	0.0375	0.0005			6.09153838	0	0	0	8.786E-05	0.0000505	1.38E-04	0.00E+00	0.00E+00	1.44E-05	8.29E-06	*2.27E-05*	0	0	0.63501671	0.36498329
	Trichloroethene	0.019	0.0005			3.04576919	0	0	0	4.452E-05	0.0000505	9.50E-05	0.00E+00	0.00E+00	1.46E-05	1.66E-05	*3.12E-05*	0	0	0.46851616	0.53148384
	Semivolatile Organics																				
	2-Methylnaphthalene	0.14	0.0025			62.53	0	0	0	0.000328	0.0002525	5.81E-04	0.00E+00	0.00E+00	5.25E-06	4.04E-06	*9.28E-06*	0	0	0.56504513	0.43495487
	Acenaphthylene	0.038	0.0025			58.00	0	0	0	8.903E-05	0.0002525	3.42E-04	0.00E+00	0.00E+00	1.54E-06	4.35E-06	*5.89E-06*	0	0	0.26068854	0.73931146
	Anthracene	0.42	0.0025			435.11	0	0	0	0.0009841	0.0002525	1.24E-03	0.00E+00	0.00E+00	2.26E-06	5.80E-07	*2.84E-06*	0	0	0.79580449	0.20419551
	Benzo(a)anthracene	0.39	0.0025			0.57	0	0	0	0.0009138	0.0002525	1.17E-03	0.00E+00	0.00E+00	1.62E-03	4.46E-04	*2.06E-03*	0	0	0.78349782	0.21650218
	Benzo(a)pyrene	0.89	0.0025		0.14	0.57	0	0.071048612	0.071048612	0.0020853	0.0002525	7.34E-02	0.00E+00	1.26E-01	3.69E-03	4.46E-04	*1.30E-01*	0	0.96814436	0.02841494	0.00344069
	Benzo(b)fluoranthene	1.6066667	0.0025		0.12	0.57	0	0.061511799	0.061511799	0.0037644	0.0002525	6.55E-02	0.00E+00	1.09E-01	6.66E-03	4.46E-04	*1.16E-01*	0	0.93869985	0.05744687	0.00385327
	Benzo(g,h,i)perylene	0.71	0.0025			58.00	0	0	0	0.0016635	0.0002525	1.92E-03	0.00E+00	0.00E+00	2.87E-05	4.35E-06	*3.30E-05*	0	0	0.86821709	0.13178291
	Benzo(k)fluoranthene	0.0335	0.0025		0.01	0.57	0	0.003354349	0.003354349	7.849E-05	0.0002525	3.69E-03	0.00E+00	5.93E-03	1.39E-04	4.46E-04	*6.52E-03*	0	0.91018723	0.02129804	0.06851473
	Carbazole	0	0			58.00014758	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0	0
	Chrysene	0.94	0.0025		0.11	0.57	0	0.055165874	0.055165874	0.0022024	0.0002525	5.76E-02	0.00E+00	9.75E-02	3.89E-03	4.46E-04	*1.02E-01*	0	0.95739524	0.03822266	0.0043821
	Dibenz(a,h)anthracene	0.24	0.0025			0.57	0	0	0	0.0005623	0.0002525	8.15E-04	0.00E+00	0.00E+00	9.94E-04	4.46E-04	*1.44E-03*	0	0	0.69011561	0.30988439
	Dibenzofuran	0	0.0025			58.00	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.35E-06	*4.35E-06*	0	0	0	1
	Fluoranthene	1.6233333	0.0025		0.08	54.39	0	0.038587948	0.038587948	0.0038035	0.0002525	4.26E-02	0.00E+00	7.09E-04	6.99E-05	4.64E-06	*7.84E-04*	0	0.90488749	0.08919138	0.00592113
	Fluorene	0.24	0.0025			54.39	0	0	0	0.0005623	0.0002525	8.15E-04	0.00E+00	0.00E+00	1.03E-05	4.64E-06	*1.50E-05*	0	0	0.69011561	0.30988439
	Indeno(1,2,3-cd)pyrene	0.62	0.0025		0.26	0.57	0	0.131337359	0.131337359	0.0014527	0.0002525	1.33E-01	0.00E+00	2.32E-01	2.57E-03	4.46E-04	*2.35E-01*	0	0.98718335	0.01091876	0.00189789
	Naphthalene	1.9	0.0025			60.92	0	0	0	0.0044517	0.0002525	4.70E-03	0.00E+00	0.00E+00	7.31E-05	4.15E-06	*7.72E-05*	0	0	0.94632456	0.05367544
	N-nitrosodiphenylamine	0	0.0025			120.62	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.09E-06	*2.09E-06*	0	0	0	1
	Phenanthrene	0.6	0.0025		0.16	58.00	0	0.081253169	0.081253169	0.0014058	0.0002525	8.29E-02	0.00E+00	1.40E-03	2.42E-05	4.35E-06	*1.43E-03*	0	0.97999915	0.01695543	0.00304542
	Pyrene	1.44	0.0025		0.09	58.00	0	0.044392925	0.044392925	0.0033739	0.0002525	4.80E-02	0.00E+00	7.65E-04	5.82E-05	4.35E-06	*8.28E-04*	0	0.92448002	0.07026168	0.0052583
	Pesticides and PCBs																				
	4,4'-DDD	0.03	0.00005	0.0006	1.55E-03	6.84	1.925E-05	0.000779805	0.000799057	7.029E-05	0.00000505	8.74E-04	2.82E-06	1.14E-04	1.03E-05	7.39E-07	*1.28E-04*	0.0220174	0.8918204	0.08038679	0.00577541
	4,4'-DDE	0.031	0.00005	0.0010	1.35E-03	0.83	2.91E-05	0.000677276	0.000706378	7.263E-05	0.00000505	7.84E-04	3.52E-05	8.19E-04	8.79E-05	6.11E-06	*9.48E-04*	0.03711675	0.86380551	0.09263692	0.00644082
	4,4'-DDT	0.0044	0.00005	0.0011	7.07E-04	0.64	3.209E-05	0.000355566	0.000387653	1.031E-05	0.00000505	4.03E-04	4.99E-05	5.53E-04	1.60E-05	7.85E-06	*6.26E-04*	0.07961694	0.88227205	0.02558037	0.01253064
	Aldrin	0.0008	0.000025	0.0003		0.16	9.104E-06	0	9.10364E-06	1.874E-06	0.000002525	1.35E-05	5.66E-05	0.00E+00	1.17E-05	1.57E-05	*8.40E-05*	0.67419189	0	0.13881319	0.18699493
	alpha-Chlordane	0.0503333	2.173E-05	0.0006	5.15E-03	1.99	1.866E-05	0.002591874	0.002610529	0.0001179	2.19459E-06	2.73E-03	9.36E-06	1.30E-03	5.92E-05	1.10E-06	*1.37E-03*	0.0068317	0.9491768	0.04318782	0.00080369
	Aroclor 1248	0.24	0.0005	0.0025		0.57	7.462E-05	0	0.00007462	0.0005623	0.0000505	6.87E-04	1.32E-04	0.00E+00	9.94E-04	8.93E-05	*1.22E-03*	0.10854766	0	0.81799139	0.07346096
	Aroclor 1254	0.0016	0.0005	0.0195		0.15	0.000582	0	0.000582036	3.749E-06	0.0000505	6.36E-04	3.98E-03	0.00E+00	2.56E-05	3.45E-04	*4.35E-03*	0.91474132	0	0.0058917	0.07936698
	Aroclor 1260	0.42	0.0005	0.0215	2.62E-02	0.28	0.0006417	0.013198121	0.013839853	0.0009841	0.0000505	1.49E-02	2.31E-03	4.76E-02	3.55E-03	1.82E-04	*5.36E-02*	0.04314335	0.88730365	0.06615791	0.00339509
	beta-BHC	0.0008	0.000025	0.0003		3.22	7.611E-06	0	7.61124E-06	1.874E-06	0.000002525	1.20E-05	2.37E-06	0.00E+00	5.83E-07	7.85E-07	*3.73E-06*	0.63370811	0	0.15606163	0.21023026
	delta-BHC	0.0018	0.000025	0.0003		1.29	7.611E-06	0	7.61124E-06	4.217E-06	0.000002525	1.44E-05	5.92E-06	0.00E+00	3.28E-06	1.96E-06	*1.12E-05*	0.53026549	0	0.29382094	0.17591357
	Endosulfan I	0.03545	0.000025	0.0006	5.83E-03	1.21	1.866E-05	0.002935185	0.00295384	8.306E-05	0.000002525	3.04E-03	1.55E-05	2.43E-03	6.89E-05	2.09E-06	*2.52E-03*	0.00613767	0.96570425	0.02732733	0.00083075
	Endosulfan Sulfate	0.0016	0.00005	0.0009		1.21	2.821E-05	0	2.82064E-05	3.749E-06	0.00000505	3.70E-05	2.34E-05	0.00E+00	3.11E-06	4.19E-06	*3.07E-05*	0.76222775	0	0.10130479	0.13646745
	Endrin Aldehyde	0.009	0.00005	0.0022	2.77E-03	0.04	6.567E-05	0.001391652	0.001457317	2.109E-05	0.00000505	1.48E-03	1.64E-03	3.48E-02	5.27E-04	1.26E-04	*3.71E-02*	0.04426534	0.93811565	0.0142148	0.00340422
	gamma-Chlordane	0.033	2.163E-05	0.0003	3.17E-03	1.99	7.611E-06	0.001593767	0.001601378	7.732E-05	2.18449E-06	1.68E-03	3.82E-06	8.00E-04	3.88E-05	1.10E-06	*8.43E-04*	0.00452812	0.94817318	0.04599908	0.00129961
	Inorganics																				
X	Aluminum	13647.5	0.3861143	47.9000	2.27E+02	41.82	1.4297192	114.2980328	115.727752	31.976093	0.038997543	1.48E+02	3.42E-02	2.73E+00	7.65E-01	9.33E-04	*3.53E+00*	0.00967708	0.77362823	0.21643074	0.00026396
	Antimony	2	0.0006929	0.0498		0.05	0.0014849	0	0.001484938	0.004686	6.99786E-05	6.24E-03	2.73E-02	0.00E+00	8.62E-02	1.29E-03	*1.15E-01*	0.23793588	0	0.75085125	0.01121287
X	Arsenic	175.25	0.0245857	3.7500	9.24	0.05	0.11193	4.64758731	4.75951731	0.2094115	0.002483157	4.97E+00	2.04E+00	8.48E+01	3.82E+00	4.53E-02	*9.07E+01*	0.02251473	0.93486264	0.04212314	0.00049949
X	Barium	127.575	0.0373429	8.8000	12.44	4.33	0.2626624	6.259102337	6.521764737	0.2989082	0.003771629	6.82E+00	6.07E-02	1.45E+00	6.90E-02	8.71E-04	*1.58E+00*	0.03848847	0.91715923	0.04379964	0.00055266
	Beryllium	0.9	6.379E-05	0.0060		0.53	0.0001791	0	0.000179088	0.0021087	6.44236E-06	2.29E-03	3.37E-04	0.00E+00	3.97E-03	1.21E-05	*4.32E-03*	0.07806016	0	0.91913177	0.00280807
X	Cadmium	17.675	0.00043	0.0570	1.89	0.78	0.0017013	0.952686816	0.954388152	0.0414125	0.00004343	9.96E-01	2.19E-03	1.23E+00	5.34E-02	5.60E-05	*1.28E+00*	0.00170844	0.9566626	0.04158535	4.3611E-05
X	Chromium	2399.75	0.0257857	0.8950	44.85	7.24	0.026714	22.56407638	22.59079034	5.6226143	0.002604357	2.82E+01	3.69E-03	3.12E+00	7.77E-01	3.60E-04	*3.90E+00*	0.00094677	0.79969057	0.19927036	9.2301E-05
	Cobalt	23.125	0.0014686	0.4850	2.05	4.02	0.0144763	1.033415978	1.047892258	0.0541819	0.000148326	1.10E+00	3.60E-03	2.57E-01	1.35E-02	3.69E-05	*2.74E-01*	0.01313372	0.93757478	0.04915693	0.00013457
X	Copper	457	0.0215429	54.3500	23.15	12.23	1.6222388	11.6458971	13.2681359	1.070751	0.002175829	1.43E+01	1.33E-01	9.52E-01	8.75E-02	1.78E-04	*1.17E+00*	0.11311845	0.81206653	0.0746633	0.00015172
	Cyanide	0	0.0025	0.2675		51.90	0.0079843	0	0.00798434	0	0.0002525	0.00E+00	1.54E-04	0.00E+00	0.00E+00	4.87E-06	*1.59E-04*	0.96934504	0	0	0.03065496
X	Iron	21950	2.401	577.5000	1817.02	2.57	17.23722	914.2355091	931.4727291	51.42885	0.242501	9.83E+02	6.72E+00	3.56E+02	2.00E+01	9.45E-02	*3.83E+02*	0.01753275	0.92991	0.05231059	0.00024666
X	Lead	526.75	0.0130729	0.5150	48.04	6.43	0.0153717	24.16989908	24.1852708	1.2341753	0.001320358	2.54E+01	2.39E-03	3.76E+00	1.92E-01	2.05E-04	*3.95E+00*	0.00060469	0.95079348	0.04854988	5.194E-05
	Manganese	207.75	0.4697143	88.7000	117.15	70.76	2.6475176	58.94530308	61.59282068	0.4867583	0.047441143	6.21E+01	3.74E-02	8.33E-01	6.88E-03	6.70E-04	*8.78E-01*	0.04261459	0.9487869	0.00783489	0.00076362
X	Mercury	9.5375	0.0002039	0.0090	0.33	0.03	0.0002686	0.168101822	0.168370454	0.0223464	2.05968E-05	1.91E-01	1.04E-02	6.53E+00	8.68E-01	8.00E-04	*7.41E+00*	0.00140839	0.8813259	0.11715773	0.00010799
	Nickel	32.7	0.0028429	0.0675	0.84	32.17	0.0020147	0.425037678	0.427052418	0.0766161	0.000287129	5.04E-01	6.26E-05	1.32E-02	2.38E-03	8.93E-06	*1.57E-02*	0.00399785	0.84340295	0.15202945	0.00056975
	Selenium	3.2333333	0.0008571	0.3300	0.28	0.16	0.0098498	0.139787847	0.149637687	0.0075757	8.65714E-05	1.57E-01	6.12E-02	8.69E-01	4.71E-02	5.38E-04	*9.78E-01*	0.0626182	0.88867059	0.04816085	0.00055036
	Silver	0.3	0.00025	0.0370		145.71	0.0011044	0	0.001104376	0.0007029	0.00002525	1.83E-03	7.58E-06	0.00E+00	4.82E-06	1.73E-07	*1.26E-05*	0.6026523	0	0.38356891	0.01377879
	Thallium	0.22	0.0007786	0.0675		0.06	0.0020147	0	0.00201474	0.0005155	7.86357E-05	2.61E-03	3.35E-02	0.00E+00	8.57E-03	1.31E-03	*4.34E-02*	0.77227554	0	0.19758239	0.03014207
X	Vanadium	53.625	0.0018789	0.1375	1.87	0.16	0.0041041	0.938841388	0.942945488	0.1256434	0.000189772	1.07E+00	2.62E-02	5.99E+00	8.01E-01	1.21E-03	*6.82E+00*	0.00383999	0.87842455	0.1175579	0.00017756
	Zinc	3562.5	0.1277857	28.7500	137.91	128.66	0.85813	69.39123374	70.24936374	8.3469375	0.012906357	7.86E+01	6.67E-03	5.39E-01	6.49E-02	1.00E-04	*6.11E-01*	0.01091641	0.88273672	0.10618269	0.00016418

		Mean Concentrations																			
		Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
				Reach 2	Reach 2																	
		Inorganics																				
X		Aluminum	7500	0.140333333	52.7	1.25E+02	41.82	1.5729896	62.81262105	64.38561065	17.5725	0.014173667	8.20E+01	3.76E-02	1.50E+00	4.20E-01	3.39E-04	*1.96E+00*	0.01918929	0.76626657	0.21437124	0.00017291
		Antimony	2	0.0006	0.1		0.05	0.00164164	0	0.00164164	0.004688	0.0000606	6.39E-03	3.02E-02	0.00E+00	8.62E-02	1.11E-03	*1.17E-01*	0.25697845	0	0.73353537	0.00948618
X		Arsenic	121	0.012683333	2.7	6.38	0.05	0.0805896	3.208890525	3.289480125	0.14458653	0.001281017	3.44E+00	1.47E+00	5.85E+01	2.64E+00	2.34E-02	*6.27E+01*	0.02345894	0.93408028	0.04208789	0.00037289
		Barium	58.4	0.032083333	10.0	5.69	4.33	0.2977338	2.865228897	3.162962697	0.1368312	0.003240417	3.30E+00	6.88E-02	6.62E-01	3.16E-02	7.48E-04	*7.63E-01*	0.09013948	0.86745357	0.04142591	0.00098104
		Beryllium	0.64	4.56667E-05	0.0		0.53	0.00019401	0	0.000194012	0.00149952	4.61234E-06	1.70E-03	3.66E-04	0.00E+00	2.83E-03	8.69E-06	*3.20E-03*	0.11424942	0	0.88303448	0.0027161
		Cadmium	3.9	0.00056	0.1	0.42	0.78	0.0032982	0.210210952	0.213509156	0.0091377	0.00005656	2.23E-01	4.25E-03	2.71E-01	1.18E-02	7.29E-05	*2.87E-01*	0.01480985	0.94390538	0.0410308	0.00025397
		Chromium	322	0.0062	2.2	6.02	7.24	0.0656656	3.027662296	3.093327896	0.754446	0.0006262	3.85E+00	9.07E-03	4.18E-01	1.04E-01	8.65E-05	*5.32E-01*	0.01706309	0.78673273	0.19604147	0.00016272
		Cobalt	20.3	0.000985	0.5	1.80	4.02	0.01611792	0.907171648	0.923289568	0.0475629	0.000099485	9.71E-01	4.01E-03	2.26E-01	1.18E-02	2.47E-05	*2.41E-01*	0.01660012	0.93431157	0.04898584	0.00010246
		Copper	197	0.007183333	62.3	9.98	12.23	1.858038	5.020222601	6.878260601	0.461571	0.000725517	7.34E+00	1.52E-01	4.10E-01	3.77E-02	5.93E-05	*6.00E-01*	0.25311948	0.68390212	0.06287956	9.8837E-05
		Cyanide	0.85	0.0025	0.2		51.90	0.0067158	0	0.0067158	0.00199155	0.0002525	8.96E-03	1.29E-04	0.00E+00	3.84E-05	4.87E-06	*1.73E-04*	0.7495438	0	0.22227493	0.02818128
X		Iron	23400	1.209333333	342.5	1937.05	2.57	10.22294	974.6291987	984.8521387	54.8262	0.122142667	1.04E+03	3.99E+00	3.80E+02	2.14E+01	4.76E-02	*4.05E+02*	0.00983164	0.93732328	0.05272762	0.00011747
X		Lead	150	0.003308333	1.0	13.68	6.43	0.02895256	6.882742976	6.911695536	0.35145	0.000334142	7.26E+00	4.50E-03	1.07E+00	5.46E-02	5.19E-05	*1.13E+00*	0.00398605	0.94758205	0.0483859	4.6003E-05
X		Manganese	1140	0.5925	120.0	642.86	70.76	3.58176	323.4543707	327.0361307	2.67102	0.0598425	3.30E+02	5.06E-02	4.57E+00	3.77E-02	8.46E-04	*4.66E+00*	0.01086149	0.98085732	0.00809972	0.00018147
X		Mercury	1.9	0.000115833	0.0	0.07	0.03	0.00041787	0.033488174	0.033906046	0.0044517	1.16992E-05	3.84E-02	1.62E-02	1.30E+00	1.73E-01	4.55E-04	*1.49E+00*	0.01089075	0.87278234	0.11602201	0.00030491
		Nickel	18	0.001633333	0.1	0.47	32.17	0.00305942	0.233965694	0.237025114	0.042174	0.000164967	2.79E-01	9.51E-05	7.27E-03	1.31E-03	5.13E-06	*8.69E-03*	0.01095137	0.83749383	0.15096429	0.00059051
		Selenium	1.1	0.00075	0.4	0.09	0.16	0.01178996	0.047556691	0.059346651	0.0025773	0.00007575	6.20E-02	7.33E-02	2.96E-01	1.60E-02	4.71E-04	*3.85E-01*	0.19016156	0.7670471	0.04156956	0.00122178
		Silver	0.21	0.000375	0.0		145.71	0.00058204	0	0.000582036	0.00049203	0.000037875	1.11E-03	3.99E-06	0.00E+00	3.38E-06	2.60E-07	*7.63E-06*	0.52344144	0	0.4424965	0.03406206
		Thallium	0.44	0.00085	0.1		0.06	0.00395486	0	0.00395486	0.00103092	0.00008585	5.07E-03	6.58E-02	0.00E+00	1.71E-02	1.43E-03	*8.43E-02*	0.77980058	0	0.20327193	0.0169275
X		Vanadium	26.9	0.000933333	0.2	0.94	0.18	0.00470106	0.470952603	0.475653663	0.0630267	9.42667E-05	5.39E-01	3.00E-02	3.00E+00	4.02E-01	6.01E-04	*3.44E+00*	0.00872547	0.874118	0.11698157	0.00017496
		Zinc	941	0.05855	27.8	36.43	128.66	0.828282	18.32902483	19.15730683	2.204763	0.00591355	2.14E+01	6.44E-03	1.42E-01	1.71E-02	4.60E-05	*1.66E-01*	0.03876278	0.85777981	0.10318068	0.00027675

Table E.1-22. Exposure Calculatioins for Muskrat - Station AS

		Mean Concentrations																			
		Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
				Reach 3	Reach 3																	
		Inorganics																				
X		Aluminum	17250	0.129	58.3	2.87E+02	41.82	1.74113333	144.4690284	146.2101617	40.41675	0.013029	1.87E+02	4.16E-02	3.45E+00	9.67E-01	3.12E-04	*4.46E+00*	0.00932884	0.77405205	0.21654931	6.9808E-05
		Antimony	2.525	0.0013	0.0		0.05	0.00136803	0	0.001368032	0.00591608	0.0001313	7.42E-03	2.52E-02	0.00E+00	1.09E-01	2.41E-03	*1.36E-01*	0.18448512	0	0.7978085	0.01770638
X		Arsenic	116	0.00695	1.5	6.11	0.05	0.04576693	3.076291743	3.122058676	0.271788	0.00070195	3.39E+00	8.35E-01	5.61E+01	4.96E+00	1.28E-02	*6.19E+01*	0.01348248	0.90624471	0.08006602	0.00020679
X		Barium	102.425	0.0339	14.0	9.99	4.33	0.41687707	5.02518955	5.442066618	0.23998178	0.0034239	5.69E+00	9.63E-02	1.16E+00	5.54E-02	7.91E-04	*1.31E+00*	0.07332321	0.88386493	0.04220965	0.00060222
		Beryllium	0.9975	0.00005	0.0		0.53	0.00011889	0	0.000118894	0.00233714	0.00000505	2.46E-03	2.24E-04	0.00E+00	4.40E-03	9.52E-06	*4.64E-03*	0.04830938	0	0.94963868	0.00205194
		Cadmium	11.95	0.0000495	0.0	1.28	0.78	0.00138793	0.644107918	0.64549585	0.02799885	4.9995E-06	6.73E-01	1.79E-03	8.30E-01	3.61E-02	6.45E-06	*8.68E-01*	0.00206078	0.95635962	0.04157218	7.4232E-06
X		Chromium	747.25	0.0031	0.9	13.96	7.24	0.02656472	7.026151088	7.052715808	1.75080675	0.0003131	8.80E+00	3.67E-03	9.71E-01	2.42E-01	4.33E-05	*1.22E+00*	0.0030174	0.7980784	0.19886863	3.5564E-05
		Cobalt	20.35	0.00048	0.4	1.81	4.02	0.01183971	0.909406061	0.921245768	0.04768005	0.00004848	9.69E-01	2.94E-03	2.26E-01	1.19E-02	1.21E-05	*2.41E-01*	0.0122188	0.93852444	0.04920672	5.0032E-05
X		Copper	510.25	0.0036	41.2	25.84	12.23	1.2297376	13.00288621	14.23262381	1.19551575	0.0003636	1.54E+01	1.01E-01	1.06E+00	9.77E-02	2.97E-05	*1.26E+00*	0.07970557	0.84278339	0.07748747	2.3567E-05
		Cyanide	2.65	0.0025	0.2		51.90	0.00736251	0	0.007362508	0.00620895	0.0002525	1.38E-02	1.42E-04	0.00E+00	1.20E-04	4.87E-06	*2.66E-04*	0.53259044	0	0.44914417	0.01826539
X		Iron	28525	1.92	277.3	2361.29	2.57	8.27784533	1188.089654	1196.367499	66.834075	0.19392	1.26E+03	3.23E+00	4.63E+02	2.61E+01	7.56E-02	*4.93E+02*	0.00655206	0.94039409	0.05290036	0.00015349
X		Lead	572.5	0.0043	1.0	52.21	6.43	0.03024597	26.26913569	26.29938166	1.3413675	0.0004343	2.76E+01	4.70E-03	4.08E+00	2.09E-01	6.75E-05	*4.30E+00*	0.00109424	0.95036219	0.04852786	1.5712E-05
X		Manganese	381.25	0.585	98.3	214.99	70.76	2.9340584	108.1727884	111.1068468	0.89326875	0.059085	1.12E+02	4.15E-02	1.53E+00	1.26E-02	8.35E-04	*1.58E+00*	0.02818311	0.96531822	0.0079714	0.00052727
X		Mercury	3.075	0.00022	0.0	0.11	0.03	0.00019401	0.054197966	0.054391978	0.00720473	0.00002222	6.16E-02	7.54E-03	2.11E+00	2.80E-01	8.63E-04	*2.39E+00*	0.00314858	0.87956692	0.1169239	0.0003606
		Nickel	37.2	0.0017	0.1	0.96	32.17	0.00293505	0.483529102	0.486464154	0.0871596	0.0001717	5.74E-01	9.12E-05	1.50E-02	2.71E-03	5.34E-06	*1.78E-02*	0.00511515	0.84268549	0.15190012	0.00029924
		Selenium	1.875	0.00075	0.4	0.16	0.16	0.01283464	0.081062541	0.093897181	0.00439313	0.00007575	9.84E-02	7.98E-02	5.04E-01	2.73E-02	4.71E-04	*6.12E-01*	0.13047834	0.82409059	0.04466099	0.00077008
		Silver	0.6825	0.00037	0.0		145.71	0.00081584	0	0.000815844	0.0015991	0.00003737	2.45E-03	5.60E-06	0.00E+00	1.10E-05	2.56E-07	*1.68E-05*	0.33268377	0	0.65207755	0.01523868
		Thallium	1.075	0.00085	0.1		0.06	0.00194012	0	0.00194012	0.00251873	0.00008585	4.54E-03	3.23E-02	0.00E+00	4.19E-02	1.43E-03	*7.56E-02*	0.42689773	0	0.55421211	0.01889016
X		Vanadium	65.8	0.0019	0.2	2.29	0.16	0.00589498	1.151995587	1.157890567	0.1541694	0.0001919	1.31E+00	3.76E-02	7.35E+00	9.83E-01	1.22E-03	*8.37E+00*	0.00449226	0.87787689	0.11748461	0.00014624
		Zinc	2187.5	0.0189	23.9	84.68	128.66	0.71436213	42.6086523	43.32301443	5.1253125	0.0019089	4.85E+01	5.55E-03	3.31E-01	3.98E-02	1.48E-05	*3.77E-01*	0.01474424	0.87943127	0.10578509	3.9399E-05

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0	0.0025			9.730183192	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E-05	*2.60E-05*	0	0	0	1
	Acetone	0	0.0025			1367.050531	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-07	*1.85E-07*	0	0	0	1
	cis-1,2-Dichloroethene	0.417	0.000583333			2504.114914	0	0	0	0.000977031	5.89167E-05	1.04E-03	0.00E+00	0.00E+00	3.90E-07	2.35E-08	*4.14E-07*	0	0	0.94312776	0.05687224
	Tetrachloroethene	0.1545	0.0005			6.09153838	0	0	0	0.000361994	0.0000505	4.12E-04	0.00E+00	0.00E+00	5.94E-05	8.29E-06	*6.77E-05*	0	0	0.87757383	0.12242617
	Trichloroethene	0.053	0.0005			3.04576919	0	0	0	0.000124179	0.0000505	1.75E-04	0.00E+00	0.00E+00	4.08E-05	1.66E-05	*5.74E-05*	0	0	0.71089828	0.28910172
	Semivolatile Organics																				
	2-Methylnaphthalene	0.013	0.0025			62.53	0	0	0	0.000030459	0.0002525	2.83E-04	0.00E+00	0.00E+00	4.87E-07	4.04E-06	*4.53E-06*	0	0	0.10764457	0.89235543
	Acenaphthylene	0.019	0.0025			58.00	0	0	0	0.000044517	0.0002525	2.97E-04	0.00E+00	0.00E+00	7.68E-07	4.35E-06	*5.12E-06*	0	0	0.14988031	0.85011969
	Anthracene	0.069	0.0025			435.11	0	0	0	0.000161667	0.0002525	4.14E-04	0.00E+00	0.00E+00	3.72E-07	5.80E-07	*9.52E-07*	0	0	0.39034254	0.60965746
	Benzo(a)anthracene	0.56	0.0025			0.57	0	0	0	0.00131208	0.0002525	1.56E-03	0.00E+00	0.00E+00	2.32E-03	4.46E-04	*2.77E-03*	0	0	0.83861484	0.16138516
	Benzo(a)pyrene	1	0.0025		0.16	0.57	0	0.079829901	0.079829901	0.002343	0.0002525	8.24E-02	0.00E+00	1.41E-01	4.14E-03	4.46E-04	*1.46E-01*	0	0.96851092	0.0284257	0.00306338
	Benzo(b)fluoranthene	1.5	0.0025		0.11	0.57	0	0.057428028	0.057428028	0.0035145	0.0002525	6.12E-02	0.00E+00	1.02E-01	6.21E-03	4.46E-04	*1.08E-01*	0	0.93844271	0.05743114	0.00412615
	Benzo(g,h,i)perylene	0.64	0.0025			58.00	0	0	0	0.00149952	0.0002525	1.75E-03	0.00E+00	0.00E+00	2.59E-05	4.35E-06	*3.02E-05*	0	0	0.85588064	0.14411936
	Benzo(k)fluoranthene	0.72	0.0025		0.14	0.57	0	0.072093462	0.072093462	0.00168696	0.0002525	7.40E-02	0.00E+00	1.27E-01	2.98E-03	4.46E-04	*1.31E-01*	0	0.97380274	0.02278662	0.00341064
	Carbazole	0	0			58.00014758	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*				
	Chrysene	0.85	0.0025		0.10	0.57	0	0.049884035	0.049884035	0.00199155	0.0002525	5.21E-02	0.00E+00	8.82E-02	3.52E-03	4.46E-04	*9.22E-02*	0	0.95695123	0.03820493	0.00484384
	Dibenz(a,h)anthracene	0.32	0.0025			0.57	0	0	0	0.00074976	0.0002525	1.00E-03	0.00E+00	0.00E+00	1.33E-03	4.46E-04	*1.77E-03*	0	0	0.74806936	0.25193064
	Dibenzofuran	0	0.0025			58.00	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.35E-06	*4.35E-06*	0	0	0	1
	Fluoranthene	1.2	0.0025		0.06	54.39	0	0.028524972	0.028524972	0.0028116	0.0002525	3.16E-02	0.00E+00	5.24E-04	5.17E-05	4.64E-06	*5.81E-04*	0	0.90300127	0.08900546	0.00799327
	Fluorene	0.047	0.0025			54.39	0	0	0	0.000110121	0.0002525	3.63E-04	0.00E+00	0.00E+00	2.02E-06	4.64E-06	*6.67E-06*	0	0	0.3036807	0.6963193
	Indeno(1,2,3-cd)pyrene	0.74	0.0025		0.31	0.57	0	0.156757493	0.156757493	0.00173382	0.0002525	1.59E-01	0.00E+00	2.77E-01	3.07E-03	4.46E-04	*2.81E-01*	0	0.98748726	0.01092213	0.00159061
	Naphthalene	0.026	0.0025			60.92	0	0	0	0.000060918	0.0002525	3.13E-04	0.00E+00	0.00E+00	1.00E-06	4.15E-06	*5.15E-06*	0	0	0.19436663	0.80563337
	N-nitrosodiphenylamine	0	0.0025			120.62	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.09E-06	*2.09E-06*	0	0	0	1
	Phenanthrene	0.57	0.0025		0.15	58.00	0	0.077190511	0.077190511	0.00133551	0.0002525	7.88E-02	0.00E+00	1.33E-03	2.30E-05	4.35E-06	*1.36E-03*	0	0.97984209	0.01695272	0.00320519
	Pyrene	1	0.0025		0.06	58.00	0	0.03082842	0.03082842	0.002343	0.0002525	3.34E-02	0.00E+00	5.32E-04	4.04E-05	4.35E-06	*5.76E-04*	0	0.92234603	0.0700995	0.00755447
	Pesticides and PCBs																				
	4,4'-DDD	0.017	0.00005	0.0006	8.78E-04	6.84	1.9252E-05	0.00044189	0.000461142	0.000039831	0.00000505	5.06E-04	2.82E-06	6.46E-05	5.83E-06	7.39E-07	*7.40E-05*	0.03804564	0.87326071	0.07871386	0.00997979
	4,4'-DDE	0.004	0.00005	0.0010	1.74E-04	0.83	2.91018E-05	8.73905E-05	0.000116492	0.000009372	0.00000505	1.31E-04	3.52E-05	1.06E-04	1.13E-05	6.11E-06	*1.58E-04*	0.22229659	0.66753972	0.07158883	0.03857486
	4,4'-DDT	0.0013	0.00005	0.0011	2.09E-04	0.64	3.20866E-05	0.000105054	0.00013714	3.0459E-06	0.00000505	1.45E-04	4.99E-05	1.63E-04	4.73E-06	7.85E-06	*2.26E-04*	0.220927	0.72333001	0.02097204	0.03477094
	Aldrin	0.000085	0.000025	0.0003		0.16	9.10364E-06	0	9.10364E-06	1.99155E-07	0.000002525	1.18E-05	5.66E-05	0.00E+00	1.24E-06	1.57E-05	*7.35E-05*	0.76968192	0	0.01683788	0.2134802
	alpha-Chlordane	0.0024	2.17286E-05	0.0006	2.46E-04	1.99	0.000018655	0.000123586	0.000142241	5.6232E-06	2.19459E-06	1.50E-04	9.36E-06	6.20E-05	2.82E-06	1.10E-06	*7.53E-05*	0.12431792	0.82358392	0.03747331	0.01462486
	Aroclor 1248	0.028	0.0005	0.0025		0.57	0.00007462	0	0.00007462	0.000065604	0.0000505	1.91E-04	1.32E-04	0.00E+00	1.16E-04	8.93E-05	*3.37E-04*	0.39124599	0	0.34397349	0.26478052
	Aroclor 1254	0.00165	0.0005	0.0195		0.15	0.000582036	0	0.000582036	3.86595E-06	0.0000505	6.36E-04	3.98E-03	0.00E+00	2.64E-05	3.45E-04	*4.35E-03*	0.91457294	0	0.0060747	0.07935237
	Aroclor 1260	0.058	0.0005	0.0215	3.62E-03	0.28	0.000641732	0.001822598	0.00246433	0.000135894	0.0000505	2.65E-03	2.31E-03	6.57E-03	4.90E-04	1.82E-04	*9.55E-03*	0.24209691	0.68758493	0.05126676	0.0190514
	beta-BHC	0.000085	0.000025	0.0003		3.22	7.61124E-06	0	7.61124E-06	1.99155E-07	0.000002525	1.03E-05	2.37E-06	0.00E+00	6.19E-08	7.85E-07	*3.21E-06*	0.73842468	0	0.01926922	0.2443061
	delta-BHC	0.000085	0.000025	0.0003		1.29	7.61124E-06	0	7.61124E-06	1.99155E-07	0.000002525	1.03E-05	5.92E-06	0.00E+00	1.55E-07	1.96E-06	*8.03E-06*	0.73842468	0	0.01926922	0.2443061
	Endosulfan I	0.000085	0.000025	0.0006	1.40E-05	1.21	0.000018655	7.03782E-06	2.56928E-05	1.99155E-07	0.000002525	2.84E-05	1.55E-05	5.83E-06	1.65E-07	2.09E-06	*2.36E-05*	0.65647379	0.24766257	0.00700831	0.08885534
	Endosulfan Sulfate	0.000165	0.00005	0.0009		1.21	2.82064E-05	0	2.82064E-05	3.86595E-07	0.00000505	3.36E-05	2.34E-05	0.00E+00	3.21E-07	4.19E-06	*2.79E-05*	0.83840317	0	0.01149111	0.15010572
	Endrin Aldehyde	0.0018	0.00005	0.0022	5.53E-04	0.04	6.56656E-05	0.00027833	0.000343996	4.2174E-06	0.00000505	3.53E-04	1.64E-03	6.95E-03	1.05E-04	1.26E-04	*8.82E-03*	0.18588288	0.78788343	0.0119384	0.01429529
	gamma-Chlordane	0.0017	2.16286E-05	0.0003	1.63E-04	1.99	7.61124E-06	8.21031E-05	8.97144E-05	3.9831E-06	2.18449E-06	9.59E-05	3.82E-06	4.12E-05	2.00E-06	1.10E-06	*4.81E-05*	0.07938136	0.85629383	0.04154171	0.0227831
	Inorganics																				
X	Aluminum	18558.3333	0.386114286	47.9	3.09E+02	41.82	1.4297192	155.4263412	156.8560604	43.482175	0.038997543	2.00E+02	3.42E-02	3.72E+00	1.04E+00	9.33E-04	*4.79E+00*	0.00713514	0.77566867	0.21700157	0.00019482
	Antimony	22.4416667	0.000692857	0.0		0.05	0.001484938	0	0.001484938	0.052580825	6.99786E-05	5.41E-02	2.73E-02	0.00E+00	9.67E-01	1.29E-03	*9.95E-01*	0.0274299	0	0.97127745	0.00129265
X	Arsenic	1238.66667	0.024585714	3.8	65.29	0.05	0.11193	32.84913827	32.96106827	2.902196	0.002483157	3.59E+01	2.04E+00	5.99E+02	5.29E+01	4.53E-02	*6.54E+02*	0.0031208	0.91589164	0.08091832	6.9235E-05
X	Barium	129.283333	0.037342857	8.8	12.61	4.33	0.2626624	6.342916822	6.605579222	0.30291085	0.003771629	6.91E+00	6.07E-02	1.46E+00	7.00E-02	8.71E-04	*1.60E+00*	0.03799949	0.91763262	0.04382225	0.00054564
	Beryllium	1.3916667	6.37857E-05	0.0		0.53	0.000179088	0	0.000179088	0.003260675	6.44236E-06	3.45E-03	3.37E-04	0.00E+00	6.14E-03	1.21E-05	*6.49E-03*	0.05196672	0	0.94616387	0.00186941
	Cadmium	10.575	0.00043	0.1	1.13	0.78	0.001701336	0.569995082	0.571696418	0.024777225	0.00004343	5.97E-01	2.19E-03	7.35E-01	3.19E-02	5.60E-05	*7.69E-01*	0.00285212	0.95553859	0.04153649	7.2806E-05
X	Chromium	1518.16667	0.025785714	0.9	28.37	7.24	0.02671396	14.27483222	14.30154618	3.5570645	0.002604357	1.79E+01	3.69E-03	1.97E+00	4.91E-01	3.60E-04	*2.47E+00*	0.00149564	0.79920835	0.1991502	0.00014581
	Cobalt	39.8416667	0.00146857	0.5	3.54	4.02	0.01447628	1.780454701	1.794930981	0.093349025	0.000148326	1.89E+00	3.60E-03	4.43E-01	2.32E-02	3.69E-05	*4.70E-01*	0.00766578	0.94282355	0.04943212	7.8544E-05
X	Copper	898.666667	0.021542857	54.4	45.52	12.23	1.6222388	22.9010493	24.5232881	2.105576	0.002175829	2.66E+01	1.33E-01	1.87E+00	1.72E-01	1.78E-04	*2.18E+00*	0.06091534	0.85993823	0.07906473	8.1703E-05
	Cyanide	0	0.0025	0.3		51.90	0.00798434	0	0.00798434	0	0.0002525	0.00E+00	1.54E-04	0.00E+00	0.00E+00	4.87E-06	*1.59E-04*	0.96934504	0	0	0.03065496
X	Iron	111725	2.401	577.5	9248.57	2.57	17.23722	4653.437916	4670.675136	261.771675	0.242501	4.93E+03	6.72E+00	1.81E+03	1.02E+02	9.45E-02	*1.92E+03*	0.00349449	0.9433876	0.05306875	4.9162E-05
X	Lead	606.75	0.013072856	0.5	55.33	6.43	0.01537172	27.84069534	27.85606706	1.42161525	0.001320358	2.93E+01	2.39E-03	4.33E+00	2.21E-01	2.05E-04	*4.55E+00*	0.00052501	0.95087581	0.04855409	4.5096E-05
X	Manganese	1035.5	0.469714286	88.7	583.93	70.76	2.6475176	293.8043867	296.4519043	2.4261765	0.047441143	2.99E+02	3.74E-02	4.15E+00	3.43E-02	6.70E-04	*4.22E+00*	0.00885678	0.98286819	0.00811632	0.00015871
X	Mercury	6.6	0.000203929	0.0	0.23	0.03	0.000268632	0.116327342	0.116595974	0.0154638	2.05968E-05	1.32E-01	1.04E-02	4.52E+00	6.01E-01	8.00E-04	*5.13E+00*	0.00203385	0.88073149	0.11707871	0.00015594
	Nickel	36.1833333	0.002842857	0.1	0.93	32.17	0.00201474	0.470314372	0.472329112	0.08477755	0.000287129	5.57E-01	6.26E-05	1.46E-02	2.64E-03	8.93E-06	*1.73E-02*	0.00361457	0.84377397	0.15209633	0.00051513
X	Selenium	9.9	0.000857143	0.3	0.85	0.16	0.00984984	0.428010216	0.437860056	0.0231957	8.65714E-05	4.61E-01	6.12E-02	2.66E+00	1.44E-01	5.38E-04	*2.87E+00*	0.02135965	0.92815209	0.05030052	0.00018773
	Silver	1.48	0.00025	0.0		145.71	0.001104376	0	0.001104376	0.00346764	0.00002525	4.60E-03	7.58E-06	0.00E+00	2.38E-05	1.73E-07	*3.16E-05*	0.24022452	0	0.75428309	0.00549239
	Thallium	8.2083333	0.000778571	0.1		0.06	0.00201474	0	0.00201474	0.019232125	7.86357E-05	2.13E-02	3.35E-02	0.00E+00	3.20E-01	1.31E-03	*3.55E-01*	0.09447562	0	0.90183697	0.0036874
X	Vanadium	80.5666667	0.001878929	0.1	2.80	0.16	0.0041041	1.410523472	1.414627572	0.1887677	0.000189772	1.60E+00	2.62E-02	9.00E+00	1.20E+00	1.21E-03	*1.02E+01*	0.00255933	0.87960628	0.11771605	0.00011834
	Zinc	2101.66667	0.127785714	28.8	81.36	128.66	0.85813	40.93676994	41.79489994	4.924205	0.012906357	4.67E+01	6.67E-03	3.18E-01	3.83E-02	1.00E-04	*3.63E-01*	0.01836279	0.8759899	0.10537113	0.00027618

Table E.1-24. Exposure Calculatioins for Muskrat - Station CB-01

		Mean Concentrations																			
		Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
				Reach 2	Reach 2																	
		Inorganics																				
X		Aluminum	11886	0.140333333	52.7	1.98E+02	41.82	1.5729896	99.54544184	101.1184314	27.848898	0.014173667	1.29E+02	3.76E-02	2.38E+00	6.66E-01	3.39E-04	*3.08E+00*	0.01219547	0.77178075	0.21591389	0.00010989
		Antimony	1.244	0.0006	0.1		0.05	0.00164164	0	0.00164164	0.00291469	0.0000606	4.62E-03	3.02E-02	0.00E+00	5.36E-02	1.11E-03	*8.49E-02*	0.35556946	0	0.63130494	0.0131256
X		Arsenic	41.265	0.012683333	2.7	2.17	0.05	0.0805896	1.094337748	1.174927348	0.04930879	0.001281017	1.23E+00	1.47E+00	2.00E+01	8.99E-01	2.34E-02	*2.24E+01*	0.06575967	0.89295996	0.04023508	0.00104529
		Barium	40.225	0.032083333	10.0	3.92	4.33	0.2977338	1.973524527	2.271258327	0.09424718	0.003240417	2.37E+00	6.88E-02	4.56E-01	2.18E-02	7.48E-04	*5.47E-01*	0.12569259	0.83315163	0.03978779	0.00136799
		Beryllium	1.007	4.56667E-05	0.0		0.53	0.00019401	0	0.000194012	0.0023594	4.61234E-06	2.56E-03	3.66E-04	0.00E+00	4.45E-03	8.69E-06	*4.82E-03*	0.07584444	0	0.92235247	0.00180308
		Cadmium	5.17	0.00056	0.1	0.55	0.78	0.0032982	0.278664263	0.281962467	0.01211331	0.00005656	2.94E-01	4.25E-03	3.59E-01	1.56E-02	7.29E-05	*3.79E-01*	0.01121333	0.94741117	0.0411832	0.00019229
		Chromium	217.25	0.0062	2.2	4.06	7.24	0.0656656	2.042731782	2.108397382	0.50901675	0.0006262	2.62E+00	9.07E-03	2.82E-01	7.03E-02	8.65E-05	*3.62E-01*	0.02508197	0.78025222	0.19442663	0.00023919
		Cobalt	6.044	0.000985	0.5	0.54	4.02	0.01611792	0.270095834	0.286213754	0.01416109	0.000099485	3.00E-01	4.01E-03	6.72E-02	3.52E-03	2.47E-05	*7.47E-02*	0.05364159	0.8988982	0.04712912	0.00033109
X		Copper	389.02	0.007183333	62.3	19.70	12.23	1.858038	9.913538053	11.77157605	0.91147386	0.000725517	1.27E+01	1.52E-01	8.10E-01	7.45E-02	5.93E-05	*1.04E+00*	0.14648935	0.78159205	0.0718614	5.72E-05
		Cyanide	0	0.0025	0.2		51.90	0.0067158	0	0.0067158	0	0.0002525	0.00E+00	1.29E-04	0.00E+00	0.00E+00	4.87E-06	*1.34E-04*	0.96376448	0	0	0.03623552
X		Iron	11059	1.209333333	342.5	915.46	2.57	10.22294	460.6164235	470.8393635	25.911237	0.122142667	4.97E+02	3.99E+00	1.80E+02	1.01E+01	4.76E-02	*1.94E+02*	0.02057456	0.92703097	0.05214864	0.00024582
X		Lead	317.41	0.003308333	1.0	28.95	6.43	0.02895256	14.56434299	14.59329555	0.74369163	0.000334142	1.53E+01	4.50E-03	2.26E+00	1.16E-01	5.19E-05	*2.38E+00*	0.00188772	0.94960148	0.04848902	2.1786E-05
X		Manganese	338.345	0.5925	120.0	190.80	70.76	3.58176	95.99927109	99.58103109	0.79274234	0.0598425	1.00E+02	5.06E-02	1.36E+00	1.12E-02	8.46E-04	*1.42E+00*	0.03566296	0.955848	0.0078932	0.00059584
X		Mercury	1.532	0.000115833	0.0	0.05	0.03	0.00041787	0.027002044	0.027419916	0.00358948	1.16992E-05	3.10E-02	1.62E-02	1.05E+00	1.39E-01	4.55E-04	*1.21E+00*	0.01347058	0.87044146	0.11571082	0.00037714
		Nickel	9.175	0.001633333	0.1	0.24	32.17	0.00305942	0.119257514	0.122316934	0.02149703	0.000164967	1.44E-01	9.51E-05	3.71E-03	6.68E-04	5.13E-06	*4.48E-03*	0.02124908	0.8282984	0.14930675	0.00114577
X		Selenium	3.71	0.00075	0.4	0.32	0.16	0.01178996	0.160395747	0.172185707	0.00869253	0.00007575	1.81E-01	7.33E-02	9.97E-01	5.40E-02	4.71E-04	*1.13E+00*	0.06515446	0.88638968	0.04803724	0.00041861
		Silver	0.3265	0.000375	0.0		145.71	0.00058204	0	0.000582036	0.00076499	0.000037875	1.38E-03	3.99E-06	0.00E+00	5.25E-06	2.60E-07	*9.50E-06*	0.42027279	0	0.55237867	0.02734854
		Thallium	1.0455	0.00085	0.1		0.06	0.00395486	0	0.00395486	0.00244961	0.00008585	6.49E-03	6.58E-02	0.00E+00	4.07E-02	1.43E-03	*1.08E-01*	0.60934779	0	0.37742481	0.0132274
X		Vanadium	53.55	0.000933333	0.2	1.86	0.16	0.00470108	0.937528323	0.942229383	0.12546765	9.42667E-05	1.07E+00	3.00E-02	5.98E+00	8.00E-01	6.01E-04	*6.81E+00*	0.0044026	0.87800708	0.11750203	8.8282E-05
		Zinc	422.06	0.05855	27.8	16.34	128.66	0.828282	8.220986418	9.049268418	0.98888658	0.00591355	1.00E+01	6.44E-03	6.39E-02	7.69E-03	4.60E-05	*7.81E-02*	0.08246479	0.81849167	0.09845478	0.00058876

Table E.1-25. Exposure Calculatioins for Muskrat - Station CB-02

		Mean Concentrations																			
		Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
				Reach 2	Reach 2																	
		Inorganics																				
X		Aluminum	4438.5	0.140333333	52.7	7.39E+01	41.82	1.5729896	37.17250914	38.74549874	10.3994055	0.014173667	4.92E+01	3.76E-02	8.89E-01	2.49E-01	3.39E-04	*1.18E+00*	0.03199795	0.75616775	0.21154598	0.00028832
		Antimony	1.539	0.0006	0.1		0.05	0.00164164	0	0.00164164	0.00360588	0.0000606	5.31E-03	3.02E-02	0.00E+00	6.63E-02	1.11E-03	*9.76E-02*	0.30926975	0	0.67931378	0.01141648
X		Arsenic	27.105	0.012683333	2.7	1.43	0.05	0.0805896	0.718817997	0.799407597	0.03238858	0.001281017	8.33E-01	1.47E+00	1.31E+01	5.91E-01	2.34E-02	*1.52E+01*	0.09673725	0.86284681	0.03887824	0.00153769
X		Barium	78.5	0.032083333	10.0	7.65	4.33	0.2977338	3.851377883	4.149111683	0.1839255	0.003240417	4.34E+00	6.88E-02	8.89E-01	4.25E-02	7.48E-04	*1.00E+00*	0.06866115	0.88817604	0.04241553	0.00074728
		Beryllium	0.287	4.56667E-05	0.0		0.53	0.00019401	0	0.000194012	0.00067244	4.61234E-06	8.71E-04	3.66E-04	0.00E+00	1.27E-03	8.69E-06	*1.64E-03*	0.22272956	0	0.77197539	0.00529505
		Cadmium	3.091	0.00056	0.1	0.33	0.78	0.0032982	0.166605655	0.169903859	0.00724221	0.00005656	1.77E-01	4.25E-03	2.15E-01	9.34E-03	7.29E-05	*2.28E-01*	0.01861281	0.94019853	0.04086967	0.00031918
		Chromium	106.06	0.0062	2.2	1.98	7.24	0.0656656	0.997248022	1.062913622	0.24849858	0.0006262	1.31E+00	9.07E-03	1.38E-01	3.43E-02	8.65E-05	*1.81E-01*	0.05004854	0.76007533	0.18939886	0.00047727
		Cobalt	4.235	0.000985	0.5	0.38	4.02	0.01611792	0.189254775	0.205372695	0.00992261	0.000099485	2.15E-01	4.01E-03	4.71E-02	2.47E-03	2.47E-05	*5.36E-02*	0.07482967	0.8786414	0.04606706	0.00046187
		Copper	75.275	0.007183333	62.3	3.81	12.23	1.858038	1.918260184	3.776298184	0.17636933	0.000725517	3.95E+00	1.52E-01	1.57E-01	1.44E-02	5.93E-05	*3.23E-01*	0.46998565	0.48521869	0.04461214	0.00018352
		Cyanide	0	0.0025	0.2		51.90	0.0067158	0	0.0067158	0	0.0002525	0.00E+00	1.29E-04	0.00E+00	0.00E+00	4.87E-06	*1.34E-04*	0.96376448	0	0	0.03623552
X		Iron	5913.5	1.209333333	342.5	489.52	2.57	10.22294	246.3021268	256.5250668	13.8553305	0.122142667	2.71E+02	3.99E+00	9.60E+01	5.40E+00	4.76E-02	*1.05E+02*	0.0377924	0.91053536	0.0512207	0.00045154
		Lead	118.855	0.003308333	1.0	10.84	6.43	0.02895256	5.453656109	5.482608669	0.27847727	0.000334142	5.76E+00	4.50E-03	8.48E-01	4.33E-02	5.19E-05	*8.96E-01*	0.00502525	0.94658193	0.04833483	5.7996E-05
		Manganese	55.99	0.5925	120.0	31.57	70.76	3.58176	15.88614931	19.46790931	0.13118457	0.0598425	1.97E+01	5.06E-02	2.24E-01	1.85E-03	8.46E-04	*2.78E-01*	0.182195	0.80808794	0.00667302	0.00304404
		Mercury	0.2405	0.000115833	0.0	0.01	0.03	0.00041787	0.004238898	0.00465677	0.00056349	1.16992E-05	5.23E-03	1.62E-02	1.65E-01	2.19E-02	4.55E-04	*2.03E-01*	0.0798691	0.81019301	0.10770179	0.0022361
		Nickel	8.275	0.001633333	0.1	0.21	32.17	0.00305942	0.107559229	0.110618649	0.01938833	0.000164967	1.30E-01	9.51E-05	3.34E-03	6.03E-04	5.13E-06	*4.05E-03*	0.02350291	0.82628582	0.14894397	0.0012673
		Selenium	1.4485	0.00075	0.4	0.12	0.16	0.01178996	0.062623515	0.074413475	0.00339384	0.00007575	7.79E-02	7.33E-02	3.89E-01	2.11E-02	4.71E-04	*4.84E-01*	0.15138029	0.80407106	0.04357604	0.00097261
		Silver	0	0.000375	0.0		145.71	0.00058204	0	0.000582036	0	0.000037875	6.20E-04	3.99E-06	0.00E+00	0.00E+00	2.60E-07	*4.25E-06*	0.93890252	0	0	0.06109748
		Thallium	0.428	0.00085	0.1		0.06	0.00395486	0	0.00395486	0.0010028	0.00008585	5.04E-03	6.58E-02	0.00E+00	1.67E-02	1.43E-03	*8.39E-02*	0.78414772	0	0.19883042	0.01702186
X		Vanadium	26.65	0.000933333	0.2	0.93	0.16	0.00470106	0.46657572	0.47127678	0.06244095	9.42667E-05	5.34E-01	3.00E-02	2.98E+00	3.98E-01	6.01E-04	*3.40E+00*	0.00880658	0.87404503	0.1169718	0.00017659
		Zinc	249.95	0.05855	27.8	9.68	128.66	0.828282	4.868586351	5.696868351	0.58563285	0.00591355	6.29E+00	6.44E-03	3.78E-02	4.55E-03	4.60E-05	*4.89E-02*	0.13171555	0.77421521	0.09312885	0.00094039

		Mean Concentrations																				
		Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
				Reach 2	Reach 2																	
		Inorganics																				
X		Aluminum	9264.16667	0.140333333	52.7	1.54E+02	41.82	1.5729896	77.58754536	79.16053496	21.7059425	0.014173667	1.01E+02	3.76E-02	1.86E+00	5.19E-01	3.39E-04	*2.41E+00*	0.01559258	0.76910235	0.21516458	0.0001405
		Antimony	1.5320833	0.0006	0.1		0.05	0.00164164	0	0.00164164	0.00358967	0.0000606	5.29E-03	3.02E-02	0.00E+00	6.60E-02	1.11E-03	*9.73E-02*	0.31021685	0	0.67833171	0.01145144
X		Arsenic	272.483333	0.012683333	2.7	14.36	0.05	0.0805896	7.226191624	7.306781224	0.32558851	0.001281017	7.63E+00	1.47E+00	1.32E+02	5.94E+00	2.34E-02	*1.39E+02*	0.01055714	0.94662205	0.042653	0.00016781
		Barium	51.5125	0.032083333	10.0	5.02	4.33	0.2977338	2.527313417	2.825047217	0.12069379	0.003240417	2.95E+00	6.88E-02	5.84E-01	2.79E-02	7.48E-04	*6.81E-01*	0.10096157	0.85701232	0.04092728	0.00109883
		Beryllium	0.5408333	4.56667E-05	0.0		0.53	0.00019401	0	0.000194012	0.00126717	4.61234E-06	1.47E-03	3.66E-04	0.00E+00	2.39E-03	8.69E-06	*2.76E-03*	0.13235941	0	0.86449394	0.00314664
		Cadmium	7.3891667	0.00056	0.1	0.79	0.78	0.0032982	0.39827789	0.401576094	0.01731282	0.00005656	4.19E-01	4.25E-03	5.13E-01	2.23E-02	7.29E-05	*5.40E-01*	0.00787263	0.95066761	0.04132475	0.00013501
		Chromium	456.729167	0.0062	2.2	8.54	7.24	0.0656656	4.294477259	4.360142859	1.07011644	0.0006262	5.43E+00	9.07E-03	5.93E-01	1.48E-01	8.65E-05	*7.50E-01*	0.01209114	0.79075084	0.19704272	0.0001153
		Cobalt	19.2458333	0.000985	0.5	1.71	4.02	0.01611792	0.860062774	0.876180694	0.04509299	0.000099485	9.21E-01	4.01E-03	2.14E-01	1.12E-02	2.47E-05	*2.29E-01*	0.01749337	0.93345759	0.04894107	0.00010797
		Copper	269.004167	0.007183333	62.3	13.62	12.23	1.858038	6.855130952	8.713168952	0.63027676	0.000725517	9.34E+00	1.52E-01	5.60E-01	5.15E-02	5.93E-05	*7.64E-01*	0.1988446	0.73362643	0.06745133	7.7644E-05
		Cyanide	0	0.0025	0.2		51.90	0.0067158	0	0.0067158	0	0.0002525	0.00E+00	1.29E-04	0.00E+00	0.00E+00	4.87E-06	*1.34E-04*	0.96376448	0	0	0.03623552
X		Iron	30995.8333	1.209333333	342.5	2565.83	2.57	10.22294	1291.001889	1301.224829	72.6232375	0.122142667	1.37E+03	3.99E+00	5.03E+02	2.83E+01	4.76E-02	*5.36E+02*	0.00744044	0.93961418	0.05285649	8.8898E-05
X		Lead	196.408333	0.003308333	1.0	17.91	6.43	0.02895256	9.012187176	9.041139736	0.46018472	0.000334142	9.50E+00	4.50E-03	1.40E+00	7.15E-02	5.19E-05	*1.48E+00*	0.00304711	0.94848569	0.04843204	3.5167E-05
X		Manganese	283.05	0.5925	120.0	159.61	70.76	3.58176	80.31031546	83.89207546	0.66318615	0.0598425	8.46E+01	5.06E-02	1.13E+00	9.37E-03	8.46E-04	*1.20E+00*	0.04233003	0.94912506	0.00783768	0.00070723
		Mercury	1.2177917	0.000115833	0.0	0.04	0.03	0.00041787	0.021464011	0.021881883	0.00285329	1.16992E-05	2.47E-02	1.62E-02	8.34E-01	1.11E-01	4.55E-04	*9.62E-01*	0.01688585	0.86734252	0.11529887	0.00047275
		Nickel	25.55	0.001633333	0.1	0.66	32.17	0.00305942	0.332101305	0.335160725	0.05986365	0.000164967	3.95E-01	9.51E-05	1.03E-02	1.86E-03	5.13E-06	*1.23E-02*	0.00774166	0.84035997	0.15148093	0.00041744
X		Selenium	3.7809091	0.00075	0.4	0.32	0.16	0.01178996	0.163461386	0.175251346	0.00885867	0.00007575	1.84E-01	7.33E-02	1.02E+00	5.51E-02	4.71E-04	*1.15E+00*	0.06401124	0.8874811	0.04809639	0.00041127
		Silver	0.51375	0.000375	0.0		145.71	0.00058204	0	0.000582036	0.00120372	0.000037875	1.82E-03	3.99E-06	0.00E+00	8.26E-06	2.60E-07	*1.25E-05*	0.31916391	0	0.66006704	0.02076905
		Thallium	0.7054545	0.00085	0.1		0.06	0.00395486	0	0.00395486	0.00165288	0.00008585	5.69E-03	6.58E-02	0.00E+00	2.75E-02	1.43E-03	*9.47E-02*	0.69461624	0	0.2903054	0.01507836
X		Vanadium	47.0291667	0.000933333	0.2	1.64	0.16	0.00470106	0.823364627	0.828065687	0.11018934	9.42667E-05	9.38E-01	3.00E-02	5.25E+00	7.03E-01	6.01E-04	*5.99E+00*	0.00500993	0.8774607	0.11742891	0.00010046
		Zinc	1147.75	0.05855	27.8	44.43	128.66	0.828282	22.35615117	23.18443317	2.68917825	0.00591355	2.59E+01	6.44E-03	1.74E-01	2.09E-02	4.60E-05	*2.01E-01*	0.0320053	0.86385477	0.10391142	0.0002285

Table E.1-27. Exposure Calculatioins for Muskrat - Station CB-04

		Mean Concentrations																			
		Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
				Reach 2	Reach 2																	
		Inorganics																				
X		Aluminum	9437	0.140333333	52.7	1.57E+02	41.82	1.5729896	79.03502731	80.60801691	22.110891	0.014173667	1.03E+02	3.76E-02	1.89E+00	5.29E-01	3.39E-04	*2.46E+00*	0.01531142	0.76932402	0.21522659	0.00013797
		Antimony	3.552	0.0006	0.1		0.05	0.00164164	0	0.00164164	0.00832234	0.0000606	1.00E-02	3.02E-02	0.00E+00	1.53E-01	1.11E-03	*1.84E-01*	0.16376154	0	0.83019332	0.00604514
X		Arsenic	111.5	0.012683333	2.7	5.88	0.05	0.0805896	2.956952839	3.037542439	0.1332347	0.001281017	3.17E+00	1.47E+00	5.39E+01	2.43E+00	2.34E-02	*5.79E+01*	0.02540609	0.93218746	0.0420026	0.00040384
		Barium	61.155	0.032083333	10.0	5.96	4.33	0.2977338	3.000395089	3.298128889	0.14328617	0.003240417	3.44E+00	6.88E-02	6.93E-01	3.31E-02	7.48E-04	*7.95E-01*	0.08643355	0.87102908	0.04159666	0.00094071
		Beryllium	0.622	4.56667E-05	0.0		0.53	0.00019401	0	0.00019401	0.00145735	4.61234E-06	1.66E-03	3.66E-04	0.00E+00	2.75E-03	8.69E-06	*3.12E-03*	0.1171591	0	0.88005562	0.00278528
		Cadmium	3.954	0.00056	0.1	0.42	0.78	0.0032982	0.213121566	0.21641977	0.00926422	0.00005656	2.26E-01	4.25E-03	2.75E-01	1.19E-02	7.29E-05	*2.91E-01*	0.0146106	0.94409961	0.04103925	0.00025055
		Chromium	167.14	0.0062	2.2	3.12	7.24	0.0656656	1.57156359	1.63722919	0.39160902	0.0006262	2.03E+00	9.07E-03	2.17E-01	5.41E-02	8.65E-05	*2.80E-01*	0.03235612	0.77437356	0.19296176	0.00030855
		Cobalt	8.765	0.000985	0.5	0.78	4.02	0.01611792	0.391692586	0.407810506	0.0205364	0.000099485	4.28E-01	4.01E-03	9.74E-02	5.11E-03	2.47E-05	*1.07E-01*	0.03761946	0.9142161	0.04793224	0.0002322
		Copper	184.8	0.007183333	62.3	9.35	12.23	1.858038	4.704228895	6.562266895	0.4325178	0.000725517	7.00E+00	1.52E-01	3.85E-01	3.54E-02	5.93E-05	*5.72E-01*	0.26560436	0.67246402	0.06182791	0.00010371
		Cyanide	0	0.0025	0.2		51.90	0.0067158	0	0.0067158	0	0.0002525	0.00E+00	1.29E-04	0.00E+00	0.00E+00	4.87E-06	*1.34E-04*	0.96376448	0	0	0.03623552
X		Iron	23967	1.209333333	342.5	1983.98	2.57	10.22294	998.2452139	1008.468154	56.154681	0.122142667	1.06E+03	3.99E+00	3.89E+02	2.19E+01	4.76E-02	*4.15E+02*	0.0096013	0.93754395	0.05274003	0.00011472
X		Lead	208.46	0.003308333	1.0	19.01	6.43	0.02895256	9.565177338	9.594129898	0.48842178	0.000334142	1.01E+01	4.50E-03	1.49E+00	7.59E-02	5.19E-05	*1.57E+00*	0.00287146	0.94865473	0.04844067	3.3139E-05
X		Manganese	403.9	0.5925	120.0	227.76	70.76	3.58176	114.5993161	118.1810761	0.9463377	0.0598425	1.19E+02	5.06E-02	1.62E+00	1.34E-02	8.46E-04	*1.68E+00*	0.03005153	0.96150645	0.00793992	0.00050209
		Mercury	0.727	0.000115833	0.0	0.03	0.03	0.00041787	0.012813633	0.013231505	0.00170336	1.16992E-05	1.49E-02	1.62E-02	4.98E-01	6.62E-02	4.55E-04	*5.81E-01*	0.02795773	0.85729617	0.11396337	0.00078273
		Nickel	41.315	0.001633333	0.1	1.07	32.17	0.00305942	0.537016259	0.540075679	0.09680105	0.000164967	6.37E-01	9.51E-05	1.67E-02	3.01E-03	5.13E-06	*1.98E-02*	0.00480254	0.84298448	0.15195402	0.00025896
		Selenium	3.024	0.00075	0.4	0.26	0.16	0.01178996	0.130737666	0.142527626	0.00708523	0.00007575	1.50E-01	7.33E-02	8.13E-01	4.41E-02	4.71E-04	*9.31E-01*	0.07876324	0.87339757	0.04733314	0.00050605
		Silver	1.317	0.000375	0.0		145.71	0.00058204	0	0.000582036	0.00308573	0.000037875	3.71E-03	3.99E-06	0.00E+00	2.12E-05	2.60E-07	*2.54E-05*	0.15706752	0	0.83271158	0.0102209
		Thallium	1.1295	0.00085	0.1		0.06	0.00395486	0	0.00395486	0.00264642	0.00008585	6.69E-03	6.58E-02	0.00E+00	4.40E-02	1.43E-03	*1.11E-01*	0.59141379	0	0.39574812	0.0128381
X		Vanadium	55.305	0.000933333	0.2	1.92	0.16	0.00470106	0.968254041	0.972955101	0.12957962	9.42667E-05	1.10E+00	3.00E-02	6.18E+00	8.27E-01	6.01E-04	*7.03E+00*	0.0042635	0.87813222	0.11751878	8.5493E-05
		Zinc	1397.45	0.05855	27.8	54.10	128.66	0.828282	27.21986796	28.04814996	3.27422535	0.00591355	3.13E+01	6.44E-03	2.12E-01	2.54E-02	4.60E-05	*2.43E-01*	0.02643879	0.86885907	0.10451338	0.00018876

Table E.1-28. Exposure Calculatioins for Muskrat - Station CB-06

		Mean Concentrations																			
		Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL *HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
				Reach 2	Reach 2																	
		Inorganics																				
X		Aluminum	7194.5	0.140333333	52.7000	1.20E+02	41.82	1.5729896	60.25405362	61.82704322	16.8567135	0.014173667	7.87E+01	3.76E-02	1.44E+00	4.03E-01	3.39E-04	*1.88E+00*	0.01998769	0.76563708	0.21419513	0.0001801
		Antimony	1.72	0.0006	0.0550		0.05	0.00164164	0	0.00164164	0.00402996	0.0000606	5.73E-03	3.02E-02	0.00E+00	7.41E-02	1.11E-03	*1.05E-01*	0.28638917	0	0.70303897	0.01057186
X		Arsenic	98.04	0.012683333	2.7000	5.17	0.05	0.0805896	2.599996918	2.680586518	0.11715094	0.001281017	2.80E+00	1.47E+00	4.74E+01	2.14E+00	2.34E-02	*5.11E+01*	0.02879209	0.92889595	0.04185429	0.00045767
		Barium	40.295	0.032083333	9.9750	3.93	4.33	0.2977338	1.976958877	2.274692677	0.09441119	0.003240417	2.37E+00	6.88E-02	4.57E-01	2.18E-02	7.48E-04	*5.48E-01*	0.12550194	0.83333557	0.03979658	0.00136591
		Beryllium	0.273	4.56667E-05	0.0065		0.53	0.00019401	0	0.000194012	0.00063964	4.61234E-06	8.38E-04	3.66E-04	0.00E+00	1.21E-03	8.69E-06	*1.58E-03*	0.23144517	0	0.76305258	0.00550225
		Cadmium	8.583	0.00056	0.1105	0.92	0.78	0.0032982	0.462625796	0.465924	0.02010997	0.00005656	4.86E-01	4.25E-03	5.96E-01	2.59E-02	7.29E-05	*6.27E-01*	0.00678516	0.95172765	0.04137083	0.00011636
		Chromium	280.29	0.0062	2.2000	5.24	7.24	0.0656656	2.635476599	2.701142199	0.65871947	0.0006262	3.36E+00	9.07E-03	3.64E-01	9.07E-02	8.65E-05	*4.64E-01*	0.01955213	0.78472119	0.19554022	0.00018645
		Cobalt	9.18	0.000985	0.5400	0.82	4.02	0.01611792	0.410238213	0.426356133	0.02150874	0.000099485	4.48E-01	4.01E-03	1.02E-01	5.35E-03	2.47E-05	*1.11E-01*	0.03598036	0.91578315	0.0480144	0.00022208
		Copper	179.6	0.007183333	62.2500	9.10	12.23	1.858038	4.576812077	6.434850077	0.4208028	0.000725517	6.86E+00	1.52E-01	3.74E-01	3.44E-02	5.93E-05	*5.61E-01*	0.27099409	0.66752618	0.06137392	0.00010582
		Cyanide	0	0.0025	0.2250		51.90	0.0067158	0	0.0067158	0	0.0002525	0.00E+00	1.29E-04	0.00E+00	0.00E+00	4.87E-06	*1.34E-04*	0.96376448	0	0	0.03623552
X		Iron	12693	1.209333333	342.5000	1050.72	2.57	10.22294	528.6738641	538.8968041	29.739699	0.122142667	5.69E+02	3.99E+00	2.06E+02	1.16E+01	4.76E-02	*2.22E+02*	0.01797413	0.92952233	0.05228879	0.00021475
X		Lead	136.96	0.003308333	0.9700	12.49	6.43	0.02895256	6.284403186	6.313355746	0.32089728	0.000334142	6.63E+00	4.50E-03	9.77E-01	4.99E-02	5.19E-05	*1.03E+00*	0.00436388	0.94721842	0.04836733	5.0364E-05
		Manganese	78.815	0.5925	120.0000	44.44	70.76	3.58176	22.36233002	25.94409002	0.18466355	0.0598425	2.62E+01	5.06E-02	3.16E-01	2.61E-03	8.46E-04	*3.70E-01*	0.13676793	0.85389572	0.0070513	0.00228506
		Mercury	0.231	0.000115833	0.0140	0.01	0.03	0.00041787	0.004071457	0.004489329	0.00054123	1.16992E-05	5.04E-03	1.62E-02	1.58E-01	2.10E-02	4.55E-04	*1.96E-01*	0.08287393	0.8074665	0.10733934	0.00232022
		Nickel	18.625	0.001633333	0.1025	0.48	32.17	0.00305942	0.242089503	0.245148923	0.04363838	0.000164967	2.89E-01	9.51E-05	7.53E-03	1.36E-03	5.13E-06	*8.98E-03*	0.01058798	0.83781833	0.15102278	0.00057091
		Selenium	1.39	0.00075	0.3950	0.12	0.16	0.01178996	0.060094364	0.071884324	0.00325677	0.00007575	7.52E-02	7.33E-02	3.74E-01	2.02E-02	4.71E-04	*4.68E-01*	0.15874627	0.79894822	0.04329841	0.00100709
		Silver	0.1295	0.000375	0.0195		145.71	0.00058204	0	0.000582036	0.00030342	0.000037875	9.23E-04	3.99E-06	0.00E+00	2.08E-06	2.60E-07	*6.34E-06*	0.63036652	0	0.32861348	0.04102003
		Thallium	3.215	0.00085	0.1325		0.06	0.00395486	0	0.00395486	0.00753275	0.00008585	1.16E-02	6.58E-02	0.00E+00	1.25E-01	1.43E-03	*1.92E-01*	0.34171818	0	0.65086398	0.00741784
X		Vanadium	53.025	0.000933333	0.1575	1.85	0.16	0.00470106	0.928336869	0.933037929	0.12423758	9.42667E-05	1.06E+00	3.00E-02	5.92E+00	7.92E-01	6.01E-04	*6.74E+00*	0.00444599	0.87796804	0.11749681	8.9152E-05
		Zinc	1420.5	0.05855	27.7500	54.99	128.66	0.828282	27.66884141	28.49712341	3.3282315	0.00591355	3.18E+01	6.44E-03	2.15E-01	2.59E-02	4.60E-05	*2.47E-01*	0.02602102	0.86923465	0.10455856	0.00018578

		Mean Concentrations																			
		Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
				Reach 1	Reach 1																	
		Inorganics																				
X		Aluminum	6652	0.386114286	47.900	1.11E+02	41.82	1.4297192	55.71060736	57.14032656	15.585636	0.038997543	7.28E+01	3.42E-02	1.33E+00	3.73E-01	9.33E-04	*1.74E+00*	0.01964846	0.7656241	0.2141915	0.00053594
		Antimony	0.92	0.000692857	0.050		0.05	0.00148494	0	0.001484938	0.00215556	6.99786E-05	3.71E-03	2.73E-02	0.00E+00	3.96E-02	1.29E-03	*6.82E-02*	0.40020142	0	0.58093885	
X		Arsenic	165.8	0.024585714	3.750	8.74	0.05	0.11193	4.396975612	4.508905612	0.19811939	0.002483157	4.71E+00	2.04E+00	8.02E+01	3.61E+00	4.53E-02	*8.59E+01*	0.02376681	0.93363796	0.04206796	0.00052726
		Barium	41.18	0.037342857	8.800	4.02	4.33	0.2626624	2.020378869	2.283041269	0.09648474	0.003771629	2.38E+00	6.07E-02	4.67E-01	2.23E-02	8.71E-04	*5.50E-01*	0.11020965	0.84772411	0.04048371	0.00158253
		Beryllium	0.502	6.37857E-05	0.006		0.53	0.00017909	0	0.000179088	0.00117619	6.44236E-06	1.36E-03	3.37E-04	0.00E+00	2.22E-03	1.21E-05	*2.57E-03*	0.13151638	0	0.86375257	0.00473106
		Cadmium	1.339	0.00043	0.057	0.14	0.78	0.00170134	0.072172427	0.073873763	0.00313728	0.00004343	7.71E-02	2.19E-03	9.30E-02	4.04E-03	5.60E-05	*9.93E-02*	0.02207965	0.93664166	0.04071506	0.00056363
		Chromium	186.2	0.025785714	0.895	3.48	7.24	0.02671396	1.750778632	1.777492592	0.4362666	0.002604357	2.22E+00	3.69E-03	2.42E-01	6.03E-02	3.60E-04	*3.06E-01*	0.01205306	0.78993297	0.19683892	0.00117506
		Cobalt	6.44	0.00146857	0.485	0.57	4.02	0.01447628	0.287792385	0.302268665	0.01508892	0.000148326	3.18E-01	3.60E-03	7.16E-02	3.75E-03	3.69E-05	*7.90E-02*	0.04559373	0.90641583	0.04752327	0.00046716
		Copper	202.06	0.021542857	54.350	10.23	12.23	1.6222388	5.149168421	6.771407221	0.47342658	0.002175829	7.25E+00	1.33E-01	4.21E-01	3.87E-02	1.78E-04	*5.92E-01*	0.22384941	0.71052319	0.06532716	0.00030024
		Cyanide	0	0.0025	0.268		51.90	0.00798434	0	0.00798434	0	0.0002525	0.00E+00	1.54E-04	0.00E+00	0.00E+00	4.87E-06	*1.59E-04*	0.96934504	0	0	0.03065496
X		Iron	19420	2.401	577.500	1607.58	2.57	17.23722	808.8589333	826.0961533	45.50106	0.242501	8.72E+02	6.72E+00	3.15E+02	1.77E+01	9.45E-02	*3.40E+02*	0.01977109	0.92776106	0.05218971	0.00027815
X		Lead	161.36	0.013072856	0.515	14.72	6.43	0.01537172	7.403996044	7.419367764	0.37806648	0.001320358	7.80E+00	2.39E-03	1.15E+00	5.88E-02	2.05E-04	*1.21E+00*	0.00197105	0.94938185	0.0484778	0.0001693
		Manganese	163.88	0.469714286	88.700	92.41	70.76	2.6475176	46.49798444	49.14550204	0.38397084	0.047441143	4.96E+01	3.74E-02	6.57E-01	5.43E-03	6.70E-04	*7.01E-01*	0.05340223	0.9378959	0.00774495	0.00095692
X		Mercury	2.634	0.000203929	0.009	0.09	0.03	0.00026863	0.046425185	0.046893817	0.00617146	2.05968E-05	5.29E-02	1.04E-02	1.80E+00	2.40E-01	8.00E-04	*2.06E+00*	0.00507947	0.87783712	0.11669396	0.00038946
		Nickel	10.78	0.002842857	0.068	0.28	32.17	0.00201474	0.140119455	0.142134195	0.02525754	0.000287129	1.68E-01	6.26E-05	4.36E-03	7.85E-04	8.93E-06	*5.21E-03*	0.01201547	0.83564173	0.15063043	0.00171237
		Selenium	1.752	0.000857143	0.330	0.15	0.16	0.00984984	0.075744838	0.085594678	0.00410494	8.65714E-05	8.98E-02	6.12E-02	4.71E-01	2.55E-02	5.38E-04	*5.58E-01*	0.10970329	0.8436135	0.04571902	0.0009642
		Silver	1.512	0.00025	0.037		145.71	0.00110438	0	0.001104376	0.00354262	0.00002525	4.67E-03	7.58E-06	0.00E+00	2.43E-05	1.73E-07	*3.21E-05*	0.23636961	0	0.75822614	0.00540426
		Thallium	0.93	0.000778571	0.068		0.06	0.00201474	0	0.00201474	0.00217899	7.86357E-05	4.27E-03	3.35E-02	0.00E+00	3.62E-02	1.31E-03	*7.10E-02*	0.4715748	0	0.51001954	0.01840566
X		Vanadium	23.62	0.001878929	0.138	0.82	0.16	0.0041041	0.413527899	0.417631999	0.05534166	0.000189772	4.73E-01	2.62E-02	2.64E+00	3.53E-01	1.21E-03	*3.02E+00*	0.00867375	0.8739642	0.11696098	0.00040107
		Zinc	342.6	0.127785714	28.750	13.26	128.66	0.85813	6.673245384	7.531375384	0.8027118	0.012906357	8.35E+00	6.67E-03	5.19E-02	6.24E-03	1.00E-04	*6.49E-02*	0.10280708	0.79947892	0.09616778	0.00154623

Table E.1-30. Exposure Calculatioins for Muskrat - Station JY

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0	0.0025			9.730183192	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	2.57E-04	*2.57E-04*	0	0	0	1
	Acetone	0	0.0025			1367.050531	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	1.83E-06	*1.83E-06*	0	0	0	1
	cis-1,2-Dichloroethene	0	0.000583333			2504.114914	0	0	0	0	0.000583333	5.83E-04	0.00E+00	0.00E+00	0.00E+00	2.33E-07	*2.33E-07*	0	0	0	1
	Tetrachloroethene	0	0.0005			6.09153838	0	0	0	0	0.0005	5.00E-04	0.00E+00	0.00E+00	0.00E+00	8.21E-05	*8.21E-05*	0	0	0	1
	Trichloroethene	0	0.0005			3.04576919	0	0	0	0	0.0005	5.00E-04	0.00E+00	0.00E+00	0.00E+00	1.64E-04	*1.64E-04*	0	0	0	1
	Semivolatile Organics																				
	2-Methylnaphthalene	0	0.0025			62.53	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.00E-05	*4.00E-05*	0	0	0	1
	Acenaphthylene	0	0.0025			58.00	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.31E-05	*4.31E-05*	0	0	0	1
	Anthracene	0	0.0025			435.11	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	5.75E-06	*5.75E-06*	0	0	0	1
	Benzo(a)anthracene	0	0.0025			0.57	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.42E-03	*4.42E-03*	0	0	0	1
	Benzo(a)pyrene	0	0.0025		0.00	0.57	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.42E-03	*4.42E-03*	0	0	0	1
	Benzo(b)fluoranthene	0	0.0025		0.00	0.57	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.42E-03	*4.42E-03*	0	0	0	1
	Benzo(g,h,i)perylene	0	0.0025			58.00	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.31E-05	*4.31E-05*	0	0	0	1
	Benzo(k)fluoranthene	0	0.0025		0.00	0.57	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.42E-03	*4.42E-03*	0	0	0	1
	Carbazole	0	0			58.00014758	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
	Chrysene	0	0.0025		0.00	0.57	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.42E-03	*4.42E-03*	0	0	0	1
	Dibenz(a,h)anthracene	0	0.0025			0.57	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.42E-03	*4.42E-03*	0	0	0	1
	Dibenzofuran	0	0.0025			58.00	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.31E-05	*4.31E-05*	0	0	0	1
	Fluoranthene	0	0.0025		0.00	54.39	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.60E-05	*4.60E-05*	0	0	0	1
	Fluorene	0	0.0025			54.39	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.60E-05	4.60E-05	0	0	0	1
	Indeno(1,2,3-cd)pyrene	0	0.0025		0.00	0.57	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.42E-03	*4.42E-03*	0	0	0	1
	Naphthalene	0	0.0025			60.92	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.10E-05	*4.10E-05*	0	0	0	1
	N-nitrosodiphenylamine	0	0.0025			120.62	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	2.07E-05	*2.07E-05*	0	0	0	1
	Phenanthrene	0	0.0025		0.00	58.00	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.31E-05	*4.31E-05*	0	0	0	1
	Pyrene	0	0.0025		0.00	58.00	0	0	0	0	0.0025	2.50E-03	0.00E+00	0.00E+00	0.00E+00	4.31E-05	*4.31E-05*	0	0	0	1
	Pesticides and PCBs																				
	4,4'-DDD	0	0.00005	0.0006	0.00E+00	6.84	4.323E-05	0	4.32305E-05	0	0.00005	9.32E-05	6.32E-06	0.00E+00	0.00E+00	7.32E-06	*1.36E-05*	0.46369471	0	0	0.53630529
	4,4'-DDE	0	0.00005	0.0010	0.00E+00	0.83	6.5348E-05	0	6.53484E-05	0	0.00005	1.15E-04	7.90E-05	0.00E+00	0.00E+00	6.05E-05	*1.40E-04*	0.56653062	0	0	0.43346938
	4,4'-DDT	0	0.00005	0.0011	0.00E+00	0.64	7.2051E-05	0	7.20508E-05	0	0.00005	1.22E-04	1.12E-04	0.00E+00	0.00E+00	7.77E-05	*1.90E-04*	0.59033452	0	0	0.40966548
	Aldrin	0	0.000025	0.0003		0.16	2.0442E-05	0	2.04423E-05	0	0.000025	4.54E-05	1.27E-04	0.00E+00	0.00E+00	1.55E-04	*2.83E-04*	0.44985203	0	0	0.55014797
	alpha-Chlordane	0	2.17286E-05	0.0006	0.00E+00	1.99	0.00004189	0	0.00004189	0	2.17286E-05	6.36E-05	2.10E-05	0.00E+00	0.00E+00	1.09E-05	*3.19E-05*	0.65845523	0	0	0.34154477
	Aroclor 1248	0.1215	0.0005	0.0025		0.57	0.00016756	0	0.00016756	0	0.0005	6.68E-04	2.96E-04	0.00E+00	0.00E+00	8.84E-04	*1.18E-03*	0.25100366	0	0	0.74899634
	Aroclor 1254	0.906	0.0005	0.0195		0.15	0.00130697	0	0.001306968	0	0.0005	1.81E-03	8.93E-03	0.00E+00	0.00E+00	3.42E-03	*1.23E-02*	0.72329338	0	0	0.27670662
	Aroclor 1260	0.99	0.0005	0.0215	6.18E-02	0.28	0.00144102	0.000144868	0.001585884	0	0.0005	2.09E-03	5.19E-03	5.22E-04	0.00E+00	1.80E-03	*7.52E-03*	0.69084202	0.0694514	0	0.23970658
	beta-BHC	0	0.000025	0.0003		3.22	1.7091E-05	0	1.70911E-05	0	0.000025	4.21E-05	5.31E-06	0.00E+00	0.00E+00	7.77E-06	*1.31E-05*	0.40605049	0	0	0.59394951
	delta-BHC	0	0.000025	0.0003		1.29	1.7091E-05	0	1.70911E-05	0	0.000025	4.21E-05	1.33E-05	0.00E+00	0.00E+00	1.94E-05	*3.27E-05*	0.40605049	0	0	0.59394951
	Endosulfan I	0	0.000025	0.0006	0.00E+00	1.21	0.00004189	0	0.00004189	0	0.000025	6.69E-05	3.47E-05	0.00E+00	0.00E+00	2.07E-05	*5.55E-05*	0.62625206	0	0	0.37374794
	Endosulfan Sulfate	0	0.00005	0.0009		1.21	6.3338E-05	0	6.33377E-05	0	0.00005	1.13E-04	5.25E-05	0.00E+00	0.00E+00	4.15E-05	*9.40E-05*	0.55884045	0	0	0.44115955
	Endrin Aldehyde	0	0.00005	0.0022	0.00E+00	0.04	0.00014745	0	0.000147453	0	0.00005	1.97E-04	3.68E-03	0.00E+00	0.00E+00	1.25E-03	*4.93E-03*	0.74677493	0	0	0.25322507
	gamma-Chlordane	0	2.16286E-05	0.0003	0.00E+00	1.99	1.7091E-05	0	1.70911E-05	0	2.16286E-05	3.87E-05	8.58E-06	0.00E+00	0.00E+00	1.09E-05	*1.94E-05*	0.44140608	0	0	0.55859392
	Inorganics																				
X	Aluminum	9592	0.386114286	47.900	1.60E+02	41.82	1.4297192	80.33315482	81.76287402	22.474056	0.038997543	1.04E+02	3.42E-02	1.92E+00	5.37E-01	9.33E-04	*2.49E+00*	0.01371092	0.77039022	0.21552487	0.00037398
	Antimony	5.405	0.000692857	0.050		0.05	0.00148494	0	0.001484938	0.01266392	6.99786E-05	1.42E-02	2.73E-02	0.00E+00	2.33E-01	1.29E-03	*2.61E-01*	0.1044346	0	0.89064386	0.00492154
X	Arsenic	144.785	0.024585714	3.750	7.63	0.05	0.11193	3.839662931	3.951592931	0.17300794	0.002483157	4.13E+00	2.04E+00	7.00E+01	3.16E+00	4.53E-02	*7.53E+01*	0.02712084	0.93035734	0.04192014	0.00060167
X	Barium	126.68	0.037342857	8.800	12.35	4.33	0.2626624	6.215191723	6.477854123	0.29681124	0.003771629	6.78E+00	6.07E-02	1.44E+00	6.85E-02	8.71E-04	*1.57E+00*	0.0387497	0.91690632	0.04378756	0.00055642
	Beryllium	0.463	6.37857E-05	0.006		0.53	0.00017909	0	0.000179088	0.00108481	6.44236E-06	1.27E-03	3.37E-04	0.00E+00	2.04E-03	1.21E-05	*2.39E-03*	0.1409765	0	0.85395213	0.00507137
	Cadmium	11.11	0.00043	0.057	1.19	0.78	0.00170134	0.598831713	0.600533049	0.02603073	0.00004343	6.27E-01	2.19E-03	7.72E-01	3.36E-02	5.60E-05	*8.08E-01*	0.00271516	0.95567319	0.04154234	6.931E-05
X	Chromium	838.56	0.025785714	0.895	15.67	7.24	0.02671396	7.884709611	7.911423571	1.96474608	0.002604357	9.88E+00	3.69E-03	1.09E+00	2.71E-01	3.60E-04	*1.36E+00*	0.00270418	0.79814657	0.19888562	0.00026363
	Cobalt	12.59	0.00146857	0.485	1.12	4.02	0.01447628	0.562625175	0.577101455	0.02949837	0.000148326	6.07E-01	3.60E-03	1.40E-01	7.34E-03	3.69E-05	*1.51E-01*	0.0238588	0.92727959	0.04861716	0.00024446
	Copper	377.55	0.021542857	54.350	19.12	12.23	1.6222388	9.621243874	11.24348267	0.88459965	0.002175829	1.21E+01	1.33E-01	7.87E-01	7.23E-02	1.78E-04	*9.92E-01*	0.13373489	0.79316069	0.07292505	0.00017937
	Cyanide	0	0.0025	0.268		51.90	0.00798434	0	0.00798434	0	0.0002525	0.00E+00	1.54E-04	0.00E+00	0.00E+00	4.87E-06	*1.59E-04*	0.96934504	0	0	0.03065496
X	Iron	28394	2.401	577.500	2350.45	2.57	17.23722	1182.633396	1199.870616	66.527142	0.242501	1.27E+03	6.72E+00	4.61E+02	2.59E+01	9.45E-02	*4.94E+02*	0.01360862	0.93367741	0.05252252	0.00019145
X	Lead	523.31	0.013072856	0.515	47.72	6.43	0.01537172	24.01205484	24.02742656	1.22611533	0.001320358	2.53E+01	2.39E-03	3.73E+00	1.91E-01	2.05E-04	*3.93E+00*	0.00060866	0.95078938	0.04854967	5.2281E-05
X	Manganese	292.85	0.469714286	88.700	165.14	70.76	2.6475176	83.09088812	85.73840572	0.68614755	0.047441143	8.65E+01	3.74E-02	1.17E+00	9.70E-03	6.70E-04	*1.22E+00*	0.03061705	0.96089941	0.00793491	0.00054863
	Mercury	0.765	0.000203929	0.009	0.03	0.03	0.00026863	0.013483396	0.013752028	0.0017924	2.05968E-05	1.56E-02	1.04E-02	5.24E-01	6.97E-02	8.00E-04	*6.05E-01*	0.0172587	0.8662627	0.11515533	0.00132327
	Nickel	51.75	0.002842857	0.068	1.34	32.17	0.00201474	0.672651371	0.674666111	0.12125025	0.000287129	7.96E-01	6.26E-05	2.09E-02	3.77E-03	8.93E-06	*2.48E-02*	0.00253043	0.84482344	0.1522855	0.00036062
	Selenium	3.022	0.000857143	0.330	0.26	0.16	0.00984984	0.130651199	0.140501039	0.00708055	8.65714E-05	1.48E-01	6.12E-02	8.12E-01	4.40E-02	5.38E-04	*9.18E-01*	0.06870253	0.88476217	0.04794904	0.00058626
	Silver	0.7035	0.00025	0.037		145.71	0.00110438	0	0.001104376	0.0016483	0.00002525	2.78E-03	7.58E-06	0.00E+00	1.13E-05	1.73E-07	*1.91E-05*	0.39755407	0	0.59335641	0.00908951
	Thallium	2.5277778	0.000778571	0.068		0.06	0.00201474	0	0.00201474	0.00592258	7.86357E-05	8.02E-03	3.35E-02	0.00E+00	9.85E-02	1.31E-03	*1.33E-01*	0.2513411	0	0.738849	0.00980989
X	Vanadium	48.87	0.001878929	0.138	1.70	0.16	0.0041041	0.855593075	0.859697175	0.11450241	0.000189772	9.74E-01	2.62E-02	5.46E+00	7.30E-01	1.21E-03	*6.22E+00*	0.00421197	0.8780813	0.11751197	0.00019476
	Zinc	1819.5	0.127785714	28.750	70.44	128.66	0.85813	35.44065959	36.29878959	4.2630885	0.012906357	4.06E+01	6.67E-03	2.75E-01	3.31E-02	1.00E-04	*3.15E-01*	0.02114934	0.87346514	0.10506743	0.00031809

Table E.1-31. Exposure Calculatioins for Muskrat - Station KFSE

		Mean Concentrations																			
		Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
				Reach 2	Reach 2																	
		Inorganics																				
X		Aluminum	4889.5	0.140333333	52.7000	8.14E+01	41.82	1.5729896	40.94964142	42.52263102	11.4560985	0.014173667	5.40E+01	3.76E-02	9.79E-01	2.74E-01	3.39E-04	*1.29E+00*	0.02913327	0.75842637	0.21217786	0.00026251
		Antimony	0.865	0.0006	0.0550		0.05	0.00164164	0	0.00164164	0.0020267	0.0000606	3.73E-03	3.02E-02	0.00E+00	3.73E-02	1.11E-03	*6.86E-02*	0.44024366	0	0.54350505	0.01625129
X		Arsenic	38.49	0.012683333	2.7000	2.03	0.05	0.0805896	1.020745424	1.101335024	0.04599286	0.001281017	1.15E+00	1.47E+00	1.86E+01	8.39E-01	2.34E-02	*2.10E+01*	0.07016279	0.88867971	0.04004222	0.00111528
		Barium	33.425	0.032083333	9.9750	3.26	4.33	0.2977338	1.639901984	1.937835784	0.07831478	0.003240417	2.02E+00	6.88E-02	3.79E-01	1.81E-02	7.48E-04	*4.66E-01*	0.14745203	0.81215794	0.03878522	0.00160481
		Beryllium	0.2905	4.56667E-05	0.0065		0.53	0.00019401	0	0.000194012	0.00068064	4.61234E-06	8.79E-04	3.66E-04	0.00E+00	1.28E-03	8.69E-06	*1.66E-03*	0.22065227	0	0.77410207	0.00524567
		Cadmium	0.5455	0.00056	0.1105	0.06	0.78	0.0032982	0.029402583	0.032700787	0.00127811	0.00005656	3.40E-02	4.25E-03	3.79E-02	1.65E-03	7.29E-05	*4.39E-02*	0.09690495	0.86388104	0.03755221	0.0016618
		Chromium	67.94	0.0062	2.2000	1.27	7.24	0.0656656	0.638817939	0.704483539	0.15918342	0.0006262	8.64E-01	9.07E-03	8.83E-02	2.20E-02	8.65E-05	*1.19E-01*	0.07597607	0.73912183	0.18417758	0.00072452
		Cobalt	6.525	0.000985	0.5400	0.58	4.02	0.01611792	0.291590887	0.307708807	0.01528808	0.000099485	3.23E-01	4.01E-03	7.25E-02	3.80E-03	2.47E-05	*8.04E-02*	0.0498858	0.90248891	0.04731738	0.00030791
		Copper	78.595	0.007183333	62.2500	3.98	12.23	1.858038	2.002864951	3.860902951	0.18414809	0.000725517	4.05E+00	1.52E-01	1.64E-01	1.51E-02	5.93E-05	*3.31E-01*	0.45925374	0.49505081	0.04551613	0.00017933
		Cyanide	0	0.0025	0.2250		51.90	0.0067158	0	0.0067158	0	0.0002525	0.00E+00	1.29E-04	0.00E+00	0.00E+00	4.87E-06	*1.34E-04*	0.96376448	0	0	0.03623552
X		Iron	11959	1.209333333	342.5000	989.96	2.57	10.22294	498.1021619	508.3251019	28.019937	0.122142667	5.36E+02	3.99E+00	1.94E+02	1.09E+01	4.76E-02	*2.09E+02*	0.01905604	0.9284858	0.05223048	0.00022768
		Lead	98.47	0.003308333	0.9700	8.98	6.43	0.02895256	4.518291339	4.547243899	0.23071521	0.000334142	4.78E+00	4.50E-03	7.02E-01	3.59E-02	5.19E-05	*7.43E-01*	0.00605918	0.94558687	0.04828402	6.9929E-05
X		Manganese	291.2	0.5925	120.0000	164.21	70.76	3.58176	82.62273047	86.20449047	0.6822816	0.0598425	8.69E+01	5.06E-02	1.17E+00	9.64E-03	8.46E-04	*1.23E+00*	0.04119493	0.95026967	0.00784713	0.00068827
		Mercury	0.513	0.000115833	0.0140	0.02	0.03	0.00041787	0.009041807	0.009459679	0.00120196	1.16992E-05	1.07E-02	1.62E-02	3.51E-01	4.67E-02	4.55E-04	*4.15E-01*	0.03915102	0.84713964	0.11261323	0.00109611
		Nickel	6.71	0.001633333	0.1025	0.17	32.17	0.00305942	0.087217212	0.090276632	0.01572153	0.000164967	1.06E-01	9.51E-05	2.71E-03	4.89E-04	5.13E-06	*3.30E-03*	0.0288181	0.82153958	0.14808842	0.0015539
		Selenium	0.33	0.00075	0.3950	0.03	0.16	0.01178996	0.014287007	0.026056967	0.00077319	0.00007575	2.69E-02	7.33E-02	8.87E-02	4.81E-03	4.71E-04	*1.67E-01*	0.43819225	0.53025557	0.02873681	0.00281537
		Silver	0.3695	0.000375	0.0195		145.71	0.00058204	0	0.000582036	0.00086574	0.000037875	1.49E-03	3.99E-06	0.00E+00	5.94E-06	2.60E-07	*1.02E-05*	0.39177208	0	0.58273402	0.0254939
		Thallium	0.875	0.00085	0.1325		0.06	0.00395486	0	0.00395486	0.00205013	0.00008585	6.09E-03	6.58E-02	0.00E+00	3.41E-02	1.43E-03	*1.01E-01*	0.64931327	0	0.33659178	0.01409495
X		Vanadium	18.655	0.000933333	0.1575	0.65	0.16	0.00470106	0.326603004	0.331304064	0.04370867	9.42667E-05	3.75E-01	3.00E-02	2.08E+00	2.79E-01	6.01E-04	*2.39E+00*	0.01253258	0.87069292	0.11652319	0.00025131
		Zinc	283.5	0.05855	27.7500	10.97	128.66	0.828282	5.522081338	6.350363338	0.6642405	0.00591355	7.02E+00	6.44E-03	4.29E-02	5.16E-03	4.60E-05	*5.46E-02*	0.11798019	0.7865633	0.09461418	0.00084232

Table E.1-32. Exposure Calculatioins for Muskrat - Station LP

		Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
				Reach 3	Reach 3																	
		Inorganics																				
X		Aluminum	6889.33333	0.129	58.333	1.15E+02	41.82	1.74113333	57.69827786	59.43941119	16.141708	0.013029	7.56E+01	4.16E-02	1.38E+00	3.86E-01	3.12E-04	*1.81E+00*	0.02303265	0.76326381	0.21353118	0.00017235
		Antimony	1.22	0.0013	0.046		0.05	0.00136803	0	0.001368032	0.00285846	0.0001313	4.36E-03	2.52E-02	0.00E+00	5.26E-02	2.41E-03	*8.01E-02*	0.31392784	0	0.65594222	0.03012994
X		Arsenic	69.9466667	0.00695	1.533	3.69	0.05	0.04576693	1.854968562	1.900735495	0.08358137	0.00070195	1.99E+00	8.35E-01	3.38E+01	1.52E+00	1.28E-02	*3.62E+01*	0.02305617	0.93448412	0.04210608	0.00035362
		Barium	30.0533333	0.0339	13.967	2.93	4.33	0.41687707	1.474480805	1.891357873	0.07041496	0.0034239	1.97E+00	9.63E-02	3.41E-01	1.63E-02	7.91E-04	*4.54E-01*	0.21212994	0.75029679	0.035831	0.00174227
		Beryllium	0.3643333	0.00005	0.004		0.53	0.00011889	0	0.000118894	0.00085363	0.00000505	9.78E-04	2.24E-04	0.00E+00	1.61E-03	9.52E-06	*1.84E-03*	0.12162071	0	0.87321346	0.00516584
		Cadmium	1.9006667	0.0000495	0.047	0.20	0.78	0.00138793	0.102446399	0.103834331	0.00445326	4.9995E-06	1.08E-01	1.79E-03	1.32E-01	5.74E-03	6.45E-06	*1.40E-01*	0.0128165	0.94601483	0.0411225	4.6167E-05
		Chromium	52.4633333	0.0031	0.890	0.98	7.24	0.02656472	0.493295827	0.519860547	0.12292159	0.0003131	6.43E-01	3.67E-03	6.82E-02	1.70E-02	4.33E-05	*8.89E-02*	0.0413076	0.76706497	0.19114057	0.00048686
		Cobalt	6.66	0.00048	0.397	0.59	4.02	0.01183971	0.297623802	0.309463509	0.01560438	0.00004848	3.25E-01	2.94E-03	7.40E-02	3.88E-03	1.21E-05	*8.09E-02*	0.03641683	0.91543776	0.04799629	0.00014912
		Copper	187.246667	0.0036	41.200	9.48	12.23	1.2297376	4.771674864	6.001412464	0.43871894	0.0003636	6.44E+00	1.01E-01	3.90E-01	3.59E-02	2.97E-05	*5.27E-01*	0.19093837	0.74088635	0.06811882	5.6455E-05
		Cyanide	0	0.0025	0.247		51.90	0.00736251	0	0.007362508	0	0.0002525	0.00E+00	1.42E-04	0.00E+00	0.00E+00	4.87E-06	*1.47E-04*	0.96684179	0	0	0.03315821
X		Iron	10464	1.92	277.333	866.21	2.57	8.27784533	435.8341853	444.1120306	24.517152	0.19392	4.69E+02	3.23E+00	1.70E+02	9.56E+00	7.56E-02	*1.83E+02*	0.01765665	0.92963462	0.0522951	0.00041363
		Lead	82.8133333	0.0043	1.013	7.55	6.43	0.03024597	3.79988592	3.830131893	0.19403164	0.0004343	4.02E+00	4.70E-03	5.91E-01	3.02E-02	6.75E-05	*6.26E-01*	0.00751528	0.94416537	0.04821144	0.00010791
		Manganese	171.853333	0.585	98.300	96.91	70.76	2.9340584	48.76027348	51.69433188	0.40265236	0.059085	5.22E+01	4.15E-02	6.89E-01	5.69E-03	8.35E-04	*7.37E-01*	0.05625536	0.93489165	0.00772014	0.00113285
		Mercury	0.4613333	0.00022	0.007	0.02	0.03	0.00019401	0.008131163	0.008325175	0.0010809	0.00002222	9.43E-03	7.54E-03	3.16E-01	4.20E-02	8.63E-04	*3.66E-01*	0.02057782	0.862421	0.11464464	0.00235673
		Nickel	9.7093333	0.0017	0.098	0.25	32.17	0.00293505	0.126202828	0.12913788	0.02274897	0.0001717	1.52E-01	9.12E-05	3.92E-03	7.07E-04	5.34E-06	*4.73E-03*	0.01930212	0.82996207	0.14960664	0.00112917
		Selenium	0.801	0.00075	0.430	0.07	0.16	0.01283464	0.034629917	0.047464557	0.00187674	0.00007575	4.94E-02	7.98E-02	2.15E-01	1.17E-02	4.71E-04	*3.07E-01*	0.25972088	0.7007686	0.03797764	0.00153287
		Silver	0.175	0.00037	0.027		145.71	0.00081584	0	0.000815844	0.00041003	0.00003737	1.26E-03	5.60E-06	0.00E+00	2.81E-06	2.56E-07	*8.67E-06*	0.64583513	0	0.3245822	0.02958268
		Thallium	1.585	0.00085	0.065		0.06	0.00194012	0	0.00194012	0.00371366	0.00008585	5.74E-03	3.23E-02	0.00E+00	6.18E-02	1.43E-03	*9.54E-02*	0.33802208	0	0.64702049	0.01495742
X		Vanadium	16.4466667	0.0019	0.198	0.57	0.16	0.00589498	0.287940539	0.293835519	0.03853454	0.0001919	3.33E-01	3.76E-02	1.84E+00	2.46E-01	1.22E-03	*2.12E+00*	0.01772596	0.86582524	0.11587176	0.00057704
		Zinc	699.48	0.0189	23.933	27.08	128.66	0.71436213	13.62425049	14.33861262	1.63883478	0.0019089	1.60E+01	5.55E-03	1.06E-01	1.27E-02	1.48E-05	*1.24E-01*	0.04470531	0.85261573	0.1025595	0.00011946

Table E.1-33. Exposure Calculatioins for Muskrat - Station TT-28

		Mean Concentrations																			
		Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
				Reach 1	Reach 1																	
		Inorganics																				
X		Aluminum	16566.6667	0.386114286	47.900	2.76E+02	41.82	1.4297192	138.7461007	140.1758199	38.8157	0.038997543	1.79E+02	3.42E-02	3.32E+00	9.28E-01	9.33E-04	*4.28E+00*	0.0079859	0.77498575	0.21681052	0.00021783
		Antimony	19.0333333	0.000692857	0.050		0.05	0.00148494	0	0.001484938	0.0445951	6.99786E-05	4.62E-02	2.73E-02	0.00E+00	8.20E-01	1.29E-03	*8.49E-01*	0.03217633	0	0.96630735	
X		Arsenic	752.333333	0.024585714	3.750	39.65	0.05	0.11193	19.95169674	20.06362674	0.89898567	0.002483157	2.10E+01	2.04E+00	3.64E+02	1.64E+01	4.53E-02	*3.82E+02*	0.00533887	0.95166257	0.04288011	0.00011844
X		Barium	94.5666667	0.037342857	8.800	9.22	4.33	0.2626624	4.639642913	4.902305313	0.2215697	0.003771629	5.13E+00	6.07E-02	1.07E+00	5.12E-02	8.71E-04	*1.18E+00*	0.05122475	0.90482891	0.0432108	0.00073555
		Beryllium	1.1233333	6.37857E-05	0.006		0.53	0.00017909	0	0.000179088	0.00263197	6.44236E-06	2.82E-03	3.37E-04	0.00E+00	4.96E-03	1.21E-05	*5.31E-03*	0.06356273	0	0.93415072	0.00228655
X		Cadmium	14.6666667	0.00043	0.057	1.57	0.78	0.00170134	0.790536917	0.792238253	0.034364	0.00004343	8.27E-01	2.19E-03	1.02E+00	4.43E-02	5.60E-05	*1.07E+00*	0.00205812	0.95631893	0.04157041	5.2538E-05
X		Chromium	2816.66667	0.025785714	0.895	52.64	7.24	0.02671396	26.48420952	26.51092348	6.59945	0.002604357	3.31E+01	3.69E-03	3.66E+00	9.12E-01	3.60E-04	*4.58E+00*	0.00080675	0.79981359	0.19930101	7.8651E-05
		Cobalt	29.5	0.00146857	0.485	2.62	4.02	0.01447628	1.318303626	1.332779906	0.0691185	0.000148326	1.40E+00	3.60E-03	3.28E-01	1.72E-02	3.69E-05	*3.49E-01*	0.01032511	0.94027082	0.04929829	0.00010579
X		Copper	962	0.021542857	54.350	48.72	12.23	1.6222388	24.51499565	26.13723445	2.253966	0.002175829	2.84E+01	1.33E-01	2.00E+00	1.84E-01	1.78E-04	*2.32E+00*	0.05713441	0.86340544	0.07938351	7.6632E-05
		Cyanide	0	0.0025	0.268		51.90	0.00798434	0	0.00798434	0	0.0002525	0.00E+00	1.54E-04	0.00E+00	0.00E+00	4.87E-06	*1.59E-04*	0.96934504	0	0	0.03065496
X		Iron	66733.3333	2.401	577.500	5524.17	2.57	17.23722	2779.498085	2796.735305	156.3562	0.242501	2.95E+03	6.72E+00	1.08E+03	6.10E+01	9.45E-02	*1.15E+03*	0.00583653	0.94113909	0.05294227	8.2111E-05
X		Lead	421.333333	0.013072856	0.515	38.42	6.43	0.01537172	19.33286027	19.34823199	0.987184	0.001320358	2.03E+01	2.39E-03	3.01E+00	1.53E-01	2.05E-04	*3.16E+00*	0.00075586	0.95063731	0.04854191	6.4925E-05
X		Manganese	683.666667	0.469714286	88.700	385.53	70.76	2.6475176	193.9780451	196.6255627	1.601831	0.047441143	1.98E+02	3.74E-02	2.74E+00	2.26E-02	6.70E-04	*2.80E+00*	0.01335277	0.97832912	0.00807884	0.00023927
X		Mercury	4.0666667	0.000203929	0.009	0.14	0.03	0.00026863	0.071676444	0.071945076	0.0095282	2.05968E-05	8.15E-02	1.04E-02	2.79E+00	3.70E-01	8.00E-04	*3.17E+00*	0.00329635	0.87953169	0.11691922	0.00025274
		Nickel	26.8666667	0.002842857	0.068	0.69	32.17	0.00201474	0.349215463	0.351230203	0.0629486	0.000287129	4.14E-01	6.26E-05	1.09E-02	1.96E-03	8.93E-06	*1.29E-02*	0.00486105	0.84256735	0.15187883	0.00069277
X		Selenium	8.5666667	0.000857143	0.330	0.74	0.16	0.00984984	0.370365744	0.380215584	0.0200717	8.65714E-05	4.00E-01	6.12E-02	2.30E+00	1.25E-01	5.38E-04	*2.49E+00*	0.02460181	0.92504977	0.05013239	0.00021623
		Silver	4.1333333	0.00025	0.037		145.71	0.00110438	0	0.001104376	0.0098844	0.00002525	1.08E-02	7.58E-06	0.00E+00	6.65E-05	1.73E-07	*7.42E-05*	0.10212441	0	0.89554066	0.00233493
		Thallium	0.3683333	0.000778571	0.068		0.06	0.00201474	0	0.00201474	0.000863	7.86357E-05	2.96E-03	3.35E-02	0.00E+00	1.44E-02	1.31E-03	*4.92E-02*	0.6814887	0	0.29191266	0.02659864
X		Vanadium	58.0333333	0.001878929	0.138	2.02	0.16	0.0041041	1.016020423	1.020124523	0.1359721	0.000189772	1.16E+00	2.62E-02	6.48E+00	8.67E-01	1.21E-03	*7.38E+00*	0.00354938	0.87869271	0.11759379	0.00016412
		Zinc	2516.66667	0.127785714	28.750	97.43	128.66	0.85813	49.02023998	49.87836998	5.89655	0.012906357	5.58E+01	6.67E-03	3.81E-01	4.58E-02	1.00E-04	*4.34E-01*	0.01538203	0.87869062	0.105696	0.00023135

		Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
				Reach 1	Reach 1																	
		Inorganics																				
X		Aluminum	16233.3333	0.386114286	47.900	2.70E+02	41.82	1.4297192	135.9544287	137.3841479	38.0347	0.038997543	1.75E+02	3.42E-02	3.25E+00	9.10E-01	9.33E-04	*4.20E+00*	0.00814851	0.77485523	0.21677401	0.00022226
		Antimony	3.9166667	0.000692857	0.050		0.05	0.00148494	0	0.001484938	0.00917675	6.99786E-05	1.07E-02	2.73E-02	0.00E+00	1.69E-01	1.29E-03	*1.97E-01*	0.13836975	0	0.8551095	0.00652075
X		Arsenic	746.666667	0.024585714	3.750	39.35	0.05	0.11193	19.80141812	19.91334812	0.8922144	0.002483157	2.08E+01	2.04E+00	3.61E+02	1.63E+01	4.53E-02	*3.80E+02*	0.00537917	0.95162316	0.04287834	0.00011934
		Barium	70.95	0.037342857	8.800	6.92	4.33	0.2626624	3.480958737	3.743621137	0.16623585	0.003771629	3.91E+00	6.07E-02	8.04E-01	3.84E-02	8.71E-04	*9.04E-01*	0.0671148	0.88944534	0.04247614	0.00096372
		Beryllium	0.985	6.37857E-05	0.006		0.53	0.00017909	0	0.000179088	0.00230786	6.44236E-06	2.49E-03	3.37E-04	0.00E+00	4.35E-03	1.21E-05	*4.70E-03*	0.07182524	0	0.92559098	0.00258378
		Cadmium	13.3166667	0.00043	0.057	1.43	0.78	0.00170134	0.717771587	0.719472923	0.03120095	0.00004343	7.51E-01	2.19E-03	9.25E-01	4.02E-02	5.60E-05	*9.68E-01*	0.00226628	0.95611435	0.04156152	5.7851E-05
X		Chromium	3126.66667	0.025785714	0.895	58.43	7.24	0.02671396	29.39903968	29.42575364	7.32578	0.002604357	3.68E+01	3.69E-03	4.06E+00	1.01E+00	3.60E-04	*5.08E+00*	0.00072683	0.7998838	0.19931851	7.0859E-05
		Cobalt	34.6333333	0.00146857	0.485	3.08	4.02	0.01447628	1.547703351	1.562179631	0.0811459	0.000148326	1.64E+00	3.60E-03	3.85E-01	2.02E-02	3.69E-05	*4.09E-01*	0.00880834	0.94172678	0.04937462	9.0251E-05
X		Copper	979	0.021542857	54.350	49.58	12.23	1.6222388	24.94821283	26.57045163	2.293797	0.002175829	2.89E+01	1.33E-01	2.04E+00	1.88E-01	1.78E-04	*2.36E+00*	0.05619812	0.86426405	0.07946246	7.5376E-05
		Cyanide	0	0.0025	0.268		51.90	0.00798434	0	0.00798434	0	0.0002525	0.00E+00	1.54E-04	0.00E+00	0.00E+00	4.87E-06	*1.59E-04*	0.96934504	0	0	0.03065496
X		Iron	73533.3333	2.401	577.500	6087.07	2.57	17.23722	3062.723664	3079.960884	172.2886	0.242501	3.25E+03	6.72E+00	1.19E+03	6.72E+01	9.45E-02	*1.27E+03*	0.0052997	0.94165448	0.05297126	7.4559E-05
X		Lead	501	0.013072856	0.515	45.69	6.43	0.01537172	22.98836154	23.00373326	1.173843	0.001320358	2.42E+01	2.39E-03	3.57E+00	1.82E-01	2.05E-04	*3.76E+00*	0.00063575	0.9507614	0.04854825	5.4608E-05
X		Manganese	786.666667	0.469714286	88.700	443.61	70.76	2.6475176	223.2024312	225.8499488	1.84316	0.047441143	2.28E+02	3.74E-02	3.15E+00	2.60E-02	6.70E-04	*3.22E+00*	0.01162515	0.9800733	0.00809324	0.00020831
X		Mercury	8.6	0.000203929	0.009	0.30	0.03	0.00026863	0.151578052	0.151846684	0.0201498	2.05968E-05	1.72E-01	1.04E-02	5.89E+00	7.83E-01	8.00E-04	*6.68E+00*	0.00156166	0.88118024	0.11713837	0.00011974
		Nickel	30.3166667	0.002842857	0.068	0.78	32.17	0.00201474	0.394058887	0.396073627	0.07103195	0.000287129	4.67E-01	6.26E-05	1.23E-02	2.21E-03	8.93E-06	*1.45E-02*	0.00431059	0.84310021	0.15197488	0.00061432
X		Selenium	7.6833333	0.000857143	0.330	0.66	0.16	0.00984984	0.332176277	0.342026117	0.01800205	8.65714E-05	3.60E-01	6.12E-02	2.07E+00	1.12E-01	5.38E-04	*2.24E+00*	0.02735195	0.92241789	0.04998976	0.0002404
		Silver	1.35	0.00025	0.037		145.71	0.00110438	0	0.001104376	0.00316305	0.00002525	4.29E-03	7.58E-06	0.00E+00	2.17E-05	1.73E-07	*2.95E-05*	0.25726982	0	0.73684806	0.00588211
		Thallium	8.9666667	0.000778571	0.068		0.06	0.00201474	0	0.00201474	0.0210089	7.86357E-05	2.31E-02	3.35E-02	0.00E+00	3.49E-01	1.31E-03	*3.84E-01*	0.08720959	0	0.9093866	0.00340381
X		Vanadium	66.6333333	0.001878929	0.138	2.32	0.16	0.0041041	1.166585196	1.170689296	0.1561219	0.000189772	1.33E+00	2.62E-02	7.44E+00	9.96E-01	1.21E-03	*8.46E+00*	0.00309276	0.87911405	0.11765018	0.00014301
		Zinc	2848.33333	0.127785714	28.750	110.27	128.66	0.85813	55.48052326	56.33865326	6.673645	0.012906357	6.30E+01	6.67E-03	4.31E-01	5.19E-02	1.00E-04	*4.90E-01*	0.01361566	0.88029105	0.10588851	0.00020478

Table E.1-35. Exposure Calculatioins for Muskrat - Station TT-30

		Mean Concentrations																			
		Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
		Inorganics		Reach 2	Reach 2																	
X		Aluminum	14295	0.140333333	52.700	2.38E+02	41.82	1.5729896	119.7208557	121.2938453	33.493185	0.014173667	1.55E+02	3.76E-02	2.86E+00	8.01E-01	3.39E-04	*3.70E+00*	0.01016135	0.77338453	0.21636256	9.156E-05
		Antimony	6.51625	0.0006	0.055		0.05	0.00164164	0	0.00164164	0.01526757	0.0000606	1.70E-02	3.02E-02	0.00E+00	2.81E-01	1.11E-03	*3.12E-01*	0.09673883	0	0.89969012	0.00357105
X		Arsenic	586.5	0.012683333	2.700	30.91	0.05	0.0805896	15.55383713	15.63442673	0.70082645	0.001281017	1.63E+01	1.47E+00	2.84E+02	1.28E+01	2.34E-02	*2.98E+02*	0.00493309	0.95208916	0.04289933	7.8414E-05
		Barium	69.5	0.032083333	9.975	6.78	4.33	0.2977338	3.409818636	3.707552436	0.1628385	0.003240417	3.87E+00	6.88E-02	7.87E-01	3.76E-02	7.48E-04	*8.95E-01*	0.07686168	0.88026411	0.04203769	0.00083653
		Beryllium	0.9275	4.56667E-05	0.007		0.53	0.00019401	0	0.000194012	0.00217313	4.61234E-06	2.37E-03	3.66E-04	0.00E+00	4.09E-03	8.69E-06	*4.47E-03*	0.08180097	0	0.91625434	0.00194469
		Cadmium	6.525	0.00056	0.111	0.70	0.78	0.0032982	0.351699093	0.354997297	0.01528808	0.00005656	3.70E-01	4.25E-03	4.53E-01	1.97E-02	7.29E-05	*4.77E-01*	0.00890583	0.94966047	0.04128097	0.00015272
X		Chromium	2368.25	0.0062	2.200	44.26	7.24	0.0656856	22.26789202	22.33355762	5.54880975	0.0006262	2.79E+01	9.07E-03	3.08E+00	7.67E-01	8.65E-05	*3.85E+00*	0.00235504	0.79861913	0.19900337	2.2458E-05
		Cobalt	19.25	0.000985	0.540	1.71	4.02	0.01611792	0.860248976	0.876366896	0.04510275	0.000099485	9.22E-01	4.01E-03	2.14E-01	1.12E-02	2.47E-05	*2.29E-01*	0.01748985	0.93346114	0.04894126	0.00010795
X		Copper	1380.5	0.007183333	62.250	69.92	12.23	1.858038	35.17978326	37.03782126	3.2345115	0.000725517	4.03E+01	1.52E-01	2.88E+00	2.64E-01	5.93E-05	*3.29E+00*	0.048136	0.87353146	0.08031452	1.8015E-05
		Cyanide	0	0.0025	0.225		51.90	0.0067158	0	0.0067158	0	0.0002525	0.00E+00	1.29E-04	0.00E+00	0.00E+00	4.87E-08	*1.34E-04*	0.96376448	0	0	0.03623552
X		Iron	38325	1.209333333	342.500	3172.54	2.57	10.22294	1596.267694	1606.490634	89.795475	0.122142667	1.70E+03	3.99E+00	6.22E+02	3.50E+01	4.76E-02	*6.61E+02*	0.00602623	0.94096907	0.0529327	7.2001E-05
X		Lead	439.25	0.003308333	0.970	40.06	6.43	0.02895256	20.15496568	20.18391824	1.02916275	0.000334142	2.12E+01	4.50E-03	3.13E+00	1.60E-01	5.19E-05	*3.30E+00*	0.00136482	0.95010471	0.04851471	1.5751E-05
X		Manganese	825.25	0.5925	120.000	465.37	70.76	3.58176	234.1497539	237.7315139	1.93356075	0.0598425	2.40E+02	5.06E-02	3.31E+00	2.73E-02	8.46E-04	*3.39E+00*	0.01494113	0.9767435	0.00806575	0.00024963
X		Mercury	24.925	0.000115833	0.014	0.87	0.03	0.00041787	0.43931197	0.439729842	0.05839928	1.16992E-05	4.98E-01	1.62E-02	1.71E+01	2.27E+00	4.55E-04	*1.94E+01*	0.00083886	0.88190318	0.11723447	2.3486E-05
		Nickel	20.6	0.001633333	0.103	0.53	32.17	0.00305942	0.267760739	0.270820159	0.0482658	0.000164967	3.19E-01	9.51E-05	8.32E-03	1.50E-03	5.13E-06	*9.93E-03*	0.00958312	0.83871562	0.15118453	0.00051673
X		Selenium	4.075	0.00075	0.395	0.35	0.16	0.01178996	0.176175922	0.187965882	0.00954773	0.00007575	1.98E-01	7.33E-02	1.10E+00	5.94E-02	4.71E-04	*1.23E+00*	0.059669	0.89162658	0.04832105	0.00038337
		Silver	0.77125	0.000375	0.020		145.71	0.00058204	0	0.000582036	0.00180704	0.000037875	2.43E-03	3.99E-06	0.00E+00	1.24E-05	2.60E-07	*1.67E-05*	0.23982202	0	0.74457197	0.01560601
		Thallium	3.5625	0.00085	0.133		0.06	0.00395486	0	0.00395486	0.00834694	0.00008585	1.24E-02	6.58E-02	0.00E+00	1.39E-01	1.43E-03	*2.06E-01*	0.31925836	0	0.67381135	0.00693029
X		Vanadium	42.75	0.000933333	0.158	1.49	0.16	0.00470106	0.748446981	0.753148041	0.10016325	9.42667E-05	8.53E-01	3.00E-02	4.77E+00	6.39E-01	6.01E-04	*5.44E+00*	0.00550859	0.87701208	0.11736887	0.00011046
		Zinc	1186	0.05855	27.750	45.91	128.66	0.828282	23.10119389	23.92947589	2.778798	0.00591355	2.67E+01	6.44E-03	1.80E-01	2.16E-02	4.60E-05	*2.08E-01*	0.03100532	0.86475375	0.10401956	0.00022136

		Mean Concentrations																			
		Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
				Reach 2	Reach 2																	
		Inorganics																				
X		Aluminum	10926.6667	0.140333333	52.700	1.82E+02	41.82	1.5729896	91.51100969	93.08399929	25.60118	0.014173667	1.19E+02	3.76E-02	2.19E+00	6.12E-01	3.39E-04	*2.84E+00*	0.01325188	0.77094784	0.21568087	0.00011941
		Antimony	0.27	0.0006	0.055		0.05	0.00164164	0	0.00164164	0.00063261	0.0000606	2.33E-03	3.02E-02	0.00E+00	1.16E-02	1.11E-03	*4.29E-02*	0.70310298	0	0.27094246	0.02595456
X		Arsenic	16.6	0.012683333	2.700	0.87	0.05	0.0805896	0.440227956	0.520817556	0.01983584	0.001281017	5.42E-01	1.47E+00	8.03E+00	3.62E-01	2.34E-02	*9.89E+00*	0.14870729	0.812327	0.03660192	0.00236379
X		Barium	91.1333333	0.032083333	9.975	8.89	4.33	0.2977338	4.471196233	4.768930033	0.2135254	0.003240417	4.99E+00	6.88E-02	1.03E+00	4.93E-02	7.48E-04	*1.15E+00*	0.0597176	0.89680485	0.0428276	0.00064994
		Beryllium	0.5433333	4.56667E-05	0.007		0.53	0.00019401	0	0.000194012	0.00127303	4.61234E-06	1.47E-03	3.66E-04	0.00E+00	2.40E-03	8.69E-06	*2.77E-03*	0.1318326	0	0.86503329	0.00313412
		Cadmium	4.1666667	0.00056	0.111	0.45	0.78	0.0032982	0.224584353	0.227882557	0.0097625	0.00005656	2.38E-01	4.25E-03	2.90E-01	1.26E-02	7.29E-05	*3.06E-01*	0.0138754	0.94481626	0.0410704	0.00023795
		Chromium	185.333333	0.0062	2.200	3.46	7.24	0.0656656	1.742629644	1.808295244	0.434236	0.0006262	2.24E+00	9.07E-03	2.41E-01	6.00E-02	8.65E-05	*3.10E-01*	0.02927374	0.77686461	0.19358249	0.00027916
		Cobalt	12.2333333	0.000985	0.540	1.09	4.02	0.01611792	0.546686361	0.562804281	0.0286627	0.000099485	5.92E-01	4.01E-03	1.36E-01	7.13E-03	2.47E-05	*1.47E-01*	0.02724617	0.92413345	0.04845221	0.00016817
		Copper	113.233333	0.007183333	62.250	5.73	12.23	1.858038	2.885566188	4.743604188	0.2653057	0.000725517	5.01E+00	1.52E-01	2.36E-01	2.17E-02	5.93E-05	*4.10E-01*	0.37089288	0.57600323	0.05295908	0.00014482
		Cyanide	0	0.0025	0.225		51.90	0.0067158	0	0.0067158	0	0.0002525	0.00E+00	1.29E-04	0.00E+00	0.00E+00	4.87E-06	*1.34E-04*	0.96376448	0	0	0.03623552
X		Iron	24000	1.209333333	342.500	1986.72	2.57	10.22294	999.619691	1009.842631	58.232	0.122142667	1.07E+03	3.99E+00	3.90E+02	2.19E+01	4.76E-02	*4.16E+02*	0.00958823	0.93755648	0.05274073	0.00011456
X		Lead	277	0.003308333	0.970	25.26	6.43	0.02895256	12.71013203	12.73908459	0.649011	0.000334142	1.34E+01	4.50E-03	1.98E+00	1.01E-01	5.19E-05	*2.08E+00*	0.00216251	0.94933702	0.04847551	2.4957E-05
X		Manganese	594.666667	0.5925	120.000	335.34	70.76	3.58176	168.7259056	172.3076656	1.393304	0.0598425	1.74E+02	5.06E-02	2.38E+00	1.97E-02	8.46E-04	*2.46E+00*	0.02061316	0.97102392	0.00801852	0.0003444
X		Mercury	1.4133333	0.000115833	0.014	0.05	0.03	0.00041787	0.024910501	0.025328373	0.00331144	1.16992E-05	2.87E-02	1.62E-02	9.68E-01	1.29E-01	4.55E-04	*1.11E+00*	0.01458464	0.86943059	0.11557645	0.00040833
		Nickel	25.9	0.001633333	0.103	0.67	32.17	0.00305942	0.336650638	0.339710058	0.0606837	0.000164967	4.01E-01	9.51E-05	1.05E-02	1.89E-03	5.13E-06	*1.25E-02*	0.00763788	0.84045264	0.15149764	0.00041184
		Selenium	2.6666667	0.00075	0.395	0.23	0.16	0.01178996	0.115288948	0.127078908	0.006248	0.00007575	1.33E-01	7.33E-02	7.17E-01	3.88E-02	4.71E-04	*8.29E-01*	0.08837875	0.86421777	0.04683565	0.00056783
		Silver	0.3133333	0.000375	0.020		145.71	0.00058204	0	0.000582036	0.00073414	0.000037875	1.35E-03	3.99E-06	0.00E+00	5.04E-06	2.60E-07	*9.29E-06*	0.42984794	0	0.54218044	0.02797162
		Thallium	0	0.00085	0.133		0.06	0.00395486	0	0.00395486	0	0.00008585	4.04E-03	6.58E-02	0.00E+00	0.00E+00	1.43E-03	*6.72E-02*	0.97875373	0	0	0.02124627
X		Vanadium	45.9666667	0.000933333	0.158	1.60	0.16	0.00470106	0.804762875	0.809463935	0.1076999	9.42667E-05	9.17E-01	3.00E-02	5.13E+00	6.87E-01	6.01E-04	*5.85E+00*	0.00512512	0.87735706	0.11741504	0.00010277
		Zinc	463.666667	0.05855	27.750	17.95	128.66	0.828282	9.031411101	9.859693101	1.086371	0.00591355	1.10E+01	6.44E-03	7.02E-02	8.44E-03	4.60E-05	*8.51E-02*	0.07562853	0.82463747	0.09919405	0.00053995

	Mean Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach 2																	
	Volatile Organics																				
	2-Butanone	0	0.0025			9.730183192	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E-05	*2.60E-05*	0	0	0	1
	Acetone	0.26	0.0025			1367.050531	0	0	0	0.00060918	0.0002525	8.62E-04	0.00E+00	0.00E+00	4.46E-07	1.85E-07	*6.30E-07*	0	0	0.70696778	0.29303222
	cis-1,2-Dichloroethene	0	0.0025			2504.114914	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E-07	*1.01E-07*	0	0	0	1
	Tetrachloroethene	0	0.0005			6.09153838	0	0	0	0	0.0000505	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.29E-06	*8.29E-06*	0	0	0	1
	Trichloroethene	0	0.0015			3.04576919	0	0	0	0	0.0001515	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.97E-05	*4.97E-05*	0	0	0	1
	Semivolatile Organics																				
	2-Methylnaphthalene	0.12	0.0025			62.53	0	0	0	0.00028116	0.0002525	5.34E-04	0.00E+00	0.00E+00	4.50E-06	4.04E-06	*8.54E-06*	0	0	0.5268523	0.4731477
	Acenaphthylene	0.12	0.0025			58.00	0	0	0	0.00028116	0.0002525	5.34E-04	0.00E+00	0.00E+00	4.85E-06	4.35E-06	*9.20E-06*	0	0	0.5268523	0.4731477
	Anthracene	0.12	0.0025			435.11	0	0	0	0.00028116	0.0002525	5.34E-04	0.00E+00	0.00E+00	6.46E-07	5.80E-07	*1.23E-06*	0	0	0.5268523	0.4731477
	Benzo(a)anthracene	0.4	0.0025			0.57	0	0	0	0.0009372	0.0002525	1.19E-03	0.00E+00	0.00E+00	1.66E-03	4.46E-04	*2.10E-03*	0	0	0.78776162	0.21223838
	Benzo(a)pyrene	0.47	0.0025		0.07	0.57	0	0.037520054	0.037520054	0.00110121	0.0002525	3.89E-02	0.00E+00	6.63E-02	1.95E-03	4.46E-04	*6.87E-02*	0	0.96517677	0.02832785	0.00649538
	Benzo(b)fluoranthene	0.81	0.0025		0.06	0.57	0	0.031011135	0.031011135	0.00189783	0.0002525	3.32E-02	0.00E+00	5.48E-02	3.36E-03	4.46E-04	*5.86E-02*	0	0.93515576	0.05722998	0.00761426
	Benzo(g,h,i)perylene	0.23	0.0025			58.00	0	0	0	0.00053889	0.0002525	7.91E-04	0.00E+00	0.00E+00	9.29E-06	4.35E-06	*1.36E-05*	0	0	0.68094113	0.31905887
	Benzo(k)fluoranthene	0.18	0.0025		0.04	0.57	0	0.018023366	0.018023366	0.00042174	0.0002525	1.87E-02	0.00E+00	3.19E-02	7.46E-04	4.46E-04	*3.31E-02*	0	0.96393977	0.02255583	0.0135044
	Carbazole	0.12	0			58.00014758	0	0	0	0.00028116	0	2.81E-04	0.00E+00	0.00E+00	4.85E-06	0.00E+00	*4.85E-06*	0	0	1	0
	Chrysene	0.48	0.0025		0.05	0.57	0	0.026996066	0.026996066	0.00107778	0.0002525	2.83E-02	0.00E+00	4.77E-02	1.91E-03	4.46E-04	*5.01E-02*	0	0.95303736	0.03804868	0.00891396
	Dibenz(a,h)anthracene	0.12	0.0025			0.57	0	0	0	0.00028116	0.0002525	5.34E-04	0.00E+00	0.00E+00	4.97E-04	4.46E-04	*9.43E-04*	0	0	0.5268523	0.4731477
	Dibenzofuran	0.12	0.0025			58.00	0	0	0	0.00028116	0.0002525	5.34E-04	0.00E+00	0.00E+00	4.85E-06	4.35E-06	*9.20E-06*	0	0	0.5268523	0.4731477
	Fluoranthene	1	0.0025		0.05	54.39	0	0.02377081	0.02377081	0.002343	0.0002525	2.64E-02	0.00E+00	4.37E-04	4.31E-05	4.64E-06	*4.85E-04*	0	0.90155998	0.0888634	0.00957661
	Fluorene	0.12	0.0025			54.39	0	0	0	0.00028116	0.0002525	5.34E-04	0.00E+00	0.00E+00	5.17E-06	4.64E-06	*9.81E-06*	0	0	0.5268523	0.4731477
	Indeno(1,2,3-cd)pyrene	0.21	0.0025		0.09	0.57	0	0.044485235	0.044485235	0.00049203	0.0002525	4.52E-02	0.00E+00	7.86E-02	8.70E-04	4.46E-04	*8.00E-02*	0	0.98353894	0.01087846	0.00558261
	Naphthalene	0.12	0.0025			60.92	0	0	0	0.00028116	0.0002525	5.34E-04	0.00E+00	0.00E+00	4.62E-06	4.15E-06	*8.76E-06*	0	0	0.5268523	0.4731477
	N-nitrosodiphenylamine	0.12	0.0025			120.62	0	0	0	0.00028116	0.0002525	5.34E-04	0.00E+00	0.00E+00	2.33E-06	2.09E-06	*4.42E-06*	0	0	0.5268523	0.4731477
	Phenanthrene	0.45	0.0025		0.12	58.00	0	0.060939877	0.060939877	0.00105435	0.0002525	6.22E-02	0.00E+00	1.05E-03	1.82E-05	4.35E-06	*1.07E-03*	0	0.97900532	0.01693824	0.00405644
	Pyrene	0.86	0.0025		0.05	58.00	0	0.026512441	0.026512441	0.00201498	0.0002525	2.88E-02	0.00E+00	4.57E-04	3.47E-05	4.35E-06	*4.96E-04*	0	0.92121313	0.0700134	0.00877348
	Pesticides and PCBs																				
	4,4'-DDD	0.00047	0.00005	0.0033	2.43E-05	6.84	9.8498E-05	1.2217E-05	0.000110715	1.1012E-06	0.00000505	1.17E-04	1.44E-05	1.79E-06	1.61E-07	7.39E-07	*1.71E-05*	0.84282791	0.10453762	0.0094228	0.04321168
	4,4'-DDE	0.00078	0.00005	0.0080	3.39E-05	0.83	0.00023878	1.70411E-05	0.000255825	1.8275E-06	0.00000505	2.63E-04	2.89E-04	2.06E-05	2.21E-06	6.11E-06	*3.18E-04*	0.9089515	0.06486856	0.00695669	0.01922325
	4,4'-DDT	0.00047	0.00005	0.0011	7.55E-05	0.64	3.134E-05	3.7981E-05	6.93214E-05	1.1012E-06	0.00000505	7.55E-05	4.87E-05	5.90E-05	1.71E-06	7.85E-06	*1.17E-04*	0.41525552	0.50324188	0.01459086	0.06691173
	Aldrin	0.000235	0.000025	0.0003		0.16	8.059E-06	0	8.05896E-06	5.5061E-07	0.000002525	1.11E-05	5.01E-05	0.00E+00	3.42E-06	1.57E-05	*6.92E-05*	0.72377861	0	0.04945007	0.22677132
	alpha-Chlordane	0.000235	0.000025	0.0006	2.41E-05	1.99	1.8506E-05	1.21011E-05	3.06069E-05	5.5061E-07	0.000002525	3.37E-05	9.29E-06	6.07E-06	2.76E-07	1.27E-06	*1.69E-05*	0.5494177	0.35927064	0.01634692	0.07496475
	Aroclor 1248	0.0047	0.0005	0.0025		0.57	0.00007462	0	0.00007462	1.1012E-05	0.0000505	1.36E-04	1.32E-04	0.00E+00	1.95E-05	8.93E-05	*2.41E-04*	0.54814405	0	0.08089275	0.3709632
	Aroclor 1254	0.0047	0.0005	0.0220		0.15	0.00065666	0	0.000656656	1.1012E-05	0.0000505	7.18E-04	4.49E-03	0.00E+00	7.52E-05	3.45E-04	*4.91E-03*	0.9143486	0	0.0153336	0.0703178
	Aroclor 1260	0.0047	0.0005	0.0410	2.94E-04	0.28	0.00122377	0.000147693	0.001371461	1.1012E-05	0.0000505	1.43E-03	4.41E-03	5.32E-04	3.97E-05	1.82E-04	*5.17E-03*	0.85400611	0.10306769	0.00768479	0.03524141
	beta-BHC	0.000235	0.000025	0.0003		3.22	7.462E-06	0	0.000007462	5.5061E-07	0.000002525	1.05E-05	2.32E-06	0.00E+00	1.71E-07	7.85E-07	*3.28E-06*	0.70813055	0	0.05225144	0.23961802
	delta-BHC	0.000235	0.000025	0.0003		1.29	7.462E-06	0	0.000007462	5.5061E-07	0.000002525	1.05E-05	5.80E-06	0.00E+00	4.28E-07	1.96E-06	*8.19E-06*	0.70813055	0	0.05225144	0.23961802
	Endosulfan I	0.000235	0.000025	0.0003	3.87E-05	1.21	7.462E-06	1.94575E-05	2.69195E-05	5.5061E-07	0.000002525	3.00E-05	6.19E-06	1.61E-05	4.56E-07	2.09E-06	*2.49E-05*	0.24877388	0.64868925	0.01835649	0.08418039
	Endosulfan Sulfate	0.00047	0.00005	0.0007		1.21	2.1341E-05	0	2.13413E-05	1.1012E-06	0.00000505	2.75E-05	1.77E-05	0.00E+00	9.13E-07	4.19E-06	*2.28E-05*	0.77625886	0	0.04005488	0.18368626
	Endrin Aldehyde	0.00047	0.00005	0.0030	1.44E-04	0.04	8.8052E-05	7.26751E-05	0.000160727	1.1012E-06	0.00000505	1.67E-04	2.20E-03	1.82E-03	2.75E-05	1.26E-04	*4.17E-03*	0.52764072	0.43549874	0.00659889	0.03026164
	gamma-Chlordane	0.000235	0.000025	0.0003	2.26E-05	1.99	7.462E-06	1.13496E-05	1.88116E-05	5.5061E-07	0.000002525	2.19E-05	3.74E-06	5.70E-06	2.76E-07	1.27E-06	*1.10E-05*	0.34093056	0.51854844	0.02515654	0.11536447
	Inorganics																				
X	Aluminum	7975	0.140333333	52.700	1.33E+02	41.82	1.5729896	66.79075372	68.36374332	18.685425	0.014173667	8.71E+01	3.76E-02	1.60E+00	4.47E-01	3.39E-04	*2.08E+00*	0.01806719	0.76715127	0.21461874	0.0001628
	Antimony	2.83875	0.0006	0.055		0.05	0.00164164	0	0.00164164	0.00665119	0.0000606	8.35E-03	3.02E-02	0.00E+00	1.22E-01	1.11E-03	*1.54E-01*	0.19652284	0	0.79622266	0.0072545
X	Arsenic	252.05	0.012683333	2.700	13.28	0.05	0.0805896	6.684304602	6.764894202	3.0118211	0.001281017	7.07E+00	1.47E+00	1.22E+02	5.49E+00	2.34E-02	*1.29E+02*	0.01140307	0.94579972	0.04261594	0.00018126
	Barium	70.325	0.032083333	9.975	6.86	4.33	0.2977338	3.4502949	3.7480287	0.16477148	0.003240417	3.92E+00	6.88E-02	7.97E-01	3.81E-02	7.48E-04	*9.04E-01*	0.07802929	0.8810672	0.04207604	0.00082747
	Beryllium	0.535	4.56667E-05	0.007		0.53	0.00019401	0	0.000194012	0.00125351	4.61234E-06	1.45E-03	3.66E-04	0.00E+00	2.36E-03	8.69E-06	*2.74E-03*	0.13360518	0	0.86321856	0.00317626
	Cadmium	5.025	0.00056	0.111	0.54	0.78	0.0032982	0.270848727	0.274146931	0.01177358	0.00005656	2.86E-01	4.25E-03	3.49E-01	1.52E-02	7.29E-05	*3.69E-01*	0.01153311	0.94709947	0.04116965	0.00019778
	Chromium	529.5	0.0062	2.200	9.90	7.24	0.0656656	4.978717967	5.044383567	1.2406185	0.0006262	6.29E+00	9.07E-03	6.88E-01	1.71E-01	8.65E-05	*8.69E-01*	0.01044694	0.79207961	0.19737383	9.9624E-05
	Cobalt	22.05	0.000985	0.540	1.96	4.02	0.01611792	0.9853761	1.00149402	0.05166315	0.000099485	1.05E+00	4.01E-03	2.45E-01	1.28E-02	2.47E-05	*2.62E-01*	0.01530294	0.93555174	0.04905087	9.4455E-05
	Copper	303.75	0.007183333	62.250	15.38	12.23	1.858038	7.740571651	9.598609651	0.71168625	0.000725517	1.03E+01	1.52E-01	6.33E-01	5.82E-02	5.93E-05	*8.43E-01*	0.18019922	0.75070852	0.0690219	7.0363E-05
	Cyanide	0	0.0025	0.225		51.90	0.0067158	0	0.0067158	0	0.0002525	0.00E+00	1.29E-04	0.00E+00	0.00E+00	4.87E-06	*1.34E-04*	0.96376448	0	0	0.03623552
X	Iron	31425	1.209333333	342.500	2601.36	2.57	10.22294	1308.877033	1319.099973	73.628775	0.122142667	1.39E+03	3.99E+00	5.10E+02	2.87E+01	4.76E-02	*5.43E+02*	0.00733958	0.93971081	0.05286192	8.7693E-05
X	Lead	215.75	0.003308333	0.970	19.68	6.43	0.02895256	9.899678647	9.928631207	0.50550225	0.000334142	1.04E+01	4.50E-03	1.54E+00	7.86E-02	5.19E-05	*1.62E+00*	0.0027747	0.94874784	0.04844543	3.2023E-05
X	Manganese	767.25	0.5925	120.000	432.66	70.76	3.58176	217.6933034	221.2750634	1.79766675	0.0598425	2.23E+02	5.06E-02	3.08E+00	2.54E-02	8.46E-04	*3.15E+00*	0.01505216	0.97562315	0.0080565	0.00026819
X	Mercury	2.71	0.000115833	0.014	0.09	0.03	0.00041787	0.047764712	0.048182584	0.00634953	1.16992E-05	5.45E-02	1.62E-02	1.86E+00	2.47E-01	4.55E-04	*2.12E+00*	0.00766122	0.87571274	0.11641155	0.00021449
	Nickel	18.075	0.001633333	0.103	0.47	32.17	0.00305942	0.234940551	0.237999971	0.04234973	0.000164967	2.81E-01	9.51E-05	7.30E-03	1.32E-03	5.13E-06	*8.72E-03*	0.01090645	0.83753394	0.15097152	0.00058809
	Selenium	2.675	0.00075	0.395	0.23	0.16	0.01178996	0.115649225	0.127439185	0.00826753	0.00007575	1.34E-01	7.33E-02	7.19E-01	3.90E-02	4.71E-04	*8.32E-01*	0.08812785	0.86445731	0.04684863	0.00056622
	Silver	0.2166667	0.000375	0.020		145.71	0.00058204	0	0.000582036	0.00050765	0.000037875	1.13E-03	3.99E-06	0.00E+00	3.48E-06	2.60E-07	*7.74E-06*	0.51619022	0	0.45021958	0.0335902
	Thallium	0.35875	0.00085	0.133		0.06	0.00395486	0	0.00395486	0.00084055	0.00008585	4.88E-03	6.58E-02	0.00E+00	1.40E-02	1.43E-03	*8.12E-02*	0.81021273	0	0.1721996	0.01758767
X	Vanadium	31.475	0.000933333	0.158	1.10	0.16	0.00470106	0.551049561	0.555750621	0.07374593	9.42667E-05	6.30E-01	3.00E-02	3.51E+00	4.70E-01	6.01E-04	*4.02E+00*	0.00746685	0.87525032	0.1171331	0.00014973
	Zinc	1194.5	0.05855	27.750	46.24	128.66	0.828282	23.26675894	24.09504094	2.7987135	0.00591355	2.69E+01	6.44E-03	1.81E-01	2.18E-02	4.60E-05	*2.09E-01*	0.03079153	0.86494595	0.10404268	0.00021984

	Mean Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach 2																	
	Volatile Organics																				
	2-Butanone	0	0.0025			9.730183192	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E-05	*2.60E-05*	0	0	0	1
	Acetone	0.2	0.0025			1367.050531	0	0	0	0.0004686	0.0002525	7.21E-04	0.00E+00	0.00E+00	3.43E-07	1.85E-07	*5.27E-07*	0	0	0.64984052	0.35015948
	cis-1,2-Dichloroethene	0	0.0025			2504.114914	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E-07	*1.01E-07*	0	0	0	1
	Tetrachloroethene	0	0.0005			6.09153838	0	0	0	0	0.0000505	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.29E-06	*8.29E-06*	0	0	0	1
	Trichloroethene	0	0.0015			3.04576919	0	0	0	0	0.0001515	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.97E-05	*4.97E-05*	0	0	0	1
	Semivolatile Organics																				
	2-Methylnaphthalene	0.065	0.0025			62.53	0	0	0	0.0001523	0.0002525	4.05E-04	0.00E+00	0.00E+00	2.44E-06	4.04E-06	*6.47E-06*	0	0	0.37622747	0.62377253
	Acenaphthylene	0.065	0.0025			58.00	0	0	0	0.0001523	0.0002525	4.05E-04	0.00E+00	0.00E+00	2.63E-06	4.35E-06	*6.98E-06*	0	0	0.37622747	0.62377253
	Anthracene	0.065	0.0025			435.11	0	0	0	0.0001523	0.0002525	4.05E-04	0.00E+00	0.00E+00	3.50E-07	5.80E-07	*9.30E-07*	0	0	0.37622747	0.62377253
	Benzo(a)anthracene	0.11	0.0025			0.57	0	0	0	0.00025773	0.0002525	5.10E-04	0.00E+00	0.00E+00	4.56E-04	4.46E-04	*9.02E-04*	0	0	0.50512514	0.49487486
	Benzo(a)pyrene	0.14	0.0025		0.02	0.57	0	0.011176186	0.011176186	0.00032802	0.0002525	1.18E-02	0.00E+00	1.98E-02	5.80E-04	4.46E-04	*2.08E-02*	0	0.95062222	0.02790067	0.0214771
	Benzo(b)fluoranthene	0.26	0.0025		0.02	0.57	0	0.009954192	0.009954192	0.00060918	0.0002525	1.08E-02	0.00E+00	1.76E-02	1.08E-03	4.46E-04	*1.91E-02*	0	0.92033189	0.05632278	0.02334532
	Benzo(g,h,i)perylene	0.06	0.0025			58.00	0	0	0	0.00014058	0.0002525	3.93E-04	0.00E+00	0.00E+00	2.42E-06	4.35E-06	*6.78E-06*	0	0	0.35763712	0.64236288
	Benzo(k)fluoranthene	0.099	0.0025		0.02	0.57	0	0.009912851	0.009912851	0.00023196	0.0002525	1.04E-02	0.00E+00	1.75E-02	4.10E-04	4.46E-04	*1.84E-02*	0	0.95340554	0.02230933	0.02428513
	Carbazole	0.065	0			58.00014758	0	0	0	0.0001523	0	1.52E-04	0.00E+00	0.00E+00	2.63E-06	0.00E+00	*2.63E-06*	0	0	1	0
	Chrysene	0.16	0.0025		0.02	0.57	0	0.009389936	0.009389936	0.00037488	0.0002525	1.00E-02	0.00E+00	1.66E-02	6.63E-04	4.46E-04	*1.77E-02*	0	0.93737045	0.0374232	0.02520635
	Dibenz(a,h)anthracene	0.065	0.0025			0.57	0	0	0	0.0001523	0.0002525	4.05E-04	0.00E+00	0.00E+00	2.69E-04	4.46E-04	*7.16E-04*	0	0	0.37622747	0.62377253
	Dibenzofuran	0.065	0.0025			58.00	0	0	0	0.0001523	0.0002525	4.05E-04	0.00E+00	0.00E+00	2.63E-06	4.35E-06	*6.98E-06*	0	0	0.37622747	0.62377253
	Fluoranthene	0.29	0.0025		0.01	54.39	0	0.006893535	0.006893535	0.00067947	0.0002525	7.83E-03	0.00E+00	1.27E-04	1.25E-05	4.64E-06	*1.44E-04*	0	0.88090609	0.08682762	0.03226629
	Fluorene	0.065	0.0025			54.39	0	0	0	0.0001523	0.0002525	4.05E-04	0.00E+00	0.00E+00	2.80E-06	4.64E-06	*7.44E-06*	0	0	0.37622747	0.62377253
	Indeno(1,2,3-cd)pyrene	0.06	0.0025		0.03	0.57	0	0.012710067	0.012710067	0.00014058	0.0002525	1.31E-02	0.00E+00	2.25E-02	2.49E-04	4.46E-04	*2.32E-02*	0	0.9700011	0.01072872	0.01927018
	Naphthalene	0.065	0.0025			60.92	0	0	0	0.0001523	0.0002525	4.05E-04	0.00E+00	0.00E+00	2.50E-06	4.15E-06	*6.65E-06*	0	0	0.37622747	0.62377253
	N-nitrosodiphenylamine	0.065	0.0025			120.62	0	0	0	0.0001523	0.0002525	4.05E-04	0.00E+00	0.00E+00	1.26E-06	2.09E-06	*3.36E-06*	0	0	0.37622747	0.62377253
	Phenanthrene	0.13	0.0025		0.03	58.00	0	0.017604853	0.017604853	0.00030459	0.0002525	1.82E-02	0.00E+00	3.04E-04	5.25E-06	4.35E-06	*3.13E-04*	0	0.96932652	0.01677078	0.0139027
	Pyrene	0.27	0.0025		0.02	58.00	0	0.008323673	0.008323673	0.00063261	0.0002525	9.21E-03	0.00E+00	1.44E-04	1.09E-05	4.35E-06	*1.59E-04*	0	0.90388415	0.06869637	0.02741947
	Pesticides and PCBs																				
	4,4'-DDD	0.0012	0.00005	0.0033	6.20E-05	6.84	9.8498E-05	3.11922E-05	0.000129691	2.8116E-06	0.00000505	1.38E-04	1.44E-05	4.56E-06	4.11E-07	7.39E-07	*2.01E-05*	0.71608006	0.22676637	0.02044024	0.03671333
	4,4'-DDE	0.0017	0.00005	0.0080	7.38E-05	0.83	0.00023878	3.7141E-05	0.000275925	3.9831E-06	0.00000505	2.85E-04	2.89E-04	4.49E-05	4.82E-06	6.11E-06	*3.45E-04*	0.83796192	0.13033833	0.01397785	0.01772191
	4,4'-DDT	0.00055	0.00005	0.0011	8.83E-05	0.64	3.134E-05	4.44458E-05	7.57862E-05	1.2887E-06	0.00000505	8.21E-05	4.87E-05	6.91E-05	2.00E-06	7.85E-06	*1.28E-04*	0.38161896	0.54119794	0.01569135	0.06149174
	Aldrin	0.000265	0.000025	0.0003		0.16	8.059E-06	0	8.05896E-06	6.209E-07	0.000002525	1.12E-05	5.01E-05	0.00E+00	3.86E-06	1.57E-05	*6.97E-05*	0.71923822	0	0.05541303	0.22534874
	alpha-Chlordane	0.000265	0.000025	0.0006	2.71E-05	1.99	1.8506E-05	1.3646E-05	3.21517E-05	6.209E-07	0.000002525	3.53E-05	9.29E-06	6.85E-06	3.12E-07	1.27E-06	*1.77E-05*	0.52427795	0.38659718	0.01759028	0.07153458
	Aroclor 1248	0.0055	0.0005	0.0025		0.57	0.00007462	0	0.00007462	1.2887E-05	0.0000505	1.38E-04	1.32E-04	0.00E+00	2.28E-05	8.93E-05	*2.44E-04*	0.54069917	0	0.09337604	0.36592479
	Aroclor 1254	0.0055	0.0005	0.0220		0.15	0.00065666	0	0.000656656	1.2887E-05	0.0000505	7.20E-04	4.49E-03	0.00E+00	8.80E-05	3.45E-04	*4.92E-03*	0.91196839	0	0.01789686	0.07013475
	Aroclor 1260	0.0055	0.0005	0.0410	3.43E-04	0.28	0.00122377	0.000172833	0.001396601	1.2887E-05	0.0000505	1.46E-03	4.41E-03	6.23E-04	4.64E-05	1.82E-04	*5.26E-03*	0.83820471	0.1183795	0.00882645	0.03458935
	beta-BHC	0.000265	0.000025	0.0003		3.22	7.462E-06	0	0.000007462	6.209E-07	0.000002525	1.06E-05	2.32E-06	0.00E+00	1.93E-07	7.85E-07	*3.30E-06*	0.70343834	0	0.05853141	0.23803026
	delta-BHC	0.000265	0.000025	0.0003		1.29	7.462E-06	0	0.000007462	6.209E-07	0.000002525	1.06E-05	5.80E-06	0.00E+00	4.83E-07	1.96E-06	*8.24E-06*	0.70343834	0	0.05853141	0.23803026
	Endosulfan I	0.000265	0.000025	0.0003	4.36E-05	1.21	7.462E-06	2.19414E-05	2.94034E-05	6.209E-07	0.000002525	3.25E-05	6.19E-06	1.82E-05	5.15E-07	2.09E-06	*2.70E-05*	0.22925198	0.67409798	0.0190755	0.07757454
	Endosulfan Sulfate	0.00055	0.00005	0.0007		1.21	2.1341E-05	0	2.13413E-05	1.2887E-06	0.00000505	2.77E-05	1.77E-05	0.00E+00	1.07E-06	4.19E-06	*2.29E-05*	0.77100228	0	0.04655533	0.18244239
	Endrin Aldehyde	0.00055	0.00005	0.0030	1.69E-04	0.04	8.8052E-05	8.50454E-05	0.000173097	1.2887E-06	0.00000505	1.79E-04	2.20E-03	2.12E-03	3.22E-05	1.26E-04	*4.48E-03*	0.49071416	0.47396036	0.00718168	0.0281438
	gamma-Chlordane	0.000265	0.000025	0.0003	2.54E-05	1.99	7.462E-06	1.27984E-05	2.02604E-05	6.209E-07	0.000002525	2.34E-05	3.74E-06	6.42E-06	3.12E-07	1.27E-06	*1.17E-05*	0.31880273	0.54679363	0.02652681	0.10787683
	Inorganics																				
X	Aluminum	9602.5	0.140333333	52.700	1.60E+02	41.82	1.5729896	80.42109249	81.99408209	22.4986575	0.014173667	1.05E+02	3.76E-02	1.92E+00	5.38E-01	3.39E-04	*2.50E+00*	0.01505154	0.76952892	0.21528392	0.00013562
	Antimony	5.725	0.0006	0.055		0.05	0.00164164	0	0.00164164	0.01341368	0.0000606	1.51E-02	3.02E-02	0.00E+00	2.47E-01	1.11E-03	*2.78E-01*	0.10360342	0	0.88738756	0.00400902
X	Arsenic	241	0.012683333	2.700	12.70	0.05	0.0805896	6.391261294	6.471850894	0.28797813	0.001281017	6.76E+00	1.47E+00	1.17E+02	5.25E+00	2.34E-02	*1.23E+02*	0.01191958	0.94529763	0.04259332	0.00018947
	Barium	62.125	0.032083333	9.975	6.08	4.33	0.2977338	3.047985363	3.345719163	0.14555888	0.003240417	3.49E+00	6.88E-02	7.04E-01	3.36E-02	7.48E-04	*8.07E-01*	0.08520024	0.87221899	0.04165349	0.00092729
	Beryllium	0.565	4.56667E-05	0.007		0.53	0.00019401	0	0.000194012	0.0013238	4.61234E-06	1.52E-03	3.66E-04	0.00E+00	2.49E-03	8.69E-06	*2.87E-03*	0.12743664	0	0.86953375	0.00302961
	Cadmium	5.55	0.00056	0.111	0.59	0.78	0.0032982	0.299146355	0.302444559	0.01300365	0.00005656	3.16E-01	4.25E-03	3.86E-01	1.68E-02	7.29E-05	*4.07E-01*	0.01045374	0.94815161	0.04121538	0.00017927
X	Chromium	986.75	0.0062	2.200	18.44	7.24	0.0656656	9.278092454	9.343758054	2.31195525	0.0006262	1.17E+01	9.07E-03	1.28E+00	3.19E-01	8.65E-05	*1.61E+00*	0.00563347	0.79596965	0.19834316	5.3722E-05
	Cobalt	20.25	0.000985	0.540	1.80	4.02	0.01611792	0.904937235	0.921055155	0.04744575	0.000099485	9.69E-01	4.01E-03	2.25E-01	1.18E-02	2.47E-05	*2.41E-01*	0.01664042	0.93427304	0.04898382	0.00010271
X	Copper	407.25	0.007183333	62.250	20.63	12.23	1.858038	10.37809977	12.23613777	0.95418675	0.000725517	1.32E+01	1.52E-01	8.48E-01	7.80E-02	5.93E-05	*1.08E+00*	0.14085596	0.78675312	0.07233592	5.5001E-05
	Cyanide	0	0.0025	0.225		51.90	0.0067158	0	0.0067158	0	0.0002525	0.00E+00	1.29E-04	0.00E+00	0.00E+00	4.87E-06	*1.34E-04*	0.96376448	0	0	0.03623552
X	Iron	30475	1.209333333	342.500	2522.71	2.57	10.22294	1269.308753	1279.531693	71.402925	0.122142667	1.35E+03	3.99E+00	4.95E+02	2.78E+01	1.14E-02	*5.27E+02*	0.00756663	0.93949328	0.05284969	9.0405E-05
X	Lead	197.75	0.003308333	0.970	18.03	6.43	0.02895256	9.07374949	9.10270205	0.48332825	0.000334142	9.57E+00	4.50E-03	1.41E+00	7.20E-02	5.19E-05	*1.49E+00*	0.0030265	0.94850552	0.04843305	3.4929E-05
X	Manganese	593.75	0.5925	120.000	334.82	70.76	3.58176	168.4658181	172.0475781	1.39115625	0.0598425	1.73E+02	5.06E-02	2.38E+00	1.97E-02	8.46E-04	*2.45E+00*	0.02064432	0.97099251	0.00801826	0.00034492
X	Mercury	3.15	0.000115833	0.014	0.11	0.03	0.00041787	0.055519868	0.05593774	0.00738045	1.16992E-05	6.33E-02	1.62E-02	2.16E+00	2.87E-01	4.55E-04	*2.46E+00*	0.00659834	0.87667717	0.11653976	0.00018473
	Nickel	14.85	0.001633333	0.103	0.38	32.17	0.00305942	0.193021698	0.196081118	0.03479355	0.000164967	2.31E-01	9.51E-05	6.00E-03	1.08E-03	5.13E-06	*7.18E-03*	0.01324197	0.83544842	0.15059559	0.00071402
	Selenium	2.99875	0.00075	0.395	0.26	0.16	0.01178996	0.129646024	0.141435984	0.00702607	0.00007575	1.49E-01	7.33E-02	8.06E-01	4.37E-02	4.71E-04	*9.24E-01*	0.07937346	0.872815	0.04730157	0.00050997
	Silver	1.47375	0.000375	0.020		145.71	0.00058204	0	0.000582036	0.003453	0.000037875	4.07E-03	3.99E-06	0.00E+00	2.37E-05	2.60E-07	*2.80E-05*	0.14290431	0	0.84779644	0.00929925
	Thallium	0.39125	0.00085	0.133		0.06	0.00395486	0	0.00395486	0.0009167	0.00008585	4.96E-03	6.58E-02	0.00E+00	1.52E-02	1.43E-03	*8.24E-02*	0.79776758	0	0.1849149	0.01731751
X	Vanadium	30	0.000933333	0.158	1.04	0.16	0.00470106	0.525225951	0.529927011	0.07029	9.42667E-05	6.00E-01	3.00E-02	3.35E+00	4.48E-01	6.01E-04	*3.83E+00*	0.00783104	0.87492268	0.11708925	0.00015703
	Zinc	940.25	0.05855	27.750	36.40	128.66	0.828282	18.31441615	19.14269815	2.20300575	0.00591355	2.14E+01	6.44E-03	1.42E-01	1.71E-02	4.60E-05	*1.66E-01*	0.03879247	0.8577531	0.10317746	0.00027696

Table E.1-39. Exposure Calculatioins for Muskrat - Station UF

		Mean Concentrations																				
		Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
				Reach 6	Reach 6																	
		Inorganics																				
X		Aluminum	22200	0.205525	23.850	3.70E+02	41.82	0.7118748	185.9253583	186.6372331	52.0146	0.020758025	2.39E+02	1.70E-02	4.45E+00	1.24E+00	4.96E-04	*5.71E+00*	0.00298264	0.77899753	0.21793286	8.6973E-05
		Antimony	0	0.0006	0.047		0.05	0.00140286	0	0.001402856	0	0.0000606	0.00E+00	2.58E-02	0.00E+00	0.00E+00	1.11E-03	*2.69E-02*	0.95859117	0	0	0.04140883
X		Arsenic	124	0.0035875	0.240	6.54	0.05	0.00716352	3.288449794	3.295613314	0.14817132	0.000362338	3.44E+00	1.31E-01	6.00E+01	2.70E+00	6.61E-03	*6.28E+01*	0.00207991	0.95479369	0.0430212	0.0001052
X		Barium	181	0.0376	2.000	17.65	4.33	0.059696	8.880247094	8.939943094	0.424083	0.0037976	9.37E+00	1.38E-02	2.05E+00	9.79E-02	8.77E-04	*2.16E+00*	0.00637245	0.94795199	0.04527017	0.00040539
		Beryllium	1.2	0.000040625	0.006		0.53	0.00017909	0	0.000179088	0.0028116	4.10313E-06	2.99E-03	3.37E-04	0.00E+00	5.30E-03	7.73E-06	*5.64E-03*	0.05979983	0	0.93883008	0.00137009
		Cadmium	11.7	0.000049625	0.063	1.25	0.78	0.0018655	0.630632857	0.632498357	0.0274131	5.01213E-06	6.60E-01	2.41E-03	8.13E-01	3.53E-02	6.46E-06	*8.51E-01*	0.00282687	0.95562527	0.04154026	7.5951E-06
		Chromium	467	0.0016675	0.200	8.73	7.24	0.0059696	4.391050596	4.397020196	1.094181	0.000168418	5.49E+00	8.25E-04	6.07E-01	1.51E-01	2.33E-05	*7.59E-01*	0.00108709	0.79962758	0.19925466	3.0669E-05
		Cobalt	27.15	0.0002575	0.270	2.41	4.02	0.00805896	1.213286218	1.221345178	0.06361245	2.60075E-05	1.28E+00	2.00E-03	3.02E-01	1.58E-02	6.47E-06	*3.20E-01*	0.00827164	0.94420363	0.04950448	2.024E-05
X		Copper	523	0.004375	40.550	26.49	12.23	1.2103364	13.32779909	14.53813549	1.225389	0.000441875	1.58E+01	9.89E-02	1.09E+00	1.00E-01	3.61E-05	*1.29E+00*	0.07877867	0.84545975	0.07773355	2.8031E-05
		Cyanide	1.4	0.0025	0.190		51.90	0.00567112	0	0.00567112	0.0032802	0.0002525	9.20E-03	1.09E-04	0.00E+00	6.32E-05	4.87E-06	*1.77E-04*	0.61817024	0	0.3563955	0.02743426
X		Iron	45600	0.65775	88.250	3774.76	2.57	2.634086	1899.277413	1901.911499	106.8408	0.06643275	2.01E+03	1.03E+00	7.40E+02	4.16E+01	2.59E-02	*7.83E+02*	0.00131126	0.94546978	0.05318588	3.3071E-05
X		Lead	733.5	0.00343125	0.213	66.89	6.43	0.0063427	33.65661315	33.66295585	1.7185905	0.000346556	3.54E+01	9.86E-04	5.23E+00	2.67E-01	5.39E-05	*5.50E+00*	0.00017926	0.95123834	0.0485726	9.7947E-06
X		Manganese	900.5	0.176575	79.100	507.80	70.76	2.3609768	255.5005796	257.8615564	2.1098715	0.017834075	2.60E+02	3.34E-02	3.61E+00	2.98E-02	2.52E-04	*3.67E+00*	0.00908106	0.98273512	0.00811523	6.8595E-05
X		Mercury	1.85	0.00006775	0.008	0.06	0.03	0.00023878	0.032606907	0.032845691	0.00433455	6.84275E-06	3.72E-02	9.28E-03	1.27E+00	1.68E-01	2.66E-04	*1.45E+00*	0.00842115	0.8768342	0.11656063	0.00018401
		Nickel	46.95	0.0013725	0.042	1.21	32.17	0.00123869	0.610260519	0.611499211	0.11000385	0.000138623	7.22E-01	3.85E-05	1.90E-02	3.42E-03	4.31E-06	*2.24E-02*	0.00171649	0.84565586	0.15243555	0.00019209
		Selenium	2.25	0.00075	0.515	0.19	0.16	0.01537172	0.097275049	0.112646769	0.00527175	0.00007575	1.18E-01	9.56E-02	6.05E-01	3.28E-02	4.71E-04	*7.34E-01*	0.13027514	0.82440486	0.04467802	0.00064198
		Silver	0.81	0.0003725	0.064		145.71	0.00189535	0	0.001895348	0.00189783	3.76225E-05	3.83E-03	1.30E-05	0.00E+00	1.30E-05	2.58E-07	*2.63E-05*	0.49476552	0	0.49541343	0.00982105
		Thallium	0.77	0.00085	0.065		0.06	0.00194012	0	0.00194012	0.00180411	0.00008585	3.83E-03	3.23E-02	0.00E+00	3.00E-02	1.43E-03	6.37E-02	0.50654817	0	0.47103716	0.02241468
X		Vanadium	82.1	0.00086375	0.042	2.86	0.16	0.00125362	1.437368354	1.43862197	0.1923603	8.72388E-05	1.63E+00	8.00E-03	9.17E+00	1.23E+00	5.56E-04	*1.04E+01*	0.00076859	0.88124286	0.11793507	5.3486E-05
		Zinc	2330	0.022325	18.350	90.20	128.66	0.5477108	45.38430165	45.93201245	5.45919	0.002254825	5.14E+01	4.26E-03	3.53E-01	4.24E-02	1.75E-05	*3.99E-01*	0.01065721	0.88307547	0.10622344	4.3874E-05

	Mean Concentrations Compound	C Sediment (mg/Kg)	C Water (mg/L)	C Animal (mg/Kg)	C Plant (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0	0.0025			9.730183192	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E-05	*2.60E-05*	0	0	0	1
	Acetone	0	0.0025			1367.050531	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E-07	*1.85E-07*	0	0	0	1
	cis-1,2-Dichloroethene	0.082	0.000583333			2504.114914	0	0	0	0.00019213	5.89167E-05	2.51E-04	0.00E+00	0.00E+00	7.87E-08	2.35E-08	*1.00E-07*	0	0	0.76531215	0.23468785
	Tetrachloroethene	0.1185	0.0005			6.09153838	0	0	0	0.00027765	0.0000505	3.28E-04	0.00E+00	0.00E+00	4.56E-05	8.29E-06	*5.39E-05*	0	0	0.84610485	0.15389515
	Trichloroethene	0.042	0.0005			3.04576919	0	0	0	9.8406E-05	0.0000505	1.49E-04	0.00E+00	0.00E+00	3.23E-05	1.66E-05	*4.89E-05*	0	0	0.66085987	0.33914013
	Semivolatile Organics																				
	2-Methylnaphthalene	0.003	0.0025			62.53	0	0	0	7.029E-06	0.0002525	2.60E-04	0.00E+00	0.00E+00	1.12E-07	4.04E-06	*4.15E-06*	0	0	0.02708368	0.97291632
	Acenaphthylene	0.001	0.0025			58.00	0	0	0	2.343E-06	0.0002525	2.55E-04	0.00E+00	0.00E+00	4.04E-08	4.35E-06	*4.39E-06*	0	0	0.0091939	0.9908061
	Anthracene	0.018	0.0025			435.11	0	0	0	4.2174E-05	0.0002525	2.95E-04	0.00E+00	0.00E+00	9.69E-08	5.80E-07	*6.77E-07*	0	0	0.14312087	0.85687913
	Benzo(a)anthracene	0.13	0.0025			0.57	0	0	0	0.00030459	0.0002525	5.57E-04	0.00E+00	0.00E+00	5.38E-04	4.46E-04	*9.85E-04*	0	0	0.54675187	0.45324813
	Benzo(a)pyrene	0.16	0.0025		0.03	0.57	0	0.012772784	0.012772784	0.00037488	0.0002525	1.34E-02	0.00E+00	2.26E-02	6.63E-04	4.46E-04	*2.37E-02*	0	0.95318117	0.02797578	0.01884305
	Benzo(b)fluoranthene	0.29	0.0025		0.02	0.57	0	0.011102752	0.011102752	0.00067947	0.0002525	1.20E-02	0.00E+00	1.96E-02	1.20E-03	4.46E-04	*2.13E-02*	0	0.92255991	0.05645914	0.02098096
	Benzo(g,h,i)perylene	0.12	0.0025			58.00	0	0	0	0.00028116	0.0002525	5.34E-04	0.00E+00	0.00E+00	4.85E-06	4.35E-06	*9.20E-06*	0	0	0.5268523	0.4731477
	Benzo(k)fluoranthene	0.2	0.0025		0.04	0.57	0	0.020025962	0.020025962	0.0004686	0.0002525	2.07E-02	0.00E+00	3.54E-02	8.28E-04	4.46E-04	*3.67E-02*	0	0.96524327	0.02258633	0.0121704
	Carbazole	0	0			58.00014758	0	0	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*				
	Chrysene	0.23	0.0025		0.03	0.57	0	0.013498033	0.013498033	0.00053889	0.0002525	1.43E-02	0.00E+00	2.39E-02	9.53E-04	4.46E-04	*2.53E-02*	0	0.94461708	0.03771251	0.01767041
	Dibenz(a,h)anthracene	0.046	0.0025			0.57	0	0	0	0.00010778	0.0002525	3.60E-04	0.00E+00	0.00E+00	1.91E-04	4.46E-04	*6.37E-04*	0	0	0.29915232	0.70084768
	Dibenzofuran	0	0.0025			58.00	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.35E-06	*4.35E-06*	0	0	0	1
	Fluoranthene	0.41	0.0025		0.02	54.39	0	0.009746032	0.009746032	0.00096063	0.0002525	1.10E-02	0.00E+00	1.79E-04	1.77E-05	4.64E-06	*2.01E-04*	0	0.88930449	0.08765542	0.02304008
	Fluorene	0.014	0.0025			54.39	0	0	0	3.2802E-05	0.0002525	2.85E-04	0.00E+00	0.00E+00	6.03E-07	4.64E-06	*5.25E-06*	0	0	0.11497291	0.88502709
	Indeno(1,2,3-cd)pyrene	0.14	0.0025		0.06	0.57	0	0.029656823	0.029656823	0.00032802	0.0002525	3.02E-02	0.00E+00	5.24E-02	5.80E-04	4.46E-04	*5.35E-02*	0	0.98080122	0.01084818	0.0083506
	Naphthalene	0.012	0.0025			60.92	0	0	0	2.8116E-05	0.0002525	0.00E+00	0.00E+00	0.00E+00	4.62E-07	4.15E-06	*4.61E-06*	0	0	0.10019386	0.89980614
	N-nitrosodiphenylamine	0	0.0025			120.62	0	0	0	0	0.0002525	2.53E-04	0.00E+00	0.00E+00	0.00E+00	2.09E-06	*2.09E-06*	0	0	0	1
	Phenanthrene	0.16	0.0025		0.04	58.00	0	0.021667512	0.021667512	0.00037488	0.0002525	2.23E-02	0.00E+00	3.74E-04	6.46E-06	4.35E-06	*3.84E-04*	0	0.97185992	0.01681461	0.01132546
	Pyrene	0.34	0.0025		0.02	58.00	0	0.010481663	0.010481663	0.00079662	0.0002525	1.15E-02	0.00E+00	1.81E-04	1.37E-05	4.35E-06	*1.99E-04*	0	0.90901572	0.06908638	0.02189791
	Pesticides and PCBs																				
	4,4'-DDD	0.009	0.00005	0.0006	4.65E-04	6.84	1.9252E-05	0.000233942	0.000253194	2.1087E-05	0.00000505	2.79E-04	2.82E-06	3.42E-05	3.09E-06	7.39E-07	*4.09E-05*	0.06892177	0.8375081	0.07549119	0.01807894
	4,4'-DDE	0.0032	0.00005	0.0010	1.39E-04	0.83	2.9102E-05	6.99124E-05	9.90142E-05	7.4976E-06	0.00000505	1.12E-04	3.52E-05	8.46E-05	9.07E-06	6.11E-06	*1.35E-04*	0.26085813	0.62666967	0.06720581	0.04526639
	4,4'-DDT	0.000165	0.00005	0.0011	2.65E-05	0.64	3.2087E-05	1.33337E-05	4.54203E-05	3.866E-07	0.00000505	5.09E-05	4.99E-05	2.07E-05	6.01E-07	7.85E-06	*7.91E-05*	0.63091887	0.26218135	0.00760162	0.09929816
	Aldrin	0.00008	0.000025	0.0003		0.16	9.1036E-06	0	9.10364E-06	1.8744E-07	0.000002525	1.18E-05	5.66E-05	0.00E+00	1.17E-06	1.57E-05	*7.35E-05*	0.77044502	0	0.01586313	0.21369185
	alpha-Chlordane	0.00098	2.17286E-05	0.0006	1.00E-04	1.99	1.8655E-05	5.04643E-05	6.91193E-05	2.2961E-06	2.19459E-06	7.36E-05	9.36E-06	2.53E-05	1.15E-06	1.10E-06	*3.69E-05*	0.25343016	0.68556282	0.03119331	0.02981372
	Aroclor 1248	0.035	0.0005	0.0025		0.57	0.00007462	0	0.00007462	8.2005E-05	0.0000505	2.07E-04	1.32E-04	0.00E+00	1.45E-04	8.93E-05	*3.66E-04*	0.36026554	0	0.39592034	0.24381412
	Aroclor 1254	0.00165	0.0005	0.0195		0.15	0.00058204	0	0.000582036	3.866E-06	0.0000505	6.36E-04	3.98E-03	0.00E+00	2.64E-05	3.45E-04	*4.35E-03*	0.91457294	0	0.0060747	0.07935237
	Aroclor 1260	0.011	0.0005	0.0215	6.87E-04	0.28	0.00064173	0.000345665	0.000987397	2.5773E-05	0.0000505	1.06E-03	2.31E-03	1.25E-03	9.29E-05	1.82E-04	*3.83E-03*	0.60331866	0.32497395	0.02423026	0.04747713
	beta-BHC	0.00008	0.000025	0.0003		3.22	7.6112E-06	0	7.61124E-06	1.8744E-07	0.000002525	1.03E-05	2.37E-06	0.00E+00	5.83E-08	7.85E-07	*3.21E-06*	0.73726036	0	0.01815632	0.24458333
	delta-BHC	0.00008	0.000025	0.0003		1.29	7.6112E-06	0	7.61124E-06	1.8744E-07	0.000002525	1.03E-05	5.92E-06	0.00E+00	1.46E-07	1.96E-06	*8.02E-06*	0.73726036	0	0.01815632	0.24458333
	Endosulfan I	0.00044	0.000025	0.0006	7.24E-05	1.21	1.8655E-05	3.64311E-05	5.50861E-05	1.0309E-06	0.000002525	5.86E-05	1.55E-05	3.02E-05	8.55E-07	2.09E-06	*4.86E-05*	0.31811674	0.62124549	0.01757989	0.04305788
	Endosulfan Sulfate	0.000165	0.00005	0.0009		1.21	2.8206E-05	0	2.82064E-05	3.866E-07	0.00000505	3.36E-05	2.34E-05	0.00E+00	3.21E-07	4.19E-06	*2.79E-05*	0.83840317	0	0.01149111	0.15010572
	Endrin Aldehyde	0.000165	0.00005	0.0022	5.07E-05	0.04	6.5666E-05	2.55136E-05	9.11792E-05	3.866E-07	0.00000505	9.66E-05	1.64E-03	6.37E-04	9.66E-06	1.26E-04	*2.41E-03*	0.6796569	0.26407285	0.00400136	0.05226888
	gamma-Chlordane	0.00059	2.16286E-05	0.0003	5.66E-05	1.99	7.6112E-06	2.84946E-05	3.61059E-05	1.3824E-06	2.18449E-06	3.97E-05	3.82E-06	1.43E-05	6.94E-07	1.10E-06	*1.99E-05*	0.19185075	0.71824215	0.03484435	0.05506275
	Inorganics																				
X	Aluminum	13754.7619	0.386114286	47.900	2.29E+02	41.82	1.4297192	115.1963529	116.6260721	32.2274071	0.038997543	1.49E+02	3.42E-02	2.75E+00	7.71E-01	9.33E-04	*3.56E+00*	0.00960236	0.7736882	0.21644752	0.00026192
	Antimony	5.9894737	0.000692857	0.050		0.05	0.00148494	0	0.001484938	0.01403334	6.99786E-05	1.56E-02	2.73E-02	0.00E+00	2.58E-01	1.29E-03	*2.87E-01*	0.09526006	0	0.90025075	0.00448919
X	Arsenic	136.383333	0.024585714	3.750	7.19	0.05	0.11193	3.616852777	3.728782777	0.16296854	0.002483157	3.89E+00	2.04E+00	6.60E+01	2.97E+00	4.53E-02	*7.10E+01*	0.02874249	0.92877119	0.04184867	0.00063765
	Barium	78.5904762	0.037342857	8.800	7.66	4.33	0.2626624	3.855816839	4.118479239	0.18413749	0.003771629	4.31E+00	6.07E-02	8.90E-01	4.25E-02	8.71E-04	*9.94E-01*	0.06099366	0.89537137	0.04275915	0.00087582
	Beryllium	1.2159524	6.37857E-05	0.006		0.53	0.00017909	0	0.000179088	0.00284898	6.44236E-06	3.03E-03	3.37E-04	0.00E+00	5.37E-03	1.21E-05	*5.72E-03*	0.05901717	0	0.9388598	0.00212303
	Cadmium	5.2114286	0.00043	0.057	0.56	0.78	0.00170134	0.280897274	0.28259861	0.01221038	0.00004343	2.95E-01	2.19E-03	3.62E-01	1.57E-02	5.60E-05	*3.80E-01*	0.00577013	0.95267075	0.04141183	0.00014729
	Chromium	560.990476	0.025785714	0.895	10.48	7.24	0.02571396	5.274812773	5.301526733	1.31440069	0.002604357	6.62E+00	3.69E-03	7.29E-01	1.82E-01	3.60E-04	*9.14E-01*	0.00403624	0.79697627	0.198594	0.00039349
	Cobalt	15.7238095	0.00146857	0.485	1.40	4.02	0.01447628	0.702669664	0.717145944	0.03684089	0.000148326	7.54E-01	3.60E-03	1.75E-01	9.16E-03	3.69E-05	*1.88E-01*	0.01919587	0.93175561	0.04885183	0.00019668
X	Copper	482.752381	0.021542857	54.350	24.45	12.23	1.6222388	12.30215439	13.92439319	1.13108883	0.002175829	1.51E+01	1.33E-01	1.01E+00	9.25E-02	1.78E-04	*1.23E+00*	0.10773513	0.81700318	0.07511718	0.0001445
	Cyanide	0.8715	0.0025	0.268		51.90	0.00798434	0	0.00798434	0.00204192	0.0002525	1.03E-02	1.54E-04	0.00E+00	3.93E-05	4.87E-06	*1.98E-04*	0.77678013	0	0.19865466	0.02456521
X	Iron	20480	2.401	577.500	1695.33	2.57	17.23722	853.008803	870.246023	47.98464	0.242501	9.18E+02	6.72E+00	3.33E+02	1.87E+01	9.45E-02	*3.58E+02*	0.01876725	0.9287248	0.05224392	0.00026403
X	Lead	428.638095	0.013072856	0.515	39.09	6.43	0.01537172	19.66803893	19.68341065	1.00429906	0.001320358	2.07E+01	2.39E-03	3.06E+00	1.56E-01	2.05E-04	*3.22E+00*	0.00074299	0.9506506	0.04854259	6.3819E-05
X	Manganese	702.280952	0.469714286	88.700	396.02	70.76	2.6475176	199.2595118	201.9070294	1.645444427	0.047441143	2.04E+02	3.74E-02	2.82E+00	2.33E-02	6.70E-04	*2.88E+00*	0.01300353	0.97868171	0.00808175	0.00023301
X	Mercury	1.3652381	0.000203929	0.009	0.05	0.03	0.00026863	0.024062806	0.024331438	0.00319875	2.05968E-05	2.76E-02	1.04E-02	9.35E-01	1.24E-01	8.00E-04	*1.07E+00*	0.00975043	0.87339811	0.11610386	0.00074759
	Nickel	28.3047619	0.002842857	0.068	0.73	32.17	0.00201474	0.367907959	0.369922699	0.06631806	0.000287129	4.37E-01	6.26E-05	1.14E-02	2.06E-03	8.93E-06	*1.36E-02*	0.00461538	0.84280517	0.1519217	0.00065776
X	Selenium	3.6542857	0.000857143	0.330	0.31	0.16	0.00984984	0.157987031	0.167836871	0.00856199	8.65714E-05	1.76E-01	6.12E-02	9.82E-01	5.32E-02	5.38E-04	*1.10E+00*	0.05581106	0.89518454	0.04851387	0.00049053
	Silver	0.3811905	0.00025	0.037		145.71	0.00110438	0	0.001104376	0.00089313	0.00002525	2.02E-03	7.58E-06	0.00E+00	6.13E-06	1.73E-07	*1.39E-05*	0.54597606	0	0.44154096	0.01248297
	Thallium	0.3595238	0.000778571	0.068		0.06	0.00201474	0	0.00201474	0.00084236	7.86357E-05	2.94E-03	3.35E-02	0.00E+00	1.40E-02	1.31E-03	*4.88E-02*	0.68628013	0	0.28693422	0.02678565
X	Vanadium	53.9380952	0.001878929	0.138	1.88	0.16	0.0041041	0.944322912	0.948427012	0.12637696	0.000189772	1.07E+00	2.62E-02	6.02E+00	8.06E-01	1.21E-03	*6.86E+00*	0.00381779	0.87844503	0.11756064	0.00017653
	Zinc	866.338095	0.127785714	28.750	33.54	128.66	0.85813	16.87474225	17.73287225	2.02983016	0.012906357	1.98E+01	6.67E-03	1.31E-01	1.58E-02	1.00E-04	*1.54E-01*	0.04339335	0.85331089	0.10264312	0.00065264

Table E.1-41. Exposure Calculatioins for Muskrat - Station WH

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0	0.0025			9.730183192	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E-05	*2.60E-05*	0	0	0	1
	Acetone	2.7	0.0025			1367.050531	0	0	0	0.0063261	0.0002525	6.58E-03	0.00E+00	0.00E+00	4.63E-06	1.85E-07	*4.81E-06*	0	0	0.96161797	0.03838203
	cis-1,2-Dichloroethene	0	0.000583333			2504.114914	0	0	0	0	5.89167E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.35E-08	*2.35E-08*	0	0	0	1
	Tetrachloroethene	0	0.0005			6.09153838	0	0	0	0	0.0000505	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.29E-06	*8.29E-06*	0	0	0	1
	Trichloroethene	0	0.0005			3.04576919	0	0	0	0	0.0000505	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-05	*1.66E-05*	0	0	0	1
	Semivolatile Organics																				
	2-Methylnaphthalene	0.3	0.0025			62.53	0	0	0	0.0007029	0.0002525	9.55E-04	0.00E+00	0.00E+00	1.12E-05	4.04E-06	*1.53E-05*	0	0	0.73571279	0.26428721
	Acenaphthylene	0.3	0.0025			58.00	0	0	0	0.0007029	0.0002525	9.55E-04	0.00E+00	0.00E+00	1.21E-05	4.35E-06	*1.65E-05*	0	0	0.73571279	0.26428721
	Anthracene	0.3	0.0025			435.11	0	0	0	0.0007029	0.0002525	9.55E-04	0.00E+00	0.00E+00	1.62E-06	5.80E-07	*2.20E-06*	0	0	0.73571279	0.26428721
	Benzo(a)anthracene	0.3	0.0025			0.57	0	0	0	0.0007029	0.0002525	9.55E-04	0.00E+00	0.00E+00	1.24E-03	4.46E-04	*1.69E-03*	0	0	0.73571279	0.26428721
	Benzo(a)pyrene	0	0.0025		0.00	0.57	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.46E-04	*4.46E-04*	0	0	0	1
	Benzo(b)fluoranthene	0.3	0.0025		0.02	0.57	0	0.011485606	0.011485606	0.0007029	0.0002525	1.24E-02	0.00E+00	2.03E-02	1.24E-03	4.46E-04	*2.20E-02*	0	0.92320556	0.05649865	0.02029579
	Benzo(g,h,i)perylene	0.3	0.0025			58.00	0	0	0	0.0007029	0.0002525	9.55E-04	0.00E+00	0.00E+00	1.21E-05	4.35E-06	*1.65E-05*	0	0	0.73571279	0.26428721
	Benzo(k)fluoranthene	0.66	0.0025		0.13	0.57	0	0.066085674	0.066085674	0.00154638	0.0002525	6.79E-02	0.00E+00	1.17E-01	2.73E-03	4.46E-04	*1.20E-01*	0	0.97350089	0.02277956	0.00371955
	Carbazole	0.3	0			58.00014758	0	0	0	0.0007029	0	7.03E-04	0.00E+00	0.00E+00	1.21E-05	0.00E+00	*1.21E-05*	0	0	1	0
	Chrysene	0.3	0.0025		0.03	0.57	0	0.01760613	0.01760613	0.0007029	0.0002525	1.86E-02	0.00E+00	3.11E-02	1.24E-03	4.46E-04	*3.28E-02*	0	0.94852795	0.03786865	0.0136034
	Dibenz(a,h)anthracene	0.3	0.0025			0.57	0	0	0	0.0007029	0.0002525	9.55E-04	0.00E+00	0.00E+00	1.24E-03	4.46E-04	*1.69E-03*	0	0	0.73571279	0.26428721
	Dibenzofuran	0.3	0.0025			58.00	0	0	0	0.0007029	0.0002525	9.55E-04	0.00E+00	0.00E+00	1.21E-05	4.35E-06	*1.65E-05*	0	0	0.73571279	0.26428721
	Fluoranthene	0.3	0.0025		0.01	54.39	0	0.007131243	0.007131243	0.0007029	0.0002525	8.09E-03	0.00E+00	1.31E-04	1.29E-05	4.64E-06	*1.49E-04*	0	0.88185456	0.08692111	0.03122433
	Fluorene	0.3	0.0025			54.39	0	0	0	0.0007029	0.0002525	9.55E-04	0.00E+00	0.00E+00	1.29E-05	4.64E-06	*1.76E-05*	0	0	0.73571279	0.26428721
	Indeno(1,2,3-cd)pyrene	0.3	0.0025		0.13	0.57	0	0.063550335	0.063550335	0.0007029	0.0002525	6.45E-02	0.00E+00	1.12E-01	1.24E-03	4.46E-04	*1.14E-01*	0	0.98518891	0.01089671	0.00391438
	Naphthalene	0.3	0.0025			60.92	0	0	0	0.0007029	0.0002525	9.55E-04	0.00E+00	0.00E+00	1.15E-05	4.15E-06	*1.57E-05*	0	0	0.73571279	0.26428721
	N-nitrosodiphenylamine	0.3	0.0025			120.62	0	0	0	0.0007029	0.0002525	9.55E-04	0.00E+00	0.00E+00	5.83E-06	2.09E-06	*7.92E-06*	0	0	0.73571279	0.26428721
	Phenanthrene	0.3	0.0025		0.08	58.00	0	0.040626584	0.040626584	0.0007029	0.0002525	4.16E-02	0.00E+00	7.00E-04	1.21E-05	4.35E-06	*7.17E-04*	0	0.9770237	0.01690396	0.00607234
	Pyrene	0.3	0.0025		0.02	58.00	0	0.009248526	0.009248526	0.0007029	0.0002525	1.02E-02	0.00E+00	1.59E-04	1.21E-05	4.35E-06	*1.76E-04*	0	0.90636937	0.06888525	0.02474538
	Pesticides and PCBs																				
	4,4'-DDD	0.00245	0.00005	0.0006	1.27E-04	6.84	1.9252E-05	6.36841E-05	8.29361E-05	5.7404E-06	0.00000505	9.37E-05	2.82E-06	9.32E-06	8.40E-07	7.39E-07	*1.37E-05*	0.2054059	0.67946808	0.0612458	0.05388022
	4,4'-DDE	0.00245	0.00005	0.0010	1.06E-04	0.83	2.9102E-05	5.35267E-05	8.26285E-05	5.7404E-06	0.00000505	9.34E-05	3.52E-05	6.47E-05	6.94E-06	6.11E-06	*1.13E-04*	0.31151966	0.57297525	0.06144747	0.05405763
	4,4'-DDT	0.00245	0.00005	0.0011	3.93E-04	0.64	3.2087E-05	0.000197986	0.000230072	5.7404E-06	0.00000505	2.41E-04	4.99E-05	3.08E-04	8.92E-06	7.85E-06	*3.74E-04*	0.13321527	0.82198599	0.02383245	0.02096629
	Aldrin	0.00125	0.000025	0.0003		0.16	9.1036E-06	0	9.10364E-06	2.9288E-06	0.000002525	1.46E-05	5.66E-05	0.00E+00	1.82E-05	1.57E-05	*9.05E-05*	0.6253621	0	0.20118648	0.17345142
	alpha-Chlordane	0.00125	2.17286E-05	0.0006	1.28E-04	1.99	1.8655E-05	6.43677E-05	8.30227E-05	2.9288E-06	2.19459E-06	8.81E-05	9.36E-06	3.23E-05	1.47E-06	1.10E-06	*4.42E-05*	0.21163736	0.73023936	0.0332261	0.02489718
	Aroclor 1248	0.0245	0.0005	0.0025		0.57	0.00007462	0	0.00007462	5.7404E-05	0.0000505	1.83E-04	1.32E-04	0.00E+00	1.01E-04	8.93E-05	*3.23E-04*	0.40882407	0	0.31449923	0.2766767
	Aroclor 1254	0.0245	0.0005	0.0195		0.15	0.00058204	0	0.000582036	5.7404E-05	0.0000505	6.90E-04	3.98E-03	0.00E+00	3.92E-04	3.45E-04	*4.71E-03*	0.8436044	0	0.08320077	0.07319482
	Aroclor 1260	0.0245	0.0005	0.0215	1.53E-03	0.28	0.00064173	0.00076989	0.001411622	5.7404E-05	0.0000505	1.52E-03	2.31E-03	2.78E-03	2.07E-04	1.82E-04	*5.48E-03*	0.42232384	0.50666486	0.03777724	0.03323405
	beta-BHC	0.00125	0.000025	0.0003		3.22	7.6112E-06	0	7.61124E-06	2.9288E-06	0.000002525	1.31E-05	2.37E-06	0.00E+00	9.11E-07	7.85E-07	*4.06E-06*	0.58256761	0	0.2241678	0.19326459
	delta-BHC	0.00125	0.000025	0.0003		1.29	7.6112E-06	0	7.61124E-06	2.9288E-06	0.000002525	1.31E-05	5.92E-06	0.00E+00	2.28E-06	1.96E-06	*1.02E-05*	0.58256761	0	0.2241678	0.19326459
	Endosulfan I	0.00125	0.000025	0.0006	2.06E-04	1.21	1.8655E-05	0.000103497	0.000122152	2.9288E-06	0.000002525	1.28E-04	1.55E-05	8.58E-05	2.43E-06	2.09E-06	*1.06E-04*	0.14819205	0.81106902	0.02295149	0.01978745
	Endosulfan Sulfate	0.00245	0.00005	0.0009		1.21	2.8206E-05	0	2.82064E-05	5.7404E-06	0.00000505	3.90E-05	2.34E-05	0.00E+00	4.76E-06	4.19E-06	*3.23E-05*	0.72330102	0	0.14720088	0.1294981
	Endrin Aldehyde	0.00245	0.00005	0.0022	7.53E-04	0.04	6.5666E-05	0.000378838	0.000444504	5.7404E-06	0.00000505	4.55E-04	1.64E-03	9.46E-03	1.43E-04	1.26E-04	*1.14E-02*	0.14422667	0.83207361	0.012608	0.01109172
	gamma-Chlordane	0.00125	2.16286E-05	0.0003	1.20E-04	1.99	7.6112E-06	6.03699E-05	6.79812E-05	2.9288E-06	2.18449E-06	7.31E-05	3.82E-06	3.03E-05	1.47E-06	1.10E-06	*3.67E-05*	0.10412887	0.82591725	0.04006803	0.02988584
	Inorganics																				
X	Aluminum	10695	0.386114286	47.900	1.78E+02	41.82	1.4297192	89.57079762	91.00051682	25.058385	0.038997543	1.16E+02	3.42E-02	2.14E+00	5.99E-01	9.33E-04	*2.78E+00*	0.01231477	0.77151092	0.2158384	0.0003359
	Antimony	21.6954545	0.000692857	0.050		0.05	0.00148494	0	0.001484938	0.05083245	6.99786E-05	5.24E-02	2.73E-02	0.00E+00	9.35E-01	1.29E-03	*9.63E-01*	0.02834535	0	0.97031886	0.00133579
X	Arsenic	114.109091	0.024585714	3.750	6.01	0.05	0.11193	3.026145294	3.138075294	0.13635238	0.002483157	3.28E+00	2.04E+00	5.52E+01	2.49E+00	4.53E-02	*5.98E+01*	0.03415717	0.92347502	0.04161004	0.00075777
X	Barium	81.4545455	0.037342857	8.800	7.94	4.33	0.2626824	3.996334204	4.258996604	0.190848	0.003771629	4.45E+00	6.07E-02	9.23E-01	4.41E-02	8.71E-04	*1.03E+00*	0.05897733	0.89732343	0.04285237	0.00084687
	Beryllium	0.9245455	6.37857E-05	0.006		0.53	0.00017909	0	0.000179088	0.00216621	6.44236E-06	2.35E-03	3.37E-04	0.00E+00	4.08E-03	1.21E-05	*4.43E-03*	0.07615126	0	0.92110934	0.0027394
	Cadmium	5.8790909	0.00043	0.057	0.63	0.78	0.00170134	0.316884435	0.318585771	0.01377471	0.00004343	3.32E-01	2.19E-03	4.09E-01	1.78E-02	5.60E-05	*4.29E-01*	0.00511828	0.95331139	0.04143967	0.00013065
	Chromium	346.463636	0.025785714	0.895	6.47	7.24	0.02671396	3.25768599	3.28439995	0.8117643	0.002604357	4.10E+00	3.69E-03	4.50E-01	1.12E-01	3.60E-04	*5.66E-01*	0.00651756	0.79479627	0.19805078	0.0006354
	Cobalt	12.1954545	0.00146857	0.485	1.08	4.02	0.01447628	0.544993623	0.559469903	0.02857395	0.000148326	5.88E-01	3.60E-03	1.36E-01	7.11E-03	3.69E-05	*1.46E-01*	0.02461148	0.92655707	0.04857928	0.00025217
	Copper	247.872727	0.021542857	54.350	12.55	12.23	1.6222388	6.316630801	7.938869601	0.5807658	0.002175829	8.52E+00	1.33E-01	5.16E-01	4.75E-02	1.78E-04	*6.97E-01*	0.19036315	0.74123102	0.06815051	0.00025532
	Cyanide	0.569	0.0025	0.268		51.90	0.00798434	0	0.00798434	0.00133317	0.0002525	9.57E-03	1.54E-04	0.00E+00	2.57E-05	4.87E-06	*1.84E-04*	0.83430869	0	0.13930679	0.02638452
X	Iron	24718.1818	2.401	577.500	2046.17	2.57	17.23722	1029.532553	1046.769773	57.9147	0.242501	1.10E+03	6.72E+00	4.01E+02	2.26E+01	9.45E-02	*4.31E+02*	0.01560033	0.93176525	0.05241496	0.00021947
X	Lead	1515.72727	0.013072856	0.515	138.23	6.43	0.01537172	69.54907493	69.56444665	3.551349	0.001320358	7.31E+01	2.39E-03	1.08E+01	5.52E-01	2.05E-04	*1.14E+01*	0.00021023	0.95120101	0.04857069	1.8058E-05
X	Manganese	250.3	0.469714286	88.700	141.15	70.76	2.6475176	71.0180956	73.6656132	0.5864529	0.047441143	7.43E+01	3.74E-02	1.00E+00	8.29E-03	6.70E-04	*1.05E+00*	0.03563304	0.95583535	0.00789309	0.00063851
	Mercury	0.5385	0.000203929	0.009	0.02	0.03	0.00026863	0.009491254	0.009759886	0.00126171	2.05968E-05	1.10E-02	1.04E-02	3.69E-01	4.90E-02	8.00E-04	*4.29E-01*	0.02432779	0.85954466	0.11426227	0.00186528
	Nickel	23.8181818	0.002842857	0.068	0.62	32.17	0.00201474	0.309590969	0.311605709	0.055806	0.000287129	3.68E-01	6.26E-05	9.62E-03	1.73E-03	8.93E-06	*1.14E-02*	0.00547932	0.84196885	0.15177094	0.00078088
	Selenium	2.7272727	0.000857143	0.330	0.23	0.16	0.00984984	0.117909149	0.127758989	0.00639	8.65714E-05	1.34E-01	6.12E-02	7.33E-01	3.97E-02	5.38E-04	*8.35E-01*	0.07337728	0.87837492	0.04760288	0.00064492
	Silver	0.2645455	0.00025	0.037		145.71	0.00110438	0	0.001104376	0.00061983	0.00002525	1.75E-03	7.58E-06	0.00E+00	4.25E-06	1.73E-07	*1.20E-05*	0.6312682	0	0.35429875	0.01443306
	Thallium	0.5615909	0.000778571	0.068		0.06	0.00201474	0	0.00201474	0.00131581	7.86357E-05	3.41E-03	3.35E-02	0.00E+00	2.19E-02	1.31E-03	*5.67E-02*	0.5909744	0	0.38595975	0.02306585
X	Vanadium	75.5954545	0.001878929	0.138	2.63	0.16	0.0041041	1.323489817	1.327593917	0.17712015	0.000189772	1.50E+00	2.62E-02	8.44E+00	1.13E+00	1.21E-03	*9.60E+00*	0.00272715	0.87945142	0.11769533	0.0001261
	Zinc	977.681818	0.127785714	28.750	37.85	128.66	0.85813	19.04352213	19.90165213	2.2907085	0.012906357	2.22E+01	6.67E-03	1.48E-01	1.78E-02	1.00E-04	*1.73E-01*	0.03864534	0.85761284	0.10316059	0.00058123

Table E.1-42. Exposure Calculatioins for Muskrat - Station WS

		Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
		Inorganics		Reach 1	Reach 1																	
X		Aluminum	8500	0.386114286	47.900	1.41E+02	41.82	1.4297192	71.18763719	72.61735639	19.9155	0.038997543	9.26E+01	3.42E-02	1.70E+00	4.76E-01	9.33E-04	*2.21E+00*	0.01544443	0.76899872	0.21513559	0.00042127
		Antimony	3.95	0.000692857	0.050		0.05	0.00148494	0	0.001484938	0.00925485	6.99786E-05	1.08E-02	2.73E-02	0.00E+00	1.70E-01	1.29E-03	*1.99E-01*	0.13737003	0	0.85615632	0.00647364
X		Arsenic	167.91	0.024585714	3.750	8.85	0.05	0.11193	4.452932298	4.564862298	0.2006407	0.002483157	4.77E+00	2.04E+00	8.12E+01	3.66E+00	4.53E-02	*8.70E+01*	0.02347532	0.93392308	0.04208081	0.0005208
X		Barium	119.285	0.037342857	8.800	11.63	4.33	0.2626624	5.852377208	6.115039608	0.27948476	0.003771629	6.40E+00	6.07E-02	1.35E+00	6.45E-02	8.71E-04	*1.48E+00*	0.04105193	0.91467747	0.04368112	0.00058947
		Beryllium	0.5275	6.37857E-05	0.006		0.53	0.00017909	0	0.000179088	0.00123593	6.44236E-06	1.42E-03	3.37E-04	0.00E+00	2.33E-03	1.21E-05	*2.68E-03*	0.12598852	0	0.86947928	0.0045322
		Cadmium	8.095	0.00043	0.057	0.87	0.78	0.00170134	0.436322477	0.438023813	0.01896659	0.00004343	4.57E-01	2.19E-03	5.63E-01	2.45E-02	5.60E-05	*5.89E-01*	0.00372256	0.95468311	0.0414993	9.5026E-05
		Chromium	504	0.025785714	0.895	9.42	7.24	0.02671396	4.73894968	4.76566364	1.180872	0.002604357	5.95E+00	3.69E-03	6.55E-01	1.63E-01	3.60E-04	*8.22E-01*	0.00449039	0.79657727	0.19849457	0.00043777
		Cobalt	18.99	0.00146857	0.485	1.69	4.02	0.01447628	0.848630029	0.863106309	0.04449357	0.000148328	9.08E-01	3.60E-03	2.11E-01	1.11E-02	3.69E-05	*2.26E-01*	0.01594746	0.93487382	0.04901532	0.0001634
		Copper	306.26	0.021542857	54.350	15.51	12.23	1.6222388	7.804534893	9.426773693	0.71756718	0.002175829	1.01E+01	1.33E-01	6.38E-01	5.87E-02	1.78E-04	*8.29E-01*	0.15988135	0.76918366	0.07072054	0.00021444
		Cyanide	3.61	0.0025	0.268		51.90	0.00798434	0	0.00798434	0.00845823	0.0002525	1.67E-02	1.54E-04	0.00E+00	1.63E-04	4.87E-06	*3.22E-04*	0.47824537	0	0.5066304	0.01512423
X		Iron	29765	2.401	577.500	2463.94	2.57	17.23722	1239.736671	1256.973891	69.739395	0.242501	1.33E+03	6.72E+00	4.83E+02	2.72E+01	9.45E-02	*5.17E+02*	0.01299005	0.93427127	0.05255593	0.00018275
X		Lead	294.8	0.013072856	0.515	26.88	6.43	0.01537172	13.52688419	13.54225591	0.6907164	0.001320358	1.42E+01	2.39E-03	2.10E+00	1.07E-01	2.05E-04	*2.21E+00*	0.00107991	0.95030252	0.04852481	9.2759E-05
X		Manganese	1036	0.469714286	88.700	584.21	70.76	2.6475176	293.9462527	296.5937703	2.427348	0.047441143	2.99E+02	3.74E-02	4.15E+00	3.43E-02	6.70E-04	*4.23E+00*	0.00885254	0.98287247	0.00811636	0.00015863
		Mercury	0.98	0.000203929	0.009	0.03	0.03	0.00026863	0.017272848	0.01754148	0.00229614	2.05968E-05	1.99E-02	1.04E-02	6.71E-01	8.92E-02	8.00E-04	*7.72E-01*	0.0135275	0.86980861	0.1156267	0.00103719
		Nickel	30.135	0.002842857	0.068	0.78	32.17	0.00201474	0.391697567	0.393712307	0.07060631	0.000287129	4.65E-01	6.26E-05	1.22E-02	2.20E-03	8.93E-06	*1.44E-02*	0.00433645	0.84307518	0.15197037	0.000618
		Selenium	2.069	0.000857143	0.330	0.18	0.16	0.00984984	0.089449812	0.099299652	0.00484767	8.65714E-05	1.04E-01	6.12E-02	5.56E-01	3.01E-02	5.38E-04	*6.48E-01*	0.09449748	0.85816438	0.04650759	0.00083055
		Silver	0.213	0.00025	0.037		145.71	0.00110438	0	0.001104376	0.00049906	0.00002525	1.63E-03	7.58E-06	0.00E+00	3.42E-06	1.73E-07	*1.12E-05*	0.67807833	0	0.30641837	0.0155033
		Thallium	0.7575	0.000778571	0.068		0.06	0.00201474	0	0.00201474	0.00177482	7.86357E-05	3.87E-03	3.35E-02	0.00E+00	2.95E-02	1.31E-03	*6.43E-02*	0.52084715	0	0.45882408	0.02032877
X		Vanadium	37.365	0.001878929	0.138	1.30	0.16	0.0041041	0.854168922	0.658273022	0.0875462	0.000189772	7.46E-01	2.62E-02	4.17E+00	5.58E-01	1.21E-03	*4.76E+00*	0.00550141	0.87689147	0.11735273	0.00025438
		Zinc	1541.5	0.127785714	28.750	59.68	128.66	0.85813	30.02570858	30.88383858	3.6117345	0.012906357	3.45E+01	6.67E-03	2.33E-01	2.81E-02	1.00E-04	*2.68E-01*	0.02486722	0.87009654	0.10468223	0.00037401

Table E.1-43. Exposure Calculatioins for Muskrat - Station WW

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Volatile Organics																				
	2-Butanone	0	0.0025			9.730183192	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E-05	*2.60E-05*	0	0	0	1
	Acetone	0.41	0.0025			1387.050531	0	0	0	0.00096063	0.0002525	1.21E-03	0.00E+00	0.00E+00	7.03E-07	1.85E-07	*8.87E-07*	0	0	0.79186072	0.20813928
	cis-1,2-Dichloroethene	0	0.000583333			2504.114914	0	0	0	0	5.89167E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.35E-08	*2.35E-08*	0	0	0	1
	Tetrachloroethene	0	0.0005			6.09153838	0	0	0	0	0.0000505	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.29E-06	*8.29E-06*	0	0	0	1
	Trichloroethene	0	0.0005			3.04576919	0	0	0	0	0.0000505	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-05	*1.66E-05*	0	0	0	1
	Semivolatile Organics																				
	2-Methylnaphthalene	0.305	0.0025			62.53	0	0	0	0.00071462	0.0002525	9.67E-04	0.00E+00	0.00E+00	1.14E-05	4.04E-06	*1.55E-05*	0	0	0.73891419	0.26108581
	Acenaphthylene	0.305	0.0025			58.00	0	0	0	0.00071462	0.0002525	9.67E-04	0.00E+00	0.00E+00	1.23E-05	4.35E-06	*1.67E-05*	0	0	0.73891419	0.26108581
	Anthracene	0.305	0.0025			435.11	0	0	0	0.00071462	0.0002525	9.67E-04	0.00E+00	0.00E+00	1.64E-06	5.80E-07	*2.22E-06*	0	0	0.73891419	0.26108581
	Benzo(a)anthracene	0.305	0.0025			0.57	0	0	0	0.00071462	0.0002525	9.67E-04	0.00E+00	0.00E+00	1.26E-03	4.46E-04	*1.71E-03*	0	0	0.73891419	0.26108581
	Benzo(a)pyrene	0	0.0025		0.00	0.57	0	0	0	0	0.0002525	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.46E-04	*4.46E-04*	0	0	0	1
	Benzo(b)fluoranthene	0.33	0.0025		0.03	0.57	0	0.012634166	0.012634166	0.00077319	0.0002525	1.37E-02	0.00E+00	2.23E-02	1.37E-03	4.46E-04	*2.41E-02*	0	0.92491209	0.05660308	0.01848482
	Benzo(g,h,i)perylene	0.305	0.0025			58.00	0	0	0	0.00071462	0.0002525	9.67E-04	0.00E+00	0.00E+00	1.23E-05	4.35E-06	*1.67E-05*	0	0	0.73891419	0.26108581
	Benzo(k)fluoranthene	0.61	0.0025		0.12	0.57	0	0.061079183	0.061079183	0.00142923	0.0002525	6.28E-02	0.00E+00	1.08E-01	2.53E-03	4.46E-04	*1.11E-01*	0	0.97320418	0.02277261	0.0040232
	Carbazole	0.305	0			58.00014758	0	0	0	0.00071462	0	7.15E-04	0.00E+00	0.00E+00	1.23E-05	0.00E+00	*1.23E-05*	0	0	1	0
	Chrysene	0.3	0.0025		0.03	0.57	0	0.01760613	0.01760613	0.0007029	0.0002525	1.86E-02	0.00E+00	3.11E-02	1.24E-03	4.46E-04	*3.28E-02*	0	0.94852795	0.03786865	0.0136034
	Dibenz(a,h)anthracene	0.305	0.0025			0.57	0	0	0	0.00071462	0.0002525	9.67E-04	0.00E+00	0.00E+00	1.26E-03	4.46E-04	*1.71E-03*	0	0	0.73891419	0.26108581
	Dibenzofuran	0.305	0.0025			58.00	0	0	0	0.00071462	0.0002525	9.67E-04	0.00E+00	0.00E+00	1.23E-05	4.35E-06	*1.67E-05*	0	0	0.73891419	0.26108581
	Fluoranthene	0.5	0.0025		0.02	54.39	0	0.011885405	0.011885405	0.0011715	0.0002525	1.33E-02	0.00E+00	2.19E-04	2.15E-05	4.64E-06	*2.45E-04*	0	0.89300799	0.08802046	0.01897155
	Fluorene	0.305	0.0025			54.39	0	0	0	0.00071462	0.0002525	9.67E-04	0.00E+00	0.00E+00	1.31E-05	4.64E-06	*1.78E-05*	0	0	0.73891419	0.26108581
	Indeno(1,2,3-cd)pyrene	0.305	0.0025		0.13	0.57	0	0.064609507	0.064609507	0.00071462	0.0002525	6.56E-02	0.00E+00	1.14E-01	1.26E-03	4.46E-04	*1.16E-01*	0	0.98525214	0.0108974	0.00385046
	Naphthalene	0.305	0.0025			60.92	0	0	0	0.00071462	0.0002525	9.67E-04	0.00E+00	0.00E+00	1.17E-05	4.15E-06	*1.59E-05*	0	0	0.73891419	0.26108581
	N-nitrosodiphenylamine	0.305	0.0025			120.62	0	0	0	0.00071462	0.0002525	9.67E-04	0.00E+00	0.00E+00	5.92E-06	2.09E-06	*8.02E-06*	0	0	0.73891419	0.26108581
	Phenanthrene	0.305	0.0025		0.08	58.00	0	0.041303694	0.041303694	0.00071462	0.0002525	4.23E-02	0.00E+00	7.12E-04	1.23E-05	4.35E-06	*7.29E-04*	0	0.97712097	0.01690564	0.00597339
	Pyrene	0.48	0.0025		0.03	58.00	0	0.014797642	0.014797642	0.00112464	0.0002525	1.62E-02	0.00E+00	2.55E-04	1.94E-05	4.35E-06	*2.79E-04*	0	0.91485882	0.06953046	0.01561072
	Pesticides and PCBs																				
	4,4'-DDD	0.0025	0.00005	0.0006	1.29E-04	6.84	1.9252E-05	6.49838E-05	8.42357E-05	5.8575E-06	0.00000505	9.51E-05	2.82E-06	9.51E-06	8.57E-07	7.39E-07	*1.39E-05*	0.2023471	0.68300998	0.06156506	0.05307786
	4,4'-DDE	0.0021	0.00005	0.0010	9.12E-05	0.83	2.9102E-05	4.588E-05	7.49818E-05	4.9203E-06	0.00000505	8.50E-05	3.52E-05	5.55E-05	5.95E-06	6.11E-06	*1.03E-04*	0.34256714	0.54006908	0.05791852	0.05944526
	4,4'-DDT	0.0025	0.00005	0.0011	4.02E-04	0.64	3.2087E-05	0.000202026	0.000234113	5.8575E-06	0.00000505	2.45E-04	4.99E-05	3.14E-04	9.11E-06	7.85E-06	*3.81E-04*	0.13095478	0.82452853	0.02390617	0.02061052
	Aldrin	0.00125	0.000025	0.0003		0.16	9.1036E-06	0	9.10364E-06	2.9288E-06	0.000002525	1.46E-05	5.66E-05	0.00E+00	1.82E-05	1.57E-05	*9.05E-05*	0.6253821	0	0.20118648	0.17345142
	alpha-Chlordane	0.00125	2.17286E-05	0.0006	1.28E-04	1.99	1.8655E-05	6.43677E-05	8.30227E-05	2.9288E-06	2.19459E-06	8.81E-05	9.36E-06	3.23E-05	1.47E-06	1.10E-06	*4.42E-05*	0.21163736	0.73023936	0.0332261	0.02489718
	Aroclor 1248	0.025	0.0005	0.0025		0.57	0.00007462	0	0.00007462	5.8575E-05	0.0000505	1.84E-04	1.32E-04	0.00E+00	1.04E-04	8.93E-05	*3.25E-04*	0.40621683	0	0.31887095	0.27491222
	Aroclor 1254	0.025	0.0005	0.0195		0.15	0.00058204	0	0.000582036	5.8575E-05	0.0000505	6.91E-04	3.98E-03	0.00E+00	4.00E-04	3.45E-04	*4.72E-03*	0.84217441	0	0.08475484	0.07307075
	Aroclor 1260	0.025	0.0005	0.0215	1.56E-03	0.28	0.00064173	0.000785602	0.001427334	5.8575E-05	0.0000505	1.54E-03	2.31E-03	2.83E-03	2.11E-04	1.82E-04	*5.54E-03*	0.41768294	0.51132361	0.0381246	0.03286884
	beta-BHC	0.00125	0.000025	0.0003		3.22	7.6112E-06	0	7.61124E-06	2.9288E-06	0.000002525	1.31E-05	5.92E-06	0.00E+00	2.28E-06	1.96E-06	*1.02E-05*	0.58256761	0	0.2241678	0.19326459
	delta-BHC	0.00125	0.000025	0.0003		1.29	7.6112E-06	0	7.61124E-06	2.9288E-06	0.000002525	1.31E-05	5.92E-06	0.00E+00	2.28E-06	1.96E-06	*1.02E-05*	0.58256761	0	0.2241678	0.19326459
	Endosulfan I	0.00125	0.000025	0.0006	2.06E-04	1.21	1.8655E-05	0.000103497	0.000122152	2.9288E-06	0.000002525	1.28E-04	1.55E-05	8.58E-05	2.43E-06	2.09E-06	*1.06E-04*	0.14819205	0.81106902	0.02295149	0.01978745
	Endosulfan Sulfate	0.0025	0.00005	0.0009		1.21	2.8206E-05	0	2.82064E-05	5.8575E-06	0.00000505	3.91E-05	2.34E-05	0.00E+00	4.86E-06	4.19E-06	*3.24E-05*	0.72113466	0	0.1497551	0.12911024
	Endrin Aldehyde	0.0025	0.00005	0.0022	7.68E-04	0.04	6.5666E-05	0.00038657	0.000452235	5.8575E-06	0.00000505	4.63E-04	1.64E-03	9.66E-03	1.46E-04	1.26E-04	*1.16E-02*	0.14178257	0.83466639	0.01264728	0.01090376
	gamma-Chlordane	0.00125	2.16286E-05	0.0003	1.20E-04	1.99	7.6112E-06	6.03699E-05	6.79812E-05	2.9288E-06	2.18449E-06	7.31E-05	3.82E-06	3.03E-05	1.47E-06	1.10E-06	*3.67E-05*	0.10412887	0.82591725	0.04006803	0.02988584
	Inorganics																				
X	Aluminum	10426.4286	0.386114286	47.900	1.74E+02	41.82	1.4297192	87.32150757	88.75122677	24.4291221	0.038997543	1.13E+02	3.42E-02	2.09E+00	5.84E-01	9.33E-04	*2.71E+00*	0.01262787	0.7712596	0.21576809	0.00034444
X	Antimony	28.9	0.000692857	0.050		0.05	0.00148494	0	0.001484938	0.0677127	6.99786E-05	6.93E-02	2.73E-02	0.00E+00	1.24E+00	1.29E-03	*1.27E+00*	0.02143769	0	0.97755204	0.00101026
X	Arsenic	40.8107143	0.024585714	3.750	2.15	0.05	0.11193	1.082290202	1.194220202	0.04876595	0.002483157	1.25E+00	2.04E+00	1.97E+01	8.90E-01	4.53E-02	*2.27E+01*	0.08986974	0.86898183	0.03915468	0.00199375
X	Barium	444.107143	0.037342857	8.800	43.30	4.33	0.2626624	21.78884822	22.05150862	1.04054304	0.003771829	2.31E+01	6.07E-02	5.03E+00	2.40E-01	8.71E-04	*5.33E+00*	0.01137272	0.94341067	0.0450533	0.0001633
	Beryllium	0.3077857	6.37857E-05	0.006		0.53	0.00017909	0	0.000179088	0.00072114	6.44236E-06	9.07E-04	3.37E-04	0.00E+00	1.36E-03	1.21E-05	*1.71E-03*	0.19752231	0	0.79537219	0.0071055
	Cadmium	4.0231429	0.00043	0.057	0.43	0.78	0.00170134	0.216848385	0.218549721	0.00942622	0.00004343	2.28E-01	2.19E-03	2.80E-01	1.22E-02	5.60E-05	*2.94E-01*	0.00746137	0.95100859	0.04133957	0.00019047
X	Chromium	12364.6429	0.025785714	0.895	231.06	7.24	0.02671396	116.2607546	116.2874685	28.9703582	0.002604357	1.45E+02	3.69E-03	1.61E+01	4.00E+00	3.60E-04	*2.01E+01*	0.0001839	0.8003608	0.19943737	1.7929E-05
	Cobalt	12.4678571	0.00146857	0.485	1.11	4.02	0.01447628	0.557166821	0.571643101	0.02921219	0.000148326	6.01E-01	3.60E-03	1.39E-01	7.27E-03	3.69E-05	*1.49E-01*	0.02408684	0.92706068	0.04860568	0.0002468
	Copper	349.214286	0.021542857	54.350	17.69	12.23	1.6222388	8.899154568	10.52139337	0.81820907	0.002175829	1.13E+01	1.33E-01	7.28E-01	6.69E-02	1.78E-04	*9.27E-01*	0.14303214	0.78463486	0.07214116	0.00019184
	Cyanide	0	0.0025	0.268		51.90	0.00798434	0	0.00798434	0	0.0002525	0.00E+00	1.54E-04	0.00E+00	0.00E+00	4.87E-06	*1.59E-04*	0	0	0	0
X	Iron	11956.4286	2.401	577.500	989.75	2.57	17.23722	497.9950597	515.2322797	28.0139121	0.242501	5.43E+02	6.72E+00	1.94E+02	1.09E+01	9.45E-02	*2.12E+02*	0.03171588	0.91629332	0.05154461	0.00044619
X	Lead	301.071429	0.013072856	0.515	27.46	6.43	0.01537172	13.8146484	13.83002012	0.70541036	0.001320358	1.45E+01	2.39E-03	2.15E+00	1.10E-01	2.05E-04	*2.26E+00*	0.00105744	0.95032573	0.048526	9.0829E-05
X	Manganese	329.207143	0.469714286	88.700	185.64	70.76	2.6475176	93.4065695	96.0540871	0.77133234	0.047441143	9.69E+01	3.74E-02	1.32E+00	1.09E-02	6.70E-04	*1.37E+00*	0.02732982	0.96421814	0.00796232	0.00048973
	Mercury	0.9825	0.000203929	0.009	0.03	0.03	0.00026863	0.017316911	0.017585543	0.002302	2.05968E-05	1.99E-02	1.04E-02	6.73E-01	8.95E-02	8.00E-04	*7.74E-01*	0.01349358	0.86984085	0.11563098	0.00103459
	Nickel	23.4464286	0.002842857	0.068	0.61	32.17	0.00201474	0.304758886	0.306773626	0.05493498	0.000287129	3.62E-01	6.26E-05	9.47E-03	1.71E-03	8.93E-06	*1.13E-02*	0.00556565	0.84188529	0.15175588	0.00079318
X	Selenium	4.3214286	0.000857143	0.330	0.37	0.16	0.00984984	0.186829857	0.196679697	0.01012511	8.65714E-05	2.07E-01	6.12E-02	1.16E+00	6.30E-02	5.38E-04	*1.29E+00*	0.04760875	0.90303357	0.04893924	0.00041844
	Silver	0.3610714	0.00025	0.037		145.71	0.00110438	0	0.001104376	0.00084599	0.00002525	1.98E-03	7.58E-06	0.00E+00	5.81E-06	1.73E-07	*1.36E-05*	0.55900329	0	0.42821589	0.01278082
	Thallium	1.2021429	0.000778571	0.068		0.06	0.00201474	0	0.00201474	0.00281662	7.86357E-05	4.91E-03	3.35E-02	0.00E+00	4.68E-02	1.31E-03	*8.17E-02*	0.4103343	0	0.57365027	0.01601543
X	Vanadium	68.2964286	0.001878929	0.138	2.38	0.16	0.0041041	1.19570189	1.19980599	0.16001853	0.000189772	1.36E+00	2.62E-02	7.63E+00	1.02E+00	1.21E-03	*8.67E+00*	0.00301769	0.87918333	0.11765945	0.00013954
	Zinc	1209.53571	0.127785714	28.750	46.82	128.66	0.85813	23.5596282	24.4177582	2.83394218	0.012906357	2.73E+01	6.67E-03	1.83E-01	2.20E-02	1.00E-04	*2.12E-01*	0.03147414	0.86411033	0.10394216	0.00047337

Table E.1-44. Exposure Calculatioins for Muskrat - Pond Reference

	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
	Mean Concentrations	lake/pond no 03i	2 ref samples																		
	Volatile Organics																				
	2-Butanone	0.105714	0.002			9.730183192	0	0	0	0.00024769	0.000202	4.50E-04	0.00E+00	0.00E+00	2.55E-05	2.08E-05	*4.62E-05*	0	0	0.55080024	0.44919976
	Acetone	0.360357	0.0025			1367.050531	0	0	0	0.00084432	0.0002525	1.10E-03	0.00E+00	0.00E+00	6.18E-07	1.85E-07	*8.02E-07*	0	0	0.76978835	0.23021165
	cis-1,2-Dichloroethene	0.00925	0.000666667			2504.114914	0	0	0	2.1673E-05	6.73333E-05	8.90E-05	0.00E+00	0.00E+00	8.65E-09	2.69E-08	*3.55E-08*	0	0	0.24349739	0.75650261
	Tetrachloroethene	0.009938	0.000666667			6.09153838	0	0	0	2.3284E-05	6.73333E-05	9.06E-05	0.00E+00	0.00E+00	3.82E-06	1.11E-05	*1.49E-05*	0	0	0.25694504	0.74305496
	Trichloroethene	0.008438	0.000666667			3.04576919	0	0	0	1.9769E-05	6.73333E-05	8.71E-05	0.00E+00	0.00E+00	6.49E-06	2.21E-05	*2.86E-05*	0	0	0.22696347	0.77303653
	Semivolatile Organics																				
	2-Methylnaphthalene	0.422125	0.0025			62.53	0	0	0	0.00098904	0.0002525	1.24E-03	0.00E+00	0.00E+00	1.58E-05	4.04E-06	*1.99E-05*	0	0	0.79662336	0.20337664
	Acenaphthylene	0.422125	0.0025			58.00	0	0	0	0.00098904	0.0002525	1.24E-03	0.00E+00	0.00E+00	1.71E-05	4.35E-06	*2.14E-05*	0	0	0.79662336	0.20337664
	Anthracene	0.461875	0.0025			435.11	0	0	0	0.00108217	0.0002525	1.33E-03	0.00E+00	0.00E+00	2.49E-06	5.80E-07	*3.07E-06*	0	0	0.8108151	0.1891849
	Benzo(a)anthracene	1.124375	0.0025			0.57	0	0	0	0.00263441	0.0002525	2.89E-03	0.00E+00	0.00E+00	4.66E-03	4.46E-04	*5.10E-03*	0	0	0.91253626	0.08746374
	Benzo(a)pyrene	1.101875	0.0025		0.17	0.57	0	0.087962573	0.087962573	0.00258169	0.0002525	9.08E-02	0.00E+00	1.56E-01	4.56E-03	4.46E-04	*1.61E-01*	0	0.96878531	0.02843376	0.00278094
	Benzo(b)fluoranthene	1.215	0.0025		0.09	0.57	0	0.046516703	0.046516703	0.00284675	0.0002525	4.96E-02	0.00E+00	8.22E-02	5.03E-03	4.46E-04	*8.77E-02*	0	0.93753531	0.0573756	0.00508909
	Benzo(g,h,i)perylene	0.568125	0.0025			58.00	0	0	0	0.00133112	0.0002525	1.58E-03	0.00E+00	0.00E+00	2.30E-05	4.35E-06	*2.73E-05*	0	0	0.84055487	0.15944513
	Benzo(k)fluoranthene	1.264375	0.0025		0.25	0.57	0	0.126601627	0.126601627	0.00296243	0.0002525	1.30E-01	0.00E+00	2.24E-01	5.24E-03	4.46E-04	*2.30E-01*	0	0.97523482	0.02282013	0.00194505
	Carbazole	0.477857	0.0025			58.00014758	0	0	0	0.00111962	0.0002525	1.37E-03	0.00E+00	0.00E+00	1.93E-05	4.35E-06	*2.37E-05*	0	0	0.8159781	0.1840219
	Chrysene	1.174375	0.0025		0.14	0.57	0	0.068920663	0.068920663	0.00275156	0.0002525	7.19E-02	0.00E+00	1.22E-01	4.86E-03	4.46E-04	*1.27E-01*	0	0.95823327	0.03825612	0.00351061
	Dibenz(a,h)anthracene	0.380625	0.0025			0.57	0	0	0	0.0008918	0.0002525	1.14E-03	0.00E+00	0.00E+00	1.58E-03	4.46E-04	*2.02E-03*	0	0	0.77934193	0.22065807
	Dibenzofuran	0.479286	0.0025			58.00	0	0	0	0.00112297	0.0002525	1.38E-03	0.00E+00	0.00E+00	1.94E-05	4.35E-06	*2.37E-05*	0	0	0.81642591	0.18357409
	Fluoranthene	2.19375	0.0025		0.10	54.39	0	0.052147214	0.052147214	0.00513996	0.0002525	5.75E-02	0.00E+00	9.59E-04	9.45E-05	4.64E-06	*1.06E-03*	0	0.90628281	0.08932891	0.00438828
	Fluorene	0.434375	0.0025			54.39	0	0	0	0.00101774	0.0002525	1.27E-03	0.00E+00	0.00E+00	1.87E-05	4.64E-06	*2.34E-05*	0	0	0.80121877	0.19878123
	Indeno(1,2,3-cd)pyrene	0.793125	0.0025		0.33	0.57	0	0.168011199	0.168011199	0.00185829	0.0002525	1.70E-01	0.00E+00	2.97E-01	3.29E-03	4.46E-04	*3.01E-01*	0	0.98759248	0.01092329	0.00148423
	Naphthalene	0.423375	0.0025			60.92	0	0	0	0.00099197	0.0002525	1.24E-03	0.00E+00	0.00E+00	1.63E-05	4.15E-06	*2.04E-05*	0	0	0.79710199	0.20289801
	N-nitrosodiphenylamine	0.479286	0.0025			120.62	0	0	0	0.00112297	0.0002525	1.38E-03	0.00E+00	0.00E+00	9.31E-06	2.09E-06	*1.14E-05*	0	0	0.81642591	0.18357409
	Phenanthrene	0.943125	0.0025		0.25	58.00	0	0.127719825	0.127719825	0.00220974	0.0002525	1.30E-01	0.00E+00	2.20E-03	3.81E-05	4.35E-06	*2.24E-03*	0	0.98108617	0.01697424	0.00193959
	Pyrene	1.67125	0.0025		0.10	58.00	0	0.051521997	0.051521997	0.00391574	0.0002525	5.57E-02	0.00E+00	8.88E-04	6.75E-05	4.35E-06	*9.60E-04*	0	0.92515315	0.07031284	0.00453401
	Pesticides and PCBs																				
	4,4'-DDD	0.021188	3.48667E-05	0.0008	1.09E-03	6.84	2.3431E-05	0.000550738	0.000574168	4.9642E-05	3.52154E-06	6.27E-04	3.43E-06	8.06E-05	7.26E-06	5.15E-07	*9.18E-05*	0.03734972	0.87790434	0.07913243	0.00561351
	4,4'-DDE	0.016456	3.48667E-05	0.0047	7.15E-04	0.83	0.00013879	0.00035953	0.000498323	3.8557E-05	3.52154E-06	5.40E-04	1.68E-04	4.35E-04	4.66E-05	4.26E-06	*6.54E-04*	0.25683341	0.6653013	0.07134877	0.00651652
	4,4'-DDT	0.012131	3.48667E-05	0.0005	1.95E-03	0.64	1.4626E-05	0.000980333	0.000994958	2.8424E-05	3.52154E-06	1.03E-03	2.27E-05	1.52E-03	4.42E-05	5.47E-06	*1.60E-03*	0.01424235	0.95464951	0.02767886	0.00342928
	Aldrin	0.005298	0.0000182	0.0003		0.16	7.5366E-06	0	7.53662E-06	1.2412E-05	1.8382E-06	2.18E-05	4.69E-05	0.00E+00	7.72E-05	1.14E-05	*1.35E-04*	0.34592498	0	0.56970307	0.08437195
	Aroclor 1248	0.0055	0.0000182	0.0003	5.63E-04	1.99	7.5366E-06	0.000283218	0.000290755	1.2887E-05	1.8382E-06	3.05E-04	3.78E-06	1.42E-04	6.47E-06	9.22E-07	*1.53E-04*	0.02467146	0.92712659	0.04218453	0.00601743
	Aroclor 1254	0.108275	0.000341	0.0025		0.57	0.00007462	0	0.00007462	0.00025369	0.000034441	3.63E-04	1.32E-04	0.00E+00	4.48E-04	6.09E-05	*6.41E-04*	0.20570679	0	0.69934885	0.09494435
	Aroclor 1254	0.101475	0.000341	0.0025		0.15	0.00007462	0	0.00007462	0.00023776	0.000034441	3.47E-04	5.10E-04	0.00E+00	1.62E-03	2.35E-04	*2.37E-03*	0.21515674	0	0.68553726	0.099306
	Aroclor 1260	0.10715	0.000341	0.0052	6.69E-03	0.28	0.00015372	0.003367092	0.003520809	0.00025105	0.000034441	3.81E-03	5.54E-04	1.21E-02	9.05E-04	1.24E-04	*1.37E-02*	0.04038491	0.88460963	0.06595704	0.00904841
	beta-BHC	0.005298	0.0000182	0.0003		3.22	7.5366E-06	0	7.53662E-06	1.2412E-05	1.8382E-06	2.18E-05	2.34E-06	0.00E+00	3.86E-06	5.71E-07	*6.77E-06*	0.34592498	0	0.56970307	0.08437195
	delta-BHC	0.005298	0.0000182	0.0003		1.29	7.5366E-06	0	7.53662E-06	1.2412E-05	1.8382E-06	2.18E-05	5.86E-06	0.00E+00	9.65E-06	1.43E-06	*1.69E-05*	0.34592498	0	0.56970307	0.08437195
	Endosulfan I	0.012848	0.0000182	0.0003	2.11E-03	1.21	7.5366E-06	0.001063746	0.001071283	3.0102E-05	1.8382E-06	1.10E-03	6.25E-06	8.82E-04	2.50E-05	1.52E-06	*9.15E-04*	0.00683146	0.96421709	0.02728524	0.00166621
	Endosulfan Sulfate	0.009683	3.48667E-05	0.0005		1.21	1.4626E-05	0	1.46255E-05	2.2686E-05	3.52154E-06	4.08E-05	1.21E-05	0.00E+00	1.88E-05	2.92E-06	*3.39E-05*	0.35817757	0	0.55558034	0.08624209
	Endrin Aldehyde	0.012129	3.48667E-05	0.0005	3.73E-03	0.04	1.4626E-05	0.001875416	0.001890042	2.8417E-05	3.52154E-06	1.92E-03	3.65E-04	4.69E-02	7.10E-04	8.80E-05	*4.80E-02*	0.00760961	0.97577275	0.0147854	0.00183224
	gamma-Chlordane	0.004888	0.0000182	0.0003	4.69E-04	1.99	7.5366E-06	0.000236046	0.000243583	1.1451E-05	1.8382E-06	2.57E-04	3.78E-06	1.18E-04	5.75E-06	9.22E-07	*1.29E-04*	0.0293399	0.91892393	0.0445801	0.00715607
	Inorganics																				
X	Aluminum	9924.375	0.060916667	9.7500	1.65E+02	41.82	0.291018	83.11680081	83.40781881	23.2528106	0.006152583	1.07E+02	6.96E-03	1.99E+00	5.56E-01	1.47E-04	*2.55E+00*	0.00272829	0.77921916	0.21799486	5.768E-05
	Antimony	0.863125	0.003416667	0.0480		0.05	0	0	0	0.0020223	0.000345083	2.37E-03	0.00E+00	0.00E+00	3.72E-02	6.34E-03	*4.35E-02*	0	0	0.8542344	0.1457656
X	Arsenic	9.89375	0.000783333	0.1925	0.52	0.05	0.00574574	0.26237984	0.26812558	0.01182234	7.91167E-05	2.80E-01	1.05E-01	4.79E+00	2.16E-01	1.44E-03	*5.11E+00*	0.02051852	0.93698039	0.04221856	0.00028253
	Barium	47.25	0.0292	15.4000	4.61	4.33	0.4596592	2.318186051	2.777845251	0.11070675	0.0029492	2.89E+00	1.06E-01	5.35E-01	2.56E-02	6.81E-04	*6.68E-01*	0.15896905	0.80172405	0.03828695	0.00101995
	Beryllium	0.458125	6.98333E-05	0.0044		0.53	0.00013126	0	0.000131257	0.00107339	7.05316E-06	1.21E-03	2.47E-04	0.00E+00	2.02E-03	1.33E-05	*2.28E-03*	0.10832462	0	0.88585448	0.0058209
	Cadmium	0.589375	0.00018	0.0800	0.06	0.78	0.00238784	0.031767456	0.034155296	0.00138091	0.00001818	3.56E-02	3.08E-03	4.10E-02	1.78E-03	2.34E-05	*4.58E-02*	0.06716022	0.8934892	0.03883925	0.00051133
	Chromium	42.525	0.001583333	0.1800	0.79	7.24	0.00537264	0.399848879	0.405221519	0.09963608	0.000159917	5.05E-01	7.42E-04	5.52E-02	1.38E-02	2.21E-05	*6.98E-02*	0.01063852	0.7917525	0.19729232	0.00031666
	Cobalt	7.68125	0.000666667	0.4200	0.68	4.02	0.01253616	0.343261686	0.355797846	0.01799717	6.73333E-05	3.74E-01	3.12E-03	8.54E-02	4.48E-03	1.67E-05	*9.30E-02*	0.03353149	0.91814992	0.04813849	0.0001801
	Copper	41.85625	0.001033333	20.1000	2.12	12.23	0.5999448	1.066638032	1.666582832	0.09806919	0.000104367	1.76E+00	4.90E-02	8.72E-02	8.02E-03	8.53E-06	*1.44E-01*	0.33995899	0.60441092	0.05557095	5.9139E-05
	Cyanide	0.425	0.0025	0.2175		51.90	0.00649194	0	0.00649194	0.00099578	0.0002525	7.74E-03	1.25E-04	0.00E+00	1.92E-05	4.87E-06	*1.49E-04*	0.83872864	0	0.12864953	0.03262183
X	Iron	15651.25	1.141333333	66.3500	1295.61	2.57	1.9804148	651.8874037	653.8678185	36.6708788	0.115274667	6.91E+02	7.72E-01	2.54E+02	1.43E+01	4.49E-02	*2.69E+02*	0.00286745	0.94386977	0.05309588	0.00016691
X	Lead	214.475	0.00073	0.0333	19.56	6.43	0.00099245	9.841175331	9.842167777	0.50251493	0.00007373	1.03E+01	1.54E-04	1.53E+00	7.81E-02	1.15E-05	*1.61E+00*	9.5937E-05	0.95132016	0.04857678	7.1273E-06
X	Manganese	259.6375	0.202966667	106.0000	146.41	70.76	3.163888	73.66744225	76.83133025	0.60833066	0.020499633	7.75E+01	4.47E-02	1.04E+00	8.60E-03	2.90E-04	*1.09E+00*	0.04084536	0.95103653	0.00785347	0.00026465
	Mercury	0.167125	5.83333E-05	0.0055	0.01	0.03	0.00016416	0.002945637	0.003109801	0.00039157	5.89166E-06	3.51E-03	6.38E-03	1.14E-01	1.52E-02	2.29E-04	*1.36E-01*	0.04680682	0.8398669	0.11164644	0.00167984
	Nickel	13.7875	0.000726667	0.1600	0.36	32.17	0.00477568	0.179211223	0.183986903	0.03230411	7.33933E-05	2.16E-01	1.48E-04	5.57E-03	1.00E-03	2.28E-06	*6.73E-03*	0.02207239	0.82828421	0.14930419	0.00033921
	Selenium	0.834375	0.000783333	0.1600	0.07	0.16	0.00477568	0.036072831	0.040848511	0.00195494	7.91167E-05	4.29E-02	2.97E-02	2.24E-01	1.22E-02	4.92E-04	*2.67E-01*	0.11136646	0.84120034	0.04558824	0.00184496
	Silver	0.24875	0.000263333	0.1550		145.71	0.00462644	0	0.00462644	0.00058282	2.65967E-05	5.24E-03	3.18E-05	0.00E+00	4.00E-06	1.83E-07	*3.59E-05*	0.88360687	0	0.11131342	0.00507971
	Thallium	0.701249	0.0007	0.0650		0.06	0.00194012	0	0.00194012	0.00164303	0.0000707	3.65E-03	3.23E-02	0.00E+00	2.73E-02	1.18E-03	*6.08E-02*	0.53098004	0	0.4496705	0.01934947
X	Vanadium	31.1875	0.001175	0.0000	1.09	0.16	0	0.546016145	0.546016145	0.07307231	0.000118675	6.19E-01	0.00E+00	3.48E+00	4.66E-01	7.57E-04	*3.95E+00*	0	0.88179886	0.11800948	0.00019166
	Zinc	141.425	0.002008333	18.1500	5.47	128.66	0.5417412	2.754710241	3.296451441	0.33135878	0.000202842	3.63E+00	4.21E-03	2.14E-02	2.58E-03	1.58E-06	*2.82E-02*	0.14932173	0.75928895	0.0913334	5.591E-05

Table E.1-45. Exposure Calculatioins for Muskrat - River Reference

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			river	2 ref samples																	
	Volatile Organics																				
	2-Butanone	0.0326111	0.0016			9.730183192	0	0	0	7.64078E-05	0.0001616	2.38E-04	0.00E+00	0.00E+00	7.85E-06	1.66E-05	*2.45E-05*	0	0	0.32103075	0.67896925
	Acetone	0.1141	0.0025			1367.050531	0	0	0	0.000267336	0.0002525	5.20E-04	0.00E+00	0.00E+00	1.96E-07	1.85E-07	*3.80E-07*	0	0	0.51427017	0.48572983
	cis-1,2-Dichloroethene	0.009	0.0008			2504.114914	0	0	0	0.000021087	0.0000808	1.02E-04	0.00E+00	0.00E+00	8.42E-09	3.23E-08	*4.07E-08*	0	0	0.20696458	0.79303542
	Tetrachloroethene	0.008	0.0008			6.09153838	0	0	0	0.000018744	0.0000808	9.95E-05	0.00E+00	0.00E+00	3.08E-06	1.33E-05	*1.63E-05*	0	0	0.18829864	0.81170136
	Trichloroethene	0.008	0.0008			3.04576919	0	0	0	0.000018744	0.0000808	9.95E-05	0.00E+00	0.00E+00	6.15E-06	2.65E-05	*3.27E-05*	0	0	0.18829864	0.81170136
	Semivolatile Organics																				
	2-Methylnaphthalene	0.1863	0.0023			62.53	0	0	0	0.000436501	0.0002323	6.69E-04	0.00E+00	0.00E+00	6.98E-06	3.72E-06	*1.07E-05*	0	0	0.65266195	0.34733805
	Acenaphthylene	0.2495	0.0023			58.00	0	0	0	0.000584579	0.0002323	8.17E-04	0.00E+00	0.00E+00	1.01E-05	4.01E-06	*1.41E-05*	0	0	0.71562478	0.28437522
	Anthracene	0.359	0.0023			435.11	0	0	0	0.000841137	0.0002323	1.07E-03	0.00E+00	0.00E+00	1.93E-06	5.34E-07	*2.47E-06*	0	0	0.78359233	0.21640767
	Benzo(a)anthracene	1.0485	0.0023			0.57	0	0	0	0.002456636	0.0002323	2.69E-03	0.00E+00	0.00E+00	4.34E-03	4.11E-04	*4.75E-03*	0	0	0.91360894	0.08639106
	Benzo(a)pyrene	0.9345	0.0023		0.15	0.57	0	0.074601043	0.074601043	0.002189534	0.0002323	7.70E-02	0.00E+00	1.32E-01	3.87E-03	4.11E-04	*1.36E-01*	0	0.96855696	0.02842705	0.00301599
	Benzo(b)fluoranthene	1.196	0.0023		0.09	0.57	0	0.045789281	0.045789281	0.002802228	0.0002323	4.88E-02	0.00E+00	8.10E-02	4.95E-03	4.11E-04	*8.63E-02*	0	0.93784737	0.0573947	0.00475792
	Benzo(g,h,i)perylene	0.4595	0.0023			58.00	0	0	0	0.001076609	0.0002323	1.31E-03	0.00E+00	0.00E+00	1.86E-05	4.01E-06	*2.26E-05*	0	0	0.82252388	0.17747612
	Benzo(k)fluoranthene	1.1285	0.0023		0.22	0.57	0	0.112996489	0.112996489	0.002644076	0.0002323	1.16E-01	0.00E+00	2.00E-01	4.67E-03	4.11E-04	*2.05E-01*	0	0.97517645	0.02281876	0.00200478
	Carbazole	0.234	0.002166667			58.00014758	0	0	0	0.000548262	0.000218833	7.67E-04	0.00E+00	0.00E+00	9.45E-06	3.77E-06	*1.32E-05*	0	0	0.71472472	0.28527528
	Chrysene	1.2475	0.0023		0.15	0.57	0	0.073212157	0.073212157	0.002922893	0.0002323	7.64E-02	0.00E+00	1.29E-01	5.17E-03	4.11E-04	*1.35E-01*	0	0.95868401	0.03827411	0.00304188
	Dibenz(a,h)anthracene	0.235	0.0023			0.57	0	0	0	0.000550605	0.0002323	7.83E-04	0.00E+00	0.00E+00	9.73E-04	4.11E-04	*1.38E-03*	0	0	0.70328456	0.29671544
	Dibenzofuran	0.196	0.0023			58.00	0	0	0	0.000459228	0.0002323	6.92E-04	0.00E+00	0.00E+00	7.92E-06	4.01E-06	*1.19E-05*	0	0	0.66407723	0.33592277
	Fluoranthene	2.2301	0.0023		0.11	54.39	0	0.053011283	0.053011283	0.005225124	0.0002323	5.85E-02	0.00E+00	9.75E-04	9.61E-05	4.27E-06	*1.08E-03*	0	0.90666077	0.08936617	0.00397307
	Fluorene	0.256	0.0023			54.39	0	0	0	0.000599808	0.0002323	8.32E-04	0.00E+00	0.00E+00	1.10E-05	4.27E-06	*1.53E-05*	0	0	0.72082951	0.27917049
	Indeno(1,2,3-cd)pyrene	0.5775	0.0023		0.24	0.57	0	0.122334395	0.122334395	0.001353083	0.0002323	1.24E-01	0.00E+00	2.16E-01	2.39E-03	4.11E-04	*2.19E-01*	0	0.98720638	0.01091902	0.0018748
	Naphthalene	0.2015	0.0023			60.92	0	0	0	0.000472115	0.0002323	7.04E-04	0.00E+00	0.00E+00	7.75E-06	3.81E-06	*1.16E-05*	0	0	0.67022257	0.32977743
	N-nitrosodiphenylamine	0.2105	0.0023			120.62	0	0	0	0.000493202	0.0002323	7.26E-04	0.00E+00	0.00E+00	4.09E-06	1.93E-06	*6.01E-06*	0	0	0.67980769	0.32019231
	Phenanthrene	1.4415	0.0023		0.39	58.00	0	0.195210739	0.195210739	0.003377435	0.0002323	1.99E-01	0.00E+00	3.37E-03	5.82E-05	4.01E-06	*3.43E-03*	0	0.98184425	0.01698736	0.00116839
	Pyrene	1.8586	0.0023		0.11	58.00	0	0.057297701	0.057297701	0.0043547	0.0002323	6.19E-02	0.00E+00	9.88E-04	7.51E-05	4.01E-06	*1.07E-03*	0	0.92587829	0.07036795	0.00375375
	Pesticides and PCBs																				
	4,4'-DDD	0.04088	0.00002274	0.0008	2.11E-03	6.84	2.3431E-05	0.001062615	0.001086046	9.57818E-05	2.29674E-06	1.18E-03	3.43E-06	1.55E-04	1.40E-05	3.36E-07	*1.73E-04*	0.01978735	0.8973847	0.08088834	0.00193961
	4,4'-DDE	0.052519	0.00002274	0.0047	2.28E-03	0.83	0.00013879	0.001147415	0.001286208	0.000123052	2.29674E-06	1.41E-03	1.68E-04	1.39E-03	1.49E-04	2.78E-06	*1.71E-03*	0.0983263	0.81287194	0.08717466	0.0016271
	4,4'-DDT	0.024519	0.00002274	0.0005	3.94E-03	0.64	1.4626E-05	0.001981394	0.001996019	5.7448E-05	2.29674E-06	2.06E-03	2.27E-05	3.08E-03	8.93E-05	3.57E-06	*3.20E-03*	0.0071144	0.96382353	0.02794485	0.00111722
	Aldrin	0.002267	0.00001274	0.0003		0.16	7.5366E-06	0	7.53662E-06	5.31158E-06	1.28674E-06	1.41E-05	4.69E-05	0.00E+00	3.30E-05	8.00E-06	*8.79E-05*	0.53319076	0	0.37577667	0.09103257
	alpha-Chlordane	0.004639	0.00001274	0.0003	4.75E-04	1.99	7.5366E-06	0.000238881	0.000246418	1.08692E-05	1.28674E-06	2.59E-04	3.78E-06	1.20E-04	5.45E-06	6.46E-07	*1.30E-04*	0.02914686	0.92384179	0.04203507	0.00497629
	Aroclor 1248	0.042555	0.0002138	0.0025		0.57	0.00007462	0	0.00007462	9.97064E-05	2.15938E-05	1.96E-04	1.32E-04	0.00E+00	1.76E-04	3.82E-05	*3.46E-04*	0.38086942	0	0.50891324	0.11021734
	Aroclor 1254	0.042555	0.0002138	0.0025		0.15	0.00007462	0	0.00007462	9.97064E-05	2.15938E-05	1.96E-04	5.10E-04	0.00E+00	6.81E-04	1.48E-04	*1.34E-03*	0.38086942	0	0.50891324	0.11021734
	Aroclor 1260	0.042555	0.0002138	0.0052	2.66E-03	0.28	0.00015372	0.001337252	0.00149097	9.97064E-05	2.15938E-05	1.61E-03	5.54E-04	4.82E-03	3.59E-04	7.78E-05	*5.81E-03*	0.09534211	0.82942224	0.06184223	0.01339342
	beta-BHC	0.002187	0.00001274	0.0003		3.22	7.5366E-06	0	7.53662E-06	5.12414E-06	1.28674E-06	1.39E-05	2.34E-06	0.00E+00	1.59E-06	4.00E-07	*4.34E-06*	0.5403563	0	0.36738775	0.09225595
	delta-BHC	0.002267	0.00001274	0.0003		1.29	7.5366E-06	0	7.53662E-06	5.31158E-06	1.28674E-06	1.41E-05	5.86E-06	0.00E+00	4.13E-06	1.00E-06	*1.10E-05*	0.53319076	0	0.37577667	0.09103257
	Endosulfan I	0.005607	0.00001274	0.0003	9.23E-04	1.21	7.5366E-06	0.000464248	0.000471784	1.31372E-05	1.28674E-06	4.86E-04	6.25E-06	3.85E-04	1.09E-05	1.07E-06	*4.03E-04*	0.0155008	0.95483303	0.02701969	0.00264648
	Endosulfan Sulfate	0.004192	0.00002274	0.0005		1.21	1.4626E-05	0	1.46255E-05	9.82186E-06	2.29674E-06	2.67E-05	1.21E-05	0.00E+00	8.14E-06	1.90E-06	*2.22E-05*	0.5468687	0	0.36725297	0.08587833
	Endrin Aldehyde	0.0060071	0.00002274	0.0005	1.85E-03	0.04	1.4626E-05	0.000928872	0.000943498	1.40747E-05	2.29674E-06	9.60E-04	3.65E-04	2.32E-02	3.52E-04	5.74E-05	*2.40E-02*	0.01523699	0.96770706	0.01486318	0.00239276
	gamma-Chlordane	0.002178	0.00001274	0.0003	2.09E-04	1.99	7.5366E-06	0.000105189	0.000112725	5.10305E-06	1.28674E-06	1.19E-04	3.78E-06	5.28E-05	2.56E-06	6.46E-07	*5.98E-05*	0.06327179	0.88308431	0.0428414	0.0108025
	Inorganics																				
X	Aluminum	6157.2727	0.56741	9.7500	1.02E+02	41.82	0.291018	51.56725847	51.85827647	14.42649	0.05730841	6.63E+01	6.96E-03	1.23E+00	3.45E-01	1.37E-03	*1.59E+00*	0.00438663	0.77729342	0.21745612	0.00086383
	Antimony	1.2254545	0.00571	0.0480		0.05	0.0014327	0	0.001432704	0.00287124	0.00057671	4.88E-03	2.63E-02	0.00E+00	5.28E-02	1.06E-02	*8.97E-02*	0.29354755	0	0.58829	0.11816245
X	Arsenic	17.618182	0.00447	0.1925	0.93	0.05	0.00574574	0.46722989	0.47297563	0.021052494	0.00045147	4.94E-01	1.05E-01	8.52E+00	3.84E-01	8.23E-03	*9.02E+00*	0.01161977	0.94489216	0.04257505	0.00091302
	Barium	57.118182	0.0315	15.4000	5.57	4.33	0.4596592	2.802340154	3.261999354	0.1338279	0.0031815	3.40E+00	1.06E-01	6.47E-01	3.09E-02	7.35E-04	*7.85E-01*	0.13523331	0.82445806	0.03937263	0.00093601
	Beryllium	0.4695455	0.0000858	0.0044		0.53	0.00013126	0	0.000131257	0.001100145	8.6658E-06	1.24E-03	2.47E-04	0.00E+00	2.07E-03	1.63E-05	*2.34E-03*	0.10584632	0	0.88716551	0.00698817
	Cadmium	1.5266809	0.000264	0.0800	0.16	0.78	0.00238784	0.082288473	0.084676313	0.003577013	0.000026664	8.83E-02	3.08E-03	1.06E-01	4.61E-03	3.44E-05	*1.14E-01*	0.02704848	0.93213052	0.04051896	0.00030204
	Chromium	105.84545	0.002862	0.1800	1.98	7.24	0.00537264	0.99523072	1.00060336	0.2479959	0.000289062	1.25E+00	7.42E-04	1.38E-01	3.43E-02	3.99E-05	*1.73E-01*	0.00430194	0.79689329	0.19857332	0.00023146
	Cobalt	7.8872727	0.00212	0.4200	0.70	4.02	0.01253616	0.352468481	0.365004641	0.01847988	0.00021412	3.84E-01	3.12E-03	8.77E-02	4.60E-03	5.33E-05	*9.54E-02*	0.03267189	0.91860758	0.04816248	0.00055804
	Copper	74.1	0.003745	20.1000	3.75	12.23	0.5999448	1.888317232	2.488262032	0.1736163	0.000378245	2.66E+00	4.90E-02	1.54E-01	1.42E-02	3.09E-05	*2.18E-01*	0.22535198	0.70929198	0.06521396	0.00014208
	Cyanide	0.333	0.0025	0.2175		51.90	0.00649194	0	0.00649194	0.000780219	0.0002525	7.52E-03	1.25E-04	0.00E+00	1.50E-05	4.87E-06	*1.45E-04*	0.86275538	0	0.10368829	0.03355634
X	Iron	15909.091	3.9402	66.3500	1316.95	2.57	1.9804148	662.6266891	664.6071039	37.275	0.3979602	7.02E+02	7.72E-01	2.58E+02	1.45E+01	1.55E-01	*2.74E+02*	0.00281998	0.94353624	0.05307712	0.00056667
	Lead	100.88182	0.01235	0.0333	9.20	6.43	0.00099245	4.628957504	4.62994995	0.2363661	0.00124735	4.87E+00	1.54E-04	7.20E-01	3.67E-02	1.94E-04	*7.57E-01*	0.00020389	0.95098042	0.04855943	0.00025626
X	Manganese	569.51818	0.6495	106.0000	321.16	70.76	3.163888	161.5904781	164.7543661	1.3343811	0.0655995	1.66E+02	4.47E-02	2.28E+00	1.89E-02	9.27E-04	*2.35E+00*	0.01904186	0.97253236	0.00803097	0.00039481
	Mercury	0.159625	0.0000581	0.0055	0.01	0.03	0.00016416	0.002813447	0.002977611	0.000374001	5.8681E-06	3.36E-03	6.38E-03	1.09E-01	1.45E-02	2.28E-04	*1.30E-01*	0.04889499	0.83796378	0.11139345	0.00174777
	Nickel	11.527273	0.001962	0.1600	0.30	32.17	0.00477568	0.149832576	0.154608256	0.0270084	0.000198162	1.82E-01	1.48E-04	4.66E-03	8.40E-04	6.16E-06	*5.65E-03*	0.02626673	0.82409441	0.14854895	0.00108991
	Selenium	0.8468182	0.0009	0.1600	0.07	0.16	0.00477568	0.036610792	0.041386472	0.001984095	0.0000909	4.35E-02	2.97E-02	2.28E-01	1.23E-02	5.65E-04	*2.70E-01*	0.10988308	0.84237359	0.04565182	0.00209151
	Silver	0.2875	0.000314	0.1550		145.71	0.00462644	0	0.00462644	0.000673613	0.000031714	5.33E-03	3.18E-05	0.00E+00	4.62E-06	2.18E-07	*3.66E-05*	0.88771242	0	0.12633946	0.00594812
	Thallium	0.377	0.00066	0.0650		0.06	0.00194012	0	0.00194012	0.000883311	0.00006666	2.89E-03	3.23E-02	0.00E+00	1.47E-02	1.11E-03	*4.81E-02*	0.67130066	0	0.30563432	0.02306502
X	Vanadium	22.727273	0.003153	0.0000	0.79	0.16	0	0.397898448	0.397898448	0.05325	0.000318453	4.51E-01	0.00E+00	2.54E+00	3.40E-01	2.03E-03	*2.88E+00*	0	0.88134578	0.11794885	0.00070537
	Zinc	191.39091	0.02006	18.1500	7.41	128.66	0.5417412	3.727958262	4.269699462	0.4484289	0.00202606	4.72E+00	4.21E-03	2.90E-02	3.49E-03	1.57E-05	*3.67E-02*	0.11477192	0.78979583	0.09500301	0.00042924

Table E.1-46. Exposure Calculatioins for Muskrat - Wetland Reference

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			wetland	2 ref samples																	
	Volatile Organics																				
	2-Butanone	0.0086	0.0025			9.730183192	0	0	0	2.01498E-05	0.0002525	2.73E-04	0.00E+00	0.00E+00	2.07E-06	2.60E-05	*2.80E-05*	0	0	0.07390359	0.92609641
	Acetone	0.0341	0.0025			1367.050531	0	0	0	7.98963E-05	0.0002525	3.32E-04	0.00E+00	0.00E+00	5.84E-08	1.85E-07	*2.43E-07*	0	0	0.24036459	0.75963541
	cis-1,2-Dichloroethene	0.0115	0.0005			2504.114914	0	0	0	2.69445E-05	0.0000505	7.74E-05	0.00E+00	0.00E+00	1.08E-08	2.02E-08	*3.09E-08*	0	0	0.34792012	0.65207988
	Tetrachloroethene	0.01291667	0.0005			6.09153838	0	0	0	3.02638E-05	0.0000505	8.08E-05	0.00E+00	0.00E+00	4.97E-06	8.29E-06	*1.33E-05*	0	0	0.37471948	0.62528052
	Trichloroethene	0.00908333	0.0005			3.04576919	0	0	0	2.12822E-05	0.0000505	7.18E-05	0.00E+00	0.00E+00	6.99E-06	1.66E-05	*2.36E-05*	0	0	0.29648346	0.70351654
	Semivolatile Organics																				
	2-Methylnaphthalene	0.19466667	0.0025			62.53	0	0	0	0.000456104	0.0002525	7.09E-04	0.00E+00	0.00E+00	7.29E-06	4.04E-06	*1.13E-05*	0	0	0.64366557	0.35633443
	Acenaphthylene	0.2425	0.0025			58.00	0	0	0	0.000568178	0.0002525	8.21E-04	0.00E+00	0.00E+00	9.80E-06	4.35E-06	*1.41E-05*	0	0	0.69232738	0.30767262
	Anthracene	0.44016667	0.0025			435.11	0	0	0	0.001031311	0.0002525	1.28E-03	0.00E+00	0.00E+00	2.37E-06	5.80E-07	*2.95E-06*	0	0	0.80331988	0.19668012
	Benzo(a)anthracene	1.36	0.0025			0.57	0	0	0	0.00318648	0.0002525	3.44E-03	0.00E+00	0.00E+00	5.63E-03	4.46E-04	*6.08E-03*	0	0	0.92657707	0.07342293
	Benzo(a)pyrene	1.23333333	0.0025		0.20	0.57	0	0.098456878	0.098456878	0.0028897	0.0002525	1.02E-01	0.00E+00	1.74E-01	5.11E-03	4.46E-04	*1.80E-01*	0	0.96907255	0.02844219	0.00248526
	Benzo(b)fluoranthene	2.18833333	0.0025		0.17	0.57	0	0.083781112	0.083781112	0.005127265	0.0002525	8.92E-02	0.00E+00	1.48E-01	9.06E-03	4.46E-04	*1.58E-01*	0	0.93966227	0.05750577	0.00283196
	Benzo(g,h,i)perylene	0.37583333	0.0025			58.00	0	0	0	0.000880577	0.0002525	1.13E-03	0.00E+00	0.00E+00	1.52E-05	4.35E-06	*1.95E-05*	0	0	0.77715558	0.22284442
	Benzo(k)fluoranthene	2.0225	0.0025		0.40	0.57	0	0.202512539	0.202512539	0.004738718	0.0002525	2.08E-01	0.00E+00	3.58E-01	8.38E-03	4.46E-04	*3.67E-01*	0	0.97594638	0.02283678	0.00121685
	Carbazole	0.3226	0			58.00014758	0	0	0	0.000755852	0	7.56E-04	0.00E+00	0.00E+00	1.30E-05	0.00E+00	*1.30E-05*	0	0	1	0
	Chrysene	1.61	0.0025		0.19	0.57	0	0.09448623	0.09448623	0.00377223	0.0002525	9.85E-02	0.00E+00	1.67E-01	6.67E-03	4.46E-04	*1.74E-01*	0	0.95914434	0.03829249	0.00256317
	Dibenz(a,h)anthracene	0.23416667	0.0025			0.57	0	0	0	0.000548653	0.0002525	8.01E-04	0.00E+00	0.00E+00	9.70E-04	4.46E-04	*1.42E-03*	0	0	0.68482904	0.31517096
	Dibenzofuran	0.357	0.0025			58.00	0	0	0	0.000836451	0.0002525	1.09E-03	0.00E+00	0.00E+00	1.44E-05	4.35E-06	*1.88E-05*	0	0	0.76812547	0.23187453
	Fluoranthene	3.29333333	0.0025		0.16	54.39	0	0.078285201	0.078285201	0.00771628	0.0002525	8.63E-02	0.00E+00	1.44E-03	1.42E-04	4.64E-06	*1.59E-03*	0	0.90761261	0.08945999	0.0029274
	Fluorene	0.56833333	0.0025			54.39	0	0	0	0.001331605	0.0002525	1.58E-03	0.00E+00	0.00E+00	2.45E-05	4.64E-06	*2.91E-05*	0	0	0.840604	0.159396
	Indeno(1,2,3-cd)pyrene	0.5175	0.0025		0.22	0.57	0	0.109624328	0.109624328	0.001212503	0.0002525	1.11E-01	0.00E+00	1.94E-01	2.14E-03	4.46E-04	*1.96E-01*	0	0.98681239	0.01091466	0.00227295
	Naphthalene	0.221333	0.0025			60.92	0	0	0	0.000518583	0.0002525	7.71E-04	0.00E+00	0.00E+00	8.51E-06	4.15E-06	*1.27E-05*	0	0	0.67253859	0.32746141
	N-nitrosodiphenylamine	0.367	0.0025			120.62	0	0	0	0.000859881	0.0002525	1.11E-03	0.00E+00	0.00E+00	7.13E-06	2.09E-06	*9.22E-06*	0	0	0.77300943	0.22699057
	Phenanthrene	2.40833333	0.0025		0.65	58.00	0	0.326141192	0.326141192	0.005642725	0.0002525	3.32E-01	0.00E+00	5.62E-03	9.73E-05	4.35E-06	*5.72E-03*	0	0.98224525	0.0169943	0.00076046
	Pyrene	2.57666667	0.0025		0.16	58.00	0	0.079434562	0.079434562	0.00603713	0.0002525	8.57E-02	0.00E+00	1.37E-03	1.04E-04	4.35E-06	*1.48E-03*	0	0.92662946	0.07042504	0.00294549
	Pesticides and PCBs																				
	4,4'-DDD	0.09471667	0.00005	0.0008	4.89E-03	6.84	2.34307E-05	0.002462019	0.00248545	0.000221921	0.00000505	2.71E-03	3.43E-06	3.60E-04	3.25E-05	7.39E-07	*3.97E-04*	0.00863829	0.90768327	0.08181663	0.00186181
	4,4'-DDE	0.01258333	0.00005	0.0047	5.46E-04	0.83	0.000138793	0.000274916	0.000413709	2.94827E-05	0.00000505	4.48E-04	1.68E-04	3.33E-04	3.57E-05	6.11E-06	*5.42E-04*	0.30963909	0.61332047	0.0657742	0.01126624
	4,4'-DDT	0.03416667	0.00005	0.0005	5.49E-03	0.64	1.46255E-05	0.002761027	0.002775652	8.00525E-05	0.00000505	2.86E-03	2.27E-05	4.29E-03	1.24E-04	7.85E-06	*4.45E-03*	0.00511247	0.96513927	0.027983	0.00176527
	Aldrin	0.00076583	0.000025	0.0003		0.16	7.53662E-06	0	7.53662E-06	1.79435E-06	0.000002525	1.19E-05	4.69E-05	0.00E+00	1.12E-05	1.57E-05	*7.37E-05*	0.63568157	0	0.15134551	0.21297292
	alpha-Chlordane	0.0018275	0.000025	0.0003	1.87E-04	1.99	7.53662E-06	9.41056E-05	0.000101642	4.28183E-06	0.000002525	1.08E-04	3.78E-06	4.72E-05	2.15E-06	1.27E-06	*5.44E-05*	0.06949456	0.86774019	0.03948243	0.02328282
	Aroclor 1248	0.06383333	0.0005	0.0025		0.57	0.00007462	0	0.00007462	0.00014956	0.0000505	2.75E-04	1.32E-04	0.00E+00	2.64E-04	8.93E-05	*4.86E-04*	0.27166009	0	0.54449062	0.18384929
	Aroclor 1254	0.01576667	0.0005	0.0025		0.15	0.00007462	0	0.00007462	3.69413E-05	0.0000505	1.62E-04	5.10E-04	0.00E+00	2.52E-04	3.45E-04	*1.11E-03*	0.46044305	0	0.22794646	0.31161048
	Aroclor 1260	0.04883333	0.0005	0.0052	3.05E-03	0.28	0.000153717	0.001534543	0.001688261	0.000114416	0.0000505	1.85E-03	5.54E-04	5.53E-03	4.12E-04	1.82E-04	*6.68E-03*	0.08294793	0.82806085	0.06174073	0.0272505
	beta-BHC	0.00079417	0.000025	0.0003		3.22	7.53662E-06	0	7.53662E-06	1.86073E-06	0.000002525	1.19E-05	2.34E-06	0.00E+00	5.78E-07	7.85E-07	*3.71E-06*	0.63214202	0	0.15607092	0.21178706
	delta-BHC	0.0009275	0.000025	0.0003		1.29	7.53662E-06	0	7.53662E-06	2.17313E-06	0.000002525	1.22E-05	5.86E-06	0.00E+00	1.69E-06	1.96E-06	*9.51E-06*	0.81600102	0	0.17761965	0.20637933
	Endosulfan I	0.00078083	0.000025	0.0003	1.28E-04	1.21	7.53662E-06	6.46514E-05	7.2188E-05	1.82949E-06	0.000002525	7.65E-05	6.25E-06	5.36E-05	1.52E-06	2.09E-06	*6.35E-05*	0.09846325	0.84464686	0.02390167	0.03298822
	Endosulfan Sulfate	0.00253333	0.00005	0.0005		1.21	1.46255E-05	0	1.46255E-05	5.9356E-06	0.00000505	2.56E-05	1.21E-05	0.00E+00	4.92E-06	4.19E-06	*2.12E-05*	0.57106132	0	0.2317587	0.19717998
	Endrin Aldehyde	0.00236667	0.00005	0.0005	7.27E-04	0.04	1.46255E-05	0.000365953	0.000380578	5.5451E-06	0.00000505	3.91E-04	3.65E-04	9.14E-03	1.39E-04	1.26E-04	*9.77E-03*	0.03738884	0.93552573	0.01417555	0.01290987
	gamma-Chlordane	0.00214417	0.0000017	0.0003	2.06E-04	1.99	7.53662E-06	0.000103555	0.000111091	5.02378E-06	1.717E-07	1.16E-04	3.78E-06	5.20E-05	2.52E-06	8.62E-08	*5.84E-05*	0.06481069	0.89051109	0.0432017	0.00147652
	Inorganics																				
X	Aluminum	8195	0.142	9.7500	1.36E+02	41.82	0.291018	68.63325727	68.92427527	19.200885	0.014342	8.81E+01	6.96E-03	1.64E+00	4.59E-01	3.43E-04	*2.11E+00*	0.00330179	0.77868896	0.21784653	0.00016272
	Antimony	0.7516667	0.00055	0.0480		0.05	0.001432704	0	0.001432704	0.001761155	0.00005555	3.25E-03	2.63E-02	0.00E+00	3.24E-02	1.02E-03	*5.97E-02*	0.44091217	0	0.54199242	0.01709542
X	Arsenic	20.55	0.0032	0.1925	1.08	0.05	0.00574574	0.544980994	0.550726734	0.024555812	0.0003232	5.76E-01	1.05E-01	9.94E+00	4.48E-01	5.90E-03	*1.05E+01*	0.00998208	0.94679561	0.04266082	0.0005615
	Barium	47.8833333	0.0451	15.4000	4.67	4.33	0.4596592	2.349258737	2.808917937	0.11219065	0.0045551	2.93E+00	1.06E-01	5.43E-01	2.59E-02	1.05E-03	*6.76E-01*	0.1571128	0.80298318	0.03834708	0.00155695
	Beryllium	0.6558333	0.00005	0.0044		0.53	0.000131257	0	0.000131257	0.001536617	0.00000505	1.67E-03	2.47E-04	0.00E+00	2.90E-03	9.52E-06	*3.15E-03*	0.07845938	0	0.91852195	0.00301867
	Cadmium	1.3033333	0.000075	0.0800	0.14	0.78	0.00238784	0.070249983	0.072637823	0.00305371	0.000007575	7.57E-02	3.08E-03	9.06E-02	3.94E-03	9.77E-06	*9.76E-02*	0.03154383	0.928016	0.0403401	0.00010007
	Chromium	129.1	0.00088	0.1800	2.41	7.24	0.00537264	1.213885722	1.219258362	0.3024813	0.00008888	1.52E+00	7.42E-04	1.68E-01	4.18E-02	1.23E-05	*2.10E-01*	0.00353038	0.79764946	0.19876175	5.8403E-05
	Cobalt	8.3666667	0.00025	0.4200	0.74	4.02	0.01253616	0.373891764	0.386427924	0.0196031	0.00002525	4.06E-01	3.12E-03	9.30E-02	4.88E-03	6.28E-06	*1.01E-01*	0.03087296	0.92078805	0.04827681	6.2183E-05
	Copper	56.8333333	0.0039	20.1000	2.88	12.23	0.5999448	1.448304489	2.048249289	0.1331605	0.0003939	2.18E+00	4.90E-02	1.18E-01	1.09E-02	3.22E-05	*1.78E-01*	0.27497653	0.66381063	0.0610323	0.00018054
	Cyanide	0.4349983	0.0025	0.2175		51.90	0.00649194	0	0.00649194	0.001019201	0.0002525	7.76E-03	1.25E-04	0.00E+00	1.96E-05	4.87E-06	*1.50E-04*	0.83619786	0	0.13127874	0.0325234
X	Iron	15518.3333	2.78	66.3500	1284.60	2.57	1.9804148	646.3513155	648.3317303	36.359455	0.28078	6.85E+02	7.72E-01	2.52E+02	1.42E+01	1.09E-01	*2.67E+02*	0.00289123	0.94361718	0.05308167	0.00040991
X	Lead	331.866667	0.0063	0.0333	30.26	6.43	0.000992446	15.22768646	15.22867891	0.7775636	0.0006363	1.60E+01	1.54E-04	2.37E+00	1.21E-01	9.89E-05	*2.49E+00*	6.2001E-05	0.95132141	0.04857684	3.9752E-05
	Manganese	133.483333	0.52	106.0000	75.27	70.76	3.163888	37.87348032	41.03736832	0.31275145	0.05252	4.14E+01	4.47E-02	5.35E-01	4.42E-03	7.42E-04	*5.95E-01*	0.07641754	0.91476004	0.0075539	0.00126852
	Mercury	0.279	0.00013	0.0055	0.01	0.03	0.000164164	0.004917474	0.005081638	0.000653697	0.00001313	5.75E-03	6.38E-03	1.91E-01	2.54E-02	5.10E-04	*2.23E-01*	0.02855788	0.85544124	0.11371679	0.00228409
	Nickel	18.9166667	0.0018	0.1600	0.49	32.17	0.00477568	0.245880614	0.250656294	0.04432175	0.0001818	2.95E-01	1.48E-04	7.64E-03	1.38E-03	5.65E-06	*9.18E-03*	0.01617998	0.83304223	0.15016186	0.00061594
	Selenium	0.7566667	0.00095	0.1600	0.07	0.16	0.00477568	0.03271324	0.03748892	0.00177287	0.00009595	3.94E-02	2.97E-02	2.03E-01	1.10E-02	5.97E-04	*2.45E-01*	0.1213403	0.83117679	0.04504502	0.00243789
	Silver	1.11	0.0002	0.1550		145.71	0.00462644	0	0.00462644	0.00260073	0.0000202	7.25E-03	3.18E-05	0.00E+00	1.78E-05	1.39E-07	*4.97E-05*	0.63836123	0	0.35885156	0.00278722
	Thallium	0.465	0.00075	0.0650		0.06	0.00194012	0	0.00194012	0.001089495	0.00007575	3.11E-03	3.23E-02	0.00E+00	1.81E-02	1.26E-03	*5.16E-02*	0.62476392	0	0.35084282	0.02439327
X	Vanadium	55.6666667	0.000275	0.0000	1.94	0.16	0	0.974585933	0.974585933	0.130427	0.000027775	1.11E+00	0.00E+00	6.22E+00	8.32E-01	1.77E-04	*7.05E+00*	0	0.88194573	0.11802914	2.5135E-05
	Zinc	154.6	0.0161	18.1500	5.98	128.66	0.5417412	3.011336066	3.553077266	0.3622278	0.0016261	3.92E+00	4.21E-03	2.34E-02	2.82E-03	1.26E-05	*3.04E-02*	0.13830756	0.76879984	0.09247745	0.00041515

Table E.1-47. Average Exposure Calculations for Heron (Site-Wide)

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Fish} (mg/Kg)	$C_{Crayfish}$ (mg/Kg)	TRV mg/Kg day	DOSE fish	DOSE crayfish	DOSE prey (f+cf)	DOSE soil/ sediment	DOSE water	Total Dose	HQ fish	HQ crayfish	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ fish	% HQ crayfish	% HQ prey (f + cf)	% HQ soil/ sediment	% HQ water
	Volatile Organics																					
	2-Butanone	0.03875532	0.0025			12.1	0	0	0	8.7975E-06	0.0001225	1.31E-04	0.00E+00	0.00E+00	7.27E-07	1.01E-05	*1.09E-05*	0	0	0	0.06700402	0.93299598
	Acetone	0.34410577	0.0025			1700	0	0	0	7.8112E-05	0.0001225	2.01E-04	0.00E+00	0.00E+00	4.59E-08	7.21E-08	*1.18E-07*	0	0	0	0.38936856	0.61063144
	cis-1,2-Dichloroethene	0.09613889	0.00090625			3114	0	0	0	2.1824E-05	4.44063E-05	6.62E-05	0.00E+00	0.00E+00	7.01E-09	1.43E-08	*2.13E-08*	0	0	0	0.32951232	0.67048768
	Tetrachloroethene	0.03569091	0.00059375			14	0	0	0	8.1018E-06	2.90938E-05	3.72E-05	0.00E+00	0.00E+00	5.79E-07	2.08E-06	*2.66E-06*	0	0	0	0.21781714	0.78218286
	Trichloroethene	0.05520536	0.0006875			7	0	0	0	1.2532E-05	3.36875E-05	4.62E-05	0.00E+00	0.00E+00	1.79E-06	4.81E-06	*6.60E-06*	0	0	0	0.27113491	0.72886509
	Semivolatile Organics																					
	2-Methylnaphthalene	0.20409322	0.0025			143.70	0	0	0	0.000048	0.0001225	1.69E-04	0.00E+00	0.00E+00	3.22E-07	8.52E-07	*1.17E-06*	0	0	0	0.27441445	0.72558555
	Acenaphthylene	0.19940678	0.0025			133.30	0	0	0	0.000045	0.0001225	1.68E-04	0.00E+00	0.00E+00	3.40E-07	9.19E-07	*1.26E-06*	0	0	0	0.26981341	0.73018659
	Anthracene	0.263375	0.0025			1000.00	0	0	0	0.000060	0.0001225	1.82E-04	0.00E+00	0.00E+00	5.98E-08	1.23E-07	*1.82E-07*	0	0	0	0.32797957	0.67202043
	Benzo(a)anthracene	0.88295714	0.0025			1.30	0	0	0	0.000200	0.0001225	3.23E-04	0.00E+00	0.00E+00	1.54E-04	9.42E-05	*2.48E-04*	0	0	0	0.62066232	0.37933768
	Benzo(a)pyrene	0.91715714	0.0025			1.30	0	0	0	0.000208	0.0001225	3.31E-04	0.00E+00	0.00E+00	1.60E-04	9.42E-05	*2.54E-04*	0	0	0	0.62956766	0.37043234
	Benzo(b)fluoranthene	1.52488158	0.0025			1.30	0	0	0	0.000348	0.0001225	4.69E-04	0.00E+00	0.00E+00	2.66E-04	9.42E-05	*3.60E-04*	0	0	0	0.73860985	0.26139015
	Benzo(g,h,i)perylene	0.54896875	0.0025			133.30	0	0	0	0.000125	0.0001225	2.47E-04	0.00E+00	0.00E+00	9.35E-07	9.19E-07	*1.85E-06*	0	0	0	0.5042812	0.4957188
	Benzo(k)fluoranthene	1.095975	0.0025			1.30	0	0	0	0.000249	0.0001225	3.71E-04	0.00E+00	0.00E+00	1.91E-04	9.42E-05	*2.86E-04*	0	0	0	0.67006595	0.32993405
	Carbazole	0.24511111	0			133.30	0	0	0	0.000058	0	5.56E-05	0.00E+00	0.00E+00	4.17E-07	0.00E+00	*4.17E-07*	0	0	0	1	0
	Chrysene	1.10639437	0.0025			1.30	0	0	0	0.000251	0.0001225	3.74E-04	0.00E+00	0.00E+00	1.93E-04	9.42E-05	*2.87E-04*	0	0	0	0.67215442	0.32784558
	Dibenz(a,h)anthracene	0.27028689	0.0025			1.30	0	0	0	0.000061	0.0001225	1.84E-04	0.00E+00	0.00E+00	4.72E-05	9.42E-05	*1.41E-04*	0	0	0	0.33371451	0.66628549
	Dibenzofuran	0.26276744	0.0025			133.30	0	0	0	0.000060	0.0001225	1.82E-04	0.00E+00	0.00E+00	4.47E-07	9.19E-07	*1.37E-06*	0	0	0	0.32747074	0.67252926
	Fluoranthene	1.90036842	0.0025			125.00	0	0	0	0.000431	0.0001225	5.54E-04	0.00E+00	0.00E+00	3.45E-06	9.80E-07	*4.43E-06*	0	0	0	0.77883441	0.22116559
	Fluorene	0.2222	0.0025			125.00	0	0	0	0.000050	0.0001225	1.73E-04	0.00E+00	0.00E+00	4.04E-07	9.80E-07	*1.38E-06*	0	0	0	0.29165939	0.70834061
	Indeno(1,2,3-cd)pyrene	0.59153731	0.0025			1.30	0	0	0	0.000134	0.0001225	2.57E-04	0.00E+00	0.00E+00	1.03E-04	9.42E-05	*1.98E-04*	0	0	0	0.52293601	0.47706399
	Naphthalene	0.256058	0.0025			140.00	0	0	0	0.000058	0.0001225	1.81E-04	0.00E+00	0.00E+00	4.15E-07	8.75E-07	*1.29E-06*	0	0	0	0.32179993	0.67820007
	N-nitrosodiphenylamine	0.28115217	0.0025			150.00	0	0	0	0.000064	0.0001225	1.86E-04	0.00E+00	0.00E+00	4.25E-07	8.17E-07	*1.24E-06*	0	0	0	0.34253443	0.65746557
	Phenanthrene	0.92373134	0.0025			133.30	0	0	0	0.000210	0.0001225	3.32E-04	0.00E+00	0.00E+00	1.57E-06	9.19E-07	*2.49E-06*	0	0	0	0.63123182	0.36876818
	Pyrene	1.536	0.0025			133.30	0	0	0	0.000349	0.0001225	4.71E-04	0.00E+00	0.00E+00	2.62E-06	9.19E-07	*3.53E-06*	0	0	0	0.74001002	0.25998998
	Pesticides and PCBs																					
	4,4'-DDD	0.02676403	0.00005	0.02417	0.0024	8.50	0.00103327	0.000125988	0.001159255	0.000006	0.00000245	1.17E-03	1.22E-04	1.48E-05	7.15E-07	2.88E-07	*1.37E-04*	0.88481293	0.10788653	0.99269946	0.00520255	0.002098
	4,4'-DDE	0.01714065	0.00005	0.02961667	0.0050	1.90	0.00126611	0.00026027	0.001526383	0.000004	0.00000245	1.53E-03	6.66E-04	1.37E-04	2.05E-06	1.29E-06	*8.07E-04*	0.82605395	0.16980902	0.99586297	0.00253857	0.00159846
	4,4'-DDT	0.0054744	0.00005	0.00515333	0.0012	0.00	0.0002203	6.04794E-05	0.000280784	0.000001	0.00000245	2.84E-04	7.87E-02	2.16E-02	4.44E-04	8.75E-04	*1.02E-01*	0.77442095	0.21259842	0.98701938	0.00436833	0.00861229
	Aldrin	0.00137322	0.000025	0.00145367	0.0003	0.20	6.2144E-05	1.48586E-05	7.70028E-05	0.000000	0.000001225	7.85E-05	3.11E-04	7.43E-05	1.56E-06	6.13E-06	*3.93E-04*	0.7912477	0.18918609	0.9804338	0.00396897	0.01559723
	alpha-Chlordane	0.01182616	2.3653E-05	0.01799167	0.0009	2.14	0.00076914	4.85272E-05	0.000817671	0.000003	1.15899E-06	8.22E-04	3.59E-04	2.27E-05	1.25E-06	5.42E-07	*3.84E-04*	0.93625101	0.0590704	0.99532141	0.00326779	0.0014108
	Aroclor 1248	0.05514643	0.0005	0.01848	0.0026	0.98	0.00079002	0.000137483	0.000927503	0.000013	0.0000245	9.65E-04	8.06E-04	1.40E-04	1.28E-05	2.50E-05	*9.84E-04*	0.8190801	0.14253998	0.96162008	0.01297871	0.02540121
	Aroclor 1254	0.02154107	0.0005	0.08945	0.0157	1.50	0.00382399	0.000819672	0.004643659	0.000005	0.0000245	4.67E-03	2.55E-03	5.46E-04	3.26E-06	1.63E-05	*3.12E-03*	0.81830671	0.17540408	0.99371078	0.00104639	0.00524283
	Aroclor 1260	0.06308966	0.0005	0.0675	0.0258	0.35	0.00288563	0.00134903	0.004234655	0.000014	0.0000245	4.27E-03	8.36E-03	3.91E-03	4.15E-05	7.10E-05	*1.24E-02*	0.67524071	0.31567503	0.99091574	0.00335122	0.00573304
	beta-BHC	0.00139703	0.000025	0.00136667	0.0003	4.00	5.8425E-05	1.45647E-05	7.29897E-05	0.000000	0.000001225	7.45E-05	1.46E-05	3.64E-06	7.93E-08	3.06E-07	*1.86E-05*	0.78389345	0.19541571	0.97930916	0.00425491	0.01643593
	delta-BHC	0.00194259	0.000025	0.00131667	0.0003	1.60	5.6288E-05	1.39442E-05	7.02317E-05	0.000000	0.000001225	7.19E-05	3.52E-05	8.72E-06	2.76E-07	7.66E-07	*4.49E-05*	0.78288334	0.1939453	0.97682864	0.00613326	0.0170381
	Endosulfan I	0.00478091	0.000025	0.00143567	0.0004	10.00	6.1375E-05	1.99203E-05	8.12951E-05	0.000001	0.000001225	8.36E-05	6.14E-06	1.99E-06	1.09E-07	1.23E-07	*8.36E-06*	0.73410094	0.23826606	0.972367	0.01298083	0.01465218
	Endosulfan Sulfate	0.00229061	0.00005	0.00267833	0.0008	10.00	0.0001145	3.98406E-05	0.000154339	0.000001	0.00000245	1.57E-04	1.14E-05	3.98E-06	5.20E-08	2.45E-07	*1.57E-05*	0.72785727	0.25326293	0.9811202	0.00330539	0.01557441
	Endrin Aldehyde	0.00297	0.00005	0.00279833	0.0020	0.30	0.00011963	0.000106786	0.000226415	0.000001	0.00000245	2.30E-04	3.99E-04	3.56E-04	2.25E-06	8.17E-06	*7.65E-04*	0.52116988	0.4652194	0.98638928	0.00293715	0.01067357
	gamma-Chlordane	0.01553268	2.3612E-05	0.00821833	0.0004	2.14	0.00035133	2.08347E-05	0.000372168	0.000004	1.15698E-06	3.77E-04	1.64E-04	9.74E-06	1.65E-06	5.41E-07	*1.76E-04*	0.9322874	0.05528622	0.98757363	0.00935626	0.00307012
	Inorganics																					
	Aluminum	10222.8962	0.25301176	0.00844394	50.0063	109.70	0.00036098	2.612826563	2.613187541	2.320597	0.012397576	4.95E+00	3.29E-06	2.38E-02	2.12E-02	1.13E-04	*4.51E-02*	7.2981E-05	0.52825114	0.52832412	0.46916939	0.00250649
	Antimony	5.5715253	0.00067941	5.5828E-05	0.0484	0.13	2.3866E-06	0.002530394	0.002532781	0.001265	3.32912E-05	3.83E-03	1.91E-05	2.02E-02	1.01E-02	2.66E-04	*3.06E-02*	0.00062301	0.66053796	0.66116097	0.33014866	0.00869038
	Arsenic	351.196448	0.01390588	0.00021902	2.2175	5.14	9.3629E-06	0.115864375	0.115873738	0.079722	0.000681388	1.96E-01	1.82E-06	2.25E-02	1.55E-02	1.33E-04	*3.82E-02*	4.7703E-05	0.59031135	0.59035905	0.40616938	0.00347157
	Barium	62.8800546	0.03672059	0.00066242	10.1813	208.00	2.8319E-05	0.531970313	0.531998631	0.014274	0.001799309	5.48E-01	1.36E-07	2.56E-03	6.86E-05	8.65E-06	*2.63E-03*	5.167E-05	0.97062173	0.9706734	0.02604362	0.00328298
	Beryllium	0.6776424	5.1412E-05	5.3877E-06	0.0054	0.66	2.3032E-07	0.00028052	0.00028075	0.000154	2.51918E-06	4.37E-04	3.49E-07	4.25E-04	2.33E-04	3.82E-06	*6.62E-04*	0.00052694	0.6417835	0.64231045	0.35192608	0.00576347
	Cadmium	6.392571	0.00029629	2.8078E-05	0.0701	1.45	1.2003E-06	0.003661231	0.003662431	0.001451	1.45184E-05	5.13E-03	8.28E-07	2.52E-03	1.00E-03	1.00E-05	*3.54E-03*	0.00023407	0.71395976	0.71419383	0.282975	0.00283117
	Chromium	617.017213	0.01258941	0.00034424	1.1325	1.00	1.4716E-05	0.059173125	0.059187841	0.140063	0.000616881	2.00E-01	1.47E-05	5.92E-02	1.40E-01	6.17E-04	*2.00E-01*	7.3631E-05	0.29606157	0.2961352	0.70077835	0.00308645
	Cobalt	15.5862842	0.000905	4.7197E-05	0.4388	5.00	2.0177E-06	0.022924688	0.022926705	0.003538	4.4345E-05	2.65E-02	4.04E-07	4.58E-03	7.08E-04	8.87E-06	*5.30E-03*	7.6112E-05	0.86478439	0.8648605	0.13346668	0.00167282
	Copper	415.268306	0.01178529	0.0008903	49.6688	47.00	3.806E-05	2.595192188	2.595230248	0.094266	0.000577479	2.69E+00	8.10E-07	5.52E-02	2.01E-03	1.23E-05	*5.72E-02*	1.4148E-05	0.96472905	0.9647432	0.03504213	0.00021467
	Cyanide	1.1638	0.0025	0.00024348	0.2394	68.70	1.0409E-05	0.012507344	0.012517753	0.000264	0.0001225	1.29E-02	1.52E-07	1.82E-04	3.85E-06	1.78E-06	*1.88E-04*	0.00080662	0.96922829	0.97003491	0.02047223	0.00949286
X	Iron	29402.5956	1.56129412	0.05218939	345.0313	3.19	0.0022311	18.02788281	18.03011391	6.674389	0.076503412	2.48E+01	6.99E-04	5.65E+00	2.09E+00	2.40E-02	*7.77E+00*	9.0033E-05	0.72748792	0.72757795	0.26933487	0.00308718
	Lead	272.036339	0.00738706	0.00012921	0.7778	1.13	5.5238E-06	0.040640703	0.040646227	0.061752	0.000361966	1.03E-01	4.89E-06	3.60E-02	5.46E-02	3.20E-04	*9.09E-02*	5.3754E-05	0.39548977	0.39554352	0.60093405	0.00352242
	Manganese	484.939344	0.4224	0.00684848	98.9250	977.00	0.00029277	5.16883125	5.169124023	0.110081	0.0206976	5.30E+00	3.00E-07	5.29E-03	1.13E-04	2.12E-05	*5.42E-03*	5.5241E-05	0.97526906	0.9753243	0.02077042	0.00390528
	Mercury	2.9862083	0.00014506	2.1167E-05	0.0092	0.01	9.0488E-07	0.000480047	0.000480952	0.000678	7.10788E-06	1.17E-03	1.41E-04	7.50E-02	1.06E-01	1.11E-03	*1.82E-01*	0.0007761	0.41172911	0.41250521	0.58139847	0.00609632
	Nickel	19.4810929	0.00207	2.4121E-05	0.0846	77.40	1.0312E-06	0.004418391	0.004419422	0.004422	0.00010143	8.94E-03	1.33E-08	5.71E-05	5.71E-05	1.31E-06	*1.16E-04*	0.00011531	0.49405804	0.49417334	0.4944849	0.01134176
	Selenium	3.3413128	0.00079412	0.00071394	0.4069	0.40	3.0521E-05	0.021259219	0.02128974	0.000758	3.89118E-05	2.21E-02	7.63E-05	5.31E-02	1.90E-03	9.73E-05	*5.52E-02*	0.00138184	0.96251615	0.96389799	0.03434027	0.00176174
	Silver	0.6066118	0.00032235	1.9424E-05	0.0323	181.20	8.3038E-07	0.001688328	0.001689159	0.000138	1.57953E-05	1.84E-03	4.58E-09	9.32E-06	7.60E-07	8.72E-08	*1.02E-05*	0.00045065	0.91624771	0.91669835	0.07472962	0.00857203
	Thallium	1.4004242	0.00082059	6.9849E-05	0.0825	0.07	2.986E-06	0.004310625	0.004313611	0.000318	4.02088E-05	4.67E-03	4.04E-05	5.83E-02	4.30E-03	5.43E-04	*6.31E-02*	0.00063917	0.92270696	0.92334613	0.06804701	0.00860686
	Vanadium	38.7240437	0.00138162	9.0605E-05	0.1467	11.40	3.8734E-06	0.007665822	0.007669696	0.008790	6.76993E-05	1.65E-02	3.40E-07	6.72E-04	7.71E-04	5.94E-06	*1.45E-03*	0.00023436	0.46381515	0.46404951	0.53185439	0.00049061
	Zinc	1236.41421	0.07170294	0.02648788	25.3938	14.50	0.00113236	1.326823438	1.327955794	0.280668	0.003513444	1.61E+00	7.81E-05	9.15E-02	1.94E-02	2.42E-04	*1.11E-01*	0.0007024	0.8230224	0.8237248	0.17409583	0.00217937

Table E.1-48. Maximum Exposure Calculations for Heron (Site-Wide)

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg) 95% UCLs	C_{Water} (mg/L)	C_{Fish} (mg/Kg)	$C_{Crayfish}$ (mg/Kg)	TRV mg/Kg day	DOSE fish	DOSE crayfish	DOSE prey (f+cf)	DOSE soil/ sediment	DOSE water	Total Dose	HQ fish	HQ crayfish	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ fish	% HQ crayfish	% HQ prey (f + cf)	% HQ soil/ sediment	% HQ water
	Volatile Organics																					
	2-Butanone	0.1319995	0			12.10	0	0	0	0.000030	0	3.00E-05	0.00E+00	0.00E+00	2.48E-06	0.00E+00	*2.48E-06*	0	0	0	1	0
	Acetone	1.3476652	0			1700.00	0	0	0	0.000306	0	3.06E-04	0.00E+00	0.00E+00	1.80E-07	0.00E+00	*1.80E-07*	0	0	0	1	0
	cis-1,2-Dichloroethene	0.1990014	0.0020356			3114.00	0	0	0	0.000045	9.97421E-05	1.45E-04	0.00E+00	0.00E+00	1.45E-08	3.20E-08	*4.65E-08*	0	0	0	0.31172191	0.68827809
	Tetrachloroethene	0.041	0.0007581			14.00	0	0	0	0.000009	3.71468E-05	4.65E-05	0.00E+00	0.00E+00	6.65E-07	2.65E-06	*3.32E-06*	0	0	0	0.20034949	0.79965051
	Trichloroethene	0.2801847	0.000912			7.00	0	0	0	0.000064	4.46901E-05	1.08E-04	0.00E+00	0.00E+00	9.09E-06	6.38E-06	*1.55E-05*	0	0	0	0.58731868	0.41268132
	Semivolatile Organics																					
	2-Methylnaphthalene	0.22	0			143.70	0	0	0	0.000050	0	4.99E-05	0.00E+00	0.00E+00	3.48E-07	0.00E+00	*3.48E-07*	0	0	0	1	0
	Acenaphthylene	0.3606415	0			133.30	0	0	0	0.000082	0	8.19E-05	0.00E+00	0.00E+00	6.14E-07	0.00E+00	*6.14E-07*	0	0	0	1	0
	Anthracene	0.3967152	0			1000.00	0	0	0	0.000090	0	9.01E-05	0.00E+00	0.00E+00	9.01E-08	0.00E+00	*9.01E-08*	0	0	0	1	0
	Benzo(a)anthracene	2.1218544	0			1.30	0	0	0	0.000482	0	4.82E-04	0.00E+00	0.00E+00	3.71E-04	0.00E+00	*3.71E-04*	0	0	0	1	0
	Benzo(a)pyrene	1.1979288	0			1.30	0	0	0	0.000272	0	2.72E-04	0.00E+00	0.00E+00	2.09E-04	0.00E+00	*2.09E-04*	0	0	0	1	0
	Benzo(b)fluoranthene	2.1103778	0			1.30	0	0	0	0.000479	0	4.79E-04	0.00E+00	0.00E+00	3.69E-04	0.00E+00	*3.69E-04*	0	0	0	1	0
	Benzo(g,h,i)perylene	0.9988317	0			133.30	0	0	0	0.000227	0	2.27E-04	0.00E+00	0.00E+00	1.70E-06	0.00E+00	*1.70E-06*	0	0	0	1	0
	Benzo(k)fluoranthene	2.811804	0			1.30	0	0	0	0.000638	0	6.38E-04	0.00E+00	0.00E+00	4.91E-04	0.00E+00	*4.91E-04*	0	0	0	1	0
	Carbazole	0.3290768	0			133.30	0	0	0	0.000075	0	7.47E-05	0.00E+00	0.00E+00	5.60E-07	0.00E+00	*5.60E-07*	0	0	0	1	0
	Chrysene	1.4191109	0			1.30	0	0	0	0.000322	0	3.22E-04	0.00E+00	0.00E+00	2.48E-04	0.00E+00	*2.48E-04*	0	0	0	1	0
	Dibenz(a,h)anthracene	0.4332605	0			1.30	0	0	0	0.000098	0	9.84E-05	0.00E+00	0.00E+00	7.57E-05	0.00E+00	*7.57E-05*	0	0	0	1	0
	Dibenzofuran	0.3953307	0			133.30	0	0	0	0.000090	0	8.97E-05	0.00E+00	0.00E+00	6.73E-07	0.00E+00	*6.73E-07*	0	0	0	1	0
	Fluoranthene	4.6542074	0			125.00	0	0	0	0.001057	0	1.06E-03	0.00E+00	0.00E+00	8.45E-06	0.00E+00	*8.45E-06*	0	0	0	1	0
	Fluorene	0.309405	0			125.00	0	0	0	0.000070	0	7.02E-05	0.00E+00	0.00E+00	5.62E-07	0.00E+00	*5.62E-07*	0	0	0	1	0
	Indeno(1,2,3-cd)pyrene	1.3638715	0			1.30	0	0	0	0.000310	0	3.10E-04	0.00E+00	0.00E+00	2.38E-04	0.00E+00	*2.38E-04*	0	0	0	1	0
	Naphthalene	0.5613967	0.0026467			140.00	0	0	0	0.000127	0.00129686	2.57E-04	0.00E+00	0.00E+00	9.10E-07	9.26E-07	*1.84E-06*	0	0	0	0.49562594	0.50437406
	N-nitrosodiphenylamine	0.4094424	0			150.00	0	0	0	0.000093	0	9.29E-05	0.00E+00	0.00E+00	6.20E-07	0.00E+00	*6.20E-07*	0	0	0	1	0
	Phenanthrene	2.2900859	0			133.30	0	0	0	0.000520	0	5.20E-04	0.00E+00	0.00E+00	3.90E-06	0.00E+00	*3.90E-06*	0	0	0	1	0
	Pyrene	3.5221324	0			133.30	0	0	0	0.000800	0	8.00E-04	0.00E+00	0.00E+00	6.00E-06	0.00E+00	*6.00E-06*	0	0	0	1	0
	Pesticides and PCBs																					
	4,4'-DDD	0.0637154	0	0.0271163	0.003	8.50	0.0011592	0.000173879	0.001333103	0.000014	0	1.35E-03	1.36E-04	2.05E-05	1.70E-06	0.00E+00	*1.59E-04*	0.86023498	0.12903206	0.98926703	0.01073297	0
	4,4-DDE	0.0342288	0	0.0337377	0.007	1.90	0.0014423	0.000358231	0.001800519	0.000008	0	1.81E-03	7.59E-04	1.89E-04	4.09E-06	0.00E+00	*9.52E-04*	0.79759815	0.198105	0.99570315	0.00429685	0
	4,4'-DDT	0.0126879	0	0.00615	0.001	0.00	0.0002629	7.81307E-05	0.000341045	0.000003	0	3.44E-04	9.39E-02	2.79E-02	1.03E-03	0.00E+00	*1.23E-01*	0.76445233	0.22717333	0.99162566	0.00837434	0
	Aldrin	0.0034057	0	0.0020491	0.000	0.20	8.76E-05	1.61975E-05	0.000103798	0.000001	0	1.05E-04	4.38E-04	8.10E-05	3.87E-06	0.00E+00	*5.23E-04*	0.83771228	0.15489464	0.99260691	0.00739309	0
	alpha-Chlordane	0.0263503	2.952E-05	0.021189	0.001	2.14	0.0009058	6.45126E-05	0.000970341	0.000006	1.44671E-06	9.78E-04	4.23E-04	3.01E-05	2.80E-06	6.76E-07	*4.57E-04*	0.92642348	0.06597941	0.99240288	0.00611752	0.0014796
	Aroclor 1248	0.1044803	0	0.0272059	0.003	0.98	0.0011631	0.000151196	0.001314247	0.000024	0	1.34E-03	1.19E-03	1.54E-04	2.42E-05	0.00E+00	*1.37E-03*	0.86926908	0.11300472	0.98227379	0.01772621	0
	Aroclor 1254	0.038972	0	0.1005747	0.020	1.50	0.0042996	0.001065188	0.005364754	0.000009	0	5.37E-03	2.87E-03	7.10E-04	5.90E-06	0.00E+00	*3.58E-03*	0.8001276	0.19822608	0.99835368	0.00164632	0
	Aroclor 1260	0.1112946	0	0.0742208	0.034	0.35	0.0031729	0.001758988	0.004931926	0.000025	0	4.96E-03	9.20E-03	5.10E-03	7.32E-05	0.00E+00	*1.44E-02*	0.64006785	0.35483574	0.99490359	0.00509641	0
	beta-BHC	0.0025044	0	0.0015714	0.000	4.00	6.718E-05	1.62735E-05	8.34493E-05	0.000001	0	8.40E-05	1.68E-05	4.07E-06	1.42E-07	0.00E+00	*2.10E-05*	0.79954219	0.19369138	0.99323357	0.00676643	0
	delta-BHC	0.0050177	0	0.0018731	0.000	1.60	8.007E-05	1.53346E-05	9.54091E-05	0.000001	0	9.65E-05	5.00E-05	9.58E-06	7.12E-07	0.00E+00	*6.03E-05*	0.82937425	0.15882824	0.98820248	0.01179752	0
	Endosulfan I	0.0145366	0	0.0019923	0.001	10.00	8.517E-05	2.63851E-05	0.000111555	0.000003	0	1.15E-04	8.52E-06	2.64E-06	3.30E-07	0.00E+00	*1.15E-05*	0.74154271	0.22972688	0.97126959	0.02873041	0
	Endosulfan Sulfate	0.0021	0	0.0030639	0.001	10.00	0.000131	5.17663E-05	0.000182748	0.000000	0	1.83E-04	1.31E-05	5.18E-06	4.77E-08	0.00E+00	*1.83E-05*	0.71486911	0.28252917	0.99739828	0.00260172	0
	Endrin Aldehyde	0.0044478	0	0.003198	0.003	0.30	0.0001367	0.00014244	0.000279155	0.000001	0	2.80E-04	4.56E-04	4.75E-04	3.37E-06	0.00E+00	*9.34E-04*	0.48798298	0.50841328	0.99639626	0.00360374	0
	gamma-Chlordane	0.0726779	2.966E-05	0.0129543	0.001	2.14	0.0005538	2.94061E-05	0.000583203	0.000016	1.45348E-06	6.01E-04	2.59E-04	1.37E-05	7.71E-06	6.79E-07	*2.81E-04*	0.92122237	0.04891612	0.97013849	0.02744369	0.00241782
	Inorganics																					
	Aluminum	11277.183	0.4714323	10.911018	59.189	109.70	0.466446	3.092645165	3.559091191	2.559920	0.023100182	6.14E+00	4.25E-03	2.82E-02	2.33E-02	2.11E-04	*5.60E-02*	0.07594229	0.50351495	0.57945724	0.41678181	0.00376095
	Antimony	11.422515	0.0007956	0.0612868	0.052	0.13	0.00262	0.002694865	0.005314877	0.002593	3.89859E-05	7.95E-03	2.10E-02	2.16E-02	2.07E-02	3.12E-04	*6.36E-02*	0.32969498	0.33911441	0.66880939	0.32628473	0.00490588
	Arsenic	521.87436	0.0217135	0.4348686	3.089	5.14	0.0185906	0.161399705	0.179990338	0.118465	0.001063963	3.00E-01	3.62E-03	3.14E-02	2.30E-02	2.07E-04	*5.83E-02*	0.06206813	0.53886159	0.60092972	0.39551805	0.00355223
	Barium	69.171063	0.0397385	0.7754249	13.254	208.00	0.0331494	0.692502294	0.72565171	0.015702	0.001947187	7.43E-01	1.59E-04	3.33E-03	7.55E-05	9.36E-06	*3.57E-03*	0.04459758	0.9316583	0.97625588	0.02112447	0.00261965
	Beryllium	0.7530869	9.335E-05	0.0057361	0.006	0.66	0.0002452	0.000321642	0.000566861	0.000171	4.57426E-06	7.42E-04	3.72E-04	4.87E-04	2.59E-04	6.93E-06	*1.12E-03*	0.33031298	0.43325353	0.76356651	0.23027192	0.00616157
	Cadmium	7.4472056	0.0017655	0.0328637	0.100	1.45	0.0014049	0.005212321	0.006617242	0.001691	8.65105E-05	8.39E-03	9.69E-04	3.59E-03	1.17E-03	5.97E-05	*5.79E-03*	0.16736672	0.6209381	0.78830482	0.20138928	0.0103059
	Chromium	1081.4522	0.0201654	0.3792097	1.625	1.00	0.0162112	0.084907404	0.10111862	0.245490	0.000988106	3.48E-01	1.62E-02	8.49E-02	2.45E-01	9.88E-04	*3.48E-01*	0.04663804	0.2442701	0.29090815	0.70624917	0.00284268
	Cobalt	18.158128	0.0013736	0.0686331	0.535	5.00	0.0029341	0.027970345	0.03090441	0.004122	6.73079E-05	3.51E-02	5.87E-04	5.59E-03	8.24E-04	1.35E-05	*7.02E-03*	0.08360682	0.79702095	0.88062777	0.11745428	0.00191795
	Copper	672.91826	0.0390789	0.9830825	57.401	47.00	0.0420268	2.999214082	3.041240861	0.152752	0.001914865	3.20E+00	8.94E-04	6.38E-02	3.25E-03	4.07E-05	*6.80E-02*	0.01315018	0.9384544	0.95160458	0.04779626	0.00059916
	Cyanide	2.3594764	0	0.2521641	0.261	68.70	0.01078	0.013643123	0.024423138	0.000536	0	2.50E-02	1.57E-04	1.99E-04	7.80E-06	0.00E+00	*3.63E-04*	0.43191346	0.54662707	0.97854054	0.02145946	0
X	Iron	40710.069	2.326423	86.582807	463.364	3.19	3.701415	24.21075697	27.91217197	9.241186	0.113994728	3.73E+01	1.16E+00	7.59E+00	2.90E+00	3.57E-02	*1.17E+01*	0.09932058	0.64965058	0.74897115	0.24797001	0.00305884
	Lead	310.23289	0.0163928	0.2455473	1.051	1.13	0.0104971	0.054908408	0.065405553	0.070423	0.000803247	1.37E-01	9.29E-03	4.86E-02	6.23E-02	7.11E-04	*1.21E-01*	0.07682806	0.40187175	0.47869981	0.51542126	0.00587893
	Manganese	602.6482	0.5079414	8.403877	121.832	977.00	0.3592657	6.365737821	6.725003565	0.136801	0.024889129	6.89E+00	3.68E-04	6.52E-03	1.40E-04	2.55E-05	*7.05E-03*	0.0521681	0.92435325	0.97652135	0.01986456	0.00361409
	Mercury	4.9662199	0.0003559	0.0251929	0.012	0.01	0.001077	0.000640415	0.001717411	0.001127	1.74367E-05	2.86E-03	1.68E-01	1.00E-01	1.76E-01	2.72E-03	*4.47E-01*	0.37628533	0.22375072	0.60003605	0.39387183	0.00609212
	Nickel	23.34263	0.002567	0.0252638	0.103	77.40	0.00108	0.005366846	0.006446875	0.005299	0.000125781	1.19E-02	1.40E-05	6.93E-05	6.85E-05	1.63E-06	*1.53E-04*	0.09097716	0.45208069	0.54305785	0.44634686	0.01059529
	Selenium	5.4051175	0.0008239	0.7494228	0.478	0.40	0.0320378	0.024964257	0.057002081	0.001227	4.03735E-05	5.83E-02	8.01E-02	6.24E-02	3.07E-03	1.01E-04	*1.46E-01*	0.54982229	0.42842813	0.97825042	0.0210567	0.00069288
	Silver	1.1979952	0.0003568	0.0206305	0.047	181.20	0.000882	0.002460942	0.003342898	0.000272	1.74849E-05	3.63E-03	4.87E-06	1.36E-05	1.50E-06	9.65E-08	*2.00E-05*	0.24280733	0.67751103	0.92031836	0.07486794	0.0048137
	Thallium	2.5457327	0.0008405	0.0717092	0.112	0.07	0.0030656	0.005847618	0.008913186	0.000578	4.11833E-05	9.53E-03	4.14E-02	7.90E-02	7.81E-03	5.57E-04	*1.29E-01*	0.32159962	0.61345615	0.93505577	0.06062381	0.00432042
	Vanadium	47.798178	0.0019937	0.1071769	0.187	11.40	0.0045818	0.009794601	0.014376412	0.010850	9.76934E-05	2.53E-02	4.02E-04	8.59E-04	9.52E-04	8.57E-06	*2.22E-03*	0.18092552	0.38676704	0.56769256	0.42844975	0.0038577
	Zinc	1411.7023	0.4202457	27.862099	27.874	14.50	1.1911047	1.456394999	2.64749972	0.320456	0.020592041	2.99E+00	8.21E-02	1.00E-01	2.21E-02	1.42E-03	*2.06E-01*	0.3985563	0.48732525	0.88588156	0.10722813	0.00689032

Table E.1-49. Average Exposure Calculatioins for Heron - Reference

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Fish} (mg/Kg)	$C_{Crayfish}$ (mg/Kg)	TRV mg/Kg day	DOSE fish	DOSE crayfish	DOSE prey (f+cf)	DOSE soil/ sediment	DOSE water	Total Dose	HQ fish	HQ crayfish	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ fish	% HQ crayfish	% HQ prey (f + cf)	% HQ soil/ sediment	% HQ water
	Volatile Organics																					
	2-Butanone	0.051262	0.0018333			12.1	0	0	0	1.164E-05	8.98333E-05	1.01E-04	0.00E+00	0.00E+00	9.62E-07	7.42E-06	*8.39E-06*	0	0	0	0.11467899	0.88532101
	Acetone	0.174273	0.0025			1700	0	0	0	3.956E-05	0.0001225	1.62E-04	0.00E+00	0.00E+00	2.33E-08	7.21E-08	*9.53E-08*	0	0	0	0.2441067	0.7558933
	cis-1,2-Dichloroethene	0.009889	0.0007222			3114	0	0	0	2.245E-06	3.53889E-05	3.76E-05	0.00E+00	0.00E+00	7.21E-10	1.14E-08	*1.21E-08*	0	0	0	0.05964813	0.94035187
	Tetrachloroethene	0.009957	0.0007222			14	0	0	0	2.26E-06	3.53889E-05	3.76E-05	0.00E+00	0.00E+00	1.61E-07	2.53E-06	*2.69E-06*	0	0	0	0.06003159	0.93996841
	Trichloroethene	0.008435	0.0007222			7	0	0	0	1.915E-06	3.53889E-05	3.73E-05	0.00E+00	0.00E+00	2.74E-07	5.06E-06	*5.33E-06*	0	0	0	0.05132739	0.94867261
	Semivolatile Organics																					
	2-Methylnaphthalene	0.267	0.0023889			143.7	0	0	0	0.000061	0.000117056	1.78E-04	0.00E+00	0.00E+00	4.22E-07	8.15E-07	*1.24E-06*	0	0	0	0.34114289	0.65885711
	Acenaphthylene	0.305292	0.0023889			133.3	0	0	0	0.000069	0.000117056	1.86E-04	0.00E+00	0.00E+00	5.20E-07	8.78E-07	*1.40E-06*	0	0	0	0.37187385	0.62812615
	Anthracene	0.413583	0.0023889			1000	0	0	0	0.000094	0.000117056	2.11E-04	0.00E+00	0.00E+00	9.39E-08	1.17E-07	*2.11E-07*	0	0	0	0.44507383	0.55492617
	Benzo(a)anthracene	1.151667	0.0023889			1.3	0	0	0	0.000261	0.000117056	3.78E-04	0.00E+00	0.00E+00	2.01E-04	9.00E-05	*2.91E-04*	0	0	0	0.69072513	0.30927487
	Benzo(a)pyrene	1.065	0.0023889			1.3	0	0	0	0.000242	0.000117056	3.59E-04	0.00E+00	0.00E+00	1.86E-04	9.00E-05	*2.76E-04*	0	0	0	0.6737678	0.3262322
	Benzo(b)fluoranthene	1.450417	0.0023889			1.3	0	0	0	0.000329	0.000117056	4.46E-04	0.00E+00	0.00E+00	2.53E-04	9.00E-05	*3.43E-04*	0	0	0	0.7377201	0.2622799
	Benzo(g,h,i)perylene	0.474792	0.0023889			133.3	0	0	0	0.000108	0.000117056	2.25E-04	0.00E+00	0.00E+00	8.09E-07	8.78E-07	*1.69E-06*	0	0	0	0.47936727	0.52063273
	Benzo(k)fluoranthene	1.397292	0.0023889			1.3	0	0	0	0.000317	0.000117056	4.34E-04	0.00E+00	0.00E+00	2.44E-04	9.00E-05	*3.34E-04*	0	0	0	0.73043628	0.26956372
	Carbazole	0.331727	0.00225			133.3	0	0	0	0.000075	0.00011025	1.86E-04	0.00E+00	0.00E+00	5.65E-07	8.27E-07	*1.39E-06*	0	0	0	0.40582723	0.59417277
	Chrysene	1.31375	0.0023889			1.3	0	0	0	0.000298	0.000117056	4.15E-04	0.00E+00	0.00E+00	2.29E-04	9.00E-05	*3.19E-04*	0	0	0	0.71812643	0.28187357
	Dibenz(a,h)anthracene	0.283333	0.0023889			1.3	0	0	0	0.000064	0.000117056	1.81E-04	0.00E+00	0.00E+00	4.95E-05	9.00E-05	*1.40E-04*	0	0	0	0.35461145	0.64538855
	Dibenzofuran	0.322727	0.0023889			133.3	0	0	0	0.000073	0.000117056	1.90E-04	0.00E+00	0.00E+00	5.50E-07	8.78E-07	*1.43E-06*	0	0	0	0.38493669	0.61506331
	Fluoranthene	2.483792	0.0023889			125	0	0	0	0.000564	0.000117056	6.81E-04	0.00E+00	0.00E+00	4.51E-06	9.36E-07	*5.45E-06*	0	0	0	0.82808102	0.17191898
	Fluorene	0.393542	0.0023889			125	0	0	0	0.000089	0.000117056	2.06E-04	0.00E+00	0.00E+00	7.15E-07	9.36E-07	*1.65E-06*	0	0	0	0.43284155	0.56715845
	Indeno(1,2,3-cd)pyrene	0.634375	0.0023889			1.3	0	0	0	0.000144	0.000117056	2.61E-04	0.00E+00	0.00E+00	1.11E-04	9.00E-05	*2.01E-04*	0	0	0	0.55161209	0.44838791
	Naphthalene	0.280417	0.0023889			140	0	0	0	0.000064	0.000117056	1.81E-04	0.00E+00	0.00E+00	4.55E-07	8.36E-07	*1.29E-06*	0	0	0	0.35224715	0.64775285
	N-nitrosodiphenylamine	0.331591	0.0023889			150	0	0	0	0.000075	0.000117056	1.92E-04	0.00E+00	0.00E+00	5.02E-07	7.80E-07	*1.28E-06*	0	0	0	0.39137124	0.60862876
	Phenanthrene	1.517083	0.0023889			133.3	0	0	0	0.000344	0.000117056	4.61E-04	0.00E+00	0.00E+00	2.58E-06	8.78E-07	*3.46E-06*	0	0	0	0.74632192	0.25367808
	Pyrene	1.975667	0.0023889			133.3	0	0	0	0.000448	0.000117056	5.66E-04	0.00E+00	0.00E+00	3.36E-06	8.78E-07	*4.24E-06*	0	0	0	0.79301688	0.20698312
	Pesticides and PCBs																					
	4,4'-DDD	0.047775	2.981E-05	0.00196	0.0008	8.50	8.379E-05	4.10163E-05	0.000124806	0.000011	1.46074E-06	1.37E-04	9.86E-06	4.83E-06	1.28E-06	1.72E-07	*1.61E-05*	0.61110661	0.29914431	0.91025092	0.07909542	0.01065366
	4,4'-DDE	0.030514	2.981E-05	0.0132833	0.0047	1.90	0.0005679	0.000242963	0.000810825	0.000007	1.46074E-06	8.19E-04	2.99E-04	1.28E-04	3.65E-06	7.69E-07	*4.31E-04*	0.69318098	0.29658057	0.98976156	0.00845534	0.00178311
	4,4'-DDT	0.022802	2.981E-05	0.0014883	0.0005	0.00	6.363E-05	2.56025E-05	8.92287E-05	0.000005	1.46074E-06	9.59E-05	2.27E-02	9.14E-03	1.85E-03	5.22E-04	*3.42E-02*	0.6637035	0.26706696	0.93077046	0.0539921	0.01523744
	Aldrin	0.002902	1.592E-05	0.0006642	0.0003	0.20	2.839E-05	1.31931E-05	4.15863E-05	0.000001	7.80188E-07	4.30E-05	1.42E-04	6.60E-05	3.29E-06	3.90E-06	*2.15E-04*	0.65991906	0.30663741	0.96655647	0.01531024	0.01813329
	alpha-Chlordane	0.004223	1.592E-05	0.0008	0.0003	2.14	0.0000342	1.31931E-05	4.73931E-05	0.000001	7.80188E-07	4.91E-05	1.60E-05	6.17E-06	4.48E-07	3.65E-07	*2.30E-05*	0.69608455	0.26852428	0.96460884	0.01951173	0.01587944
	Aroclor 1248	0.069781	0.000288	0.0065333	0.0025	0.98	0.0002793	0.000130625	0.000409925	0.000016	0.000014112	4.40E-04	2.85E-04	1.33E-04	1.62E-05	1.44E-05	*4.49E-04*	0.63494973	0.29695778	0.93190751	0.03601082	0.03208167
	Aroclor 1254	0.055498	0.000288	0.0065333	0.0025	1.50	0.0002793	0.000130625	0.000409925	0.000013	0.000014112	4.37E-04	1.86E-04	8.71E-05	8.40E-06	9.41E-06	*2.91E-04*	0.63966467	0.2991629	0.93882757	0.02885253	0.0323199
	Aroclor 1260	0.065656	0.000288	0.0193167	0.0052	0.35	0.0008258	0.000269088	0.001094875	0.000015	0.000014112	1.12E-03	2.39E-03	7.80E-04	4.32E-05	4.09E-05	*3.26E-03*	0.73475766	0.23942491	0.97418258	0.01326105	0.01255638
	beta-BHC	0.002876	1.592E-05	0.0006642	0.0003	4.00	2.839E-05	1.31931E-05	4.15863E-05	0.000001	7.80188E-07	4.30E-05	7.10E-06	3.30E-06	1.63E-07	1.95E-07	*1.08E-05*	0.66001047	0.30667988	0.96669035	0.01517385	0.0181358
	delta-BHC	0.002942	1.592E-05	0.0006642	0.0003	1.60	2.839E-05	1.31931E-05	4.15863E-05	0.000001	7.80188E-07	4.30E-05	1.77E-05	8.25E-06	4.17E-07	4.88E-07	*2.69E-05*	0.65977837	0.30657203	0.96635041	0.01552017	0.01812942
	Endosulfan I	0.006814	1.592E-05	0.0007283	0.0003	10.00	3.114E-05	1.31931E-05	4.43294E-05	0.000002	7.80188E-07	4.67E-05	3.11E-06	1.32E-06	1.55E-07	7.80E-08	*4.67E-06*	0.66735315	0.28277246	0.9501256	0.03315238	0.01672201
	Endosulfan Sulfate	0.005608	2.981E-05	0.0012967	0.0005	10.00	5.543E-05	2.56025E-05	8.1035E-05	0.000001	1.46074E-06	8.38E-05	5.54E-06	2.56E-06	1.27E-07	1.46E-07	*8.38E-06*	0.66173327	0.30563344	0.96736671	0.01519545	0.01743784
	Endrin Aldehyde	0.007058	2.981E-05	0.0012967	0.0005	0.30	5.543E-05	2.56025E-05	8.1035E-05	0.000002	1.46074E-06	8.41E-05	1.85E-04	8.53E-05	5.34E-06	4.87E-06	*2.80E-04*	0.65914332	0.30443722	0.96358054	0.01904987	0.0173659
	gamma-Chlordane	0.003073	1.333E-05	0.0006458	0.0003	2.14	2.761E-05	1.31931E-05	4.08025E-05	0.000001	6.53332E-07	4.22E-05	1.29E-05	6.17E-06	3.26E-07	3.05E-07	*1.97E-05*	0.65497483	0.31297939	0.96795422	0.01654685	0.01549893
	Inorganics																					
	Aluminum	7851.8	0.3513111	2.35	9.7500	109.70	0.1004625	0.5094375	0.6099	1.782359	0.017214244	2.41E+00	9.16E-04	4.64E-03	1.62E-02	1.57E-04	*2.20E-02*	0.0416948	0.2114311	0.25312591	0.73972969	0.0071444
	Antimony	0.9958	0.0043722	0.0513333	0.0480	0.13	0.0021945	0.002508	0.004702499	0.000226	0.000214239	5.14E-03	1.76E-02	2.01E-02	1.81E-03	1.71E-03	*4.11E-02*	0.42671412	0.4876736	0.91438772	0.04395413	0.04165815
	Arsenic	15.85	0.0031	0.049	0.1925	5.14	0.0020948	0.010058125	0.012152875	0.003598	0.0001519	1.59E-02	4.08E-04	1.96E-03	7.00E-04	2.96E-05	*3.09E-03*	0.13172271	0.63247808	0.76420079	0.22624739	0.00955182
	Barium	51.744	0.0322444	2.0833333	15.4000	208.00	0.0890625	0.80465	0.893712499	0.011746	0.001579978	9.07E-01	4.28E-04	3.87E-03	5.65E-05	7.60E-06	*4.36E-03*	0.09819044	0.88711793	0.98530838	0.01294971	0.00174191
	Beryllium	0.5106	0.0000765	0.0051083	0.0044	0.66	0	0.000229769	0.000229769	0.000116	3 7485E-06	3.49E-04	0.00E+00	3.48E-04	1.76E-04	5.68E-06	*5.29E-04*	0	0.65756595	0.65756595	0.33170639	0.01072765
	Cadmium	1.17314	0.000215	0.0121667	0.0800	1.45	0.0005201	0.00418	0.004700126	0.000266	0.000010535	4.98E-03	3.59E-04	2.88E-03	1.84E-04	7.27E-06	*3.43E-03*	0.10450677	0.83986943	0.94437619	0.05350705	0.00211675
	Chromium	91.164	0.0022156	0.2616667	0.1800	1.00	0.0111863	0.009405	0.020591251	0.020694	0.000108562	4.14E-02	1.12E-02	9.41E-03	2.07E-02	1.09E-04	*4.14E-02*	0.2702382	0.22720661	0.49744482	0.49993253	0.00262265
	Cobalt	7.9364	0.0014278	0.0343333	0.4200	5.00	0.0014677	0.021945	0.023412749	0.001802	6.99611E-05	2.53E-02	2.94E-04	4.39E-03	3.60E-04	1.40E-05	*5.06E-03*	0.05804986	0.86793085	0.92598071	0.07125231	0.00276698
	Copper	59.638	0.0028583	0.3416667	20.1000	47.00	0.0146063	1.050225	1.064831251	0.013538	0.000140058	1.08E+00	3.11E-04	2.23E-02	2.88E-04	2.98E-06	*2.29E-02*	0.013543	0.97377478	0.98731779	0.01255235	0.00012986
	Cyanide	0.394285	0.0025	0.2283333	0.2175	68.70	0.0097612	0.011364375	0.021125624	0.000090	0.0001225	2.13E-02	1.42E-04	1.65E-04	1.30E-06	1.78E-06	*3.11E-04*	0.45746647	0.5325979	0.99006437	0.0041946	0.00574103
X	Iron	15732.8	2.8783333	35.316667	66.3500	3.19	1.5097875	3.4667875	4.976575001	3.571346	0.141038333	8.69E+00	4.73E-01	1.09E+00	1.12E+00	4.42E-02	*2.72E+00*	0.17375931	0.39898767	0.57274698	0.41102112	0.0162319
	Lead	192.668	0.0078044	0.0345	0.0333	1.13	0.0014749	0.001737313	0.003212188	0.043736	0.000382418	4.73E-02	1.31E-03	1.54E-03	3.87E-02	3.38E-04	*4.19E-02*	0.03116137	0.03670618	0.06786755	0.92405267	0.00807978
	Manganese	365.708	0.4862667	12.65	106.0000	977.00	0.5407875	5.5385	6.0792875	0.083016	0.023827067	6.19E+00	5.54E-04	5.67E-03	8.50E-05	2.44E-05	*6.33E-03*	0.08741935	0.8953093	0.98272866	0.01341965	0.00385169
	Mercury	0.191969	6.617E-05	0.05875	0.0055	0.01	0.0025116	0.000287375	0.002798938	0.000044	3.24217E-06	2.85E-03	3.92E-01	4.49E-02	6.81E-03	5.07E-04	*4.45E-01*	0.88256406	0.10098369	0.98354775	0.01531295	0.0011393
	Nickel	14.024	0.0015322	0.023	0.1600	77.40	0	0.00836	0.00836	0.003183	7.50789E-05	1.16E-02	0.00E+00	1.08E-04	4.11E-05	9.70E-07	*1.50E-04*	0	0.71954044	0.71954044	0.27399756	0.006462
	Selenium	0.8212	0.0008667	0.62	0.1600	0.40	0.026505	0.00836	0.034865	0.000186	4.24667E-05	3.51E-02	6.63E-02	2.09E-02	4.66E-04	1.06E-04	*8.77E-02*	0.75525991	0.23821818	0.99347809	0.00531182	0.00121009
	Silver	0.480208	0.0002844	0.02175	0.1550	181.20	0.0009298	0.00809875	0.009028563	0.000109	1 39378E-05	9.15E-03	5.13E-06	4.47E-05	6.02E-07	7.69E-08	*5.05E-05*	0.10160211	0.88496348	0.98656559	0.0119114	0.001523
	Thallium	0.507083	0.0006833	0.0691667	0.0650	0.07	0	0.00339625	0.00339625	0.000115	3.34833E-05	3.54E-03	0.00E+00	4.59E-02	1.56E-03	4.52E-04	*4.79E-02*	0	0.95808241	0.95808241	0.03247194	0.00944565
	Vanadium	33.34	0.0021739	0.0925	0.0000	11.40	0	0	0	0.007568	0.000106521	7.67E-03	0.00E+00	0.00E+00	6.64E-04	9.34E-06	*6.73E-04*	0	0	0	0.98612056	0.01387944
	Zinc	166.572	0.0136028	27.85	18.1500	14.50	1.1905875	0.9483375	2.138925	0.037812	0.000666536	2.18E+00	8.21E-02	6.54E-02	2.61E-03	4.60E-05	*1.59E-01*	0.54679234	0.43553597	0.98232832	0.01736557	0.00030612

Table E.1-50. Maximum Exposure Calculations for Heron - Reference

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Fish} (mg/Kg)	$C_{Crayfish}$ (mg/Kg)	TRV mg/Kg day	DOSE fish	DOSE crayfish	DOSE prey (f+cf)	DOSE soil/ sediment	DOSE water	Total Dose	HQ fish	HQ crayfish	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ fish	% HQ crayfish	% HQ prey (f + cf)	% HQ soil/ sediment	% HQ water
	Volatile Organics																					
	2-Butanone	0.38119	0.0021099			12.10	0	0	0	0.000087	0.000103385	1.90E-04	0.00E+00	0.00E+00	7.15E-06	8.54E-06	*1.57E-05*	0	0	0	0.45562492	0.54437508
	Acetone	0.3314051	0			1700.00	0	0	0	0.000075	0	7.52E-05	0.00E+00	0.00E+00	4.43E-08	0.00E+00	*4.43E-08*	0	0	0	1	0
	cis-1,2-Dichloroethene	0.0123769	0.0009154			3114.00	0	0	0	0.000003	4.48557E-05	4.77E-05	0.00E+00	0.00E+00	9.02E-10	1.44E-08	*1.53E-08*	0	0	0	0.05894345	0.94105655
	Tetrachloroethene	0.0122223	0.0009154			14.00	0	0	0	0.000003	4.48557E-05	4.76E-05	0.00E+00	0.00E+00	1.98E-07	3.20E-06	*3.40E-06*	0	0	0	0.05824996	0.94175004
	Trichloroethene	0.0094551	0.0009154			7.00	0	0	0	0.000002	4.48557E-05	4.70E-05	0.00E+00	0.00E+00	3.07E-07	6.41E-06	*6.71E-06*	0	0	0	0.04566422	0.95433578
	Semivolatile Organics																					
	2-Methylnaphthalene	0.36	0.002456			143.70	0	0	0	0.000082	0.000120346	2.02E-04	0.00E+00	0.00E+00	5.69E-07	8.37E-07	*1.41E-06*	0	0	0	0.40442263	0.59557737
	Acenaphthylene	0.5815158	0.002456			133.30	0	0	0	0.000132	0.000120346	2.52E-04	0.00E+00	0.00E+00	9.90E-07	9.03E-07	*1.89E-06*	0	0	0	0.52309935	0.47690065
	Anthracene	0.5902654	0.002456			1000.00	0	0	0	0.000134	0.000120346	2.54E-04	0.00E+00	0.00E+00	1.34E-07	1.20E-07	*2.54E-07*	0	0	0	0.52682355	0.47317645
	Benzo(a)anthracene	2.2638109	0.002456			1.30	0	0	0	0.000514	0.000120346	6.34E-04	0.00E+00	0.00E+00	3.95E-04	9.26E-05	*4.88E-04*	0	0	0	0.81024917	0.18975083
	Benzo(a)pyrene	1.9753975	0.002456			1.30	0	0	0	0.000448	0.000120346	5.69E-04	0.00E+00	0.00E+00	3.45E-04	9.26E-05	*4.38E-04*	0	0	0	0.78840703	0.21159297
	Benzo(b)fluoranthene	2.232118	0.002456			1.30	0	0	0	0.000507	0.000120346	6.27E-04	0.00E+00	0.00E+00	3.90E-04	9.26E-05	*4.82E-04*	0	0	0	0.80807207	0.19192793
	Benzo(g,h,i)perylene	0.9098546	0.002456			133.30	0	0	0	0.000207	0.000120346	3.27E-04	0.00E+00	0.00E+00	1.55E-06	9.03E-07	*2.45E-06*	0	0	0	0.63183798	0.36816202
	Benzo(k)fluoranthene	2.6849763	0.002456			1.30	0	0	0	0.000609	0.000120346	7.30E-04	0.00E+00	0.00E+00	4.69E-04	9.26E-05	*5.61E-04*	0	0	0	0.83510552	0.16489448
	Carbazole	0.4546323	0.0023791			133.30	0	0	0	0.000103	0.000116574	2.20E-04	0.00E+00	0.00E+00	7.74E-07	8.75E-07	*1.65E-06*	0	0	0	0.46957594	0.53042406
	Chrysene	2.6098175	0.002456			1.30	0	0	0	0.000592	0.000120346	7.13E-04	0.00E+00	0.00E+00	4.56E-04	9.26E-05	*5.48E-04*	0	0	0	0.83115858	0.16884142
	Dibenz(a,h)anthracene	0.461925	0.002456			1.30	0	0	0	0.000105	0.000120346	2.25E-04	0.00E+00	0.00E+00	8.07E-05	9.26E-05	*1.73E-04*	0	0	0	0.4656113	0.5343887
	Dibenzofuran	0.6291505	0.002456			133.30	0	0	0	0.000143	0.000120346	2.63E-04	0.00E+00	0.00E+00	1.07E-06	9.03E-07	*1.97E-06*	0	0	0	0.5426947	0.4573053
	Fluoranthene	4.0029073	0.002456			125.00	0	0	0	0.000909	0.000120346	1.03E-03	0.00E+00	0.00E+00	7.27E-06	9.63E-07	*8.23E-06*	0	0	0	0.88304649	0.11695351
	Fluorene	0.9204586	0.002456			125.00	0	0	0	0.000209	0.000120346	3.29E-04	0.00E+00	0.00E+00	1.67E-06	9.63E-07	*2.63E-06*	0	0	0	0.63452926	0.36547074
	Indeno(1,2,3-cd)pyrene	1.3482834	0.002456			1.30	0	0	0	0.000306	0.000120346	4.26E-04	0.00E+00	0.00E+00	2.35E-04	9.26E-05	*3.28E-04*	0	0	0	0.71776712	0.28223288
	Naphthalene	0.52	0.0028865			140.00	0	0	0	0.000118	0.000141439	2.59E-04	0.00E+00	0.00E+00	8.43E-07	1.01E-06	*1.85E-06*	0	0	0	0.45491221	0.54508779
	N-nitrosodiphenylamine	0.6395426	0.002456			150.00	0	0	0	0.000145	0.000120346	2.66E-04	0.00E+00	0.00E+00	9.68E-07	8.02E-07	*1.77E-06*	0	0	0	0.54675756	0.45324244
	Phenanthrene	2.3467091	0.002456			133.30	0	0	0	0.000533	0.000120346	6.53E-04	0.00E+00	0.00E+00	4.00E-06	9.03E-07	*4.90E-06*	0	0	0	0.81571692	0.18428308
	Pyrene	3.0975453	0.002456			133.30	0	0	0	0.000703	0.000120346	8.23E-04	0.00E+00	0.00E+00	5.27E-06	9.03E-07	*6.18E-06*	0	0	0	0.85385853	0.14614147
	Pesticides and PCBs																					
	4,4'-DDD	0.1093171	9.643E-05	0.0032	0.00094	8.50	0.0001368	0.000049115	0.000185915	0.000025	4.72494E-06	2.15E-04	1.61E-05	5.78E-06	2.92E-06	5.56E-07	*2.53E-05*	0.6349356	0.22795952	0.86289512	0.11517481	0.02193007
	4,4-DDE	0.0552787	9.643E-05	0.0195383	0.00530	1.90	0.0008353	0.000276925	0.001112187	0.000013	4.72494E-06	1.13E-03	4.40E-04	1.46E-04	6.60E-06	2.49E-06	*5.94E-04*	0.73952326	0.24518341	0.98470668	0.01110996	0.00418336
	4,4'-DDT	0.0388368	9.643E-05	0.0022274	0.00000	0.00	9.522E-05	0	9.52221E-05	0.000009	4.72494E-06	1.09E-04	3.40E-02	0.00E+00	3.15E-03	1.69E-03	*3.88E-02*	0.87550093	0	0.87550093	0.08105651	0.04344255
	Aldrin	0.0016	2.789E-05	0.0010618	0.00000	0.20	4.539E-05	0	4.53921E-05	0.000000	1.3664E-06	4.71E-05	2.27E-04	0.00E+00	1.82E-06	6.83E-06	*2.36E-04*	0.96329508	0	0.96329508	0.0077077	0.02899722
	alpha-Chlordane	0.0061993	2.789E-05	0.0011475	0.00000	2.14	4.906E-05	0	4.90573E-05	0.000001	1.3664E-06	5.18E-05	2.29E-05	0.00E+00	6.58E-07	6.39E-07	*2.42E-05*	0.94648686	0	0.94648686	0.02715053	0.0263626
	Aroclor 1248	0.1103562	0.0009873	0.0132086	0.00000	0.98	0.025	0	0.025	0.000025	4.83783E-05	2.51E-02	2.55E-02	0.00E+00	2.56E-05	4.94E-05	*2.56E-02*	0.99707143	0	0.99707143	0.0009991	0.00192947
	Aroclor 1254	0.1735649	0.0009873	0.0132086	0.00000	1.50	0.025	0	0.025	0.000039	4.83783E-05	2.51E-02	1.67E-02	0.00E+00	2.63E-05	3.23E-05	*1.67E-02*	0.99650118	0	0.99650118	0.00157046	0.00192836
	Aroclor 1260	0.1929808	0.0009873	0.026936	0.00520	0.35	0.0011515	0.0002717	0.001423214	0.000044	4.83783E-05	1.52E-03	3.34E-03	7.88E-04	1.27E-04	1.40E-04	*4.39E-03*	0.75987516	0.1792927	0.93916786	0.02890765	0.03192449
	beta-BHC	0.00075	2.789E-05	0.0010618	0.00000	4.00	4.539E-05	0	4.53921E-05	0.000000	1.3664E-06	4.69E-05	1.13E-05	0.00E+00	4.26E-08	3.42E-07	*1.17E-05*	0.96725571	0	0.96725571	0.00362784	0.02911645
	delta-BHC	0.0087438	2.789E-05	0.0010618	0.00000	1.60	4.539E-05	0	4.53921E-05	0.000002	1.3664E-06	4.87E-05	2.84E-05	0.00E+00	1.24E-06	8.54E-07	*3.05E-05*	0.93124703	0	0.93124703	0.04072046	0.02803251
	Endosulfan I	0.0171988	2.789E-05	0.00088	0.00000	10.00	3.762E-05	0	0.00003762	0.000004	1.3664E-06	4.29E-05	3.76E-06	0.00E+00	3.90E-07	1.37E-07	*4.29E-06*	0.87711695	0	0.87711695	0.09102521	0.03185784
	Endosulfan Sulfate	0.0085466	9.643E-05	0.0020655	0.00000	10.00	8.83E-05	0	8.82994E-05	0.000002	4.72494E-06	9.50E-05	8.83E-06	0.00E+00	1.94E-07	4.72E-07	*9.50E-06*	0.92981561	0	0.92981561	0.02042954	0.04975485
	Endrin Aldehyde	0.0059	9.643E-05	0.0020655	0.00000	0.30	8.83E-05	0	8.82994E-05	0.000001	4.72494E-06	9.44E-05	2.94E-04	0.00E+00	4.46E-06	1.57E-05	*3.15E-04*	0.93573541	0	0.93573541	0.01419296	0.05007162
	gamma-Chlordane	0.0046	0.0000017	0.0010603	0.00000	2.14	4.533E-05	0	4.53294E-05	0.000001	8.33E-08	4.65E-05	2.12E-05	0.00E+00	4.88E-07	3.89E-08	*2.17E-05*	0.97573018	0	0.97573018	0.02247676	0.00179306
	Inorganics																					
	Aluminum	9110.91	1.3653908	3.6646806	10.1	109.70	0.1566651	0.527725	0.684390097	2.068177	0.06690415	2.82E+00	1.43E-03	4.81E-03	1.89E-02	6.10E-04	*2.57E-02*	0.05556543	0.18717165	0.24273708	0.7335336	0.02372933
	Antimony	1.3114162	0.0187145	0.056071	0.0	0.13	0.002397	0	0.002397033	0.000298	0.000917011	3.61E-03	1.92E-02	0.00E+00	2.38E-03	7.34E-03	*2.89E-02*	0.66367896	0	0.66367896	0.08242337	0.25389767
	Arsenic	25.075787	0.0071334	0.0538876	0.0	5.14	0.0023037	0	0.002303696	0.005692	0.000349537	8.35E-03	4.48E-04	0.00E+00	1.11E-03	6.80E-05	*1.62E-03*	0.27604256	0	0.27604256	0.68207381	0.04188363
	Barium	67.234043	0.0386255	2.5683887	18.3	208.00	0.1097986	0.956175	1.065973619	0.015262	0.00189265	1.08E+00	5.28E-04	4.60E-03	7.34E-05	9.10E-06	*5.21E-03*	0.10137175	0.88279008	0.98416182	0.01409078	0.00174739
	Beryllium	0.6262643	9.98E-05	0.0058233	0.0	0.66	0.0002489	0	0.000248947	0.000142	4.89021E-06	3.96E-04	3.77E-04	0.00E+00	2.15E-04	7.41E-06	*6.00E-04*	0.6286556	0	0.6286556	0.35899538	0.01234902
	Cadmium	1.9998014	0.000463	0.018	0.1	1.45	0.0007695	0.0047025	0.005472	0.000454	2.26879E-05	5.95E-03	5.31E-04	3.24E-03	3.13E-04	1.56E-05	*4.10E-03*	0.12935724	0.79051645	0.91987369	0.07631235	0.00381396
	Chromium	370.01734	0.00088	0.35	0.2	1.00	0.0149625	0.009405	0.0243675	0.083994	0.00004312	1.08E-01	1.50E-02	9.41E-03	8.40E-02	4.31E-05	*1.08E-01*	0.13802464	0.08675835	0.22478299	0.77481924	0.00039777
	Cobalt	10.225516	0.0071	0.0448736	0.4	5.00	0.0019183	0.02299	0.024908347	0.002321	0.0003479	2.76E-02	3.84E-04	4.60E-03	4.64E-04	6.96E-05	*5.52E-03*	0.06956219	0.83365246	0.90321465	0.08416996	0.01261538
	Copper	91.269619	0.0053098	0.4911217	21.0	47.00	0.0209955	1.09725	1.118245454	0.020718	0.000260178	1.14E+00	4.47E-04	2.33E-02	4.41E-04	5.54E-06	*2.42E-02*	0.01842961	0.96315576	0.98158537	0.01818624	0.00022838
	Cyanide	0.4516316	0	0.2427393	0.0	68.70	0.0103771	0	0.010377106	0.000103	0	1.05E-02	1.51E-04	0.00E+00	1.49E-06	0.00E+00	*1.53E-04*	0.99021717	0	0.99021717	0.00978283	0
X	Iron	20053.617	5.9620954	45.626472	78.0	3.19	1.9505317	4.0755	6.026031665	4.552171	0.292142673	1.09E+01	6.11E-01	1.28E+00	1.43E+00	9.16E-02	*3.41E+00*	0.17943603	0.37491909	0.55435512	0.41876968	0.0268752
	Lead	296.68526	0.0179906	0.0374432	0.0	1.13	0.0016007	0	0.001600695	0.067348	0.000881541	6.98E-02	1.42E-03	0.00E+00	5.96E-02	7.80E-04	*6.18E-02*	0.02292282	0	0.02292282	0.96445305	0.01262414
	Manganese	678.70987	0.8506434	33.966308	108.0	977.00	1.4520597	5.643	7.09505968	0.154067	0.041681526	7.29E+00	1.49E-03	5.78E-03	1.58E-04	4.27E-05	*7.46E-03*	0.19916306	0.77398825	0.97315131	0.0211317	0.005717
	Mercury	0.3230484	0.0001171	0.0885425	0.0	0.01	0.0037852	0	0.00378519	0.000073	5.74035E-06	3.86E-03	5.91E-01	0.00E+00	1.15E-02	8.97E-04	*6.04E-01*	0.97953753	0	0.97953753	0.01897697	0.0014855
	Nickel	16.720277	0.0026906	0.0251294	0.0	77.40	0.0010743	0	0.00107428	0.003796	0.000131841	5.00E-03	1.39E-05	0.00E+00	4.90E-05	1.70E-06	*6.46E-05*	0.21478621	0	0.21478621	0.75885421	0.02635957
	Selenium	1.5395849	0.0009831	0.6552873	0.2	0.40	0.0280135	0.01254	0.040553533	0.000349	4.81727E-05	4.10E-02	7.00E-02	3.14E-02	8.74E-04	1.20E-04	*1.02E-01*	0.68407126	0.3062182	0.99028945	0.0085342	0.00117634
	Silver	1.1091745	0.0003579	0.027199	0.2	181.20	0.0011628	0.0109725	0.012135258	0.000252	1.75351E-05	1.24E-02	6.42E-06	6.06E-05	1.39E-06	9.68E-08	*6.85E-05*	0.09373622	0.88455261	0.97828884	0.02029756	0.0014136
	Thallium	0.662975	0.000711	0.0761803	0.0	0.07	0.0032567	0	0.003256706	0.000150	3.48385E-05	3.44E-03	4.40E-02	0.00E+00	2.03E-03	4.71E-04	*4.65E-02*	0.94615581	0	0.94615581	0.04372272	0.01012147
	Vanadium	44.615438	0.0049744	0	0.0	11.40	0	0	0	0.010128	0.000243745	1.04E-02	0.00E+00	0.00E+00	8.88E-04	2.14E-05	*9.10E-04*	0	0	0	0.97649847	0.02350153
	Zinc	240.3501	0.0292318	36.467208	18.3	14.50	1.5589731	0.956175	2.51514814	0.054559	0.001432357	2.57E+00	1.08E-01	6.59E-02	3.76E-03	9.88E-05	*1.77E-01*	0.60633538	0.37188757	0.97822296	0.02121995	0.00055709

Table E.1-51. Average Exposure Calculations for Mallard (Site-Wide)

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
	Volatile Organics																				
	2-Butanone	0.0387553	0.0025			12.1	0	0	0	3.645E-05	0.0000725	1.09E-04	0.00E+00	0.00E+00	3.01E-06	5.99E-06	*9.00E-06*	0	0	0.33455333	0.66544667
	Acetone	0.3889537	0.0025			1700.0	0	0	0	0.0003658	0.0000725	4.38E-04	0.00E+00	0.00E+00	2.15E-07	4.26E-08	*2.58E-07*	0	0	0.83459232	0.16540768
	cis-1,2-Dichloroethene	0.0953947	0.0009063			3114.0	0	0	0	8.972E-05	2.62813E-05	1.16E-04	0.00E+00	0.00E+00	2.88E-08	8.44E-09	*3.73E-08*	0	0	0.7734375	0.2265625
	Tetrachloroethene	0.0371696	0.0005938			14.0	0	0	0	3.496E-05	1.72188E-05	5.22E-05	0.00E+00	0.00E+00	2.50E-06	1.23E-06	*3.73E-06*	0	0	0.66999221	0.33000779
	Trichloroethene	0.0549737	0.0006875			7.0	0	0	0	5.17E-05	1.99375E-05	7.16E-05	0.00E+00	0.00E+00	7.39E-06	2.85E-06	*1.02E-05*	0	0	0.72169974	0.27830026
	Semivolatile Organics																				
	2-Methylnaphthalene	0.2040242	0.0025			143.70	0	0	0	0.0001919	0.0000725	2.64E-04	0.00E+00	0.00E+00	1.34E-06	5.05E-07	*1.84E-06*	0	0	0.72577844	0.27422156
	Acenaphthylene	0.1995323	0.0025			133.30	0	0	0	0.0001877	0.0000725	2.60E-04	0.00E+00	0.00E+00	1.41E-06	5.44E-07	*1.95E-06*	0	0	0.72132543	0.27867457
	Anthracene	0.2607222	0.0025			1000.00	0	0	0	0.0002452	0.0000725	3.18E-04	0.00E+00	0.00E+00	2.45E-07	7.25E-08	*3.18E-07*	0	0	0.77180394	0.22819606
	Benzo(a)anthracene	0.8567397	0.0025			1.30	0	0	0	0.0008058	0.0000725	8.78E-04	0.00E+00	0.00E+00	6.20E-04	5.58E-05	*6.76E-04*	0	0	0.91745076	0.08254924
	Benzo(a)pyrene	0.906493	0.0025		0.14	1.30	0	0.010724655	0.010724655	0.0008526	0.0000725	1.16E-02	0.00E+00	8.25E-03	6.56E-04	5.58E-05	*8.96E-03*	0	0.92059403	0.07318264	0.00622333
	Benzo(b)fluoranthene	1.4786203	0.0025		0.11	1.30	0	0.008389626	0.008389626	0.0013906	0.0000725	9.85E-03	0.00E+00	6.45E-03	1.07E-03	5.58E-05	*7.58E-03*	0	0.85149936	0.1411423	0.00735834
	Benzo(g,h,i)perylene	0.535209	0.0025			133.30	0	0	0	0.0005034	0.0000725	5.76E-04	0.00E+00	0.00E+00	3.78E-06	5.44E-07	*4.32E-06*	0	0	0.87410222	0.12589778
	Benzo(k)fluoranthene	1.0710719	0.0025		0.21	1.30	0	0.015894077	0.015894077	0.0010073	0.0000725	1.70E-02	0.00E+00	1.22E-02	7.75E-04	5.58E-05	*1.31E-02*	0	0.93638222	0.05934652	0.00427126
	Carbazole	0.2475532	0			133.30	0	0	0	0.0002328	0	2.33E-04	0.00E+00	0.00E+00	1.75E-06	0.00E+00	*1.75E-06*	0	0	1	0
	Chrysene	1.0727568	0.0025		0.13	1.30	0	0.009330334	0.009330334	0.0010089	0.0000725	1.04E-02	0.00E+00	7.18E-03	7.76E-04	5.58E-05	*8.01E-03*	0	0.89613403	0.09690269	0.00696328
	Dibenz(a,h)anthracene	0.2677891	0.0025			1.30	0	0	0	0.0002519	0.0000725	3.24E-04	0.00E+00	0.00E+00	1.94E-04	5.58E-05	*2.50E-04*	0	0	0.7764799	0.2235201
	Dibenzofuran	0.2645333	0.0025			133.30	0	0	0	0.0002488	0.0000725	3.21E-04	0.00E+00	0.00E+00	1.87E-06	5.44E-07	*2.41E-06*	0	0	0.77434969	0.22565031
	Fluoranthene	1.843519	0.0025		0.09	125.00	0	0.006494488	0.006494488	0.0017338	0.0000725	8.30E-03	0.00E+00	5.20E-05	1.39E-05	5.80E-07	*6.64E-05*	0	0.78239135	0.20887457	0.00873408
	Fluorene	0.2214444	0.0025			125.00	0	0	0	0.0002083	0.0000725	2.81E-04	0.00E+00	0.00E+00	1.67E-06	5.80E-07	*2.25E-06*	0	0	0.74178015	0.25821985
	Indeno(1,2,3-cd)pyrene	0.5768286	0.0025		0.24	1.30	0	0.018109091	0.018109091	0.0005425	0.0000725	1.87E-02	0.00E+00	1.39E-02	4.17E-04	5.58E-05	*1.44E-02*	0	0.96715424	0.02897375	0.00387202
	Naphthalene	0.253659	0.0025			140.00	0	0	0	0.0002386	0.0000725	3.11E-04	0.00E+00	0.00E+00	1.70E-06	5.18E-07	*2.22E-06*	0	0	0.76693071	0.23306929
	N-nitrosodiphenylamine	0.2820417	0.0025			150.00	0	0	0	0.0002653	0.0000725	3.38E-04	0.00E+00	0.00E+00	1.77E-06	4.83E-07	*2.25E-06*	0	0	0.78535066	0.21464934
	Phenanthrene	0.8950714	0.0025		0.24	133.30	0	0.017963876	0.017963876	0.0008418	0.0000725	1.89E-02	0.00E+00	1.35E-04	6.32E-06	5.44E-07	*1.42E-04*	0	0.95156767	0.04459192	0.00384041
	Pyrene	1.4912821	0.0025		0.09	133.30	0	0.006813407	0.006813407	0.0014026	0.0000725	8.29E-03	0.00E+00	5.11E-05	1.05E-05	5.44E-07	*6.22E-05*	0	0.82203556	0.16921733	0.0087471
	Pesticides and PCBs																				
	4,4'-DDD	0.0258795	0.00005	0.0024	1.34E-03	8.50	0.0001964	9.96951E-05	0.000296048	2.434E-05	0.00000145	3.22E-04	2.31E-05	1.17E-05	2.86E-06	1.71E-07	*3.79E-05*	0.61009934	0.3097682	0.07562708	0.00450538
	4,4'-DDE	0.0165808	0.00005	0.0050	7.20E-04	1.90	0.0004056	5.36861E-05	0.000459319	1.559E-05	0.00000145	4.76E-04	2.13E-04	2.83E-05	8.21E-06	7.63E-07	*2.51E-04*	0.85152032	0.11269986	0.03273593	0.00304389
	4,4'-DDT	0.0053129	0.00005	0.0012	8.53E-04	0.00	9.426E-05	6.36282E-05	0.000157886	4.997E-06	0.00000145	1.64E-04	3.37E-02	2.27E-02	1.78E-03	5.18E-04	*5.87E-02*	0.57357835	0.38719177	0.0304063	0.00882358
	Aldrin	0.0013484	0.000025	0.0003		0.20	2.316E-05	0	2.31572E-05	1.268E-06	0.000000725	2.52E-05	1.16E-04	0.00E+00	6.34E-06	3.63E-06	*1.26E-04*	0.92075039	0	0.05042301	0.0288266
	alpha-Chlordane	0.0114051	2.365E-05	0.0009	1.17E-03	2.14	7.563E-05	8.70386E-05	0.000162669	1.073E-05	6.85934E-07	1.74E-04	3.53E-05	4.07E-05	5.01E-06	3.21E-07	*8.13E-05*	0.43445276	0.49998891	0.06161802	0.00394032
	Aroclor 1248	0.0635899	0.0005	0.0026		0.98	0.0002143	0	0.000214268	5.981E-05	0.0000145	2.89E-04	2.19E-04	0.00E+00	6.10E-05	1.48E-05	*2.94E-04*	0.74250554	0	0.20724741	0.05024704
	Aroclor 1254	0.1495283	0.0005	0.0157		1.50	0.0012775	0	0.001277465	0.0001406	0.0000145	1.43E-03	8.52E-04	0.00E+00	9.38E-05	9.67E-06	*9.55E-04*	0.89171312	0	0.09816539	0.01012149
	Aroclor 1260	0.1918268	0.0005	0.0258	1.20E-02	0.35	0.0021025	0.000893357	0.00299583	0.0001804	0.0000145	3.19E-03	6.09E-03	2.59E-03	5.23E-04	4.20E-05	*9.25E-03*	0.6589288	0.27998416	0.05654265	0.0045444
	beta-BHC	0.001373	0.000025	0.0003		4.00	2.27E-05	0	2.26992E-05	1.291E-06	0.000000725	2.47E-05	5.67E-06	0.00E+00	3.23E-07	1.81E-07	*6.18E-06*	0.9184198	0	0.05224634	0.02933386
	delta-BHC	0.0018893	0.000025	0.0003		1.60	2.173E-05	0	2.17322E-05	1.777E-06	0.000000725	2.42E-05	1.36E-05	0.00E+00	1.11E-06	4.53E-07	*1.51E-05*	0.89675998	0	0.07332349	0.02991653
	Endosulfan I	0.0046157	0.000025	0.0004	7.60E-04	10.00	3.105E-05	5.66377E-05	8.76837E-05	4.341E-06	0.000000725	9.27E-05	3.10E-06	5.66E-06	4.34E-07	7.25E-08	*9.27E-06*	0.33472838	0.61065126	0.04680362	0.00781674
	Endosulfan Sulfate	0.0022613	0.00005	0.0008		10.00	6.209E-05	0	6.20919E-05	2.127E-06	0.00000145	6.57E-05	6.21E-06	0.00E+00	2.13E-07	1.45E-07	*6.57E-06*	0.94553288	0	0.03238658	0.02208054
	Endrin Aldehyde	0.0029098	0.00005	0.0020	8.94E-04	0.30	0.0001664	6.66805E-05	0.000233107	2.737E-06	0.00000145	2.37E-04	5.55E-04	2.22E-04	9.12E-06	4.83E-06	*7.91E-04*	0.70135282	0.28100394	0.01153267	0.00611057
	gamma-Chlordane	0.0149447	2.361E-05	0.0004	1.43E-03	2.14	3.247E-05	0.000106968	0.000139439	1.406E-05	6.84742E-07	1.54E-04	1.52E-05	5.00E-05	6.57E-06	3.20E-07	*7.20E-05*	0.21060613	0.69378892	0.09116373	0.00444122
	Inorganics																				
	Aluminum	10335.521	0.2530118	50.0063	1.72E+02	109.70	4.072109	12.82836558	16.90047453	9.7205577	0.007337341	2.66E+01	3.71E-02	1.17E-01	8.86E-02	6.69E-05	*2.43E-01*	0.15292371	0.48175558	0.36504517	0.00027555
	Antimony	6.1743514	0.0006794	0.0484		0.13	0.0039436	0	0.003943638	0.005807	1.97029E-05	9.77E-03	3.15E-02	0.00E+00	4.65E-02	1.58E-04	*7.82E-02*	0.40363453	0	0.59434886	0.00201661
	Arsenic	279.43938	0.0139059	2.2175	14.73	5.14	0.1805755	1.098273323	1.278848783	0.2628127	0.000403271	1.54E+00	3.51E-02	2.14E-01	5.11E-02	7.85E-05	*3.00E-01*	0.11709979	0.71220958	0.17042912	0.00026151
	Barium	87.119691	0.0367206	10.1813	8.50	208.00	0.8290796	0.633455475	1.462535025	0.0819361	0.001064897	1.55E+00	3.99E-03	3.05E-03	3.94E-04	5.12E-06	*7.43E-03*	0.53643497	0.40986135	0.05301466	0.00068901
	Beryllium	0.6816549	5.141E-05	0.0054		0.66	0.0004372	0	0.000437192	0.0006411	1.49094E-06	1.08E-03	6.62E-04	0.00E+00	9.71E-04	2.26E-06	*1.64E-03*	0.40489019	0	0.59372903	0.00138078
	Cadmium	6.2776042	0.0002963	0.0701	0.67	1.45	0.0057061	0.050146191	0.055852246	0.0059041	8.59253E-06	6.18E-02	3.94E-03	3.46E-02	4.07E-03	5.93E-06	*4.26E-02*	0.09238341	0.81188784	0.09558964	0.00013912
X	Chromium	1214.6122	0.0125894	1.1325	22.70	1.00	0.0922217	1.692553783	1.784775523	1.1423427	0.000365093	2.93E+00	9.22E-02	1.69E+00	1.14E+00	3.65E-04	*2.93E+00*	0.03150205	0.57816	0.39021323	0.00012471
	Cobalt	14.683359	0.000905	0.4388	1.30	5.00	0.0357283	0.097246089	0.132974379	0.0138097	2.6245E-05	1.47E-01	7.15E-03	1.94E-02	2.76E-03	5.25E-06	*2.94E-02*	0.24336361	0.66239272	0.09406491	0.00017877
	Copper	390.0888	0.0117853	49.6688	19.76	47.00	4.0446257	1.473240078	5.517865728	0.3668785	0.000341774	5.89E+00	8.61E-02	3.13E-02	7.81E-03	7.27E-06	*1.25E-01*	0.68726704	0.2503345	0.06234038	5.8075E-05
	Cyanide	1.037439	0.0025	0.2394		68.70	0.0194928	0	0.019492785	0.0009757	0.0000725	2.05E-02	2.84E-04	0.00E+00	1.42E-05	1.06E-06	*2.99E-04*	0.94896979	0	0.04750068	0.00352953
X	Iron	26526.313	1.5612941	345.0313	2195.84	3.19	28.096585	163.7396049	191.8361896	24.947997	0.045277529	2.17E+02	8.81E+00	5.13E+01	7.82E+00	1.42E-02	*6.80E+01*	0.12957918	0.75515385	0.11505815	0.00020882
X	Lead	341.61988	0.0073871	0.7778	31.15	1.13	0.0633388	2.323093692	2.38643252	0.3212935	0.000214225	2.71E+00	5.61E-02	2.06E+00	2.84E-01	1.90E-04	*2.40E+00*	0.02339004	0.85788218	0.11864867	7.911E-05
	Manganese	454.71834	0.4224	98.9250	256.42	977.00	8.0556606	19.12070648	27.17636708	0.4276626	0.0122496	2.76E+01	8.25E-03	1.96E-02	4.38E-04	1.25E-05	*2.83E-02*	0.29169971	0.69237084	0.01548589	0.00044356
X	Mercury	2.4094804	0.0001451	0.0092	0.08	0.01	0.0007482	0.006293823	0.00704198	0.0022661	4.20671E-06	9.31E-03	1.17E-01	9.83E-01	3.54E-01	6.57E-04	*1.46E+00*	0.08034065	0.67586111	0.2433465	0.00045174
	Nickel	21.740695	0.00207	0.0846	0.56	77.40	0.0068861	0.041879973	0.048766066	0.0204471	0.00006003	6.93E-02	8.90E-05	5.41E-04	2.64E-04	7.76E-07	*8.95E-04*	0.09940484	0.60456224	0.29516635	0.00086657
	Selenium	3.2456275	0.0007941	0.4069	0.28	0.40	0.0331326	0.020795574	0.053928219	0.0030525	2.30294E-05	5.70E-02	8.28E-02	5.20E-02	7.63E-03	5.76E-05	*1.43E-01*	0.58123612	0.36481056	0.05354932	0.000404
	Silver	0.55	0.0003224	0.0323		181.20	0.0026313	0	0.002631272	0.0005173	9.34823E-06	3.16E-03	1.45E-05	0.00E+00	2.85E-06	5.16E-08	*1.74E-05*	0.83323598	0	0.16380375	0.00296027
	Thallium	1.3591456	0.0008206	0.0825		0.07	0.0067181	0	0.00671814	0.0012783	2.37971E-05	8.02E-03	9.08E-02	0.00E+00	1.73E-02	3.22E-04	*1.08E-01*	0.83765102	0	0.15938185	0.00296714
	Vanadium	43.832626	0.0013816	0.1467	1.53	11.40	0.0119472	0.113730173	0.125677411	0.0412246	4.00669E-05	1.67E-01	1.05E-03	9.98E-03	3.62E-03	3.51E-06	*1.46E-02*	0.07156518	0.68125535	0.24693947	0.00024
	Zinc	1195.073	0.0717029	25.3938	46.26	14.50	2.0678639	3.449828078	5.517691928	1.1239661	0.002079385	6.64E+00	1.43E-01	2.38E-01	7.75E-02	1.43E-04	*4.58E-01*	0.31125009	0.51926015	0.16917678	0.00031298

Table E.1-52. Maximum Exposure Calculations for Mallard (Site-Wide)

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
	Volatile Organics																				
	2-Butanone	0.1296245	0			12.10	0	0	0	0.0001219	0	1.22E-04	0.00E+00	0.00E+00	1.01E-05	0.00E+00	*1.01E-05*	0	0	1	0
	Acetone	1.368513	0			1700.00	0	0	0	0.0012871	0	1.29E-03	0.00E+00	0.00E+00	7.57E-07	0.00E+00	*7.57E-07*	0	0	1	0
	cis-1,2-Dichloroethene	0.1962503	0.0020356			3114.00	0	0	0	0.0001846	5.9031E-05	2.44E-04	0.00E+00	0.00E+00	5.93E-08	1.90E-08	*7.82E-08*	0	0	0.75767665	0.24232335
	Tetrachloroethene	0.041	0.0007581			14.00	0	0	0	3.856E-05	2.19849E-05	6.05E-05	0.00E+00	0.00E+00	2.75E-06	1.57E-06	*4.32E-06*	0	0	0.63688618	0.36311382
	Trichloroethene	0.2713513	0.000912			7.00	0	0	0	0.0002552	2.64492E-05	2.82E-04	0.00E+00	0.00E+00	3.65E-05	3.78E-06	*4.02E-05*	0	0	0.90609355	0.09390645
	Semivolatile Organics																				
	2-Methylnaphthalene	0.22	0			143.70	0	0	0	0.0002069	0	2.07E-04	0.00E+00	0.00E+00	1.44E-06	0.00E+00	*1.44E-06*	0	0	1	0
	Acenaphthylene	0.3525276	0			133.30	0	0	0	0.0003316	0	3.32E-04	0.00E+00	0.00E+00	2.49E-06	0.00E+00	*2.49E-06*	0	0	1	0
	Anthracene	0.3845728	0			1000.00	0	0	0	0.0003617	0	3.62E-04	0.00E+00	0.00E+00	3.62E-07	0.00E+00	*3.62E-07*	0	0	1	0
	Benzo(a)anthracene	2.0240032	0			1.30	0	0	0	0.0019036	0	1.90E-03	0.00E+00	0.00E+00	1.46E-03	0.00E+00	*1.46E-03*	0	0	1	0
	Benzo(a)pyrene	2.0973701	0		0.33	1.30	0	0.024813838	0.024813838	0.0019726	0	2.68E-02	0.00E+00	1.91E-02	1.52E-03	0.00E+00	*2.06E-02*	0	0.92635907	0.07364093	0
	Benzo(b)fluoranthene	3.3346966	0		0.25	1.30	0	0.018920921	0.018920921	0.0031363	0	2.21E-02	0.00E+00	1.46E-02	2.41E-03	0.00E+00	*1.70E-02*	0	0.85781143	0.14218857	0
	Benzo(g,h,i)perylene	0.9549598	0			133.30	0	0	0	0.0008981	0	8.98E-04	0.00E+00	0.00E+00	6.74E-06	0.00E+00	*6.74E-06*	0	0	1	0
	Benzo(k)fluoranthene	1.2592954	0		0.25	1.30	0	0.018687203	0.018687203	0.0011844	0	1.99E-02	0.00E+00	1.44E-02	9.11E-04	0.00E+00	*1.53E-02*	0	0.94039891	0.05960109	0
	Carbazole	0.3257606	0			133.30	0	0	0	0.0003064	0	3.06E-04	0.00E+00	0.00E+00	2.30E-06	0.00E+00	*2.30E-06*	0	0	1	0
	Chrysene	2.4900124	0		0.29	1.30	0	0.021656958	0.021656958	0.0023419	0	2.40E-02	0.00E+00	1.67E-02	1.80E-03	0.00E+00	*1.85E-02*	0	0.90241782	0.09758218	0
	Dibenz(a,h)anthracene	0.4205216	0			1.30	0	0	0	0.0003955	0	3.96E-04	0.00E+00	0.00E+00	3.04E-04	0.00E+00	*3.04E-04*	0	0	1	0
	Dibenzofuran	0.3873014	0			133.30	0	0	0	0.0003643	0	3.64E-04	0.00E+00	0.00E+00	2.73E-06	0.00E+00	*2.73E-06*	0	0	1	0
	Fluoranthene	4.4500439	0		0.21	125.00	0	0.01567695	0.01567695	0.0041853	0	1.99E-02	0.00E+00	1.25E-04	3.35E-05	0.00E+00	*1.59E-04*	0	0.78928503	0.21071497	0
	Fluorene	0.3045118	0			125.00	0	0	0	0.0002864	0	2.86E-04	0.00E+00	0.00E+00	2.29E-06	0.00E+00	*2.29E-06*	0	0	1	0
	Indeno(1,2,3-cd)pyrene	0.6775208	0		0.29	1.30	0	0.021270247	0.021270247	0.0006372	0	2.19E-02	0.00E+00	1.64E-02	4.90E-04	0.00E+00	*1.69E-02*	0	0.97091363	0.02908637	0
	Naphthalene	0.5401128	0.0026467			140.00	0	0	0	0.000508	7.67532E-05	5.85E-04	0.00E+00	0.00E+00	3.63E-06	5.48E-07	*4.18E-06*	0	0	0.86873724	0.13126276
	N-nitrosodiphenylamine	0.4010479	0			150.00	0	0	0	0.0003772	0	3.77E-04	0.00E+00	0.00E+00	2.51E-06	0.00E+00	*2.51E-06*	0	0	1	0
	Phenanthrene	2.1795974	0		0.59	133.30	0	0.043744013	0.043744013	0.0020499	0	4.58E-02	0.00E+00	3.28E-04	1.54E-05	0.00E+00	*3.44E-04*	0	0.95523617	0.04476383	0
	Pyrene	1.9747232	0		0.12	133.30	0	0.009022166	0.009022166	0.0018572	0	1.09E-02	0.00E+00	6.77E-05	1.39E-05	0.00E+00	*8.16E-05*	0	0.82928944	0.17071056	0
	Pesticides and PCBs																				
	4,4'-DDD	0.0607702	0	0.0033	3.14E-03	8.50	0.000271	0.000234104	0.000505096	5.715E-05	0	5.62E-04	3.19E-05	2.75E-05	6.72E-06	0.00E+00	*6.61E-05*	0.48197741	0.41636972	0.10165287	0
	4,4-DDE	0.0363427	0	0.0069	1.58E-03	1.90	0.0005583	0.000117672	0.000675978	3.418E-05	0	7.10E-04	2.94E-04	6.19E-05	1.80E-05	0.00E+00	*3.74E-04*	0.78617069	0.16569878	0.04813053	0
	4,4'-DDT	0.0069455	0	0.0015	1.12E-03	0.00	0.0001218	8.31814E-05	0.000204949	6.532E-06	0	2.11E-04	4.35E-02	2.97E-02	2.33E-03	0.00E+00	*7.55E-02*	0.57578348	0.39332831	0.03088821	0
	Aldrin	0.0032507	0	0.0003		0.20	2.524E-05	0	2.52439E-05	3.057E-06	0	2.83E-05	1.26E-04	0.00E+00	1.53E-05	0.00E+00	*1.42E-04*	0.89197398	0	0.10802602	0
	alpha-Chlordane	0.0251399	0.0000021	0.0012	2.57E-03	2.14	0.0001005	0.000191856	0.000292399	2.364E-05	6.09E-08	3.16E-04	4.70E-05	8.97E-05	1.10E-05	2.85E-08	*1.48E-04*	0.31807019	0.60693877	0.07479839	0.00019266
	Aroclor 1248	0.1050844	0	0.0029		0.98	0.0002356	0	0.00023564	9.883E-05	0	3.34E-04	2.40E-04	0.00E+00	1.01E-04	0.00E+00	*3.41E-04*	0.70451399	0	0.29548601	0
	Aroclor 1254	0.4641183	0	0.0204		1.50	0.0016601	0	0.001660103	0.0004365	0	2.10E-03	1.11E-03	0.00E+00	2.91E-04	0.00E+00	*1.40E-03*	0.79180485	0	0.20819515	0
	Aroclor 1260	0.5170425	0	0.0337	3.23E-02	0.35	0.0027414	0.002407922	0.005149317	0.0004863	0	5.64E-03	7.95E-03	6.98E-03	1.41E-03	0.00E+00	*1.63E-02*	0.48644292	0.42727011	0.08628697	0
	beta-BHC	0.0024175	0	0.0003		4.00	2.536E-05	0	2.53624E-05	2.274E-06	0	2.76E-05	6.34E-06	0.00E+00	5.68E-07	0.00E+00	*6.91E-06*	0.91772743	0	0.08227257	0
	delta-BHC	0.0047598	0	0.0003		1.60	2.39E-05	0	2.3899E-05	4.477E-06	0	2.84E-05	1.49E-05	0.00E+00	2.80E-06	0.00E+00	*1.77E-05*	0.84223781	0	0.15776219	0
	Endosulfan I	0.0137828	0	0.0005	2.27E-03	10.00	4.112E-05	0.000169126	0.000210247	1.296E-05	0	2.23E-04	4.11E-06	1.69E-05	1.30E-06	0.00E+00	*2.23E-05*	0.1842276	0.7576983	0.0580741	0
	Endosulfan Sulfate	0.0021	0	0.0010		10.00	8.068E-05	0	8.06782E-05	1.975E-06	0	8.27E-05	8.07E-06	0.00E+00	1.98E-07	0.00E+00	*8.27E-06*	0.97610438	0	0.02389562	0
	Endrin Aldehyde	0.004296	0	0.0027	1.32E-03	0.30	0.000222	9.84481E-05	0.000320441	4.04E-06	0	3.24E-04	7.40E-04	3.28E-04	1.35E-05	0.00E+00	*1.08E-03*	0.68414701	0.30340112	0.01245187	0
	gamma-Chlordane	0.0688881	0.0000014	0.0006	6.61E-03	2.14	4.583E-05	0.000493069	0.000538899	6.479E-05	4.06E-08	6.04E-04	2.14E-05	2.30E-04	3.03E-05	1.90E-08	*2.82E-04*	0.07591098	0.81670667	0.1073151	6.7249E-05
	Inorganics																				
	Aluminum	11152.083	0.4714323	59.1894	1.86E+02	109.70	4.8199097	13.841875	18.66178469	10.488534	0.013671536	2.92E+01	4.39E-02	1.26E-01	9.56E-02	1.25E-04	*2.66E-01*	0.16526921	0.47462213	0.35963988	0.00046878
	Antimony	11.033844	0.0007956	0.0516		0.13	0.0042	0	0.004199967	0.0103773	2.30733E-05	1.46E-02	3.36E-02	0.00E+00	8.30E-02	1.85E-04	*1.17E-01*	0.28766168	0	0.710758	0.00158032
	Arsenic	524.31157	0.0217135	3.0890	27.64	5.14	0.2515426	2.060688113	2.312230711	0.493115	0.000629693	2.81E+00	4.89E-02	4.01E-01	9.59E-02	1.23E-04	*5.46E-01*	0.08964533	0.73439278	0.17573747	0.00022441
	Barium	89.138509	0.0397385	13.2536	8.69	208.00	1.0792698	0.648134487	1.727404283	0.0838348	0.001152417	1.81E+00	5.19E-03	3.12E-03	4.03E-04	5.54E-06	*8.71E-03*	0.59549486	0.35761285	0.04625643	0.00063585
	Beryllium	0.7428803	9.335E-05	0.0062		0.66	0.0005013	0	0.000501281	0.0006987	2.70722E-06	1.20E-03	7.60E-04	0.00E+00	1.06E-03	4.10E-06	*1.82E-03*	0.41680756	0	0.58094143	0.00225101
	Cadmium	7.0411832	0.0017655	0.0998	0.75	1.45	0.0081234	0.056245745	0.064369184	0.0066222	5.12001E-05	7.10E-02	5.60E-03	3.88E-02	4.57E-03	3.53E-05	*4.90E-02*	0.11434601	0.79171836	0.09321493	0.0007207
X	Chromium	1675.307	0.0201654	1.6250	31.31	1.00	0.1323288	2.334528966	2.466857765	1.5756263	0.000584797	4.04E+00	1.32E-01	2.33E+00	1.58E+00	5.85E-04	*4.04E+00*	0.03272979	0.57741509	0.38971047	0.00014464
	Cobalt	16.362145	0.0013736	0.5353	1.45	5.00	0.043592	0.108364481	0.151956464	0.0153886	3.98353E-05	1.67E-01	8.72E-03	2.17E-02	3.08E-03	7.97E-06	*3.35E-02*	0.26042961	0.64739701	0.0919354	0.00023799
	Copper	579.16865	0.0390789	57.4012	29.33	47.00	4.6742967	2.187333919	6.861630591	0.5447081	0.001133287	7.41E+00	9.95E-02	4.65E-02	1.16E-02	2.41E-05	*1.58E-01*	0.63102455	0.2952875	0.07353495	0.00015299
	Cyanide	1.783484	0	0.2611		68.70	0.0212629	0	0.021262905	0.0016774	0	2.29E-02	3.10E-04	0.00E+00	2.44E-05	0.00E+00	*3.34E-04*	0.92688113	0	0.07311887	0
X	Iron	34922.686	2.326423	463.3638	2890.89	3.19	37.732638	215.5680982	253.3007367	32.844786	0.067466268	2.86E+02	1.18E+01	6.76E+01	1.03E+01	2.11E-02	*8.97E+01*	0.13183412	0.75317371	0.11475645	0.00023572
X	Lead	380.83703	0.0163928	1.0509	34.73	1.13	0.0855751	2.589779261	2.675354408	0.3581772	0.000475391	3.03E+00	7.57E-02	2.29E+00	3.17E-01	4.21E-04	*2.68E+00*	0.02820532	0.85358381	0.11805418	0.00015669
	Manganese	531.78196	0.5079414	121.8323	299.88	977.00	9.9210481	22.36119788	32.28224597	0.5001409	0.014730301	3.28E+01	1.02E-02	2.29E-02	5.12E-04	1.51E-05	*3.36E-02*	0.30249756	0.68180376	0.01524954	0.00044913
X	Mercury	3.3336899	0.0003559	0.0123	0.12	0.01	0.0009981	0.008707959	0.00970605	0.0031353	1.03197E-05	1.29E-02	1.56E-01	1.36E+00	4.90E-01	1.61E-03	*2.01E+00*	0.07766215	0.67757227	0.2439626	0.00080298
	Nickel	23.468213	0.002567	0.1027	0.61	77.40	0.0083643	0.04520776	0.053572028	0.0220719	7.4442E-05	7.57E-02	1.08E-04	5.84E-04	2.85E-04	9.62E-07	*9.78E-04*	0.11046557	0.59705178	0.29149951	0.00098314
	Selenium	4.7355585	0.0008239	0.4778	0.41	0.40	0.038907	0.030341947	0.069248921	0.0044538	2.38945E-05	7.37E-02	9.73E-02	7.59E-02	1.11E-02	5.97E-05	*1.84E-01*	0.52771957	0.41154676	0.06040957	0.0003241
	Silver	0.8366008	0.0003568	0.0471		181.20	0.0038354	0	0.003835396	0.0007868	1.03482E-05	4.63E-03	2.12E-05	0.00E+00	4.34E-06	5.71E-08	*2.56E-05*	0.82792021	0	0.16984599	0.0022338
	Thallium	2.2065524	0.0008405	0.1119		0.07	0.0091136	0	0.009113554	0.0020753	2.43738E-05	1.12E-02	1.23E-01	0.00E+00	2.80E-02	3.29E-04	*1.52E-01*	0.81275299	0	0.18507334	0.00217367
	Vanadium	51.734154	0.0019937	0.1875	1.80	11.40	0.015265	0.134231848	0.149496804	0.048656	5.78185E-05	1.98E-01	1.34E-03	1.18E-02	4.27E-03	5.07E-06	*1.74E-02*	0.07701383	0.67721833	0.24547614	0.0002917
	Zinc	1321.6875	0.4202457	27.8736	51.17	14.50	2.2698021	3.815327283	6.085129341	1.2430471	0.012187126	7.34E+00	1.57E-01	2.63E-01	8.57E-02	8.40E-04	*5.06E-01*	0.30922202	0.51977361	0.16934407	0.00166029

Table E.1-53. Average Exposure Calculations for Mallard (38-Acre)

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
	Volatile Organics																				
	2-Butanone	0.0968	0.0025			12	0	0	0	9.104E-05	0.0000725	1.64E-04	0.00E+00	0.00E+00	7.52E-06	5.99E-06	1.35E-05	0	0	0.55668446	0.44331554
	Acetone	0.62755	0.0025			1700	0	0	0	0.0005902	0.0000725	6.63E-04	0.00E+00	0.00E+00	3.47E-07	4.26E-08	3.90E-07	0	0	0.89060084	0.10939916
	cis-1,2-Dichloroethene	0.1157	0.0005833			3114	0	0	0	0.0001088	1.69167E-05	1.26E-04	0.00E+00	0.00E+00	3.49E-08	5.43E-09	4.04E-08	0	0	0.86545512	0.13454488
	Tetrachloroethene	0.0798095	0.0005			14	0	0	0	7.506E-05	0.0000145	8.96E-05	0.00E+00	0.00E+00	5.36E-06	1.04E-06	6.40E-06	0	0	0.83809891	0.16190109
	Trichloroethene	0.1277727	0.0005			7	0	0	0	0.0001202	0.0000145	1.35E-04	0.00E+00	0.00E+00	1.72E-05	2.07E-06	1.92E-05	0	0	0.8923296	0.1076704
	Semivolatile Organics																				
	2-Methylnaphthalene	0.156	0.0025			143.70	0	0	0	0.0001467	0.0000725	2.19E-04	0.00E+00	0.00E+00	1.02E-06	5.05E-07	1.53E-06	0	0	0.66927898	0.33072102
	Acenaphthylene	0.14968	0.0025			133.30	0	0	0	0.0001408	0.0000725	2.13E-04	0.00E+00	0.00E+00	1.06E-06	5.44E-07	1.60E-06	0	0	0.66006177	0.33993823
	Anthracene	0.20202	0.0025			1000.00	0	0	0	0.00019	0.0000725	2.62E-04	0.00E+00	0.00E+00	1.90E-07	7.25E-08	2.62E-07	0	0	0.72380932	0.27619068
	Benzo(a)anthracene	0.4871429	0.0025			1.30	0	0	0	0.0004582	0.0000725	5.31E-04	0.00E+00	0.00E+00	3.52E-04	5.58E-05	4.08E-04	0	0	0.86337713	0.13662287
	Benzo(a)pyrene	0.6082813	0.0025		0.10	1.30	0	0.007196533	0.007196533	0.0005721	0.0000725	7.84E-03	0.00E+00	5.54E-03	4.40E-04	5.58E-05	6.03E-03	0	0.91779384	0.07296004	0.00924613
	Benzo(b)fluoranthene	1.047125	0.0025		0.08	1.30	0	0.005941341	0.005941341	0.0009848	0.0000725	7.00E-03	0.00E+00	4.57E-03	7.58E-04	5.58E-05	5.38E-03	0	0.84892525	0.14071562	0.01035912
	Benzo(g,h,i)perylene	0.4196552	0.0025			133.30	0	0	0	0.0003947	0.0000725	4.67E-04	0.00E+00	0.00E+00	2.96E-06	5.44E-07	3.50E-06	0	0	0.84481545	0.15518455
	Benzo(k)fluoranthene	0.6301	0.0025		0.13	1.30	0	0.009350313	0.009350313	0.0005926	0.0000725	1.00E-02	0.00E+00	7.19E-03	4.56E-04	5.58E-05	7.70E-03	0	0.93359151	0.05916965	0.00723884
	Carbazole	0.2830769	0			133.30	0	0	0	0.0002662	0	2.66E-04	0.00E+00	0.00E+00	2.00E-06	0.00E+00	2.00E-06	0	0	1	0
	Chrysene	0.6652857	0.0025		0.08	1.30	0	0.005786342	0.005786342	0.0006257	0.0000725	6.48E-03	0.00E+00	4.45E-03	4.81E-04	5.58E-05	4.99E-03	0	0.8923284	0.09649117	0.01118043
	Dibenz(a,h)anthracene	0.2417692	0.0025			1.30	0	0	0	0.0002274	0.0000725	3.00E-04	0.00E+00	0.00E+00	1.75E-04	5.58E-05	2.31E-04	0	0	0.75823982	0.24176018
	Dibenzofuran	0.2925	0.0025			133.30	0	0	0	0.0002751	0.0000725	3.48E-04	0.00E+00	0.00E+00	2.06E-06	5.44E-07	2.61E-06	0	0	0.79142468	0.20857532
	Fluoranthene	1.163	0.0025		0.05	125.00	0	0.004097104	0.004097104	0.0010938	0.0000725	5.26E-03	0.00E+00	3.28E-05	8.75E-06	5.80E-07	4.21E-05	0	0.77841314	0.20781251	0.01377435
	Fluorene	0.18916	0.0025			125.00	0	0	0	0.0001779	0.0000725	2.50E-04	0.00E+00	0.00E+00	1.42E-06	5.80E-07	2.00E-06	0	0	0.71046902	0.28953098
	Indeno(1,2,3-cd)pyrene	0.4535625	0.0025		0.19	1.30	0	0.014239247	0.014239247	0.0004266	0.0000725	1.47E-02	0.00E+00	1.10E-02	3.28E-04	5.58E-05	1.13E-02	0	0.96613756	0.02894329	0.00491915
	Naphthalene	0.299846	0.0025			140.00	0	0	0	0.000282	0.0000725	3.55E-04	0.00E+00	0.00E+00	2.01E-06	5.18E-07	2.53E-06	0	0	0.79548958	0.20451042
	N-nitrosodiphenylamine	0.322	0.0025			150.00	0	0	0	0.0003028	0.0000725	3.75E-04	0.00E+00	0.00E+00	2.02E-06	4.83E-07	2.50E-06	0	0	0.80684231	0.19315769
	Phenanthrene	0.529375	0.0025		0.14	133.30	0	0.010624433	0.010624433	0.0004979	0.0000725	1.12E-02	0.00E+00	7.97E-05	3.74E-06	5.44E-07	8.40E-05	0	0.94904986	0.04447393	0.00647621
	Pyrene	0.9433077	0.0025		0.06	133.30	0	0.004309808	0.004309808	0.0008872	0.0000725	5.27E-03	0.00E+00	3.23E-05	6.66E-06	5.44E-07	3.95E-05	0	0.81787971	0.16836184	0.01375845
	Pesticides and PCBs																				
	4,4'-DDD	0.0288321	0.00005	0.0006	1.49E-03	8.50	5.252E-05	0.000111069	0.000163593	2.712E-05	0.00000145	1.92E-04	6.18E-06	1.31E-05	3.19E-06	1.71E-07	2.26E-05	0.27333365	0.57800571	0.14111482	0.00754582
	4,4'-DDE	0.0193812	0.00005	0.0010	8.42E-04	1.90	7.94E-05	6.27535E-05	0.00014215	1.823E-05	0.00000145	1.62E-04	4.18E-05	3.30E-05	9.59E-06	7.63E-07	8.52E-05	0.49062181	0.38777967	0.11263838	0.00896015
	4,4'-DDT	0.0022374	0.00005	0.0011	3.59E-04	0.00	8.754E-05	2.6796E-05	0.000114335	2.104E-06	0.00000145	1.18E-04	3.13E-02	9.57E-03	7.52E-04	5.18E-04	4.21E-02	0.7425532	0.22729743	0.01784974	0.01229963
	Aldrin	0.0013439	0.000025	0.0003		0.20	2.484E-05	0	2.48368E-05	1.264E-06	0.000000725	2.68E-05	1.24E-04	0.00E+00	6.32E-06	3.63E-06	1.34E-04	0.92585606	0	0.04711764	0.0270263
	alpha-Chlordane	0.013583	2.173E-05	0.0006	1.39E-03	2.14	5.09E-05	0.000103659	0.000154554	1.277E-05	6.30129E-07	1.68E-04	2.38E-05	4.84E-05	5.97E-06	2.94E-07	7.65E-05	0.30302043	0.61716876	0.07605912	0.00375169
	Aroclor 1248	0.0895714	0.0005	0.0025		0.98	0.0002036	0	0.00020358	8.424E-05	0.0000145	3.02E-04	2.08E-04	0.00E+00	8.60E-05	1.48E-05	3.08E-04	0.67338814	0	0.27864975	0.04796212
	Aroclor 1254	0.2695514	0.0005	0.0195		1.50	0.0015879	0	0.001587924	0.0002535	0.0000145	1.86E-03	1.06E-03	0.00E+00	1.69E-04	9.67E-06	1.24E-03	0.85559149	0	0.13659575	0.00781276
	Aroclor 1260	0.3360676	0.0005	0.0215	2.10E-02	0.35	0.0017508	0.001565102	0.00331589	0.0003161	0.0000145	3.65E-03	5.07E-03	4.54E-03	9.16E-04	4.20E-05	1.06E-02	0.48013338	0.42921119	0.08667897	0.00397646
	beta-BHC	0.0010384	0.000025	0.0003		4.00	2.077E-05	0	2.07652E-05	9.767E-07	0.000000725	2.25E-05	5.19E-06	0.00E+00	2.44E-07	1.81E-07	5.62E-06	0.92425937	0	0.04347081	0.03226982
	delta-BHC	0.0013284	0.000025	0.0003		1.60	2.077E-05	0	2.07652E-05	1.249E-06	0.000000725	2.27E-05	1.30E-05	0.00E+00	7.81E-07	4.53E-07	1.42E-05	0.91317494	0	0.05494224	0.03188282
	Endosulfan I	0.0077731	0.000025	0.0006	1.28E-03	10.00	5.09E-05	9.53826E-05	0.000146278	7.311E-06	0.000000725	1.54E-04	5.09E-06	9.54E-06	7.31E-07	7.25E-08	1.54E-05	0.32981611	0.61811033	0.04737532	0.00469824
	Endosulfan Sulfate	0.0015784	0.00005	0.0009		10.00	7.695E-05	0	7.69532E-05	1.484E-06	0.00000145	7.99E-05	7.70E-06	0.00E+00	1.48E-07	1.45E-07	7.99E-06	0.96326738	0	0.01858214	0.01815047
	Endrin Aldehyde	0.003165	0.00005	0.0022	9.73E-04	0.30	0.0001792	7.25296E-05	0.00025168	2.977E-06	0.00000145	2.56E-04	5.97E-04	2.42E-04	9.92E-06	4.83E-06	8.54E-04	0.69951487	0.2832006	0.01162282	0.0056617
	gamma-Chlordane	0.0232458	2.163E-05	0.0003	2.23E-03	2.14	2.077E-05	0.000166383	0.000187148	2.186E-05	6.27229E-07	2.10E-04	9.70E-06	7.77E-05	1.02E-05	2.93E-07	9.80E-05	0.09905254	0.79366771	0.10428778	0.00299197
	Inorganics																				
	Aluminum	13148.294	0.3861143	47.9000	2.19E+02	109.70	3.9005928	16.31955601	20.22014881	12.36597	0.011197314	3.26E+01	3.56E-02	1.49E-01	1.13E-01	1.02E-04	2.97E-01	0.11965994	0.50064109	0.37935547	0.0003435
	Antimony	11.698349	0.0006929	0.0498		0.13	0.0040512	0	0.004051242	0.0110023	2.00929E-05	1.51E-02	3.24E-02	0.00E+00	8.80E-02	1.61E-04	1.21E-01	0.26876349	0	0.72990353	0.00133298
	Arsenic	468.41865	0.0245543	3.7500	24.69	5.14	0.30537	1.841013618	2.146383618	0.4405477	0.000712986	2.59E+00	5.94E-02	3.58E-01	8.57E-02	1.39E-04	5.03E-01	0.11801081	0.71146316	0.1702505	0.00027553
	Barium	129.62063	0.0373429	8.8000	12.64	208.00	0.7166016	0.942483838	1.659085438	0.1219082	0.001082943	1.78E+00	3.45E-03	4.53E-03	5.86E-04	5.21E-06	8.57E-03	0.40211605	0.52886831	0.06840795	0.00060769
	Beryllium	0.937123	6.379E-05	0.0060		0.66	0.0004886	0	0.000488592	0.0008814	1.84979E-06	1.37E-03	7.40E-04	0.00E+00	1.34E-03	2.80E-06	2.08E-03	0.35616699	0	0.64248458	0.00134843
	Cadmium	8.9811825	0.00043	0.0570	0.96	1.45	0.0046416	0.071742672	0.076384296	0.0084468	0.00001247	8.48E-02	3.20E-03	4.95E-02	5.83E-03	8.60E-06	5.85E-02	0.05470802	0.84558763	0.09955737	0.00014698
X	Chromium	2214.1389	0.0257857	0.8950	41.38	1.00	0.0728816	3.085387476	3.158269116	2.0823976	0.000747786	5.24E+00	7.29E-02	3.09E+00	2.08E+00	7.48E-04	5.24E+00	0.01390496	0.5886555	0.39729688	0.00014267
	Cobalt	19.440079	0.0014686	0.4850	1.73	5.00	0.0394945	0.128749264	0.168243784	0.0182834	4.25885E-05	1.87E-01	7.90E-03	2.57E-02	3.66E-03	8.52E-06	3.73E-02	0.21168767	0.69008643	0.09799763	0.00022827
	Copper	579.39286	0.0215429	54.3500	29.34	47.00	4.4258292	2.188180668	6.614009868	0.544919	0.000624743	7.16E+00	9.42E-02	4.66E-02	1.16E-02	1.33E-05	1.52E-01	0.61817111	0.30563088	0.07611075	8.726E-05
	Cyanide	1.3512766	0.0025	0.2675		68.70		0	0	0.0012709		1.27E-03	0.00E+00	0.00E+00	1.85E-05	0.00E+00	1.85E-05	0	0	1	0
X	Iron	36919.444	2.401	577.5000	3056.18	3.19	47.02698	227.8935374	274.9205174	34.722737	0.069629	3.10E+02	1.47E+01	7.14E+01	1.09E+01	2.18E-02	9.71E+01	0.15184057	0.73582195	0.11211267	0.00022482
X	Lead	524.42302	0.0130729	0.5150	47.82	1.13	0.0419375	3.566196983	3.608134463	0.4932198	0.000379113	4.10E+00	3.71E-02	3.16E+00	4.36E-01	3.35E-04	3.63E+00	0.01022433	0.86943656	0.12024668	9.2427E-05
	Manganese	615.68651	0.4697143	88.7000	347.19	977.00	7.2230184	25.88934726	33.11236566	0.5790532	0.013621714	3.37E+01	7.39E-03	2.65E-02	5.93E-04	1.39E-05	3.45E-02	0.21430084	0.768115	0.01718002	0.00040414
X	Mercury	3.3087704	0.0002039	0.0090	0.12	0.01	0.0007329	0.008642866	0.009375754	0.0031119	5.91393E-06	1.25E-02	1.15E-01	1.35E+00	4.86E-01	9.24E-04	1.95E+00	0.05866123	0.69178534	0.24908008	0.00047336
	Nickel	27.718254	0.0028429	0.0675	0.72	77.40	0.0054967	0.053394785	0.058891445	0.026069	8.24429E-05	8.50E-02	7.10E-05	6.90E-04	3.37E-04	1.07E-06	1.10E-03	0.06463396	0.62785701	0.3065396	0.00096943
	Selenium	4.8625203	0.0008571	0.3300	0.42	0.40	0.0268726	0.031155424	0.058027984	0.0045732	2.48571E-05	6.26E-02	6.72E-02	7.79E-02	1.14E-02	6.21E-05	1.57E-01	0.42909562	0.49748352	0.07302394	0.00039691
	Silver	0.6898182	0.00025	0.0370		181.20	0.003013	0	0.003012984	0.0006488	0.00000725	3.67E-03	1.66E-05	0.00E+00	3.58E-06	4.00E-08	2.02E-05	0.82119853	0	0.17682546	0.00197601
	Thallium	1.5743287	0.0007786	0.0675		0.07	0.0054967	0	0.00549666	0.0014807	2.25786E-05	7.00E-03	7.43E-02	0.00E+00	2.00E-02	3.05E-04	9.46E-02	0.78524895	0	0.21152549	0.00322556
	Vanadium	55.442064	0.0018789	0.1375	1.93	11.40	0.0111969	0.143852561	0.155049461	0.0521433	5.44889E-05	2.07E-01	9.82E-04	1.26E-02	4.57E-03	4.78E-06	1.82E-02	0.05402678	0.69411096	0.25159934	0.00026292
	Zinc	1672.5405	0.1277857	28.7500	64.75	14.50	2.34117	4.828137885	7.169307885	1.5730243	0.003705786	8.75E+00	1.61E-01	3.33E-01	1.08E-01	2.56E-04	6.03E-01	0.26768349	0.55203715	0.17985565	0.00042371

Table E.1-54. Maximum Exposure Calculations for Mallard (38-Acre)

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
	Volatile Organics																				
	2-Butanone	0.1370232	0			12	0	0	0	0.0001289	0	1.29E-04	0.00E+00	0.00E+00	1.07E-05	0.00E+00	*1.07E-05*	0	0	1	0
	Acetone	1.3640614	0			1700	0	0	0	0.0012829	0	1.28E-03	0.00E+00	0.00E+00	7.55E-07	0.00E+00	*7.55E-07*	0	0	1	0
	cis-1,2-Dichloroethene	0.2092793	0.0007513			3114	0	0	0	0.0001968	2.17864E-05	2.19E-04	0.00E+00	0.00E+00	6.32E-08	7.00E-09	*7.02E-08*	0	0	0.90034301	0.09965699
	Tetrachloroethene	0.041	0			14	0	0	0	3.856E-05	0	3.86E-05	0.00E+00	0.00E+00	2.75E-06	0.00E+00	*2.75E-06*	0	0	1	0
	Trichloroethene	1.0308958	0			7	0	0	0	0.0009696	0	9.70E-04	0.00E+00	0.00E+00	1.39E-04	0.00E+00	*1.39E-04*	0	0	1	0
	Semivolatile Organics																				
	2-Methylnaphthalene	0.14	0			143.70	0	0	0	0.0001317	0	1.32E-04	0.00E+00	0.00E+00	9.16E-07	0.00E+00	*9.16E-07*	0	0	1	0
	Acenaphthylene	0.038	0			133.30	0	0	0	3.574E-05	0	3.57E-05	0.00E+00	0.00E+00	2.68E-07	0.00E+00	*2.68E-07*	0	0	1	0
	Anthracene	0.2492468	0			1000.00	0	0	0	0.0002344	0	2.34E-04	0.00E+00	0.00E+00	2.34E-07	0.00E+00	*2.34E-07*	0	0	1	0
	Benzo(a)anthracene	0.6336971	0			1.30	0	0	0	0.000596	0	5.96E-04	0.00E+00	0.00E+00	4.58E-04	0.00E+00	*4.58E-04*	0	0	1	0
	Benzo(a)pyrene	0.8214214	0		0.13	1.30	0	0.009718179	0.009718179	0.0007725	0	1.05E-02	0.00E+00	7.48E-03	5.94E-04	0.00E+00	*8.07E-03*	0	0.92635907	0.07364093	0
	Benzo(b)fluoranthene	1.4458234	0		0.11	1.30	0	0.008203538	0.008203538	0.0013598	0	9.56E-03	0.00E+00	6.31E-03	1.05E-03	0.00E+00	*7.36E-03*	0	0.85781143	0.14218857	0
	Benzo(g,h,i)perylene	0.5183468	0			133.30	0	0	0	0.0004875	0	4.88E-04	0.00E+00	0.00E+00	3.66E-06	0.00E+00	*3.66E-06*	0	0	1	0
	Benzo(k)fluoranthene	0.7943029	0		0.16	1.30	0	0.011786988	0.011786988	0.000747	0	1.25E-02	0.00E+00	9.07E-03	5.75E-04	0.00E+00	*9.64E-03*	0	0.94039891	0.05960109	0
	Carbazole	0.17	0			133.30	0	0	0	0.0001599	0	1.60E-04	0.00E+00	0.00E+00	1.20E-06	0.00E+00	*1.20E-06*	0	0	1	0
	Chrysene	0.8772462	0		0.10	1.30	0	0.007629875	0.007629875	0.0008251	0	8.45E-03	0.00E+00	5.87E-03	6.35E-04	0.00E+00	*6.50E-03*	0	0.90241782	0.09758218	0
	Dibenz(a,h)anthracene	0.2832599	0			1.30	0	0	0	0.0002664	0	2.66E-04	0.00E+00	0.00E+00	2.05E-04	0.00E+00	*2.05E-04*	0	0	1	0
	Dibenzofuran	0.3434094	0			133.30	0	0	0	0.000323	0	3.23E-04	0.00E+00	0.00E+00	2.42E-06	0.00E+00	*2.42E-06*	0	0	1	0
	Fluoranthene	1.5022637	0		0.07	125.00	0	0.005292288	0.005292288	0.0014129	0	6.71E-03	0.00E+00	4.23E-05	1.13E-05	0.00E+00	*5.36E-05*	0	0.78928503	0.21071497	0
	Fluorene	0.2336562	0			125.00	0	0	0	0.0002198	0	2.20E-04	0.00E+00	0.00E+00	1.76E-06	0.00E+00	*1.76E-06*	0	0	1	0
	Indeno(1,2,3-cd)pyrene	0.5653761	0		0.24	1.30	0	0.01774955	0.01774955	0.0005317	0	1.83E-02	0.00E+00	1.37E-02	4.09E-04	0.00E+00	*1.41E-02*	0	0.97091363	0.02908637	0
	Naphthalene	0.4799877	0.0031184			140.00	0	0	0	0.0004514	9.04337E-05	5.42E-04	0.00E+00	0.00E+00	3.22E-06	6.46E-07	*3.87E-06*	0	0	0.83310567	0.16689433
	N-nitrosodiphenylamine	0.3866736	0			150.00	0	0	0	0.0003637	0	3.64E-04	0.00E+00	0.00E+00	2.42E-06	0.00E+00	*2.42E-06*	0	0	1	0
	Phenanthrene	0.6685545	0		0.18	133.30	0	0.013417734	0.013417734	0.0006288	0	1.40E-02	0.00E+00	1.01E-04	4.72E-06	0.00E+00	*1.05E-04*	0	0.95523617	0.04476383	0
	Pyrene	1.2105517	0		0.07	133.30	0	0.005530799	0.005530799	0.0011385	0	6.67E-03	0.00E+00	4.15E-05	8.54E-06	0.00E+00	*5.00E-05*	0	0.82928944	0.17071056	0
	Pesticides and PCBs																				
	4,4'-DDD	0.1235042	0	0.0000	6.38E-03	8.50	0	0.000475773	0.000475773	0.0001162	0	5.92E-04	0.00E+00	5.60E-05	1.37E-05	0.00E+00	*6.96E-05*	0	0.8037675	0.1962325	0
	4,4'-DDE	0.0737613	0	0.0000	3.20E-03	1.90	0	0.000238829	0.000238829	6.937E-05	0	3.08E-04	0.00E+00	1.26E-04	3.65E-05	0.00E+00	*1.62E-04*	0	0.77491144	0.22508856	0
	4,4'-DDT	0.0028409	0	0.0013	4.56E-04	0.00	0.0001059	3.40234E-05	0.000139885	2.672E-06	0	1.43E-04	3.78E-02	1.22E-02	9.54E-04	0.00E+00	*5.09E-02*	0.74259229	0.23866525	0.01874246	0
	Aldrin	0.0075868	0	0.0003		0.20	2.524E-05	0	2.52439E-05	7.135E-06	0	3.24E-05	1.26E-04	0.00E+00	3.57E-05	0.00E+00	*1.62E-04*	0.77963087	0	0.22036913	0
	alpha-Chlordane	0.0462603	0.0000021	0.0000	4.73E-03	2.14	0	0.000353036	0.000353036	4.351E-05	6.09E-08	3.97E-04	0.00E+00	1.65E-04	2.03E-05	2.85E-08	*1.85E-04*	0	0.89014595	0.10970049	0.00015355
	Aroclor 1248	0.1326454	0	0.0000		0.98	0	0	0	0.0001248	0	1.25E-04	0.00E+00	0.00E+00	1.27E-04	0.00E+00	*1.27E-04*	0	0	1	0
	Aroclor 1254	1.2410479	0	0.0240		1.50	0.0019544	0	0.001954368	0.0011672	0	3.12E-03	1.30E-03	0.00E+00	7.78E-04	0.00E+00	*2.08E-03*	0.62608424	0	0.37391576	0
	Aroclor 1260	1.2963472	0	0.0280	8.10E-02	0.35	0.0022801	0.006037226	0.008317322	0.0012192	0	9.54E-03	6.61E-03	1.75E-02	3.53E-03	0.00E+00	*2.76E-02*	0.23909057	0.63306275	0.12784668	0
	beta-BHC	0.0025775	0	0.0000		4.00	0	0	0	2.424E-06	0	2.42E-06	0.00E+00	0.00E+00	6.06E-07	0.00E+00	*6.06E-07*	0	0	1	0
	delta-BHC	0.0071898	0	0.0000		1.60	0	0	0	6.762E-06	0	6.76E-06	0.00E+00	0.00E+00	4.23E-06	0.00E+00	*4.23E-06*	0	0	1	0
	Endosulfan I	0.0362708	0	0.0000	5.97E-03	10.00	0	0.000445071	0.000445071	3.411E-05	0	4.79E-04	0.00E+00	4.45E-05	3.41E-06	0.00E+00	*4.79E-05*	0	0.9288109	0.0711891	0
	Endosulfan Sulfate	0.00072	0	0.0014		10.00	0.000114	0	0.000114005	6.772E-07	0	1.15E-04	1.14E-05	0.00E+00	6.77E-08	0.00E+00	*1.15E-05*	0.99409532	0	0.00590468	0
	Endrin Aldehyde	0.0046758	0	0.0029	1.44E-03	0.30	0.0002362	0.000107152	0.000343305	4.398E-06	0	3.48E-04	7.87E-04	3.57E-04	1.47E-05	0.00E+00	*1.16E-03*	0.67918137	0.308171	0.01264763	0
	gamma-Chlordane	0.0281198	0.0000014	0.0000	2.70E-03	2.14	0	0.000201269	0.000201269	2.645E-05	4.06E-08	2.28E-04	0.00E+00	9.41E-05	1.24E-05	1.90E-08	*1.06E-04*	0	0.8837033	0.11611844	0.00017826
	Inorganics																				
	Aluminum	14244.609	2.18	49.1000	2.37E+02	109.70	3.9983112	17.68029436	21.67860556	13.397055	0.06322	3.51E+01	3.64E-02	1.61E-01	1.22E-01	5.76E-04	*3.20E-01*	0.11378596	0.50315474	0.38126016	0.00179915
	Antimony	14.142353	0.0009546	0.0000		0.13	0	0	0	0.0133009	2.7684E-05	1.33E-02	0.00E+00	0.00E+00	1.06E-01	2.21E-04	*1.07E-01*	0	0	0.99792296	0.00207704
	Arsenic	771.37851	0.0463257	4.4000	40.66	5.14	0.3583008	3.031728873	3.390029673	0.7254815	0.001343446	4.12E+00	6.97E-02	5.90E-01	1.41E-01	2.61E-04	*8.01E-01*	0.08703266	0.73641874	0.17622228	0.00032633
	Barium	129.86617	0.0434637	0.0000	12.66	208.00	0	0.944269149	0.944269149	0.1221391	0.001260448	1.07E+00	0.00E+00	4.54E-03	5.87E-04	6.06E-06	*5.13E-03*	0	0.88442147	0.11439797	0.00118056
	Beryllium	1.0287972	0.0001505	0.0000		0.66	0	0	0	0.0009676	4.36485E-06	9.72E-04	0.00E+00	0.00E+00	1.47E-03	6.61E-06	*1.47E-03*	0	0	0.99550917	0.00449083
	Cadmium	12.672809	0.0025	0.0640	1.36	1.45	0.0052116	0.101231787	0.106443435	0.0119188	0.0000725	1.18E-01	3.59E-03	6.98E-02	8.22E-03	5.00E-05	*8.17E-02*	0.0440044	0.85474761	0.10063584	0.00061215
X	Chromium	3872.4721	0.058864	1.0000	72.37	1.00	0.081432	5.396263543	5.477695543	3.64206	0.001707055	9.12E+00	8.14E-02	5.40E+00	3.64E+00	1.71E-03	*9.12E+00*	0.00892752	0.59160069	0.39928465	0.00018715
	Cobalt	21.520038	0.0039065	0.5600	1.91	5.00	0.0456019	0.142524574	0.188126494	0.0202396	0.000113289	2.08E-01	9.12E-03	2.85E-02	4.05E-03	2.27E-05	*4.17E-02*	0.21873588	0.68363871	0.097082	0.0005434
	Copper	663.01246	0.0712382	59.6000	33.58	47.00	4.8533472	2.503985061	7.357332261	0.6235632	0.002065908	7.98E+00	1.03E-01	5.33E-02	1.33E-02	4.40E-05	*1.70E-01*	0.60796326	0.31366619	0.07811177	0.00025879
	Cyanide	1.7454033	0	0.0000		68.70		0	0	0.0016416	0	1.64E-03	0.00E+00	0.00E+00	2.39E-05	0.00E+00	*2.39E-05*	0	0	1	0
X	Iron	42768.778	6.8492234	645.0000	3540.39	3.19	52.52364	263.9998589	316.5234989	40.224036	0.198627478	3.57E+02	1.65E+01	8.28E+01	1.26E+01	6.23E-02	*1.12E+02*	0.14714723	0.73960694	0.11268936	0.00055646
X	Lead	593.51412	0.0759	0.5500	54.13	1.13	0.0447876	4.036032385	4.080819985	0.5582	0.0022011	4.64E+00	3.96E-02	3.57E+00	4.94E-01	1.95E-03	*4.11E+00*	0.00964996	0.86960571	0.12027008	0.00047425
	Manganese	696.18486	0.5791672	112.0000	392.58	977.00	9.120384	29.27426774	38.39465174	0.6547619	0.01679585	3.91E+01	9.34E-03	3.00E-02	6.70E-04	1.72E-05	*4.00E-02*	0.23345966	0.74935009	0.01676031	0.00042993
X	Mercury	5.3190024	0.0006096	0.0000	0.19	0.01	0	0.01389381	0.01389381	0.0050025	1.76772E-05	1.89E-02	0.00E+00	2.17E+00	7.82E-01	2.76E-03	*2.96E+00*	0	0.73457774	0.26448765	0.00093461
	Nickel	30.389124	0.0039395	0.0000	0.79	77.40	0	0.058539789	0.058539789	0.028581	0.000114246	8.72E-02	0.00E+00	7.56E-04	3.69E-04	1.48E-06	*1.13E-03*	0	0.67105846	0.32763191	0.00130963
	Selenium	5.5301058	0.0009109	0.3500	0.48	0.40	0.0285012	0.035432816	0.063934016	0.0052011	2.64161E-05	6.92E-02	7.13E-02	8.86E-02	1.30E-02	6.60E-05	*1.73E-01*	0.41209634	0.51231997	0.07520173	0.00038195
	Silver	1.0390303	0.0003127	0.0560		181.20	0.0045602	0	0.004560192	0.0009772	9.06876E-06	5.55E-03	2.52E-05	0.00E+00	5.39E-06	5.00E-08	*3.06E-05*	0.82217934	0	0.17618561	0.00163505
	Thallium	3.2261893	0.0008144	0.0000		0.07	0	0	0	0.0030342	2.36179E-05	3.06E-03	0.00E+00	0.00E+00	4.10E-02	3.19E-04	*4.13E-02*	0	0	0.99227631	0.00772369
	Vanadium	60.419845	0.0060955	0.0000	2.10	11.40	0	0.156768145	0.156768145	0.0568249	0.000176771	2.14E-01	0.00E+00	1.38E-02	4.98E-03	1.55E-05	*1.88E-02*	0	0.73335036	0.26582272	0.00082692
	Zinc	1831.8979	0.626	29.1000	70.92	14.50	2.3696712	5.288156285	7.657827485	1.7228999	0.018154	9.40E+00	1.63E-01	3.65E-01	1.19E-01	1.25E-03	*6.48E-01*	0.25212268	0.56263677	0.18330904	0.00193151

Table E.1-55. Average Exposure Calculatioins for Mallard - Reference

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
	Volatile Organics																				
	2-Butanone	0.0512619	0.00183333			12.10	0	0	0	4.82118E-05	5.31667E-05	1.01E-04	0.00E+00	0.00E+00	3.98E-06	4.39E-06	*8.38E-06*	0	0	0.47556264	0.52443736
	Acetone	0.17427273	0.0025			1700.00	0	0	0	0.000163904	0.0000725	2.36E-04	0.00E+00	0.00E+00	9.64E-08	4.26E-08	*1.39E-07*	0	0	0.69332095	0.30667905
	cis-1,2-Dichloroethene	0.00988889	0.00072222			3114.00	0	0	0	9.3005E-06	2.09444E-05	3.02E-05	0.00E+00	0.00E+00	2.99E-09	6.73E-09	*9.71E-09*	0	0	0.30750594	0.69249406
	Tetrachloroethene	0.00995652	0.00072222			14.00	0	0	0	9.36411E-06	2.09444E-05	3.03E-05	0.00E+00	0.00E+00	6.69E-07	1.50E-06	*2.16E-06*	0	0	0.30895928	0.69104072
	Trichloroethene	0.00843478	0.00072222			7.00	0	0	0	7.93291E-06	2.09444E-05	2.89E-05	0.00E+00	0.00E+00	1.13E-06	2.99E-06	*4.13E-06*	0	0	0.2747105	0.7252895
	Semivolatile Organics																				
	2-Methylnaphthalene	0.267	0.00238889			143.70	0	0	0	0.000251114	6.92778E-05	3.20E-04	0.00E+00	0.00E+00	1.75E-06	4.82E-07	*2.23E-06*	0	0	0.78377134	0.21622866
	Acenaphthylene	0.30529167	0.00238889			133.30	0	0	0	0.000287127	6.92778E-05	3.56E-04	0.00E+00	0.00E+00	2.15E-06	5.20E-07	*2.67E-06*	0	0	0.80562041	0.19437959
	Anthracene	0.41358333	0.00238889			1000.00	0	0	0	0.000388975	6.92778E-05	4.58E-04	0.00E+00	0.00E+00	3.89E-07	6.93E-08	*4.58E-07*	0	0	0.84882195	0.15117805
	Benzo(a)anthracene	1.15166667	0.00238889			1.30	0	0	0	0.001083143	6.92778E-05	1.15E-03	0.00E+00	0.00E+00	8.33E-04	5.33E-05	*8.86E-04*	0	0	0.93988497	0.06011503
	Benzo(a)pyrene	1.065	0.00238889		0.17	1.30	0	0.01259994	0.01259994	0.001001633	6.92778E-05	1.37E-02	0.00E+00	9.69E-03	7.70E-04	5.33E-05	*1.05E-02*	0	0.92166469	0.07326775	0.00506755
	Benzo(b)fluoranthene	1.45041667	0.00238889		0.11	1.30	0	0.0082296	0.0082296	0.001364117	6.92778E-05	9.66E-03	0.00E+00	6.33E-03	1.05E-03	5.33E-05	*7.43E-03*	0	0.85166144	0.14116917	0.00716939
	Benzo(g,h,i)perylene	0.47479167	0.00238889			133.30	0	0	0	0.000446542	6.92778E-05	5.16E-04	0.00E+00	0.00E+00	3.35E-06	5.20E-07	*3.87E-06*	0	0	0.86569372	0.13430628
	Benzo(k)fluoranthene	1.39729167	0.00238889		0.28	1.30	0	0.020734986	0.020734986	0.001314153	6.92778E-05	2.21E-02	0.00E+00	1.59E-02	1.01E-03	5.33E-05	*1.70E-02*	0	0.93745345	0.05941442	0.00313213
	Carbazole	0.33172727	0.00225			133.30	0	0	0	0.000311989	0.00006525	3.77E-04	0.00E+00	0.00E+00	2.34E-06	4.89E-07	*2.83E-06*	0	0	0.82703296	0.17296704
	Chrysene	1.31375	0.00238889		0.15	1.30	0	0.01142638	0.01142638	0.001235582	6.92778E-05	1.27E-02	0.00E+00	8.79E-03	9.50E-04	5.33E-05	*9.79E-03*	0	0.89750726	0.09705118	0.00544156
	Dibenz(a,h)anthracene	0.28333333	0.00238889			1.30	0	0	0	0.000266475	6.92778E-05	3.36E-04	0.00E+00	0.00E+00	2.05E-04	5.33E-05	*2.58E-04*	0	0	0.79366432	0.20633568
	Dibenzofuran	0.32272727	0.00238889			133.30	0	0	0	0.000303525	6.92778E-05	3.73E-04	0.00E+00	0.00E+00	2.28E-06	5.20E-07	*2.80E-06*	0	0	0.81417043	0.18582957
	Fluoranthene	2.48379167	0.00238889		0.12	125.00	0	0.008750088	0.008750088	0.002336006	6.92778E-05	1.12E-02	0.00E+00	7.00E-05	1.87E-05	5.54E-07	*8.92E-05*	0	0.78438336	0.20940638	0.00621026
	Fluorene	0.39354167	0.00238889			125.00	0	0	0	0.000370126	6.92778E-05	4.39E-04	0.00E+00	0.00E+00	2.96E-06	5.54E-07	*3.52E-06*	0	0	0.84233684	0.15766316
	Indeno(1,2,3-cd)pyrene	0.634375	0.00238889		0.27	1.30	0	0.019915717	0.019915717	0.00059663	6.92778E-05	2.06E-02	0.00E+00	1.53E-02	4.59E-04	5.33E-05	*1.58E-02*	0	0.96764553	0.02898846	0.003366
	Naphthalene	0.280417	0.00238889			140.00	0	0	0	0.000263732	6.92778E-05	3.33E-04	0.00E+00	0.00E+00	1.88E-06	4.95E-07	*2.38E-06*	0	0	0.79196485	0.20803515
	N-nitrosodiphenylamine	0.33159091	0.00238889			150.00	0	0	0	0.000311861	6.92778E-05	3.81E-04	0.00E+00	0.00E+00	2.08E-06	4.62E-07	*2.54E-06*	0	0	0.81823489	0.18176511
	Phenanthrene	1.51708333	0.00238889		0.41	133.30	0	0.03044751	0.03044751	0.001426817	6.92778E-05	3.19E-02	0.00E+00	2.28E-04	1.07E-05	5.20E-07	*2.40E-04*	0	0.9531645	0.04466675	0.00216875
	Pyrene	1.97566667	0.00238889		0.12	133.30	0	0.009026476	0.009026476	0.001858115	6.92778E-05	1.10E-02	0.00E+00	6.77E-05	1.39E-05	5.20E-07	*8.22E-05*	0	0.8240446	0.1696309	0.0063245
	Pesticides and PCBs																				
	4,4'-DDD	0.047775	2.9811E-05	0.0008	2.47E-03	8.50	6.3924E-05	0.000184043	0.000247967	4.49324E-05	8.64522E-07	2.94E-04	7.52E-06	2.17E-05	5.29E-06	1.02E-07	*3.46E-05*	0.21760373	0.62649927	0.15295408	0.00294291
	4,4'-DDE	0.03051417	2.9811E-05	0.0047	1.32E-03	1.90	0.00037866	9.88005E-05	0.000477459	2.86986E-05	8.64522E-07	5.07E-04	1.99E-04	5.20E-05	1.51E-05	4.55E-07	*2.67E-04*	0.74682861	0.19486411	0.05660219	0.0017051
	4,4'-DDT	0.02280167	2.9811E-05	0.0005	3.66E-03	0.00	3.9902E-05	0.000273079	0.00031298	2.1445E-05	8.64522E-07	3.35E-04	1.43E-02	9.75E-02	7.66E-03	3.09E-04	*1.20E-01*	0.1190065	0.8144556	0.06395947	0.00257843
	Aldrin	0.00290188	1.5922E-05	0.0003		0.20	2.0562E-05	0	2.05616E-05	2.72921E-06	4.61744E-07	2.38E-05	1.03E-04	0.00E+00	1.36E-05	2.31E-06	*1.19E-04*	0.86565826	0	0.11490197	0.01943977
	alpha-Chlordane	0.00422313	1.5922E-05	0.0003	4.32E-04	2.14	2.0562E-05	3.22289E-05	5.27905E-05	3.97185E-06	4.61744E-07	5.72E-05	9.61E-06	1.51E-05	1.86E-06	2.16E-07	*2.67E-05*	0.35931701	0.56320522	0.06940872	0.00806905
	Aroclor 1248	0.06978125	0.000288	0.0025		0.98	0.00020358	0	0.00020358	6.56293E-05	0.000008352	2.78E-04	2.08E-04	0.00E+00	6.70E-05	8.52E-06	*2.83E-04*	0.73345969	0	0.23644966	0.03009065
	Aroclor 1254	0.05549792	0.000288	0.0025		1.50	0.00020358	0	0.00020358	5.21958E-05	0.000008352	2.64E-04	1.36E-04	0.00E+00	3.48E-05	5.57E-06	*1.76E-04*	0.77076327	0	0.19761567	0.03162106
	Aroclor 1260	0.06565625	0.000288	0.0052	4.10E-03	0.35	0.00041937	0.000305768	0.000725143	6.17497E-05	0.000008352	7.95E-04	1.22E-03	8.86E-04	1.79E-04	2.42E-05	*2.31E-03*	0.52735322	0.38449566	0.07764869	0.01050243
	beta-BHC	0.00287563	1.5922E-05	0.0003		4.00	2.0562E-05	0	2.05616E-05	2.70453E-06	4.61744E-07	2.37E-05	5.14E-06	0.00E+00	6.76E-07	1.15E-07	*5.93E-06*	0.86655895	0	0.11398106	0.01945999
	delta-BHC	0.00294229	1.5922E-05	0.0003		1.60	2.0562E-05	0	2.05616E-05	2.76723E-06	4.61744E-07	2.38E-05	1.29E-05	0.00E+00	1.73E-06	2.89E-07	*1.49E-05*	0.86427513	0	0.11631616	0.01940871
	Endosulfan I	0.00681396	1.5922E-05	0.0003	1.12E-03	10.00	2.0562E-05	8.36127E-05	0.000104174	6.40853E-06	4.61744E-07	1.11E-04	2.06E-06	8.36E-06	6.41E-07	4.62E-08	*1.11E-05*	0.1851652	0.75296528	0.05771134	0.00415819
	Endosulfan Sulfate	0.0056075	2.9811E-05	0.0005		10.00	3.9902E-05	0	3.99017E-05	5.27385E-06	8.64522E-07	4.60E-05	3.99E-06	0.00E+00	5.27E-07	8.65E-08	*4.60E-06*	0.86667315	0	0.11454925	0.0187776
	Endrin Aldehyde	0.0070575	2.9811E-05	0.0005	2.17E-03	0.30	3.9902E-05	0.000161731	0.000201632	6.63758E-06	8.64522E-07	2.09E-04	1.33E-04	5.39E-04	2.21E-05	2.88E-06	*6.97E-04*	0.19079446	0.77333338	0.03173834	0.00413381
	gamma-Chlordane	0.00307271	1.3333E-05	0.0003	2.95E-04	2.14	2.0562E-05	2.1993E-05	4.25546E-05	2.88988E-06	3.86666E-07	4.58E-05	9.61E-06	1.03E-05	1.35E-06	1.81E-07	*2.14E-05*	0.44863741	0.4798709	0.06305494	0.00843674
	Inorganics																				
	Aluminum	7851.8	0.35131111	9.7500	1.31E+02	109.70	0.793962	9.74559082	10.53955282	7.3846179	0.010188022	1.79E+01	7.24E-03	8.88E-02	6.73E-02	9.29E-05	*1.63E-01*	0.04427044	0.54340336	0.41175812	0.00056807
	Antimony	0.9958	0.00437222	0.0480		0.13	0.00390874	0	0.003908736	0.00093655	0.000126794	4.97E-03	3.13E-02	0.00E+00	7.49E-03	1.01E-03	*3.98E-02*	0.78613693	0	0.18836178	0.02550129
	Arsenic	15.85	0.0031	0.1925	0.84	5.14	0.01567566	0.062294842	0.077970502	0.014906925	0.0000899	9.30E-02	3.05E-03	1.21E-02	2.90E-03	1.75E-05	*1.81E-02*	0.16861472	0.67007242	0.16034585	0.00096701
	Barium	51.744	0.03224444	15.4000	5.05	208.00	1.2540528	0.376235495	1.630288295	0.048665232	0.000935089	1.68E+00	6.03E-03	1.81E-03	2.34E-04	4.50E-06	*8.08E-03*	0.74650949	0.22396455	0.02896932	0.00055664
	Beryllium	0.5106	0.0000765	0.0044		0.66	0.0003581	0	0.000358097	0.000480219	2.2185E-06	8.41E-04	5.43E-04	0.00E+00	7.28E-04	3.36E-06	*1.27E-03*	0.42603486	0	0.57132575	0.00263939
	Cadmium	1.1731396	0.000215	0.0800	0.13	1.45	0.00651456	0.009371168	0.015885728	0.001103338	0.000006235	1.70E-02	4.49E-03	6.46E-03	7.61E-04	4.30E-06	*1.17E-02*	0.38331537	0.55139759	0.06492017	0.00036687
	Chromium	91.164	0.00221556	0.1800	1.70	1.00	0.01465776	0.127036414	0.141694174	0.085739742	6.42511E-05	2.27E-01	1.47E-02	1.27E-01	8.57E-02	6.43E-05	*2.27E-01*	0.06443023	0.55840632	0.37688102	0.00028242
	Cobalt	7.9364	0.00142778	0.4200	0.70	5.00	0.03420144	0.052561805	0.086763245	0.007464184	4.14056E-05	9.43E-02	6.84E-03	1.05E-02	1.49E-03	8.28E-06	*1.89E-02*	0.3628075	0.55757351	0.07917977	0.00043923
	Copper	59.638	0.00285833	20.1000	3.02	47.00	1.6367832	0.225233565	1.862016765	0.056089539	8.28917E-05	1.92E+00	3.48E-02	4.79E-03	1.19E-03	1.76E-06	*4.08E-02*	0.85329602	0.11741989	0.02924088	4.3213E-05
	Cyanide	0.3942854	0.0025	0.2175		68.70	0.01771146	0	0.01771146	0.000370825	0.0000725	1.82E-02	2.58E-04	0.00E+00	5.40E-06	1.06E-06	*2.64E-04*	0.9755808	0	0.02042577	0.00399344
X	Iron	15732.8	2.87833333	66.3500	1302.36	3.19	5.4030132	97.11423071	102.5172439	14.7966984	0.083471667	1.17E+02	1.69E+00	3.04E+01	4.64E+00	2.62E-02	*3.68E+01*	0.04602327	0.82722632	0.12603939	0.00071102
X	Lead	192.668	0.00780444	0.0333	17.57	1.13	0.00270761	1.310186661	1.312894275	0.181204254	0.000226329	1.49E+00	2.40E-03	1.16E+00	1.60E-01	2.00E-04	*1.32E+00*	0.00181193	0.87677499	0.12126162	0.00015146
	Manganese	365.708	0.48626667	106.0000	206.23	977.00	8.631792	15.37786079	24.00965279	0.343948374	0.014101733	2.44E+01	8.83E-03	1.57E-02	3.52E-04	1.44E-05	*2.49E-02*	0.35423085	0.63107552	0.01411493	0.00057871
	Mercury	0.1919688	6.6167E-05	0.0055	0.01	0.01	0.00044788	0.000501443	0.000949319	0.000180547	1.91883E-06	1.13E-03	7.00E-02	7.84E-02	2.82E-02	3.00E-04	*1.77E-01*	0.39572542	0.44305533	0.15952384	0.00169541
	Nickel	14.024	0.00153222	0.1600	0.36	77.40	0.01302912	0.027014994	0.040044114	0.013189572	4.44344E-05	5.33E-02	1.68E-04	3.49E-04	1.70E-04	5.74E-07	*6.88E-04*	0.24454917	0.50705606	0.24756076	0.00083401
	Selenium	0.8212	0.00086667	0.1600	0.07	0.40	0.01302912	0.005261641	0.018290761	0.000772339	2.51333E-05	1.91E-02	3.26E-02	1.32E-02	1.93E-03	6.28E-05	*4.77E-02*	0.68257341	0.27564839	0.0404615	0.00131669
	Silver	0.4802083	0.00028444	0.1550		181.20	0.01262196	0	0.01262196	0.000451636	8.24889E-06	1.31E-02	6.97E-05	0.00E+00	2.49E-06	4.55E-08	*7.22E-05*	0.96484557	0	0.03452387	0.00063056
	Thallium	0.5070831	0.00068333	0.0650		0.07	0.00529308	0	0.00529308	0.000476912	1.98167E-05	5.79E-03	7.15E-02	0.00E+00	6.44E-03	2.68E-04	*7.82E-02*	0.91420643	0	0.08237089	0.00342268
	Vanadium	33.34	0.00217389	0.0000	1.16	11.40	0	0.086505518	0.086505518	0.03135627	6.30428E-05	1.18E-01	0.00E+00	7.59E-03	2.75E-03	5.53E-06	*1.03E-02*	0	0.73356491	0.26590049	0.0005346
	Zinc	166.572	0.01360278	18.1500	6.45	14.50	1.4779908	0.480844915	1.958835715	0.156660966	0.000394481	2.12E+00	1.02E-01	3.32E-02	1.08E-02	2.72E-05	*1.46E-01*	0.69851929	0.22725409	0.07404018	0.00018644

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
	Volatile Organics																				
	2-Butanone	0.38119004	0.0021099			12.10	0	0	0	0.000358509	6.11871E-05	4.20E-04	0.00E+00	0.00E+00	2.96E-05	5.06E-06	*3.47E-05*	0	0	0.85421096	0.14578904
	Acetone	0.33140515	0			1700.00	0	0	0	0.000311687	0	3.12E-04	0.00E+00	0.00E+00	1.83E-07	0.00E+00	*1.83E-07*	0	0	1	0
	cis-1,2-Dichloroethene	0.01237688	0.0009154			3114.00	0	0	0	1.16405E-05	2.65472E-05	3.82E-05	0.00E+00	0.00E+00	3.74E-09	8.53E-09	*1.23E-08*	0	0	0.30482227	0.69517773
	Tetrachloroethene	0.01222225	0.0009154			14.00	0	0	0	1.1495E-05	2.65472E-05	3.80E-05	0.00E+00	0.00E+00	8.21E-07	1.90E-06	*2.72E-06*	0	0	0.3021648	0.6978352
	Trichloroethene	0.0094551	0.0009154			7.00	0	0	0	8.89252E-06	2.65472E-05	3.54E-05	0.00E+00	0.00E+00	1.27E-06	3.79E-06	*5.06E-06*	0	0	0.25091946	0.74908054
	Semivolatile Organics																				
	2-Methylnaphthalene	0.36	0.002456			143.70	0	0	0	0.00033858	7.12251E-05	4.10E-04	0.00E+00	0.00E+00	2.36E-06	4.96E-07	*2.85E-06*	0	0	0.82619764	0.17380236
	Acenaphthylene	0.58151579	0.002456			133.30	0	0	0	0.000546916	7.12251E-05	6.18E-04	0.00E+00	0.00E+00	4.10E-06	5.34E-07	*4.64E-06*	0	0	0.88477528	0.11522472
	Anthracene	0.59026536	0.002456			1000.00	0	0	0	0.000555145	7.12251E-05	6.26E-04	0.00E+00	0.00E+00	5.55E-07	7.12E-08	*6.26E-07*	0	0	0.88628905	0.11371095
	Benzo(a)anthracene	2.26381085	0.002456			1.30	0	0	0	0.002129114	7.12251E-05	2.20E-03	0.00E+00	0.00E+00	1.64E-03	5.48E-05	*1.69E-03*	0	0	0.96762995	0.03237005
	Benzo(a)pyrene	1.97539747	0.002456		0.31	1.30	0	0.023370789	0.023370789	0.001857861	7.12251E-05	2.53E-02	0.00E+00	1.80E-02	1.43E-03	5.48E-05	*1.95E-02*	0	0.92375115	0.07343361	0.00281523
	Benzo(b)fluoranthene	2.23211797	0.002456		0.17	1.30	0	0.012664938	0.012664938	0.002099307	7.12251E-05	1.48E-02	0.00E+00	9.74E-03	1.61E-03	5.48E-05	*1.14E-02*	0	0.85369308	0.14150592	0.004801
	Benzo(g,h,i)perylene	0.90985456	0.002456			133.30	0	0	0	0.000855718	7.12251E-05	9.27E-04	0.00E+00	0.00E+00	6.42E-06	5.34E-07	*6.95E-06*	0	0	0.92316133	0.07683867
	Benzo(k)fluoranthene	2.68497632	0.002456		0.53	1.30	0	0.039843469	0.039843469	0.00252522	7.12251E-05	4.24E-02	0.00E+00	3.06E-02	1.94E-03	5.48E-05	*3.26E-02*	0	0.93882067	0.05950107	0.00167826
	Carbazole	0.45463233	0.0023791			133.30	0	0	0	0.000427582	6.89931E-05	4.97E-04	0.00E+00	0.00E+00	3.21E-06	5.18E-07	*3.73E-06*	0	0	0.86106207	0.13893793
	Chrysene	2.60981751	0.002456		0.30	1.30	0	0.022698966	0.022698966	0.002454533	7.12251E-05	2.52E-02	0.00E+00	1.75E-02	1.89E-03	5.48E-05	*1.94E-02*	0	0.89986973	0.09730665	0.00282362
	Dibenz(a,h)anthracene	0.46192501	0.002456			1.30	0	0	0	0.00043444	7.12251E-05	5.06E-04	0.00E+00	0.00E+00	3.34E-04	5.48E-05	*3.89E-04*	0	0	0.85914586	0.14085414
	Dibenzofuran	0.62915054	0.002456			133.30	0	0	0	0.000591716	7.12251E-05	6.63E-04	0.00E+00	0.00E+00	4.44E-06	5.34E-07	*4.97E-06*	0	0	0.89256197	0.10743803
	Fluoranthene	4.0029073	0.002456		0.19	125.00	0	0.014101743	0.014101743	0.003764734	7.12251E-05	1.79E-02	0.00E+00	1.13E-04	3.01E-05	5.70E-07	*1.44E-04*	0	0.78615102	0.20987829	0.00397069
	Fluorene	0.92045863	0.002456			125.00	0	0	0	0.000865691	7.12251E-05	9.37E-04	0.00E+00	0.00E+00	6.93E-06	5.70E-07	*7.50E-06*	0	0	0.92397925	0.07602075
	Indeno(1,2,3-cd)pyrene	1.34828341	0.002456		0.57	1.30	0	0.042328324	0.042328324	0.001268061	7.12251E-05	4.37E-02	0.00E+00	3.26E-02	9.75E-04	5.48E-05	*3.36E-02*	0	0.96933	0.02903893	0.00163107
	Naphthalene	0.52	0.0028865			140.00	0	0	0	0.00048906	8.37086E-05	5.73E-04	0.00E+00	0.00E+00	3.49E-06	5.98E-07	*4.09E-06*	0	0	0.8538527	0.1461473
	N-nitrosodiphenylamine	0.63954259	0.002456			150.00	0	0	0	0.00060149	7.12251E-05	6.73E-04	0.00E+00	0.00E+00	4.01E-06	4.75E-07	*4.48E-06*	0	0	0.89412292	0.10587708
	Phenanthrene	2.3467091	0.002456		0.63	133.30	0	0.047097907	0.047097907	0.00220708	7.12251E-05	4.94E-02	0.00E+00	3.53E-04	1.66E-05	5.34E-07	*3.70E-04*	0	0.95385825	0.04469926	0.0014425
	Pyrene	3.09754534	0.002456		0.19	133.30	0	0.014152144	0.014152144	0.002913241	7.12251E-05	1.71E-02	0.00E+00	1.06E-04	2.19E-05	5.34E-07	*1.29E-04*	0	0.82584266	0.17000103	0.00415631
	Pesticides and PCBs																				
	4,4'-DDD	0.10931709	9.643E-05	0.0009	5.65E-03	8.50	7.6546E-05	0.00042112	0.000497667	0.000102813	2.79639E-06	6.03E-04	9.01E-06	4.95E-05	1.21E-05	3.29E-07	*7.10E-05*	0.12688408	0.69805645	0.17042411	0.00463535
	4,4-DDE	0.05527869	9.643E-05	0.0053	2.40E-03	1.90	0.00043159	0.000178984	0.000610574	5.19896E-05	2.79639E-06	6.65E-04	2.27E-04	9.42E-05	2.74E-05	1.47E-06	*3.50E-04*	0.64865577	0.26900384	0.07813756	0.00420283
	4,4'-DDT	0.03883679	9.643E-05	0.0000	6.24E-03	0.00	0	0.00046512	0.00046512	3.6526E-05	2.79639E-06	5.04E-04	0.00E+00	1.66E-01	1.30E-02	9.99E-04	*1.80E-01*	0	0.92204774	0.07240872	0.00554354
	Aldrin	0.0016	2.789E-05	0.0000		0.20	0	0	0	1.5048E-06	8.08685E-07	2.31E-06	0.00E+00	0.00E+00	7.52E-06	4.04E-06	*1.16E-05*	0	0	0.6504472	0.3495528
	alpha-Chlordane	0.00619929	2.789E-05	0.0000	6.34E-04	2.14	0	4.731E-05	4.731E-05	5.83043E-06	8.08685E-07	5.39E-05	0.00E+00	2.21E-05	2.72E-06	3.78E-07	*2.52E-05*	0	0.87693753	0.1080727	0.01498977
	Aroclor 1248	0.11035616	0.0009873	0.0000		0.98	0	0	0	0.00010379	2.86321E-05	1.32E-04	0.00E+00	0.00E+00	1.06E-04	2.92E-05	*1.35E-04*	0	0	0.78378165	0.21621835
	Aroclor 1254	0.17356494	0.0009873	0.0000		1.50	0	0	0	0.000163238	2.86321E-05	1.92E-04	0.00E+00	0.00E+00	1.09E-04	1.91E-05	*1.28E-04*	0	0	0.85077349	0.14922651
	Aroclor 1260	0.19298076	0.0009873	0.0052	1.21E-02	0.35	0.00042345	0.000898732	0.001322178	0.000181498	2.86321E-05	1.53E-03	1.23E-03	2.61E-03	5.26E-04	8.30E-05	*4.44E-03*	0.27634537	0.58652138	0.11844768	0.01868558
	beta-BHC	0.00075	2.789E-05	0.0000		4.00	0	0	0	7.05375E-07	8.08685E-07	1.51E-06	0.00E+00	0.00E+00	1.76E-07	2.02E-07	*3.79E-07*	0	0	0.46588304	0.53411696
	delta-BHC	0.00874384	2.789E-05	0.0000		1.60	0	0	0	8.22359E-06	8.08685E-07	9.03E-06	0.00E+00	0.00E+00	5.14E-06	5.05E-07	*5.65E-06*	0	0	0.91046712	0.08953288
	Endosulfan I	0.01719876	2.789E-05	0.0000	2.83E-03	10.00	0	0.000211042	0.000211042	1.61754E-05	8.08685E-07	2.28E-04	0.00E+00	2.11E-05	1.62E-06	8.09E-08	*2.28E-05*	0	0.92551692	0.07093663	0.00354645
	Endosulfan Sulfate	0.00854661	9.643E-05	0.0000		10.00	0	0	0	8.03808E-06	2.79639E-06	1.08E-05	0.00E+00	0.00E+00	8.04E-07	2.80E-07	*1.08E-06*	0	0	0.74189856	0.25810144
	Endrin Aldehyde	0.0059	9.643E-05	0.0000	1.81E-03	0.30	0	0.000135205	0.000135205	5.54895E-06	2.79639E-06	1.44E-04	0.00E+00	4.51E-04	1.85E-05	9.32E-06	*4.79E-04*	0	0.94186475	0.03865503	0.01948021
	gamma-Chlordane	0.0046	0.0000017	0.0000	4.42E-04	2.14	0	3.29247E-05	3.29247E-05	4.3263E-06	4.93E-08	3.73E-05	0.00E+00	1.54E-05	2.02E-06	2.30E-08	*1.74E-05*	0	0.88269265	0.11598564	0.0013217
	Inorganics																				
	Aluminum	9110.90995	1.3653908	10.1000	1.52E+02	109.70	0.8224632	11.30838794	12.13085114	8.568810811	0.039596334	2.07E+01	7.50E-03	1.03E-01	7.81E-02	3.61E-04	*1.89E-01*	0.03965731	0.54526482	0.41316862	0.00190925
	Antimony	1.3114162	0.0187145	0.0000		0.13	0	0	0	0.001233387	0.000542721	1.78E-03	0.00E+00	0.00E+00	9.87E-03	4.34E-03	*1.42E-02*	0	0	0.69443239	0.30556761
	Arsenic	25.0757871	0.0071334	0.0000	1.32	5.14	0	0.098554713	0.098554713	0.023583778	0.000206869	1.22E-01	0.00E+00	1.92E-02	4.59E-03	4.02E-05	*2.38E-02*	0	0.80554516	0.19276397	0.00169086
	Barium	67.2340431	0.0386255	18.3000	6.56	208.00	1.4902056	0.488865056	1.979070656	0.063233617	0.00112014	2.04E+00	7.16E-03	2.35E-03	3.04E-04	5.39E-06	*9.82E-03*	0.72926877	0.23923814	0.03094493	0.00054817
	Beryllium	0.62626426	9.98E-05	0.0000		0.66	0	0	0	0.000589002	2.8942E-06	5.92E-04	0.00E+00	0.00E+00	8.92E-04	4.39E-06	*8.97E-04*	0	0	0.99511028	0.00488972
	Cadmium	1.99980141	0.000463	0.0900	0.21	1.45	0.00732888	0.015974633	0.023303513	0.001880813	1.34275E-05	2.52E-02	5.05E-03	1.10E-02	1.30E-03	9.26E-06	*1.74E-02*	0.2908545	0.63397052	0.0746421	0.00053289
	Chromium	370.017342	0.00088	0.1800	6.91	1.00	0.01465776	0.515616649	0.530274409	0.348001311	0.00002552	8.78E-01	1.47E-02	5.16E-01	3.48E-01	2.55E-05	*8.78E-01*	0.01668876	0.58706128	0.3962209	2.9056E-05
	Cobalt	10.2255156	0.0071	0.4400	0.91	5.00	0.03583008	0.067722337	0.103552417	0.009617097	0.0002059	1.13E-01	7.17E-03	1.35E-02	1.92E-03	4.12E-05	*2.27E-02*	0.31603042	0.59732824	0.08482525	0.00181609
	Copper	91.2696188	0.0053098	21.0000	4.62	47.00	1.710072	0.344696026	2.054768026	0.085839076	0.000153983	2.14E+00	3.64E-02	7.33E-03	1.83E-03	3.28E-06	*4.55E-02*	0.79881497	0.16101564	0.04009746	7.1929E-05
	Cyanide	0.4516316	0	0.0000		68.70	0	0	0	0.00042476	0	4.25E-04	0.00E+00	0.00E+00	6.18E-06	0.00E+00	*6.18E-06*	0	0	1	0
X	Iron	20053.6171	5.9620954	78.0000	1660.03	3.19	6.351696	123.7854416	130.1371376	18.86042687	0.172900765	1.49E+02	1.99E+00	3.88E+01	5.91E+00	5.42E-02	*4.68E+01*	0.04258012	0.8298254	0.1264354	0.00115908
X	Lead	296.685259	0.0179906	0.0000	27.06	1.13	0	2.017527915	2.017527915	0.279032486	0.000521728	2.30E+00	0.00E+00	1.79E+00	2.47E-01	4.62E-04	*2.03E+00*	0	0.8783003	0.12147258	0.00022713
	Manganese	678.709865	0.8506434	108.0000	382.73	977.00	8.794656	28.53945175	37.33410775	0.638326628	0.024668658	3.80E+01	9.00E-03	2.92E-02	6.53E-04	2.52E-05	*3.89E-02*	0.23145596	0.75109546	0.01679935	0.00064922
	Mercury	0.32304843	0.0001171	0.0000	0.01	0.01	0	0.000843837	0.000843837	0.000303827	3.39735E-06	1.15E-03	0.00E+00	1.32E-01	4.75E-02	5.31E-04	*1.80E-01*	0	0.7330948	0.26395371	0.00295149
	Nickel	16.7202774	0.0026906	0.0000	0.43	77.40	0	0.032208941	0.032208941	0.015725421	0.000847722	4.88E-02	0.00E+00	4.16E-04	2.03E-04	1.10E-05	*6.30E-04*	0	0.66026169	0.32236058	0.01737772
	Selenium	1.5395849	0.0009831	0.2400	0.13	0.40	0.01954368	0.009864518	0.029408198	0.00144798	2.85104E-05	3.09E-02	4.89E-02	2.47E-02	3.62E-03	7.13E-05	*7.72E-02*	0.63279512	0.31939834	0.04688341	0.00092312
	Silver	1.10917445	0.0003579	0.2100		181.20	0.01710072	0	0.01710072	0.001043179	1.03779E-05	1.82E-02	9.44E-05	0.00E+00	5.76E-06	5.73E-08	*1.00E-04*	0.94196648	0	0.05746186	0.00057165
	Thallium	0.66297503	0.000711	0.0000		0.07	0	0	0	0.000623528	2.06187E-05	6.44E-04	0.00E+00	0.00E+00	8.43E-03	2.79E-04	*8.70E-03*	0	0	0.96799066	0.03200934
	Vanadium	44.6154381	0.0049744	0.0000	1.55	11.40	0	0.115761295	0.115761295	0.04196082	0.000144257	1.58E-01	0.00E+00	1.02E-02	3.68E-03	1.27E-05	*1.38E-02*	0	0.7332866	0.26579961	0.00091379
	Zinc	240.350102	0.0292318	18.3000	9.30	14.50	1.4902056	0.693820838	2.184026438	0.226049271	0.000847722	2.41E+00	1.03E-01	4.78E-02	1.56E-02	5.85E-05	*1.66E-01*	0.61810574	0.2877822	0.09376045	0.00035162

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0.1075	0.0025	0.097091709	26.5937491	0.018292078	0.00132763	0.00055	2.02E-02	6.88E-04	4.99E-05	2.07E-05	*0.00*	0.90690864	0.06582273	0.02726862
	Acetone	0.342	0.0025	0.302663316	3736.31185	0.057021769	0.0042237	0.00055	6.18E-02	1.53E-05	1.13E-06	1.47E-07	*0.00*	0.92275	0.06834967	0.00890033
	cis-1,2-Dichloroethene	0	0.00058333	0	6844.04418	0	0	0.00012833	0.00E+00	0.00E+00	0.00E+00	1.88E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005	0	17	0	0	0.00011	0.00E+00	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0005	0	8.32444981	0	0	0.00011	0.00E+00	0.00E+00	0.00E+00	1.32E-05	*0.00*	0	0	1
	Semivolatile Organics															
	2-Methylnaphthalene	0	0.0025	0	170.89	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.22E-06	*0.00*	0	0	1
	Acenaphthylene	0	0.0025	0	158.52	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Anthracene	0	0.0025	0	1189.21	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	4.62E-07	*0.00*	0	0	1
	Benzo(a)anthracene	1.05	0.0025	1.168350044	1.55	0.220117148	0.0129675	0.00055	2.34E-01	1.42E-01	8.39E-03	3.56E-04	*0.15*	0.94214257	0.05550333	0.0023541
	Benzo(a)pyrene	0.965	0.0025	1.089434172	1.55	0.205249398	0.01191775	0.00055	2.18E-01	1.33E-01	7.71E-03	3.56E-04	*0.14*	0.94273418	0.0547396	0.00252621
	Benzo(b)fluoranthene	2.77166667	0.0025	3.202172171	1.55	0.603289237	0.03423008	0.00055	6.38E-01	3.90E-01	2.21E-02	3.56E-04	*0.41*	0.94549169	0.05364634	0.00086198
	Benzo(g,h,i)perylene	0	0.0025	0	158.52	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Benzo(k)fluoranthene	0	0.0025	0	1.55	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	1.45	0.0025	1.613435775	1.55	0.3039713	0.0179075	0.00055	3.22E-01	1.97E-01	1.16E-02	3.56E-04	*0.21*	0.9427548	0.05553939	0.0017058
	Dibenz(a,h)anthracene	0	0.0025	0	1.55	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenzofuran	0	0.0025	0	158.52	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	2.22333333	0.0025	2.446967827	148.65	0.461008739	0.02745817	0.00055	4.89E-01	3.10E-03	1.85E-04	3.70E-06	*0.00*	0.94272557	0.05614973	0.00112471
	Fluorene	0	0.0025	0	148.65	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Indeno(1,2,3-cd)pyrene	0.83	0.0025	1.00071814	1.55	0.188535298	0.0102505	0.00055	1.99E-01	1.22E-01	6.63E-03	3.56E-04	*0.13*	0.94581756	0.05142328	0.00275916
	Naphthalene	0	0.0025	0	166.49	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.30E-06	*0.00*	0	0	1
	N-nitrosodiphenylamine	0	0.0025	0	329.67	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0.77	0.0025	0.819076386	158.52	0.154313991	0.0095095	0.00055	1.64E-01	9.73E-04	6.00E-05	3.47E-06	*0.00*	0.93880096	0.057853	0.00334604
	Pyrene	1.95	0.0025	2.133576855	158.52	0.401965879	0.0240825	0.00055	4.27E-01	2.54E-03	1.52E-04	3.47E-06	*0.00*	0.94225834	0.05645239	0.00128927
	Pesticides and PCBs															
	4,4'-DDD	0.024	0.00005	0.027105344	18.68	0.005106647	0.0002964	0.000011	5.41E-03	2.73E-04	1.59E-05	5.89E-07	*0.00*	0.94322177	0.05474648	0.00203175
	4,4'-DDE	0.025	0.00005	0.027905107	2.26	0.005257322	0.00030875	0.000011	5.58E-03	2.33E-03	1.37E-04	4.87E-06	*0.00*	0.94266705	0.05536059	0.00197236
	4,4'-DDT	0	0.00005	0	1.76	0	0	0.000011	0.00E+00	0.00E+00	0.00E+00	6.26E-06	*0.00*	0	0	1
	Aldrin	0	0.000025	0	0.44	0	0	0.0000055	0.00E+00	0.00E+00	0.00E+00	1.25E-05	*0.00*	0	0	1
	alpha-Chlordane	0.03516667	2.1729E-05	0.040233229	5.45	0.00757994	0.00043431	4.7803E-06	8.02E-03	1.39E-03	7.97E-05	8.78E-07	*0.00*	0.94524416	0.05415972	0.00059612
	Aroclor 1248	0	0.0005	0	1.55	0	0	0.00011	0.00E+00	0.00E+00	0.00E+00	7.12E-05	*0.00*	0	0	1
	Aroclor 1254	0	0.0005	0	0.08	0	0	0.00011	0.00E+00	0.00E+00	0.00E+00	1.36E-03	*0.00*	0	0	1
	Aroclor 1260	0	0.0005	0	0.76	0	0	0.00011	0.00E+00	0.00E+00	0.00E+00	1.45E-04	*0.00*	0	0	1
	beta-BHC	0	0.000025	0	8.79	0	0	0.0000055	0.00E+00	0.00E+00	0.00E+00	6.26E-07	*0.00*	0	0	1
	delta-BHC	0	0.000025	0	3.52	0	0	0.0000055	0.00E+00	0.00E+00	0.00E+00	1.56E-06	*0.00*	0	0	1
	Endosulfan I	0.04	0.000025	0.041954029	3.30	0.007904139	0.000494	0.0000055	8.40E-03	2.40E-03	1.50E-04	1.67E-06	*0.00*	0.94056146	0.05878406	0.00065448
	Endosulfan Sulfate	0	0.00005	0	3.30	0	0	0.000011	0.00E+00	0.00E+00	0.00E+00	3.34E-06	*0.00*	0	0	1
	Endrin Aldehyde	0	0.00005	0	0.11	0	0	0.000011	0.00E+00	0.00E+00	0.00E+00	1.01E-04	*0.00*	0	0	1
	gamma-Chlordane	0.0119	2.1629E-05	0.013614467	5.45	0.002564966	0.00014697	4.7583E-06	2.72E-03	4.71E-04	2.70E-05	8.74E-07	*0.00*	0.94415139	0.0540971	0.0017515
	Inorganics															
X	Aluminum	24983.3333	0.38611429	1348.306878	58.2711486	254.0210159	308.544167	0.08494514	5.63E+02	4.36E+00	5.29E+00	1.46E-03	*9.66*	0.45147242	0.5483766	0.00015097
	Antimony	4.55	0.00069286	0.361111111	0.14865089	0.068033333	0.0561925	0.00015243	1.24E-01	4.58E-01	3.78E-01	1.03E-03	*0.84*	0.54698733	0.45178715	0.00122552
X	Arsenic	298.833333	0.02458571	2.143778354	0.1498401	0.403887842	1.88220175	0.00540886	2.29E+00	2.70E+00	1.26E+01	3.61E-02	*15.29*	0.17625491	0.82138469	0.0023604
	Barium	106.75	0.03734286	6.1	11.8350385	1.14924	1.3183625	0.00821543	2.48E+00	9.71E-02	1.11E-01	6.94E-04	*0.21*	0.46418599	0.53249574	0.00331827
	Beryllium	1.7833333	6.3786E-05	0.141534389	1.45056813	0.026665079	0.02202417	1.4033E-05	4.87E-02	1.84E-02	1.52E-02	9.67E-06	*0.03*	0.5475007	0.45221117	0.00028813
X	Cadmium	16.3166667	0.00043	12.10040656	2.12000967	2.279716595	0.20151083	0.0000946	2.48E+00	1.08E+00	9.51E-02	4.46E-05	*1.17*	0.9187508	0.08121108	3.8125E-05
X	Chromium	1586.66667	0.02578571	1.158007866	19.7804745	0.218168682	19.5953333	0.00567286	1.98E+01	1.10E-02	9.91E-01	2.87E-04	*1.00*	0.01100796	0.98870581	0.00028623
	Cobalt	37.8666667	0.00146857	3.005291008	10.99	0.566196826	0.46765333	0.00032309	1.03E+00	5.15E-02	4.26E-02	2.94E-05	*0.09*	0.5474874	0.45220019	0.00031241
	Copper	997.666667	0.02154286	5.246079333	33.43	0.988361346	12.3211833	0.00473943	1.33E+01	2.96E-02	3.69E-01	1.42E-04	*0.40*	0.07423316	0.92541088	0.00035597
	Cyanide	0	0.0025	0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	34266.6667	2.401	2066.878307	7.01	389.399873	423.193333	0.52822	8.13E+02	5.55E+01	6.04E+01	7.53E-02	*115.98*	0.47889511	0.52045527	0.00064962
	Lead	876.5	0.01307286	30.25408547	17.582644	5.699869702	10.824775	0.00287603	1.65E+01	3.24E-01	6.16E-01	1.64E-04	*0.94*	0.34487143	0.65495456	0.00017401
	Manganese	735.166667	0.46971429	6.370746416	193.41	1.200248625	9.07930833	0.10333714	1.04E+01	6.21E-03	4.69E-02	5.34E-04	*0.05*	0.11559866	0.87444871	0.00995263
	Mercury	2.3	0.00020393	0.088366146	0.07033058	0.016648182	0.028405	4.4864E-05	4.51E-02	2.37E-01	4.04E-01	6.38E-04	*0.64*	0.36915528	0.6298499	0.00099482
	Nickel	47.65	0.00284286	2.297544295	87.9132201	0.432857345	0.5884775	0.00062543	1.02E+00	4.92E-03	6.69E-03	7.11E-06	*0.01*	0.42355594	0.57583207	0.00061199
	Selenium	8.3333333	0.00085714	0.696702715	0.4395661	0.131258792	0.10291667	0.00018857	2.34E-01	2.99E-01	2.34E-01	4.29E-04	*0.53*	0.56006373	0.43913166	0.00080461
	Silver	1.6	0.00025	0.126984127	398.246887	0.02392381	0.01976	0.000055	4.37E-02	6.01E-05	4.96E-05	1.38E-07	*0.00*	0.54696984	0.4517727	0.00125746
	Thallium	4.4	0.00077857	0.349206349	0.1643547	0.065790476	0.05434	0.00017129	1.20E-01	4.00E-01	3.31E-01	1.04E-03	*0.73*	0.54687874	0.45169746	0.0014238
X	Vanadium	90.2666667	0.00187893	7.164021167	0.42848914	1.349701588	1.11479333	0.00041336	2.46E+00	3.15E+00	2.60E+00	9.65E-04	*5.75*	0.54756666	0.45226564	0.0001677
	Zinc	2840	0.12778571	184.2994266	351.65288	34.72201197	35.074	0.02811286	6.98E+01	9.87E-02	9.97E-02	7.99E-05	*0.20*	0.49727816	0.50231922	0.00040262

Table E.1-58. Average Exposure Calculations for Shrew - Station 21

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)				C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																		
	2-Butanone	0	0.0025				0	26.59374907	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025				0	3736.311853	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0.038	0.000583333				0.031183704	6844.044183	0.00587501	0.0004693	0.000128333	6.47E-03	8.58E-07	6.86E-08	1.88E-08	*0.00*	0.907667809	0.072505156	0.019827036
	Tetrachloroethene	0.0375	0.0005				0.031764745	17	0.005984478	0.000463125	0.00011	6.56E-03	3.59E-04	2.78E-05	6.61E-06	*0.00*	0.912601448	0.07062413	0.016774422
	Trichloroethene	0.019	0.0005				0.016119357	8.324449805	0.003036887	0.00023465	0.00011	3.38E-03	3.65E-04	2.82E-05	1.32E-05	*0.00*	0.898078885	0.069391527	0.032529588
	Semivolatile Organics																		
	2-Methylnaphthalene	0.14	0.0025				0.12424306	170.89	0.023407392	0.001729	0.00055	2.57E-02	1.37E-04	1.01E-05	3.22E-06	*0.00*	0.91127598	0.067311905	0.021412115
	Acenaphthylene	0.038	0.0025				0.03400147	158.52	0.006405877	0.0004693	0.00055	7.43E-03	4.04E-05	2.96E-06	3.47E-06	*0.00*	0.862723812	0.06320388	0.074072308
	Anthracene	0.42	0.0025				0.381437505	1189.21	0.071862826	0.005187	0.00055	7.76E-02	6.04E-05	4.36E-06	4.62E-07	*0.00*	0.926069422	0.066842934	0.007087645
	Benzo(a)anthracene	0.39	0.0025				0.370645481	1.55	0.069829609	0.0048165	0.00055	7.52E-02	4.52E-02	3.12E-03	3.56E-04	*0.05*	0.928633275	0.064052517	0.007314208
	Benzo(a)pyrene	0.89	0.0025				0.858171542	1.55	0.161679519	0.0109915	0.00055	1.73E-01	1.05E-01	7.11E-03	3.56E-04	*0.11*	0.93337125	0.063453616	0.003175134
	Benzo(b)fluoranthene	1.606666667	0.0025				1.585403766	1.55	0.29869007	0.019842333	0.00055	3.19E-01	1.93E-01	1.28E-02	3.56E-04	*0.21*	0.936090699	0.062185608	0.001723693
	Benzo(g,h,i)perylene	0.71	0.0025				0.718939675	158.52	0.135448235	0.0087685	0.00055	1.45E-01	8.54E-04	5.53E-05	3.47E-06	*0.00*	0.935630931	0.060569854	0.003799215
	Benzo(k)fluoranthene	0.0335	0.0025				0.033407879	1.55	0.006294044	0.000413725	0.00055	7.26E-03	4.07E-03	2.68E-04	3.56E-04	*0.00*	0.867214713	0.057004428	0.075780858
	Carbazole	0	0				na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	#DIV/0!	0
	Chrysene	0.94	0.0025				0.893350646	1.55	0.168307262	0.011609	0.00055	1.80E-01	1.09E-01	7.51E-03	3.56E-04	*0.12*	0.932624526	0.064327813	0.003047661
	Dibenz(a,h)anthracene	0.24	0.0025				0.231326477	1.55	0.043581908	0.002964	0.00055	4.71E-02	2.82E-02	1.92E-03	3.56E-04	*0.03*	0.925386299	0.062935404	0.011678297
	Dibenzofuran	0	0.0025				0	158.52	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	1.623333333	0.0025				1.525955288	148.65	0.287489976	0.020048167	0.00055	3.08E-01	1.93E-03	1.35E-04	3.70E-06	*0.00*	0.933141969	0.065072828	0.001785203
	Fluorene	0.24	0.0025				0.215672784	148.65	0.040632752	0.002964	0.00055	4.41E-02	2.73E-04	1.99E-05	3.70E-06	*0.00*	0.920401846	0.067139706	0.012458448
	Indeno(1,2,3-cd)pyrene	0.62	0.0025				0.638463084	1.55	0.120286445	0.007657	0.00055	1.28E-01	7.78E-02	4.95E-03	3.56E-04	*0.08*	0.936129038	0.059590588	0.004280374
	Naphthalene	1.9	0.0025				1.654122629	166.49	0.311636703	0.023465	0.00055	3.36E-01	1.87E-03	1.41E-04	3.30E-06	*0.00*	0.92845262	0.069908777	0.001638603
	N-nitrosodiphenylamine	0	0.0025				0	329.67	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0.6	0.0025				0.545124062	158.52	0.102701373	0.00741	0.00055	1.11E-01	6.48E-04	4.67E-05	3.47E-06	*0.00*	0.928068849	0.066961034	0.004970117
	Pyrene	1.44	0.0025				1.345694862	158.52	0.253528912	0.017784	0.00055	2.72E-01	1.60E-03	1.12E-04	3.47E-06	*0.00*	0.932561599	0.065415322	0.002023078
	Pesticides and PCBs																		
	4,4'-DDD	0.03	0.00005				0.028938456	18.68	0.005452005	0.0003705	0.000011	5.83E-03	2.92E-04	1.98E-05	5.89E-07	*0.00*	0.934601926	0.063512415	0.001885659
	4,4'-DDE	0.031	0.00005				0.029553968	2.26	0.005567968	0.00038285	0.000011	5.96E-03	2.46E-03	1.69E-04	4.87E-06	*0.00*	0.933937931	0.064216994	0.001845075
	4,4'-DDT	0.0044	0.00005				0.004277665	1.76	0.000805912	0.00005434	0.000011	8.71E-04	4.58E-04	3.09E-05	6.26E-06	*0.00*	0.925004485	0.062370007	0.012625508
	Aldrin	0.0008	0.000025				0.000787253	0.44	0.000148318	0.00000988	0.0000055	1.64E-04	3.37E-04	2.25E-05	1.25E-05	*0.00*	0.906046721	0.060354902	0.033598377
	alpha-Chlordane	0.050333333	2.17286E-05				0.049183541	5.45	0.009266179	0.000621617	4.78029E-06	9.89E-03	1.70E-03	1.14E-04	8.78E-07	*0.00*	0.936680097	0.062836683	0.00048322
	Aroclor 1248	0.24	0.0005				0.233418538	1.55	0.043976052	0.002964	0.00011	4.71E-02	2.84E-02	1.92E-03	7.12E-05	*0.03*	0.934665323	0.062996742	0.002337936
	Aroclor 1254	0.0016	0.0005				0.001574505	0.08	0.000296637	0.00001976	0.00011	4.26E-04	3.67E-03	2.44E-04	1.36E-03	*0.01*	0.695682498	0.046341814	0.257975688
	Aroclor 1260	0.42	0.0005				0.418189758	0.76	0.07878695	0.005187	0.00011	8.41E-02	1.04E-01	6.84E-03	1.45E-04	*0.11*	0.937003436	0.061688348	0.001308216
	beta-BHC	0.0008	0.000025				0.000708572	8.79	0.000133495	0.00000988	0.0000055	1.49E-04	1.52E-05	1.12E-06	6.26E-07	*0.00*	0.896691853	0.066364401	0.036943746
	delta-BHC	0.0018	0.000025				0.001615015	3.52	0.000304269	0.00002223	0.0000055	3.32E-04	8.65E-05	6.32E-06	1.56E-06	*0.00*	0.916475617	0.066958061	0.016566322
	Endosulfan I	0.03545	0.000025				0.031757064	3.30	0.005983031	0.000437808	0.0000055	6.43E-03	1.81E-03	1.33E-04	1.67E-06	*0.00*	0.931017093	0.068127054	0.000855853
	Endosulfan Sulfate	0.0016	0.00005				0.001408848	3.30	0.000265427	0.00001976	0.00011	2.96E-04	8.05E-05	5.99E-06	3.34E-06	*0.00*	0.896146666	0.066714625	0.037138708
	Endrin Aldehyde	0.009	0.00005				0.00855001	0.11	0.001610822	0.00011115	0.00011	1.73E-03	1.47E-02	1.02E-03	1.01E-04	*0.02*	0.929514146	0.064138376	0.006347478
	gamma-Chlordane	0.033	2.16286E-05				0.032246163	5.45	0.006075177	0.00040755	4.75829E-06	6.49E-03	1.12E-03	7.48E-05	8.74E-07	*0.00*	0.936445592	0.062820951	0.000733457
	Inorganics																		
X	Aluminum	13647.5	0.386114286				736.531746	58.27114864	138.762581	168.546625	0.084945143	3.07E+02	2.38E+00	2.89E+00	1.46E-03	*5.28*	0.451415814	0.548307846	0.000276339
	Antimony	2	0.000692857				0.158730159	0.148650889	0.029904762	0.0247	0.000152429	5.48E-02	2.01E-01	1.66E-01	1.03E-03	*0.37*	0.546133972	0.451082311	0.002783718
X	Arsenic	175.25	0.024585714				1.470786207	0.149840096	0.277096121	1.103812125	0.005408857	1.39E+00	1.85E+00	7.37E+00	3.61E-02	*9.25*	0.199879321	0.796219077	0.003901602
	Barium	127.575	0.037342857				7.29	11.83503851	1.373436	1.57555125	0.008215429	2.96E+00	1.16E-01	1.33E-01	6.94E-04	*0.25*	0.464437561	0.532784331	0.002778108
	Beryllium	0.9	6.37857E-05				0.071428571	1.450568131	0.013457143	0.011115	1.40329E-05	2.46E-02	9.28E-03	7.66E-03	9.67E-06	*0.02*	0.547345916	0.452083322	0.000570762
X	Cadmium	17.675	0.00043				12.89462469	2.120009672	2.429347292	0.21828625	0.0000946	2.65E+00	1.15E+00	1.03E-01	4.46E-05	*1.25*	0.917521423	0.082442848	3.57287E-05
X	Chromium	2399.75	0.025785714				1.126348874	19.78047452	0.212204128	29.6369125	0.005672857	2.99E+01	1.07E-02	1.50E+00	2.87E-04	*1.51*	0.007107876	0.992702109	0.000190015
	Cobalt	23.125	0.00146857				1.83531746	10.99	0.345777381	0.28559375	0.000323085	6.32E-01	3.15E-02	2.60E-02	2.94E-05	*0.06*	0.547378392	0.452110146	0.000511461
	Copper	457	0.021542857				4.268945099	33.43	0.804269257	5.64395	0.004739429	6.45E+00	2.41E-02	1.69E-01	1.42E-04	*0.19*	0.124635736	0.874629806	0.000734458
	Cyanide	0	0.0025				0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	21950	2.401				1323.968254	7.01	249.4356619	271.0825	0.52822	5.21E+02	3.56E+01	3.87E+01	7.53E-02	*74.32*	0.478720606	0.520265626	0.001013768
	Lead	526.75	0.013072856				20.05940739	17.58264402	3.779192353	6.5053625	0.002876028	1.03E+01	2.15E-01	3.70E-01	1.64E-04	*0.59*	0.36736017	0.632360263	0.000279567
	Manganese	207.75	0.469714286				2.690779969	193.41	0.506942946	2.5657125	0.103337143	3.18E+00	2.62E-03	1.33E-02	5.34E-04	*0.02*	0.159617169	0.807845871	0.03253696
X	Mercury	9.5375	0.000203929				0.104514201	0.070330576	0.019690475	0.117788125	4.48643E-05	1.38E-01	2.80E-01	1.67E+00	6.38E-04	*1.96*	0.143179024	0.856494746	0.00032623
	Nickel	32.7	0.002842857				2.533832091	87.91322008	0.477373966	0.403845	0.000625429	8.82E-01	5.43E-03	4.59E-03	7.11E-06	*0.01*	0.541335829	0.457954944	0.000709228
	Selenium	3.2333333	0.000857143				0.348065645	0.4395661	0.065575567	0.039931666	0.000188571	1.06E-01	1.49E-01	9.08E-02	4.29E-04	*0.24*	0.620417881	0.377798023	0.001784096
	Silver	0.3	0.00025				0.023809524	398.246887	0.004485714	0.003705	0.000055	8.25E-03	1.13E-05	9.30E-06	1.38E-07	*0.00*	0.544005544	0.449324324	0.006670132
	Thallium	0.22	0.000778571				0.017460317	0.164354697	0.003289524	0.002717	0.000171286	6.18E-03	2.00E-02	1.65E-02	1.04E-03	*0.04*	0.53247414	0.439799899	0.027725961
X	Vanadium	53.625	0.001878929				4.255952381	0.428489138	0.801821429	0.66226875	0.000413364	1.46E+00	1.87E+00	1.55E+00	9.65E-04	*3.42*	0.547503919	0.452213826	0.000282256
	Zinc	3562.5	0.127785714				198.523154	351.6528803	37.40176222	43.996875	0.028112857	8.14E+01	1.06E-01	1.25E-01	7.99E-05	*0.23*	0.459330161	0.540324586	0.000345253

Table E.1-59. Average Exposure Calculations for Shrew - Station 22-TT22

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)					C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																			
	2-Butanone	0.013	0.0025					0.007481433	26.59374907	0.001409502	0.00016055	0.00055	2.12E-03	5.30E-05	6.04E-06	2.07E-05	*0.00*	0.664843108	0.075729279	0.259427613
	Acetone	1.2065	0.0025					0.680344278	3736.311853	0.128176862	0.014900275	0.00055	1.44E-01	3.43E-05	3.99E-06	1.47E-07	*0.00*	0.892427884	0.103742756	0.00382936
	cis-1,2-Dichloroethene	0.073	0.000583333					0.044691432	6844.044183	0.008419866	0.00090155	0.000128333	9.45E-03	1.23E-06	1.32E-07	1.88E-08	*0.00*	0.891014744	0.095404649	0.013580607
	Tetrachloroethene	1.131	0.0005					0.714716841	17	0.134652653	0.01396785	0.00011	1.49E-01	8.09E-03	8.39E-04	6.61E-06	*0.01*	0.905346585	0.093913822	0.000739593
	Trichloroethene	0.25925	0.0005					0.164085489	8.324449805	0.030913706	0.003201738	0.00011	3.42E-02	3.71E-03	3.85E-04	1.32E-05	*0.00*	0.903237558	0.093548459	0.003213983
	Semivolatile Organics																			
	2-Methylnaphthalene	0.239333333	0.0025					0.158454508	170.89	0.029852829	0.002955767	0.00055	3.34E-02	1.75E-04	1.73E-05	3.22E-06	*0.00*	0.894906648	0.088605847	0.016487504
	Acenaphthylene	0.239	0.0025					0.159539899	158.52	0.030057317	0.00295165	0.00055	3.36E-02	1.90E-04	1.86E-05	3.47E-06	*0.00*	0.8956568	0.087954138	0.016389062
	Anthracene	0.250333333	0.0025					0.169609468	1189.21	0.031954424	0.003091617	0.00055	3.56E-02	2.69E-05	2.60E-06	4.62E-07	*0.00*	0.897696019	0.086852825	0.015451157
	Benzo(a)anthracene	0.335	0.0025					0.23751783	1.55	0.044748359	0.00413725	0.00055	4.94E-02	2.89E-02	2.68E-03	3.56E-04	*0.03*	0.905184743	0.083689674	0.011125584
	Benzo(a)pyrene	0.3175	0.0025					0.228394236	1.55	0.043029474	0.003921125	0.00055	4.75E-02	2.78E-02	2.54E-03	3.56E-04	*0.03*	0.90587224	0.082548959	0.011578801
	Benzo(b)fluoranthene	0.39375	0.0025					0.289862462	1.55	0.054610088	0.004862813	0.00055	6.00E-02	3.53E-02	3.15E-03	3.56E-04	*0.04*	0.909820877	0.081015953	0.009163169
	Benzo(g,h,i)perylene	0.298333333	0.0025					0.225368488	158.52	0.042459423	0.003684417	0.00055	4.67E-02	2.68E-04	2.32E-05	3.47E-06	*0.00*	0.909315304	0.07890584	0.011778856
	Benzo(k)fluoranthene	0.421666667	0.0025					0.313711675	1.55	0.05910328	0.005207583	0.00055	6.49E-02	3.82E-02	3.37E-03	3.56E-04	*0.04*	0.91123178	0.08028853	0.00847969
	Carbazole	0.3525	0					na	158.52	No BCF	0.004353375	0	4.35E-03	No BCF	2.75E-05	0.00E+00	*0.00*	0	1	0
	Chrysene	0.368333333	0.0025					0.261151445	1.55	0.049200932	0.004548917	0.00055	5.43E-02	3.18E-02	2.94E-03	3.56E-04	*0.04*	0.906097038	0.083774021	0.010128942
	Dibenz(a,h)anthracene	0.249666667	0.0025					0.179527909	1.55	0.033823058	0.003083383	0.00055	3.75E-02	2.19E-02	1.99E-03	3.56E-04	*0.02*	0.902997103	0.082319174	0.014683723
	Dibenzofuran	0.3525	0.0025					0.235765651	158.52	0.044418249	0.004353375	0.00055	4.93E-02	2.80E-04	2.75E-05	3.47E-06	*0.00*	0.900583666	0.088265038	0.011151296
	Fluoranthene	0.475	0.0025					0.333107967	148.65	0.062757541	0.00586625	0.00055	6.92E-02	4.22E-04	3.95E-05	3.70E-06	*0.00*	0.907244494	0.084804518	0.007950988
	Fluorene	0.243666667	0.0025					0.163356919	148.65	0.030776443	0.003009283	0.00055	3.43E-02	2.07E-04	2.02E-05	3.70E-06	*0.00*	0.89633878	0.087642919	0.016018301
	Indeno(1,2,3-cd)pyrene	0.308333333	0.0025					0.236876451	1.55	0.044627523	0.003807917	0.00055	4.90E-02	2.89E-02	2.46E-03	3.56E-04	*0.03*	0.911036491	0.077735683	0.011227826
	Naphthalene	0.243333	0.0025					0.158041965	166.49	0.029775106	0.003005163	0.00055	3.33E-02	1.79E-04	1.81E-05	3.30E-06	*0.00*	0.893335317	0.090163166	0.016501517
	N-nitrosodiphenylamine	0.3525	0.0025					0.223805385	329.67	0.042164935	0.004353375	0.00055	4.71E-02	1.28E-04	1.32E-05	1.67E-06	*0.00*	0.895824281	0.092490575	0.011685145
	Phenanthrene	0.398333333	0.0025					0.269990238	158.52	0.050866161	0.004919417	0.00055	5.63E-02	3.21E-04	3.10E-05	3.47E-06	*0.00*	0.902913631	0.087323444	0.009762925
	Pyrene	0.438333333	0.0025					0.305594764	158.52	0.057574054	0.005413417	0.00055	6.35E-02	3.63E-04	3.41E-05	3.47E-06	*0.00*	0.90614331	0.085200381	0.008656309
	Pesticides and PCBs																			
	4,4'-DDD	0.0054	0.00005					0.003886021	18.68	0.000732126	0.00006669	0.000011	8.10E-04	3.92E-05	3.57E-06	5.89E-07	*0.00*	0.904064675	0.082352	0.013583326
	4,4'-DDE	0.0178875	0.00005					0.012722166	2.26	0.002396856	0.000220911	0.000011	2.63E-03	1.06E-03	9.78E-05	4.87E-06	*0.00*	0.911779685	0.084035843	0.004184472
	4,4'-DDT	0.0031	0.00005					0.002248398	1.76	0.000423598	0.000038285	0.000011	4.73E-04	2.41E-04	2.18E-05	6.26E-06	*0.00*	0.895777624	0.080960813	0.023261563
	Aldrin	0.001158333	0.000025					0.000850384	0.44	0.000160212	1.43054E-05	0.0000055	1.80E-04	3.64E-04	3.25E-05	1.25E-05	*0.00*	0.889980737	0.079466714	0.030552549
	alpha-Chlordane	0.001533333	2.17286E-05					0.001117784	5.45	0.000210591	1.89367E-05	4.78029E-06	2.34E-04	3.87E-05	3.48E-06	8.78E-07	*0.00*	0.898778496	0.080819716	0.020401788
	Aroclor 1248	0.0247	0.0005					0.017921665	1.55	0.003376442	0.000305045	0.00011	3.79E-03	2.18E-03	1.97E-04	7.12E-05	*0.00*	0.890532388	0.080455246	0.029012366
	Aroclor 1254	0.022517	0.0005					0.016530726	0.08	0.003114389	0.000278085	0.00011	3.50E-03	3.85E-02	3.44E-03	1.36E-03	*0.04*	0.889196902	0.079396725	0.031406373
	Aroclor 1260	0.031666667	0.0005					0.023522515	0.76	0.004431642	0.000391083	0.00011	4.93E-03	5.84E-03	5.16E-04	1.45E-04	*0.01*	0.898416532	0.079283421	0.022300046
	beta-BHC	0.001158333	0.000025					0.000765394	8.79	0.0001442	1.43054E-05	0.0000055	1.64E-04	1.64E-05	1.63E-06	6.26E-07	*0.00*	0.879239399	0.087225163	0.033535438
	delta-BHC	0.001186667	0.000025					0.00079431	3.52	0.000149648	1.46553E-05	0.0000055	1.70E-04	4.26E-05	4.17E-06	1.56E-06	*0.00*	0.881301932	0.086307666	0.032390403
	Endosulfan I	0.002506	0.000025					0.001674798	3.30	0.000315532	3.09491E-05	0.0000055	3.52E-04	9.57E-05	9.39E-06	1.67E-06	*0.00*	0.896445853	0.087928307	0.01562584
	Endosulfan Sulfate	0.002251667	0.00005					0.001479127	3.30	0.000278668	2.78081E-05	0.000011	3.17E-04	8.45E-05	8.44E-06	3.34E-06	*0.00*	0.877760437	0.087591235	0.034648327
	Endrin Aldehyde	0.0033	0.00005					0.002338812	0.11	0.000440632	0.000040755	0.000011	4.92E-04	4.03E-03	3.73E-04	1.01E-04	*0.00*	0.894889635	0.082770223	0.022340141
	gamma-Chlordane	0.001196667	2.16286E-05					0.000872358	5.45	0.000164352	1.47788E-05	4.75829E-06	1.84E-04	3.02E-05	2.71E-06	8.74E-07	*0.00*	0.893756063	0.08036809	0.025875847
	Inorganics																			
X	Aluminum	4711.25	0.386114286					254.2579365	58.27114864	47.90219524	58.1839375	0.084945143	1.06E+02	8.22E-01	9.99E-01	1.46E-03	*1.82*	0.451179325	0.548020597	0.000800078
X	Antimony	69.865	0.000692857					5.54484127	0.148650889	1.044648095	0.86283275	0.000152429	1.91E+00	7.03E+00	5.80E+00	1.03E-03	*12.83*	0.547614738	0.452305358	7.99045E-05
X	Arsenic	21.2416667	0.024585714					0.331529465	0.149840096	0.062460151	0.133790638	0.005408857	2.02E-01	4.17E-01	8.93E-01	3.61E-02	*1.35*	0.309730541	0.663447746	0.026821713
	Barium	41.4125	0.037342857					2.366428571	11.83503851	0.445835143	0.511444375	0.008215429	9.65E-01	3.77E-02	4.32E-02	6.94E-04	*0.08*	0.461768489	0.529722477	0.008509033
	Beryllium	0.48875	6.37857E-05					0.038789683	1.450568131	0.007307976	0.006036063	1.40329E-05	1.34E-02	5.04E-03	4.16E-03	9.67E-06	*0.01*	0.547083175	0.45186631	0.001050515
	Cadmium	1.0185714	0.00043					1.333862922	2.120009672	0.251299774	0.012579357	0.0000946	2.64E-01	1.19E-01	5.93E-03	4.46E-05	*0.12*	0.951987811	0.04765382	0.000358369
	Chromium	24.975	0.025785714					1.529365122	19.78047452	0.288132389	0.30844125	0.005672857	6.02E-01	1.46E-02	1.56E-02	2.87E-04	*0.03*	0.478429332	0.512151174	0.009419494
	Cobalt	2.8125	0.00146857					0.223214286	10.99	0.042053571	0.034734375	0.000323085	7.71E-02	3.83E-03	3.16E-03	2.94E-05	*0.01*	0.545363879	0.450446248	0.004189873
	Copper	22.95	0.021542857					1.937980159	33.43	0.365115462	0.2834325	0.004739429	6.53E-01	1.09E-02	8.48E-03	1.42E-04	*0.02*	0.558889498	0.433855764	0.007254738
	Cyanide	0.65	0.0025					0.051587302	141.9	0.009719048	0.0080275	0.00055	1.83E-02	6.85E-05	5.66E-05	3.88E-06	*0.00*	0.531195711	0.438743973	0.030060316
X	Iron	4245	2.401					256.0476119	7.01	48.23937143	52.42575	0.52822	1.01E+02	6.88E+00	7.48E+00	7.53E-02	*14.43*	0.476704996	0.518075095	0.005219909
X	Lead	6765.25	0.013072856					157.4063647	17.58264402	29.65535911	83.5508375	0.002876028	1.13E+02	1.69E+00	4.75E+00	1.64E-04	*6.44*	0.261952142	0.738022453	2.54046E-05
	Manganese	70.7	0.469714286					1.290087732	193.41	0.243052529	0.873145	0.103337143	1.22E+00	1.26E-03	4.51E-03	5.34E-04	*0.01*	0.1992994	0.715965704	0.084734895
	Mercury	0.1508333	0.000203929					0.064071472	0.070330576	0.012071065	0.001862791	4.48643E-05	1.40E-02	1.72E-01	2.65E-02	6.38E-04	*0.20*	0.863531466	0.133259063	0.00320947
	Nickel	7.75	0.002842857					3.684188169	87.91322008	0.694101051	0.0957125	0.000625429	7.90E-01	7.90E-03	1.09E-03	7.11E-06	*0.01*	0.87812098	0.121087778	0.000791242
	Selenium	3.6875	0.000857143					0.38326745	0.4395661	0.072207588	0.045540625	0.000188571	1.18E-01	1.64E-01	1.04E-01	4.29E-04	*0.27*	0.612256712	0.386144368	0.00159892
	Silver	1.2225	0.00025					0.09702381	398.246887	0.018279286	0.015097875	0.000055	3.34E-02	4.59E-05	3.79E-05	1.38E-07	*0.00*	0.546757533	0.451597345	0.001645123
	Thallium	0.4291667	0.000778571					0.034060849	0.164354697	0.006417064	0.005300209	0.000171286	1.19E-02	3.90E-02	3.22E-02	1.04E-03	*0.07*	0.539768048	0.445824342	0.01440761
X	Vanadium	31.0875	0.001878929					2.467261905	0.428489138	0.464832143	0.383930625	0.000413364	8.49E-01	1.08E+00	8.96E-01	9.65E-04	*1.98*	0.547391908	0.45212131	0.000486783
	Zinc	69.5875	0.127785714					54.5991421	351.6528803	10.28647837	0.859405625	0.028112857	1.12E+01	2.93E-02	2.44E-03	7.99E-05	*0.03*	0.920572872	0.076911211	0.002515918

Table E.1-60. Average Exposure Calculations for Shrew - Station BW

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0.0025	0	26.59374907	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025	0	3736.311853	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0.417	0.000583333	0.392278186	6844.044183	0.07390521	0.00514995	0.000128333	7.92E-02	1.08E-05	7.52E-07	1.88E-08	*0.00*	0.933341116	0.065038176	0.001620708
	Tetrachloroethene	0.1545	0.0005	0.150022565	17	0.028264251	0.001908075	0.00011	3.03E-02	1.70E-03	1.15E-04	6.61E-06	*0.00*	0.933357993	0.063009525	0.003632482
	Trichloroethene	0.053	0.0005	0.051544695	8.324449805	0.009711021	0.00065455	0.00011	1.05E-02	1.17E-03	7.86E-05	1.32E-05	*0.00*	0.927015908	0.06248347	0.010500621
	Semivolatile Organics															
	2-Methylnaphthalene	0.013	0.0025	0.013225176	170.89	0.002491623	0.00016055	0.00055	3.20E-03	1.46E-05	9.39E-07	3.22E-06	*0.00*	0.778103815	0.050137826	0.171758358
	Acenaphthylene	0.019	0.0025	0.019488648	158.52	0.003671661	0.00023465	0.00055	4.46E-03	2.32E-05	1.48E-06	3.47E-06	*0.00*	0.823923878	0.052655658	0.123420464
	Anthracene	0.069	0.0025	0.071835182	1189.21	0.013533748	0.00085215	0.00055	1.49E-02	1.14E-05	7.17E-07	4.62E-07	*0.00*	0.906122151	0.057053817	0.036824032
	Benzo(a)anthracene	0.56	0.0025	0.610093124	1.55	0.114941545	0.006916	0.00055	1.22E-01	7.43E-02	4.47E-03	3.56E-04	*0.08*	0.939007027	0.056499785	0.004493187
	Benzo(a)pyrene	1	0.0025	1.105345642	1.55	0.208247119	0.01235	0.00055	2.21E-01	1.35E-01	7.99E-03	3.56E-04	*0.14*	0.941667791	0.055845177	0.002487032
	Benzo(b)fluoranthene	1.5	0.0025	1.696755878	1.55	0.319668807	0.018525	0.00055	3.39E-01	2.07E-01	1.20E-02	3.56E-04	*0.22*	0.943689007	0.054687347	0.001623646
	Benzo(g,h,i)perylene	0.64	0.0025	0.742896098	158.52	0.139961625	0.007904	0.00055	1.48E-01	8.83E-04	4.99E-05	3.47E-06	*0.00*	0.943038342	0.053255848	0.003705809
	Benzo(k)fluoranthene	0.72	0.0025	0.823096206	1.55	0.155071325	0.008892	0.00055	1.65E-01	1.00E-01	5.75E-03	3.56E-04	*0.11*	0.942606473	0.054050333	0.003343194
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	0.85	0.0025	0.926034206	1.55	0.174464844	0.0104975	0.00055	1.86E-01	1.13E-01	6.79E-03	3.56E-04	*0.12*	0.940448707	0.056586531	0.002964762
	Dibenz(a,h)anthracene	0.32	0.0025	0.353572176	1.55	0.066612998	0.003952	0.00055	7.11E-02	4.31E-02	2.56E-03	3.56E-04	*0.05*	0.936694085	0.055571962	0.007733952
	Dibenzofuran	0	0.0025	0	158.52	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	1.2	0.0025	1.293091775	148.65	0.24361849	0.01482	0.00055	2.59E-01	1.64E-03	9.97E-05	3.70E-06	*0.00*	0.940653733	0.05722262	0.002123646
	Fluorene	0.047	0.0025	0.048416786	148.65	0.009121723	0.00058045	0.00055	1.03E-02	6.14E-05	3.90E-06	3.70E-06	*0.00*	0.889735567	0.056617268	0.053647166
	Indeno(1,2,3-cd)pyrene	0.74	0.0025	0.873554133	1.55	0.164577599	0.009139	0.00055	1.74E-01	1.06E-01	5.91E-03	3.56E-04	*0.11*	0.944401279	0.052442637	0.003156084
	Naphthalene	0.026	0.0025	0.025947854	166.49	0.004888576	0.0003211	0.00055	5.76E-03	2.94E-05	1.93E-06	3.30E-06	*0.00*	0.848758847	0.055749666	0.095491487
	N-nitrosodiphenylamine	0	0.0025	0	329.67	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0.57	0.0025	0.593653399	158.52	0.1118443	0.0070395	0.00055	1.19E-01	7.06E-04	4.44E-05	3.47E-06	*0.00*	0.936454337	0.058940601	0.004605062
	Pyrene	1	0.0025	1.071267929	158.52	0.201826878	0.01235	0.00055	2.15E-01	1.27E-03	7.79E-05	3.47E-06	*0.00*	0.939923683	0.057514924	0.002561393
	Pesticides and PCBs															
	4,4'-DDD	0.017	0.00005	0.018798233	18.68	0.003541587	0.00020995	0.000011	3.76E-03	1.90E-04	1.12E-05	5.89E-07	*0.00*	0.941276326	0.055800115	0.002923559
	4,4'-DDE	0.004	0.00005	0.004371476	2.26	0.000823586	0.0000494	0.000011	8.84E-04	3.65E-04	2.19E-05	4.87E-06	*0.00*	0.931673132	0.055883233	0.012443635
	4,4'-DDT	0.0013	0.00005	0.00144881	1.76	0.000272956	0.000016055	0.000011	3.00E-04	1.55E-04	9.13E-06	6.26E-06	*0.00*	0.909819918	0.053514737	0.036665345
	Aldrin	0.000085	0.000025	9.58864E-05	0.44	1.8065E-05	1.04975E-06	0.0000055	2.46E-05	4.11E-05	2.39E-06	1.25E-05	*0.00*	0.733909529	0.042647196	0.223443275
	alpha-Chlordane	0.0024	2.17286E-05	0.002688372	5.45	0.000506489	0.00002964	4.78029E-06	5.41E-04	9.30E-05	5.44E-06	8.78E-07	*0.00*	0.936365901	0.054796592	0.008837507
	Aroclor 1248	0.028	0.0005	0.031217357	1.55	0.00588135	0.0003458	0.00011	6.34E-03	3.80E-03	2.24E-04	7.12E-05	*0.00*	0.928074924	0.054567115	0.01735796
	Aroclor 1254	0.00165	0.0005	0.001861324	0.08	0.000350673	2.03775E-05	0.00011	4.81E-04	4.34E-03	2.52E-04	1.36E-03	*0.01*	0.728973642	0.042360374	0.228665984
	Aroclor 1260	0.058	0.0005	0.066201236	0.76	0.012472313	0.0007163	0.00011	1.33E-02	1.64E-02	9.45E-04	1.45E-04	*0.02*	0.9378657	0.053862761	0.008271539
	beta-BHC	0.000085	0.000025	8.63032E-05	8.79	1.62595E-05	1.04975E-06	0.0000055	2.28E-05	1.85E-06	1.19E-07	6.26E-07	*0.00*	0.712847111	0.046022939	0.24112995
	delta-BHC	0.000085	0.000025	8.74253E-05	3.52	1.64709E-05	1.04975E-06	0.0000055	2.30E-05	4.68E-06	2.99E-07	1.56E-06	*0.00*	0.715483987	0.045600318	0.238915695
	Endosulfan I	0.000085	0.000025	8.72885E-05	3.30	1.64452E-05	1.04975E-06	0.0000055	2.30E-05	4.99E-06	3.18E-07	1.67E-06	*0.00*	0.715165143	0.04565142	0.239183436
	Endosulfan Sulfate	0.000165	0.00005	0.000166549	3.30	3.13778E-05	2.03775E-06	0.000011	4.44E-05	9.52E-06	6.18E-07	3.34E-06	*0.00*	0.706460005	0.045879168	0.247660827
	Endrin Aldehyde	0.0018	0.00005	0.001960246	0.11	0.00036931	0.00002223	0.000011	4.03E-04	3.38E-03	2.03E-04	1.01E-04	*0.00*	0.917449274	0.055224274	0.027326452
	gamma-Chlordane	0.0017	2.16286E-05	0.001904263	5.45	0.000358763	0.000020995	4.75829E-06	3.85E-04	6.59E-05	3.85E-06	8.74E-07	*0.00*	0.933024225	0.054601035	0.01237474
	Inorganics															
X	Aluminum	18558.33333	0.386114286	1001.560847	58.27114864	188.6940635	229.1954167	0.084945143	4.18E+02	3.24E+00	3.93E+00	1.46E-03	*7.17*	0.451448826	0.548347944	0.00020323
X	Antimony	22.4416667	0.000692857	1.781084659	0.148650889	0.33555635	0.277154584	0.000152429	6.13E-01	2.26E+00	1.86E+00	1.03E-03	*4.12*	0.547522287	0.452228997	0.000248715
X	Arsenic	1238.666667	0.024585714	5.849958935	0.149840096	1.102132263	7.801742	0.005408857	8.91E+00	7.36E+00	5.21E+01	3.61E-02	*59.46*	0.123706055	0.875686842	0.000607104
	Barium	129.2833333	0.037342857	7.387619046	11.8350385	1.391827428	1.596649166	0.008215429	3.00E+00	1.18E-01	1.35E-01	6.94E-04	*0.25*	0.464454611	0.53280389	0.002741499
	Beryllium	1.3916667	6.37857E-05	0.110449738	1.450568131	0.020808731	0.017187084	1.40329E-05	3.80E-02	1.43E-02	1.18E-02	9.67E-06	*0.03*	0.547456308	0.452174502	0.00036919
	Cadmium	10.575	0.00043	8.57157967	2.120009672	1.61488561	0.13060125	0.0000946	1.75E+00	7.62E-01	6.16E-02	4.46E-05	*0.82*	0.925127613	0.074818193	5.4194E-05
	Chromium	1518.166667	0.025785714	1.161436975	19.78047452	0.218814726	18.74935833	0.005672857	1.90E+01	1.11E-02	9.48E-01	2.87E-04	*0.96*	0.011532439	0.988168578	0.000298983
	Cobalt	39.8416667	0.00146857	3.16203704	10.99	0.595727778	0.492044584	0.000323085	1.09E+00	5.42E-02	4.48E-02	2.94E-05	*0.10*	0.547495883	0.452207189	0.000296927
	Copper	898.6666667	0.021542857	5.103319175	33.43	0.961465333	11.09853333	0.004739429	1.21E+01	2.88E-02	3.32E-01	1.42E-04	*0.36*	0.079692184	0.919914983	0.000392833
	Cyanide	0	0.0025	0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	111725	2.401	6738.968254	7.01	1269.621619	1379.80375	0.52822	2.65E+03	1.81E+02	1.97E+02	7.53E-02	*377.97*	0.479110889	0.52068978	0.000199332
	Lead	606.75	0.013072856	22.48392498	17.58264402	4.235971465	7.4933625	0.002876028	1.17E+01	2.41E-01	4.26E-01	1.64E-04	*0.67*	0.361054862	0.638699998	0.00024514
	Manganese	1035.5	0.469714286	8.047251365	193.41	1.516102157	12.788425	0.103337143	1.44E+01	7.84E-03	6.61E-02	5.34E-04	*0.07*	0.105227404	0.887600323	0.007172273
X	Mercury	6.6	0.000203929	0.100070993	0.070330576	0.018853375	0.08151	4.48643E-05	1.00E-01	2.68E-01	1.16E+00	6.38E-04	*1.43*	0.187767212	0.811785969	0.000446819
	Nickel	36.1833333	0.002842857	2.468016274	87.91322008	0.464974266	0.446864166	0.000625429	9.12E-01	5.29E-03	5.08E-03	7.11E-06	*0.01*	0.509581021	0.48973355	0.000685428
	Selenium	9.9	0.000857143	0.790474664	0.4395661	0.148925427	0.122265	0.000188571	2.71E-01	3.39E-01	2.78E-01	4.29E-04	*0.62*	0.548772852	0.450532284	0.000694864
	Silver	1.48	0.00025	0.117460317	398.246887	0.022129524	0.018278	0.000055	4.05E-02	5.56E-05	4.59E-05	1.38E-07	*0.00*	0.546914076	0.451726642	0.001359282
X	Thallium	8.2083333	0.000778571	0.651455024	0.164354697	0.122734126	0.101372916	0.000171286	2.24E-01	7.47E-01	6.17E-01	1.04E-03	*1.36*	0.547240241	0.45199604	0.000763719
X	Vanadium	80.5666667	0.001878929	6.394179897	0.428489138	1.204663493	0.994998334	0.000413364	2.20E+00	2.81E+00	2.32E+00	9.65E-04	*5.18*	0.547555601	0.452256513	0.000187886
	Zinc	2101.666667	0.127785714	166.9692541	351.6528803	31.45700748	25.95558333	0.028112857	5.74E+01	8.95E-02	7.38E-02	7.99E-05	*0.16*	0.547643143	0.451867433	0.000489424

Table E.1-61. Average Exposure Calculations for Shrew - Station CB-01

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0.0025	0	26.59374907	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025	0	3736.311853	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0	0.0025	0	6844.044183	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	8.04E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005	0	17	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0015	0	8.324449805	0	0	0.00033	3.30E-04	0.00E+00	0.00E+00	3.96E-05	*0.00*	0	0	1
	Semivolatile Organics															
	2-Methylnaphthalene	0	0.0025	0	170.89	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.22E-06	*0.00*	0	0	1
	Acenaphthylene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Anthracene	0	0.0025	0	1189.21	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	4.62E-07	*0.00*	0	0	1
	Benzo(a)anthracene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(a)pyrene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(b)fluoranthene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(g,h,i)perylene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Benzo(k)fluoranthene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenz(a,h)anthracene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenzofuran	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	0	0.0025	0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Fluorene	0	0.0025	0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Indeno(1,2,3-cd)pyrene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Naphthalene	0	0.0025	0	166.49	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.30E-06	*0.00*	0	0	1
	N-nitrosodiphenylamine	0	0.0025	0	329.67	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pyrene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pesticides and PCBs															
	4,4'-DDD	0	0.00005	0	18.68	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	5.89E-07	*0.00*	0	0	1
	4,4'-DDE	0	0.00005	0	2.26	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	4.87E-06	*0.00*	0	0	1
	4,4'-DDT	0	0.00005	0	1.76	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	6.26E-06	*0.00*	0	0	1
	Aldrin	0	0.000025	0	0.44	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.25E-05	*0.00*	0	0	1
	alpha-Chlordane	0	0.000025	0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Aroclor 1248	0	0.0005	0	1.55	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	7.12E-05	*0.00*	0	0	1
	Aroclor 1254	0	0.0005	0	0.08	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.36E-03	*0.00*	0	0	1
	Aroclor 1260	0	0.0005	0	0.76	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.45E-04	*0.00*	0	0	1
	beta-BHC	0	0.000025	0	8.79	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	6.26E-07	*0.00*	0	0	1
	delta-BHC	0	0.000025	0	3.52	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.56E-06	*0.00*	0	0	1
	Endosulfan I	0	0.000025	0	3.30	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Endosulfan Sulfate	0	0.00005	0	3.30	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	3.34E-06	*0.00*	0	0	1
	Endrin Aldehyde	0	0.00005	0	0.11	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	1.01E-04	*0.00*	0	0	1
	gamma-Chlordane	0	0.000025	0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Inorganics															
X	Aluminum	11886	0.140333333	641.4666667	58.27114864	120.85232	146.7921	0.030873333	2.68E+02	2.07E+00	2.52E+00	5.30E-04	*4.59*	0.451488512	0.548396149	0.000115339
	Antimony	1.244	0.0006	0.098730159	0.148650889	0.018600762	0.0153634	0.000132	3.41E-02	1.25E-01	1.03E-01	8.88E-04	*0.23*	0.545538291	0.450590305	0.003871403
X	Arsenic	41.265	0.012683333	0.529819297	0.149840096	0.099817956	0.259907603	0.002790333	3.63E-01	6.66E-01	1.73E+00	1.86E-02	*2.42*	0.275347807	0.71695506	0.007697134
	Barium	40.225	0.032083333	2.298571429	11.83503851	0.433050857	0.49677875	0.007058333	9.37E-01	3.66E-02	4.20E-02	5.96E-04	*0.08*	0.462222683	0.53024351	0.007533807
	Beryllium	1.007	4.56667E-05	0.079920635	1.450568131	0.015057048	0.01243645	1.00467E-05	2.75E-02	1.04E-02	8.57E-03	6.93E-06	*0.02*	0.547458446	0.452176267	0.000365287
	Cadmium	5.17	0.00056	4.852694502	2.120009672	0.914247644	0.0638495	0.0001232	9.78E-01	4.31E-01	3.01E-02	5.81E-05	*0.46*	0.934602975	0.065271082	0.000125943
	Chromium	217.25	0.0062	1.323024068	19.78047452	0.249257734	2.6830375	0.001364	2.93E+00	1.26E-02	1.36E-01	6.90E-05	*0.15*	0.084964788	0.914570264	0.000464948
	Cobalt	6.044	0.000985	0.47968254	10.99	0.09037219	0.0746434	0.0002167	1.65E-01	8.22E-03	6.79E-03	1.97E-05	*0.02*	0.546940251	0.451748262	0.001311487
	Copper	389.02	0.007183333	4.091243067	33.43	0.770790194	4.804397	0.001580333	5.58E+00	2.31E-02	1.44E-01	4.73E-05	*0.17*	0.13821451	0.861502112	0.000283378
	Cyanide	0	0.0025	0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	11059	1.209333333	667.0507937	7.01	125.6723695	136.57865	0.266053333	2.63E+02	1.79E+01	1.95E+01	3.79E-02	*37.44*	0.478720748	0.520265781	0.001013471
	Lead	317.41	0.003308333	13.32880032	17.58264402	2.511145979	3.9200135	0.000727833	6.43E+00	1.43E-01	2.23E-01	4.14E-05	*0.37*	0.390421327	0.609465513	0.00011316
	Manganese	338.345	0.5925	3.752654302	193.41	0.70700007	4.17856075	0.13035	5.02E+00	3.66E-03	2.16E-02	6.74E-04	*0.03*	0.140951483	0.833061213	0.025987304
	Mercury	1.532	0.000115833	0.084229178	0.070330576	0.015868777	0.0189202	2.54833E-05	3.48E-02	2.26E-01	2.69E-01	3.62E-04	*0.50*	0.45580994	0.543458085	0.000731975
	Nickel	9.175	0.001633333	3.526002919	87.91322008	0.66429895	0.11331125	0.000359333	7.78E-01	7.56E-03	1.29E-03	4.09E-06	*0.01*	0.85388813	0.145649984	0.000461886
	Selenium	3.71	0.00075	0.384980238	0.4395661	0.072530277	0.0458185	0.000165	1.19E-01	1.65E-01	1.04E-01	3.75E-04	*0.27*	0.611998695	0.386609061	0.001392243
	Silver	0.3265	0.000375	0.025912698	398.246887	0.004881952	0.004032275	0.0000825	9.00E-03	1.23E-05	1.01E-05	2.07E-07	*0.00*	0.542636469	0.44819353	0.009170001
	Thallium	1.0455	0.00085	0.08297619	0.164354697	0.015632714	0.012911925	0.000187	2.87E-02	9.51E-02	7.86E-02	1.14E-03	*0.17*	0.544094061	0.449397435	0.006508504
X	Vanadium	53.55	0.000933333	4.25	0.428489138	0.8007	0.6613425	0.000205333	1.46E+00	1.87E+00	1.54E+00	4.79E-04	*3.41*	0.547581594	0.452277983	0.000140423
	Zinc	422.06	0.05855	98.6184806	351.6528803	18.57972174	5.212441	0.012881	2.38E+01	5.28E-02	1.48E-02	3.66E-05	*0.07*	0.780495173	0.218963723	0.000541104

Table E.1-62. Average Exposure Calculations for Shrew - Station CB-02

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)					C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																			
	2-Butanone	0	0.0025					0	26.59374907	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025					0	3736.311853	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0	0.0025					0	6844.044183	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	8.04E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005					0	17	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0015					0	8.324449805	0	0	0.00033	3.30E-04	0.00E+00	0.00E+00	3.96E-05	*0.00*	0	0	1
	Semivolatile Organics																			
	2-Methylnaphthalene	0	0.0025					0	170.89	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.22E-06	*0.00*	0	0	1
	Acenaphthylene	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Anthracene	0	0.0025					0	1189.21	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	4.62E-07	*0.00*	0	0	1
	Benzo(a)anthracene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(a)pyrene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(b)fluoranthene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(g,h,i)perylene	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Benzo(k)fluoranthene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Carbazole	0	0					na	158.52	No BCF		0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenz(a,h)anthracene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenzofuran	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	0	0.0025					0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Fluorene	0	0.0025					0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Indeno(1,2,3-cd)pyrene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Naphthalene	0	0.0025					0	166.49	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.30E-06	*0.00*	0	0	1
	N-nitrosodiphenylamine	0	0.0025					0	329.67	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pyrene	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pesticides and PCBs																			
	4,4'-DDD	0	0.00005					0	18.68	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	5.89E-07	*0.00*	0	0	1
	4,4'-DDE	0	0.00005					0	2.26	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	4.87E-06	*0.00*	0	0	1
	4,4'-DDT	0	0.00005					0	1.76	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	6.26E-06	*0.00*	0	0	1
	Aldrin	0	0.000025					0	0.44	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.25E-05	*0.00*	0	0	1
	alpha-Chlordane	0	0.000025					0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Aroclor 1248	0	0.0005					0	1.55	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	7.12E-05	*0.00*	0	0	1
	Aroclor 1254	0	0.0005					0	0.08	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.36E-03	*0.00*	0	0	1
	Aroclor 1260	0	0.0005					0	0.76	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.45E-04	*0.00*	0	0	1
	beta-BHC	0	0.000025					0	8.79	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	6.26E-07	*0.00*	0	0	1
	delta-BHC	0	0.000025					0	3.52	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.56E-06	*0.00*	0	0	1
	Endosulfan I	0	0.000025					0	3.30	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Endosulfan Sulfate	0	0.00005					0	3.30	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	3.34E-06	*0.00*	0	0	1
	Endrin Aldehyde	0	0.00005					0	0.11	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	1.01E-04	*0.00*	0	0	1
	gamma-Chlordane	0	0.000025					0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Inorganics																			
X	Aluminum	4438.5	0.140333333					239.5380952	58.27114864	45.12897714	54.815475	0.030873333	1.00E+02	7.74E-01	9.41E-01	5.30E-04	*1.72*	0.451401153	0.548290038	0.00030881
	Antimony	1.539	0.0006					0.122142857	0.148650889	0.023011714	0.01900665	0.000132	4.22E-02	1.55E-01	1.28E-01	8.88E-04	*0.28*	0.545943426	0.450924928	0.003131646
X	Arsenic	27.105	0.012683333					0.393785638	0.149840096	0.074189214	0.170720843	0.002790333	2.48E-01	4.95E-01	1.14E+00	1.86E-02	*1.65*	0.299511899	0.689223148	0.011264953
	Barium	78.5	0.032083333					4.485714286	11.83503851	0.845108571	0.969475	0.007058333	1.82E+00	7.14E-02	8.19E-02	5.96E-04	*0.15*	0.463926839	0.532198451	0.00387471
	Beryllium	0.287	4.56667E-05					0.022777778	1.450568131	0.004291333	0.00354445	1.00467E-05	7.85E-03	2.96E-03	2.44E-03	6.93E-06	*0.01*	0.546957215	0.451762273	0.001280511
	Cadmium	3.091	0.00056					3.223937995	2.120009672	0.607389918	0.03817385	0.0001232	6.46E-01	2.87E-01	1.80E-02	5.81E-05	*0.30*	0.9406879	0.059121295	0.000190805
	Chromium	106.06	0.0062					1.388136237	19.78047452	0.261524867	1.309841	0.001364	1.57E+00	1.32E-02	6.62E-02	6.90E-05	*0.08*	0.166287213	0.832845505	0.000867282
	Cobalt	4.235	0.000985					0.336111111	10.99	0.063323333	0.05230225	0.0002167	1.16E-01	5.76E-03	4.76E-03	1.97E-05	*0.01*	0.546634023	0.451495331	0.001870647
	Copper	75.275	0.007183333					2.651786142	33.43	0.499596509	0.92964625	0.001580333	1.43E+00	1.49E-02	2.78E-02	4.73E-05	*0.04*	0.349167211	0.649728296	0.001104492
	Cyanide	0	0.0025					0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	5913.5	1.209333333					356.6873016	7.01	67.19988762	73.031725	0.266053333	1.40E+02	9.58E+00	1.04E+01	3.79E-02	*20.04*	0.478298961	0.51980739	0.001893649
	Lead	118.855	0.003308333					6.032847181	17.58264402	1.136588409	1.46785925	0.000727833	2.61E+00	6.46E-02	8.35E-02	4.14E-05	*0.15*	0.436280939	0.563439682	0.00027938
	Manganese	55.99	0.5925					1.100339098	193.41	0.207303886	0.6914765	0.13035	1.03E+00	1.07E-03	3.58E-03	6.74E-04	*0.01*	0.201435978	0.671903686	0.126660336
	Mercury	0.2405	0.000115833					0.067697652	0.070330576	0.012754238	0.002970175	2.54833E-05	1.57E-02	1.81E-01	4.22E-02	3.62E-04	*0.22*	0.809798216	0.188583785	0.001618
	Nickel	8.275	0.001633333					3.621934279	87.91322008	0.682372418	0.10219625	0.000359333	7.85E-01	7.76E-03	1.16E-03	4.09E-06	*0.01*	0.869343961	0.130198247	0.000457791
	Selenium	1.4485	0.00075					0.193214904	0.4395661	0.036401688	0.017888975	0.000165	5.45E-02	8.28E-02	4.07E-02	3.75E-04	*0.12*	0.668464692	0.32850532	0.003029988
	Silver	0	0.000375					0	398.246887	0	0	0.0000825	0.00E+00	0.00E+00	0.00E+00	2.07E-07	*0.00*	0	0	1
	Thallium	0.428	0.00085					0.033968254	0.164354697	0.006399619	0.0052858	0.000187	1.19E-02	3.89E-02	3.22E-02	1.14E-03	*0.07*	0.539032443	0.445216765	0.015750792
X	Vanadium	26.65	0.000933333					2.115079365	0.428489138	0.398480952	0.3291275	0.000205333	7.28E-01	9.30E-01	7.68E-01	4.79E-04	*1.70*	0.517503991	0.452213886	0.000282123
	Zinc	249.95	0.05855					83.04842535	351.6528803	15.64632334	3.0868825	0.012881	1.87E+01	4.45E-02	8.78E-03	3.66E-05	*0.05*	0.83464477	0.1646681	0.00068713

Table E.1-63. Average Exposure Calculations for Shrew - Station CB-03

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)					C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																			
	2-Butanone	0	0.0025					0	26.59374907	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025					0	3736.311853	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0	0.0025					0	6844.044183	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	8.04E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005					0	17	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0015					0	8.324449805	0	0	0.00033	3.30E-04	0.00E+00	0.00E+00	3.96E-05	*0.00*	0	0	1
	Semivolatile Organics																			
	2-Methylnaphthalene	0	0.0025					0	170.89	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.22E-06	*0.00*	0	0	1
	Acenaphthylene	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Anthracene	0	0.0025					0	1189.21	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	4.62E-07	*0.00*	0	0	1
	Benzo(a)anthracene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(a)pyrene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(b)fluoranthene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(g,h,i)perylene	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Benzo(k)fluoranthene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Carbazole	0	0					na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenz(a,h)anthracene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenzofuran	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	0	0.0025					0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Fluorene	0	0.0025					0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Indeno(1,2,3-cd)pyrene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Naphthalene	0	0.0025					0	166.49	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.30E-06	*0.00*	0	0	1
	N-nitrosodiphenylamine	0	0.0025					0	329.67	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pyrene	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pesticides and PCBs																			
	4,4'-DDD	0	0.00005					0	18.68	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	5.89E-07	*0.00*	0	0	1
	4,4'-DDE	0	0.00005					0	2.26	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	4.87E-06	*0.00*	0	0	1
	4,4'-DDT	0	0.00005					0	1.76	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	6.26E-06	*0.00*	0	0	1
	Aldrin	0	0.000025					0	0.44	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.25E-05	*0.00*	0	0	1
	alpha-Chlordane	0	0.000025					0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Aroclor 1248	0	0.0005					0	1.55	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	7.12E-05	*0.00*	0	0	1
	Aroclor 1254	0	0.0005					0	0.08	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.36E-03	*0.00*	0	0	1
	Aroclor 1260	0	0.0005					0	0.76	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.45E-04	*0.00*	0	0	1
	beta-BHC	0	0.000025					0	8.79	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	6.26E-07	*0.00*	0	0	1
	delta-BHC	0	0.000025					0	3.52	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.56E-06	*0.00*	0	0	1
	Endosulfan I	0	0.000025					0	3.30	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Endosulfan Sulfate	0	0.00005					0	3.30	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	3.34E-06	*0.00*	0	0	1
	Endrin Aldehyde	0	0.00005					0	0.11	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	1.01E-04	*0.00*	0	0	1
	gamma-Chlordane	0	0.000025					0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Inorganics																			
X	Aluminum	9264.166667	0.140333333					499.9708995	58.27114864	94.19451746	114.4124583	0.030873333	2.09E+02	1.62E+00	1.96E+00	5.30E-04	*3.58*	0.451473776	0.548378249	0.000147976
	Antimony	1.5320833	0.0006					0.121593913	0.148650889	0.022908293	0.018921229	0.000132	4.20E-02	1.54E-01	1.27E-01	8.88E-04	*0.28*	0.545935708	0.450918553	0.003145739
X	Arsenic	272.4833333	0.012683333					2.008523791	0.149840096	0.378405882	1.716236275	0.002790333	2.10E+00	2.53E+00	1.15E+01	1.86E-02	*14.00*	0.180413855	0.818255788	0.001330357
	Barium	51.5125	0.032083333					2.943571429	11.83503851	0.554568857	0.636179375	0.007058333	1.20E+00	4.69E-02	5.38E-02	5.96E-04	*0.10*	0.462986991	0.531120294	0.005892716
	Beryllium	0.5408333	4.56667E-05					0.042923278	1.450568131	0.008086746	0.006679291	1.00467E-05	1.48E-02	5.57E-03	4.60E-03	6.93E-06	*0.01*	0.54728613	0.452033942	0.000679928
	Cadmium	7.3891667	0.00056					6.446015755	2.120009672	1.214429368	0.091256209	0.0001232	1.31E+00	5.73E-01	4.30E-02	5.81E-05	*0.62*	0.930020834	0.069884818	9.43477E-05
	Chromium	456.7291667	0.0062					1.258771538	19.78047452	0.237152558	5.640605209	0.001364	5.88E+00	1.20E-02	2.85E-01	6.90E-05	*0.30*	0.040338093	0.9594299	0.000232007
	Cobalt	19.2458333	0.000985					1.527447087	10.99	0.287771031	0.237686041	0.0002167	5.26E-01	2.62E-02	2.16E-02	1.97E-05	*0.05*	0.547432735	0.452155032	0.000412233
	Copper	269.0041667	0.007183333					3.711582097	33.43	0.699262067	3.322201459	0.001580333	4.02E+00	2.09E-02	9.94E-02	4.73E-05	*0.12*	0.173814179	0.825793	0.00039282
	Cyanide	0	0.0025					0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	30995.83333	1.209333333					1869.589947	7.01	352.230746	382.7985417	0.266053333	7.35E+02	5.02E+01	5.46E+01	3.79E-02	*104.88*	0.479033018	0.52060515	0.000361832
	Lead	196.4083333	0.003308333					9.048222732	17.58264402	1.704685163	2.425642916	0.000727833	4.13E+00	9.70E-02	1.38E-01	4.14E-05	*0.23*	0.412651196	0.587172618	0.000176186
	Manganese	283.05	0.5925					3.322659788	193.41	0.625989104	3.4956675	0.13035	4.25E+00	3.24E-03	1.81E-02	6.74E-04	*0.02*	0.147222044	0.822121842	0.030656114
	Mercury	1.2177917	0.000115833					0.081978439	0.070330576	0.015444738	0.015039727	2.54833E-05	3.05E-02	2.20E-01	2.14E-01	3.62E-04	*0.43*	0.506219726	0.492945028	0.000835246
	Nickel	25.55	0.001633333					2.701709267	87.91322008	0.509002026	0.3155425	0.000359333	8.25E-01	5.79E-03	3.59E-03	4.09E-06	*0.01*	0.617044059	0.382520334	0.000435606
	Selenium	3.7809091	0.00075					0.390360083	0.4395661	0.07354384	0.046694227	0.000165	1.20E-01	1.67E-01	1.06E-01	3.75E-04	*0.27*	0.610813673	0.38781593	0.001370397
	Silver	0.51375	0.000375					0.04077381	398.246887	0.007681786	0.006344813	0.0000825	1.41E-02	1.93E-05	1.59E-05	2.07E-07	*0.00*	0.54445618	0.449696529	0.005847291
	Thallium	0.7054545	0.00085					0.055988452	0.164354697	0.010548224	0.008712363	0.000187	1.94E-02	6.42E-02	5.30E-02	1.14E-03	*0.12*	0.54239244	0.447991972	0.009615589
X	Vanadium	47.0291667	0.000933333					3.732473548	0.428489138	0.703198016	0.580810209	0.000205333	1.28E+00	1.64E+00	1.36E+00	4.79E-04	*3.00*	0.547570933	0.452269177	0.00015989
	Zinc	1147.75	0.05855					136.9195568	351.6528803	25.7956445	14.1747125	0.012881	4.00E+01	7.34E-02	4.03E-02	3.66E-05	*0.11*	0.645161467	0.354516373	0.00032216

Table E.1-64. Average Exposure Calculations for Shrew - Station CB-04

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0.0025	0	26.59374907	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025	0	3736.311853	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0	0.0025	0	6844.044183	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	8.04E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005	0	17	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0015	0	8.324449805	0	0	0.00033	3.30E-04	0.00E+00	0.00E+00	3.96E-05	*0.00*	0	0	1
	Semivolatile Organics															
	2-Methylnaphthalene	0	0.0025	0	170.89	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.22E-06	*0.00*	0	0	1
	Acenaphthylene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Anthracene	0	0.0025	0	1189.21	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	4.62E-07	*0.00*	0	0	1
	Benzo(a)anthracene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(a)pyrene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(b)fluoranthene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(g,h,i)perylene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Benzo(k)fluoranthene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenz(a,h)anthracene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenzofuran	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	0	0.0025	0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Fluorene	0	0.0025	0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Indeno(1,2,3-cd)pyrene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Naphthalene	0	0.0025	0	166.49	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.30E-06	*0.00*	0	0	1
	N-nitrosodiphenylamine	0	0.0025	0	329.67	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pyrene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pesticides and PCBs															
	4,4'-DDD	0	0.00005	0	18.68	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	5.89E-07	*0.00*	0	0	1
	4,4'-DDE	0	0.00005	0	2.26	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	4.87E-06	*0.00*	0	0	1
	4,4'-DDT	0	0.00005	0	1.76	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	6.26E-06	*0.00*	0	0	1
	Aldrin	0	0.000025	0	0.44	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.25E-05	*0.00*	0	0	1
	alpha-Chlordane	0	0.000025	0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Aroclor 1248	0	0.0005	0	1.55	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	7.12E-05	*0.00*	0	0	1
	Aroclor 1254	0	0.0005	0	0.08	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.36E-03	*0.00*	0	0	1
	Aroclor 1260	0	0.0005	0	0.76	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.45E-04	*0.00*	0	0	1
	beta-BHC	0	0.000025	0	8.79	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	6.26E-07	*0.00*	0	0	1
	delta-BHC	0	0.000025	0	3.52	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.56E-06	*0.0000016*	0	0	1
	Endosulfan I	0	0.000025	0	3.30	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Endosulfan Sulfate	0	0.00005	0	3.30	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	3.34E-06	*0.00*	0	0	1
	Endrin Aldehyde	0	0.00005	0	0.11	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	1.01E-04	*0.00*	0	0	1
	gamma-Chlordane	0	0.000025	0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Inorganics															
X	Aluminum	9437	0.140333333	509.2984127	58.27114864	95.95182095	116.54695	0.030873333	2.13E+02	1.65E+00	2.00E+00	5.30E-04	*3.65*	0.451474999	0.548379735	0.000145266
	Antimony	3.552	0.0006	0.281904762	0.148650889	0.053110857	0.0438672	0.000132	9.71E-02	3.57E-01	2.95E-01	8.88E-04	*0.65*	0.546914076	0.451726642	0.001359282
X	Arsenic	111.5	0.012683333	1.068816229	0.149840096	0.201364978	0.70228275	0.002790333	9.06E-01	1.34E+00	4.69E+00	1.86E-02	*6.05*	0.222149738	0.774771913	0.00307835
	Barium	61.155	0.032083333	3.494571429	11.83503851	0.658377257	0.75526425	0.007058333	1.42E+00	5.56E-02	6.38E-02	5.96E-04	*0.12*	0.463417563	0.531614229	0.004968209
	Beryllium	0.622	4.56667E-05	0.049365079	1.450568131	0.009300381	0.0076817	1.00467E-05	1.70E-02	6.41E-03	5.30E-03	6.93E-06	*0.01*	0.547334693	0.452074053	0.000591255
	Cadmium	3.954	0.00056	3.921047644	2.120009672	0.738725376	0.0488319	0.0001232	7.88E-01	3.48E-01	2.30E-02	5.81E-05	*0.37*	0.937849037	0.061994554	0.000156409
	Chromium	167.14	0.0062	1.346473045	19.78047452	0.253675522	2.064179	0.001364	2.32E+00	1.28E-02	1.04E-01	6.90E-05	*0.12*	0.109179741	0.89003213	0.000588129
	Cobalt	8.765	0.000985	0.695634921	10.99	0.131057619	0.10824775	0.0002167	2.40E-01	1.19E-02	9.85E-03	1.97E-05	*0.02*	0.547163022	0.45193226	0.000904718
	Copper	184.6	0.007183333	3.360375903	33.43	0.63309482	2.27981	0.001580333	2.91E+00	1.89E-02	6.82E-02	4.73E-05	*0.09*	0.217223553	0.782234213	0.000542234
	Cyanide	0	0.0025	0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	23967	1.209333333	1445.628571	7.01	272.3564229	295.99245	0.266053333	5.69E+02	3.88E+01	4.22E+01	3.79E-02	*81.10*	0.47898219	0.520549912	0.000467897
	Lead	208.46	0.003308333	9.49367982	17.58264402	1.788609278	2.574481	0.000727833	4.36E+00	1.02E-01	1.46E-01	4.14E-05	*0.25*	0.409872555	0.589960657	0.000166788
	Manganese	403.9	0.5925	4.234420345	193.41	0.797764793	4.988165	0.13035	5.92E+00	4.12E-03	2.58E-02	6.74E-04	*0.03*	0.134842303	0.84312527	0.022032427
	Mercury	0.727	0.000115833	0.077137061	0.070330576	0.014532622	0.00897845	2.54833E-05	2.35E-02	2.07E-01	1.28E-01	3.62E-04	*0.33*	0.617448982	0.381468305	0.001082713
	Nickel	41.315	0.001633333	2.384362217	87.91322008	0.449213842	0.51024025	0.000359333	9.60E-01	5.11E-03	5.80E-03	4.09E-06	*0.01*	0.468022045	0.531603577	0.000374378
	Selenium	3.024	0.00075	0.331400997	0.4395661	0.062435948	0.0373464	0.000165	9.99E-02	1.42E-01	8.50E-02	3.75E-04	*0.23*	0.62468839	0.37366074	0.001650869
	Silver	1.317	0.000375	0.10452381	398.246887	0.019692286	0.01626495	0.0000825	3.60E-02	4.94E-05	4.08E-05	2.07E-07	*0.00*	0.546404831	0.451306029	0.00228914
	Thallium	1.1295	0.00085	0.089642857	0.164354697	0.016888714	0.013949325	0.000187	3.10E-02	1.03E-01	8.49E-02	1.14E-03	*0.19*	0.544357547	0.449615063	0.00602739
X	Vanadium	55.305	0.000933333	4.389285714	0.428489138	0.826941429	0.68301675	0.000205333	1.51E+00	1.93E+00	1.59E+00	4.79E-04	*3.52*	0.547584034	0.452279998	0.000135968
	Zinc	1397.45	0.05855	146.0514485	351.6528803	27.51609291	17.2585075	0.012881	4.48E+01	7.82E-02	4.91E-02	3.66E-05	*0.13*	0.614370178	0.38534222	0.000287603

Table E.1-65. Average Exposure Calculations for Shrew - Station CB-05

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)					C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																			
	2-Butanone	0	0.0025					0	26.5937491	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025					0	3736.31185	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0	0.0025					0	6844.04418	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	8.04E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005					0	17	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0015					0	8.32444981	0	0	0.00033	3.30E-04	0.00E+00	0.00E+00	3.96E-05	*0.00*	0	0	1
	Semivolatile Organics																			
	2-Methylnaphthalene	0	0.0025					0	170.89	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.22E-06	*0.00*	0	0	1
	Acenaphthylene	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Anthracene	0	0.0025					0	1189.21	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	4.62E-07	*0.00*	0	0	1
	Benzo(a)anthracene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(a)pyrene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(b)fluoranthene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(g,h,i)perylene	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Benzo(k)fluoranthene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Carbazole	0	0					na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenz(a,h)anthracene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenzofuran	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	0	0.0025					0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Fluorene	0	0.0025					0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Indeno(1,2,3-cd)pyrene	0	0.0025					0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Naphthalene	0	0.0025					0	166.49	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.30E-06	*0.00*	0	0	1
	N-nitrosodiphenylamine	0	0.0025					0	329.67	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pyrene	0	0.0025					0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pesticides and PCBs																			
	4,4'-DDD	0	0.00005					0	18.68	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	5.89E-07	*0.00*	0	0	1
	4,4'-DDE	0	0.00005					0	2.26	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	4.87E-06	*0.00*	0	0	1
	4,4'-DDT	0	0.00005					0	1.76	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	6.26E-06	*0.00*	0	0	1
	Aldrin	0	0.000025					0	0.44	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.25E-05	*0.00*	0	0	1
	alpha-Chlordane	0	0.000025					0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Aroclor 1248	0	0.0005					0	1.55	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	7.12E-05	*0.00*	0	0	1
	Aroclor 1254	0	0.0005					0	0.08	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.36E-03	*0.00*	0	0	1
	Aroclor 1260	0	0.0005					0	0.76	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.45E-04	*0.00*	0	0	1
	beta-BHC	0	0.000025					0	8.79	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	6.26E-07	*0.00*	0	0	1
	delta-BHC	0	0.000025					0	3.52	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.56E-06	*0.00*	0	0	1
	Endosulfan I	0	0.000025					0	3.30	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Endosulfan Sulfate	0	0.00005					0	3.30	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	3.34E-06	*0.00*	0	0	1
	Endrin Aldehyde	0	0.00005					0	0.11	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	1.01E-04	*0.00*	0	0	1
	gamma-Chlordane	0	0.000025					0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Inorganics																			
X	Aluminum	5769	0.14033333					311.3428571	58.2711486	58.65699429	71.24715	0.03087333	1.30E+02	1.01E+00	1.22E+00	5.30E-04	*2.23*	0.4514333	0.54832909	0.00023761
	Antimony	0.9135	0.0006					0.0725	0.14865089	0.013659	0.01128173	0.000132	2.51E-02	9.19E-02	7.59E-02	8.88E-04	*0.17*	0.54477525	0.44996007	0.00526469
X	Arsenic	30.025	0.01268333					0.423282191	0.1498401	0.079746365	0.18911246	0.00279033	2.72E-01	5.32E-01	1.26E+00	1.86E-02	*1.81*	0.29356382	0.69616435	0.01027183
	Barium	26.755	0.03208333					1.528857143	11.8350385	0.288036686	0.33042425	0.00705833	6.26E-01	2.43E-02	2.79E-02	5.96E-04	*0.05*	0.46047612	0.52823992	0.01128396
	Beryllium	0.2595	4.5667E-05					0.020595238	1.45056813	0.003880143	0.00320483	1.0047E-05	7.10E-03	2.67E-03	2.21E-03	6.93E-06	*0.00*	0.546883	0.45170098	0.00141602
	Cadmium	0.494	0.00056					0.750362122	2.12000967	0.141368224	0.0061009	0.0001232	1.48E-01	6.67E-02	2.88E-03	5.81E-05	*0.07*	0.95782911	0.04133616	0.00083473
	Chromium	56.29	0.0062					1.448322096	19.7804745	0.272863883	0.6951815	0.001364	9.69E-01	1.38E-02	3.51E-02	6.90E-05	*0.05*	0.28147436	0.7171186	0.00140704
	Cobalt	5.64	0.000985					0.447619048	10.99	0.084331429	0.069654	0.0002167	1.54E-01	7.67E-03	6.34E-03	1.97E-05	*0.01*	0.54688887	0.45170583	0.0014053
	Copper	40.16	0.00718333					2.246488675	33.43	0.423238466	0.495976	0.00158033	9.21E-01	1.27E-02	1.48E-02	4.73E-05	*0.03*	0.45964472	0.53863901	0.00171627
	Cyanide	0	0.0025					0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	10107	1.20933333					609.6285714	7.01	114.8540229	124.82145	0.26605333	2.40E+02	1.64E+01	1.78E+01	3.79E-02	*34.22*	0.47867505	0.52021612	0.00110883
	Lead	50.34	0.00330833					3.01597128	17.582644	0.568208989	0.621699	0.00072783	1.19E+00	3.23E-02	3.54E-02	4.14E-05	*0.07*	0.47723156	0.52215714	0.0006113
	Manganese	193.85	0.5925					2.566651365	193.41	0.483557117	2.3940475	0.13035	3.01E+00	2.50E-03	1.24E-02	6.74E-04	*0.02*	0.16075945	0.79590546	0.0433351
	Mercury	0.174	0.00011583					0.065160865	0.07033058	0.012276307	0.0021489	2.5483E-05	1.45E-02	1.75E-01	3.06E-02	3.62E-04	*0.21*	0.84953083	0.1487057	0.00176347
	Nickel	9.755	0.00163333					3.470253136	87.9132201	0.653795691	0.12047425	0.00035933	7.75E-01	7.44E-03	1.37E-03	4.09E-06	*0.01*	0.84401108	0.15552504	0.00046388
	Selenium	0.5155	0.00075					0.090604753	0.4395661	0.017069936	0.00636643	0.000165	2.36E-02	3.88E-02	1.45E-02	3.75E-04	*0.05*	0.72326066	0.26974822	0.00699112
	Silver	0.1155	0.000375					0.009166667	398.246887	0.001727	0.00142643	0.0000825	3.24E-03	4.34E-06	3.58E-06	2.07E-07	*0.00*	0.53369593	0.44080904	0.02549503
	Thallium	0.781	0.00085					0.061984127	0.1643547	0.01167781	0.00964535	0.000187	2.15E-02	7.11E-02	5.87E-02	1.14E-03	*0.13*	0.54289739	0.44840904	0.00869357
X	Vanadium	22.72	0.00093333					1.803174603	0.42848914	0.339718095	0.280592	0.00020533	6.21E-01	7.93E-01	6.55E-01	4.79E-04	*1.45*	0.54747727	0.45219182	0.00033091
	Zinc	129.67	0.05855					66.96485497	351.65288	12.61617868	1.6014245	0.012881	1.42E+01	3.59E-02	4.55E-03	3.66E-05	*0.04*	0.88656004	0.11253479	0.00090517

Table E.1-66. Average Exposure Calculations for Shrew - Station CB-06

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)				C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																		
	2-Butanone	0	0.0025				0	26.59374907	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025				0	3736.311853	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0	0.0025				0	6844.044183	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	8.04E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005				0	17	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0015				0	8.324449805	0	0	0.00033	3.30E-04	0.00E+00	0.00E+00	3.96E-05	*0.00*	0	0	1
	Semivolatile Organics																		
	2-Methylnaphthalene	0	0.0025				0	170.89	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.22E-06	*0.00*	0	0	1
	Acenaphthylene	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Anthracene	0	0.0025				0	1189.21	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	4.62E-07	*0.00*	0	0	1
	Benzo(a)anthracene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(a)pyrene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(b)fluoranthene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(g,h,i)perylene	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Benzo(k)fluoranthene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Carbazole	0	0				na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenz(a,h)anthracene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenzofuran	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	0	0.0025				0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Fluorene	0	0.0025				0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Indeno(1,2,3-cd)pyrene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Naphthalene	0	0.0025				0	166.49	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.30E-06	*0.00*	0	0	1
	N-nitrosodiphenylamine	0	0.0025				0	329.67	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pyrene	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pesticides and PCBs																		
	4,4'-DDD	0	0.00005				0	18.68	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	5.89E-07	*0.00*	0	0	1
	4,4'-DDE	0	0.00005				0	2.26	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	4.87E-06	*0.00*	0	0	1
	4,4'-DDT	0	0.00005				0	1.76	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	6.26E-06	*0.00*	0	0	1
	Aldrin	0	0.000025				0	0.44	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.25E-05	*0.00*	0	0	1
	alpha-Chlordane	0	0.000025				0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Aroclor 1248	0	0.0005				0	1.55	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	7.12E-05	*0.00*	0	0	1
	Aroclor 1254	0	0.0005				0	0.08	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.36E-03	*0.00*	0	0	1
	Aroclor 1260	0	0.0005				0	0.76	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.45E-04	*0.00*	0	0	1
	beta-BHC	0	0.000025				0	8.79	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	6.26E-07	*0.00*	0	0	1
	delta-BHC	0	0.000025				0	3.52	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.56E-06	*0.00*	0	0	1
	Endosulfan I	0	0.000025				0	3.30	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Endosulfan Sulfate	0	0.00005				0	3.30	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	3.34E-06	*0.00*	0	0	1
	Endrin Aldehyde	0	0.00005				0	0.11	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	1.01E-04	*0.00*	0	0	1
	gamma-Chlordane	0	0.000025				0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Inorganics																		
X	Aluminum	7194.5	0.140333333				388.2746032	58.27114864	73.15093524	88.852075	0.030873333	1.62E+02	1.26E+00	1.52E+00	5.30E-04	*2.78*	0.451454558	0.548354906	0.000190536
	Antimony	1.72	0.0006				0.136507937	0.148650889	0.025718095	0.021242	0.000132	4.71E-02	1.73E-01	1.43E-01	8.88E-04	*0.32*	0.546123402	0.45107358	0.002803018
X	Arsenic	98.04	0.012683333				0.976017748	0.149840096	0.183881744	0.61750494	0.002790333	8.04E-01	1.23E+00	4.12E+00	1.86E-02	*5.37*	0.228658293	0.767871907	0.0034698
	Barium	40.295	0.032083333				2.302571429	11.83503851	0.433804457	0.49764325	0.007058333	9.39E-01	3.67E-02	4.20E-02	5.96E-04	*0.08*	0.462228732	0.53025045	0.007520818
	Beryllium	0.273	4.56667E-05				0.021666667	1.450568131	0.004082	0.00337155	1.00467E-05	7.46E-03	2.81E-03	2.32E-03	6.93E-06	*0.01*	0.546921301	0.451732609	0.00134609
	Cadmium	8.583	0.00056				7.261077336	2.120009672	1.36798697	0.10600005	0.0001232	1.47E+00	6.45E-01	5.00E-02	5.81E-05	*0.70*	0.928008606	0.071907818	8.35758E-05
	Chromium	280.29	0.0062				1.300631719	19.78047452	0.245039016	3.4615815	0.001364	3.71E+00	1.24E-02	1.75E-01	6.90E-05	*0.19*	0.066084153	0.933547992	0.000367855
	Cobalt	9.18	0.000985				0.728571429	10.99	0.137262857	0.113373	0.0002167	2.51E-01	1.25E-02	1.03E-02	1.97E-05	*0.02*	0.547185401	0.451950745	0.000863854
	Copper	179.6	0.007183333				3.336103883	33.43	0.628521971	2.21806	0.001580333	2.85E+00	1.88E-02	6.63E-02	4.73E-05	*0.09*	0.220676318	0.778768821	0.000554861
	Cyanide	0	0.0025				0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	12693	1.209333333				765.6095238	7.01	144.2408343	156.75855	0.266053333	3.01E+02	2.06E+01	2.24E+01	3.79E-02	*42.97*	0.478783213	0.520333667	0.000883119
	Lead	136.96	0.003308333				6.764168078	17.58264402	1.274369266	1.691456	0.000727833	2.97E+00	7.25E-02	9.62E-02	4.14E-05	*0.17*	0.429579119	0.570175535	0.000245346
	Manganese	78.815	0.5925				1.389320554	193.41	0.261747992	0.97336525	0.13035	1.37E+00	1.35E-03	5.03E-03	6.74E-04	*0.01*	0.191691716	0.712846175	0.095462108
	Mercury	0.231	0.000115833				0.067376468	0.070330576	0.012693727	0.00285285	2.54833E-05	1.56E-02	1.80E-01	4.06E-02	3.62E-04	*0.22*	0.8151604	0.183203122	0.001636478
	Nickel	18.625	0.001633333				2.933156355	87.91322008	0.552606657	0.23001875	0.000359333	7.83E-01	6.29E-03	2.62E-03	4.09E-06	*0.01*	0.705769383	0.293771689	0.000458928
	Selenium	1.39	0.00075				0.187463712	0.4395661	0.035318163	0.0171665	0.000165	5.26E-02	8.03E-02	3.91E-02	3.75E-04	*0.12*	0.670814609	0.326051468	0.003133923
	Silver	0.1295	0.000375				0.010277778	398.246887	0.001936333	0.001599325	0.0000825	3.62E-03	4.86E-06	4.02E-06	2.07E-07	*0.00*	0.535170978	0.442027367	0.022801656
	Thallium	3.215	0.00085				0.25515873	0.164354697	0.048071905	0.03970525	0.000187	8.80E-02	2.92E-01	2.42E-01	1.14E-03	*0.54*	0.54649425	0.451379884	0.002125866
X	Vanadium	53.025	0.000933333				4.208333333	0.428489138	0.79285	0.65485875	0.000205333	1.45E+00	1.85E+00	1.53E+00	4.79E-04	*3.38*	0.547580833	0.452277354	0.000141813
	Zinc	1420.5	0.05855				146.837268	351.6528803	27.66414129	17.543175	0.012881	4.52E+01	7.87E-02	4.99E-02	3.66E-05	*0.13*	0.611765161	0.387949988	0.000284851

Table E.1-67. Average Exposure Calculations for Shrew - Station DA

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0.0025	0	26.59374907	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025	0	3736.311853	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0	0.0025	0	6844.044183	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	8.04E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005	0	17	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0015	0	8.324449805	0	0	0.00033	3.30E-04	0.00E+00	0.00E+00	3.96E-05	*0.00*	0	0	1
	Semivolatile Organics															
	2-Methylnaphthalene	0	0.0025	0	170.89	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.22E-06	*0.00*	0	0	1
	Acenaphthylene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Anthracene	0	0.0025	0	1189.21	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	4.62E-07	*0.00*	0	0	1
	Benzo(a)anthracene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(a)pyrene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(b)fluoranthene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(g,h,i)perylene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Benzo(k)fluoranthene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenz(a,h)anthracene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenzofuran	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	0	0.0025	0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Fluorene	0	0.0025	0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Indeno(1,2,3-cd)pyrene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Naphthalene	0	0.0025	0	166.49	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.30E-06	*0.00*	0	0	1
	N-nitrosodiphenylamine	0	0.0025	0	329.67	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pyrene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pesticides and PCBs															
	4,4'-DDD	0	0.00005	0	18.68	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	5.89E-07	*0.00*	0	0	1
	4,4'-DDE	0	0.00005	0	2.26	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	4.87E-06	*0.00*	0	0	1
	4,4'-DDT	0	0.00005	0	1.76	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	6.26E-06	*0.00*	0	0	1
	Aldrin	0	0.000025	0	0.44	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.25E-05	*0.00*	0	0	1
	alpha-Chlordane	0	0.000025	0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Aroclor 1248	0	0.0005	0	1.55	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	7.12E-05	*0.00*	0	0	1
	Aroclor 1254	0	0.0005	0	0.08	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.36E-03	*0.00*	0	0	1
	Aroclor 1260	0	0.0005	0	0.76	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.45E-04	*0.00*	0	0	1
	beta-BHC	0	0.000025	0	8.79	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	6.26E-07	*0.00*	0	0	1
	delta-BHC	0	0.000025	0	3.52	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.56E-06	*0.00*	0	0	1
	Endosulfan I	0	0.000025	0	3.30	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Endosulfan Sulfate	0	0.00005	0	3.30	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	3.34E-06	*0.00*	0	0	1
	Endrin Aldehyde	0	0.00005	0	0.11	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	1.01E-04	*0.00*	0	0	1
	gamma-Chlordane	0	0.000025	0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Inorganics															
X	Aluminum	6979	0.140333333	376.6444444	58.27114864	70.95981333	86.19065	0.030873333	1.57E+02	1.22E+00	1.48E+00	5.30E-04	*2.70*	0.451451902	0.54835168	0.000196419
	Antimony	1.01	0.0006	0.08015873	0.148650889	0.015101905	0.0124735	0.000132	2.77E-02	1.02E-01	8.39E-02	8.88E-04	*0.19*	0.545049415	0.450186515	0.004764069
X	Arsenic	98.63	0.012683333	0.980160871	0.149840096	0.184662308	0.621221055	0.002790333	8.09E-01	1.23E+00	4.15E+00	1.86E-02	*5.40*	0.228352064	0.76819743	0.003450506
	Barium	35.29	0.032083333	2.016571429	11.83503851	0.379922057	0.4358315	0.007058333	8.23E-01	3.21E-02	3.68E-02	5.96E-04	*0.07*	0.461736226	0.529685466	0.008578307
	Beryllium	0.221	4.56667E-05	0.017539683	1.450568131	0.003304476	0.00272935	1.00467E-05	6.04E-03	2.28E-03	1.88E-03	6.93E-06	*0.00*	0.546748131	0.451589579	0.001662291
	Cadmium	1.352	0.00056	1.670646035	2.120009672	0.314749713	0.0166972	0.0001232	3.32E-01	1.48E-01	7.88E-03	5.81E-05	*0.16*	0.949270458	0.050357977	0.000371565
	Chromium	193.25	0.0062	1.333441735	19.78047452	0.251220423	2.3866375	0.001364	2.64E+00	1.27E-02	1.21E-01	6.90E-05	*0.13*	0.095187305	0.904295876	0.000516819
	Cobalt	9.02	0.000985	0.715873016	10.99	0.134870476	0.111397	0.0002167	2.46E-01	1.23E-02	1.01E-02	1.97E-05	*0.02*	0.547177017	0.451943819	0.000879164
	Copper	145.18	0.007183333	3.153886697	33.43	0.594192254	1.792973	0.001580333	2.39E+00	1.78E-02	5.36E-02	4.73E-05	*0.07*	0.248746563	0.750591863	0.000661575
	Cyanide	0	0.0025	0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	16868	1.209333333	1017.434921	7.01	191.684739	208.3198	0.266053333	4.00E+02	2.73E+01	2.97E+01	3.79E-02	*57.09*	0.478887889	0.520447427	0.000664684
	Lead	134.22	0.003308333	6.654749997	17.58264402	1.253754899	1.657617	0.000727833	2.91E+00	7.13E-02	9.43E-02	4.14E-05	*0.17*	0.430532954	0.569217112	0.000249934
	Manganese	791.28	0.5925	6.698481873	193.41	1.261993985	9.772308	0.13035	1.12E+01	6.52E-03	5.05E-02	6.74E-04	*0.06*	0.11303478	0.875289979	0.011675241
	Mercury	1.189	0.000115833	0.081747313	0.070330576	0.015401194	0.01468415	2.54833E-05	3.01E-02	2.19E-01	2.09E-01	3.62E-04	*0.43*	0.511483584	0.487670098	0.000846318
	Nickel	11.26	0.001633333	3.343183888	87.91322008	0.629855844	0.139061	0.000359333	7.69E-01	7.16E-03	1.58E-03	4.09E-06	*0.01*	0.818764265	0.180768629	0.000467106
	Selenium	1.052	0.00075	0.152835732	0.4395661	0.028794252	0.0129922	0.000165	4.20E-02	6.55E-02	2.96E-02	3.75E-04	*0.10*	0.686370807	0.309696075	0.003933118
	Silver	0.146	0.000375	0.011587302	398.246887	0.002183048	0.0018031	0.0000825	4.07E-03	5.48E-06	4.53E-06	2.07E-07	*0.00*	0.536553623	0.443169369	0.020277008
	Thallium	1.47	0.00085	0.116666667	0.164354697	0.02198	0.0181545	0.000187	4.03E-02	1.34E-01	1.10E-01	1.14E-03	*0.25*	0.545118609	0.450243667	0.004637724
X	Vanadium	26.66	0.000933333	2.115873016	0.428489138	0.398630476	0.329251	0.000205333	7.28E-01	9.30E-01	7.68E-01	4.79E-04	*1.70*	0.547504049	0.452213933	0.000282018
	Zinc	274.54	0.05855	85.64425154	351.6528803	16.13537699	3.390569	0.012881	1.95E+01	4.59E-02	9.64E-03	3.66E-05	*0.06*	0.825810935	0.173529813	0.000659251

Table E.1-68. Average Exposure Calculations for Shrew - Station NRSE

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)				C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																		
	2-Butanone	0	0.0025				0	26.59374907	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025				0	3736.311853	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0	0.000583333				0	6844.044183	0	0	0.000128333	1.28E-04	0.00E+00	0.00E+00	1.88E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005				0	17	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0005				0	8.324449805	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.32E-05	*0.00*	0	0	1
	Semivolatile Organics																		
	2-Methylnaphthalene	0	0.0025				0	170.89	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.22E-06	*0.00*	0	0	1
	Acenaphthylene	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Anthracene	0	0.0025				0	1189.21	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	4.62E-07	*0.00*	0	0	1
	Benzo(a)anthracene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(a)pyrene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(b)fluoranthene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(g,h,i)perylene	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Benzo(k)fluoranthene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Carbazole	0	0				na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenz(a,h)anthracene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenzofuran	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	0	0.0025				0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Fluorene	0	0.0025				0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Indeno(1,2,3-cd)pyrene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Naphthalene	0	0.0025				0	166.49	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.30E-06	*0.00*	0	0	1
	N-nitrosodiphenylamine	0	0.0025				0	329.67	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pyrene	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pesticides and PCBs																		
	4,4'-DDD	0	0.00005				0	18.68	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	5.89E-07	*0.00*	0	0	1
	4,4'-DDE	0	0.00005				0	2.26	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	4.87E-06	*0.00*	0	0	1
	4,4'-DDT	0	0.00005				0	1.76	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	6.26E-06	*0.00*	0	0	1
	Aldrin	0	0.000025				0	0.44	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.25E-05	*0.00*	0	0	1
	alpha-Chlordane	0	2.17286E-05				0	5.45	0	0	4.78029E-06	4.78E-06	0.00E+00	0.00E+00	8.78E-07	*0.00*	0	0	1
	Aroclor 1248	0	0.0005				0	1.55	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	7.12E-05	*0.00*	0	0	1
	Aroclor 1254	0	0.0005				0	0.08	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.36E-03	*0.00*	0	0	1
	Aroclor 1260	0	0.0005				0	0.76	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.45E-04	*0.00*	0	0	1
	beta-BHC	0	0.000025				0	8.79	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	6.26E-07	*0.00*	0	0	1
	delta-BHC	0	0.000025				0	3.52	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.56E-06	*0.00*	0	0	1
	Endosulfan I	0	0.000025				0	3.30	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Endosulfan Sulfate	0	0.00005				0	3.30	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	3.34E-06	*0.00*	0	0	1
	Endrin Aldehyde	0	0.00005				0	0.11	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	1.01E-04	*0.00*	0	0	1
	gamma-Chlordane	0	2.16286E-05				0	5.45	0	0	4.75829E-06	4.76E-06	0.00E+00	0.00E+00	8.74E-07	*0.00*	0	0	1
	Inorganics																		
X	Aluminum	6652	0.386114286				358.9968254	58.27114864	67.6350019	82.1522	0.084945143	1.50E+02	1.16E+00	1.41E+00	1.46E-03	*2.57*	0.451284667	0.548148549	0.000566784
	Antimony	0.92	0.000692857				0.073015873	0.148650889	0.01375619	0.011362	0.000152429	2.53E-02	9.25E-02	7.64E-02	1.03E-03	*0.17*	0.544355105	0.449613046	0.006031849
X	Arsenic	165.8	0.024585714				1.414339457	0.149840096	0.266461554	1.0442913	0.005408857	1.32E+00	1.78E+00	6.97E+00	3.61E-02	*8.78*	0.202453507	0.793436925	0.004109569
	Barium	41.18	0.037342857				2.353142857	11.83503851	0.443332114	0.508573	0.008215429	9.60E-01	3.75E-02	4.30E-02	6.94E-04	*0.08*	0.461746306	0.52969703	0.008556664
	Beryllium	0.502	6.37857E-05				0.03984127	1.450568131	0.007506095	0.0061997	1.40329E-05	1.37E-02	5.17E-03	4.27E-03	9.67E-06	*0.01*	0.547098345	0.45187884	0.001022816
	Cadmium	1.339	0.00043				1.657862596	2.120009672	0.312341313	0.01653665	0.0000946	3.29E-01	1.47E-01	7.80E-03	4.46E-05	*0.16*	0.949444872	0.050267566	0.000287562
	Chromium	186.2	0.025785714				1.336766065	19.78047452	0.251846727	2.29957	0.005672857	2.56E+00	1.27E-02	1.16E-01	2.87E-04	*0.13*	0.098489599	0.899291919	0.002218482
	Cobalt	6.44	0.00146857				0.511111111	10.99	0.096293333	0.079534	0.000323085	1.76E-01	8.76E-03	7.24E-03	2.94E-05	*0.02*	0.546654013	0.451511842	0.001834145
	Copper	202.06	0.021542857				3.441513724	33.43	0.648381186	2.495441	0.004739429	3.15E+00	1.94E-02	7.46E-02	1.42E-04	*0.09*	0.205929331	0.792565402	0.001505268
	Cyanide	0	0.0025				0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	19420	2.401				1171.365079	7.01	220.685181	239.837	0.52822	4.61E+02	3.15E+01	3.42E+01	7.53E-02	*65.76*	0.478657389	0.520196923	0.001145688
	Lead	161.36	0.013072856				7.721017116	17.58264402	1.454639625	1.992796	0.002876028	3.45E+00	8.27E-02	1.13E-01	1.64E-04	*0.20*	0.421596589	0.577569855	0.000833556
	Manganese	163.88	0.469714286				2.288874096	193.41	0.43122388	2.023918	0.103337143	2.56E+00	2.23E-03	1.05E-02	5.34E-04	*0.01*	0.168546967	0.791062964	0.040390068
	Mercury	2.634	0.000203929				0.089791389	0.070330576	0.016916698	0.0325299	4.48643E-05	4.95E-02	2.41E-01	4.63E-01	6.38E-04	*0.70*	0.341810425	0.657283069	0.000906506
	Nickel	10.78	0.002842857				3.381266243	87.91322008	0.63703056	0.133133	0.000625429	7.71E-01	7.25E-03	1.51E-03	7.11E-06	*0.01*	0.826465569	0.172723017	0.000811413
	Selenium	1.752	0.000857143				0.222125214	0.4395661	0.04184839	0.0216372	0.000188571	6.37E-02	9.52E-02	4.92E-02	4.29E-04	*0.14*	0.657227189	0.339811305	0.002961506
	Silver	1.512	0.00025				0.12	398.246887	0.022608	0.0186732	0.000055	4.13E-02	5.68E-05	4.69E-05	1.38E-07	*0.00*	0.54692981	0.451739637	0.001330553
	Thallium	0.93	0.000778571				0.073809524	0.164354697	0.013905714	0.0114855	0.000171286	2.56E-02	8.46E-02	6.99E-02	1.04E-03	*0.16*	0.543988823	0.449310514	0.006700663
X	Vanadium	23.62	0.001878929				1.874603175	0.428489138	0.353175238	0.291707	0.000413364	6.45E-01	8.24E-01	6.81E-01	9.65E-04	*1.51*	0.547307679	0.45205174	0.000640581
	Zinc	342.6	0.127785714				92.09707245	351.6528803	17.35108845	4.23111	0.028112857	2.16E+01	4.93E-02	1.20E-02	7.99E-05	*0.06*	0.802907844	0.195791256	0.0013009

Table E.1-69. Average Exposure Calculations for Shrew - Station JY

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)					C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																			
	2-Butanone	0	0.0025					0	26.59374907	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025					0	3736.311853	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0	0.000583333					0	6844.044183	0	0	0.000128333	0.00E+00	0.00E+00	0.00E+00	1.88E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005					0	17	0	0	0.00011	0.00E+00	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0005					0	8.324449805	0	0	0.00011	0.00E+00	0.00E+00	0.00E+00	1.32E-05	*0.00*	0	0	1
	Semivolatile Organics																			
	2-Methylnaphthalene	0	0.0025					0	170.89	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.22E-06	*0.00*	0	0	1
	Acenaphthylene	0	0.0025					0	158.52	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Anthracene	0	0.0025					0	1189.21	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	4.62E-07	*0.00*	0	0	1
	Benzo(a)anthracene	0	0.0025					0	1.55	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(a)pyrene	0	0.0025					0	1.55	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(b)fluoranthene	0	0.0025					0	1.55	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(g,h,i)perylene	0	0.0025					0	158.52	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Benzo(k)fluoranthene	0	0.0025					0	1.55	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Carbazole	0	0					na	158.52	No BCF		0	0.00E+00	No BCF		0.00E+00	*0.00*	0	0	0
	Chrysene	0	0.0025					0	1.55	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenz(a,h)anthracene	0	0.0025					0	1.55	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenzofuran	0	0.0025					0	158.52	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	0	0.0025					0	148.65	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Fluorene	0	0.0025					0	148.65	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Indeno(1,2,3-cd)pyrene	0	0.0025					0	1.55	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Naphthalene	0	0.0025					0	166.49	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.30E-06	*0.00*	0	0	1
	N-nitrosodiphenylamine	0	0.0025					0	329.67	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0	0.0025					0	158.52	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pyrene	0	0.0025					0	158.52	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pesticides and PCBs																			
	4,4'-DDD	0	0.00005					0	18.68	0	0	0.000011	0.00E+00	0.00E+00	0.00E+00	5.89E-07	*0.00*	0	0	1
	4,4'-DDE	0	0.00005					0	2.26	0	0	0.000011	0.00E+00	0.00E+00	0.00E+00	4.87E-06	*0.00*	0	0	1
	4,4'-DDT	0	0.00005					0	1.76	0	0	0.000011	0.00E+00	0.00E+00	0.00E+00	6.26E-06	*0.00*	0	0	1
	Aldrin	0	0.000025					0	0.44	0	0	0.0000055	0.00E+00	0.00E+00	0.00E+00	1.25E-05	*0.00*	0	0	1
	alpha-Chlordane	0	2.17286E-05					0	5.45	0	0	4.78029E-06	0.00E+00	0.00E+00	0.00E+00	8.78E-07	*0.00*	0	0	1
	Aroclor 1248	0.1215	0.0005					0.264471539	1.55	0.049826438	0.001500525	0.00011	5.14E-02	3.22E-02	9.71E-04	7.12E-05	*0.03*	0.968689345	0.029172115	0.00213854
X	Aroclor 1254	0.906	0.0005					1.995404112	0.08	0.375934135	0.0111891	0.00011	3.87E-01	4.65E+00	1.38E-01	1.36E-03	*4.79*	0.970820945	0.028894989	0.000284067
	Aroclor 1260	0.99	0.0005					2.206164337	0.76	0.415641361	0.0122265	0.00011	4.28E-01	5.48E-01	1.61E-02	1.45E-04	*0.56*	0.971174911	0.028568067	0.000257023
	beta-BHC	0	0.000025					0	8.79	0	0	0.0000055	0.00E+00	0.00E+00	0.00E+00	6.26E-07	*0.00*	0	0	1
	delta-BHC	0	0.000025					0	3.52	0	0	0.0000055	0.00E+00	0.00E+00	0.00E+00	1.56E-06	*0.00*	0	0	1
	Endosulfan I	0	0.000025					0	3.30	0	0	0.0000055	0.00E+00	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Endosulfan Sulfate	0	0.00005					0	3.30	0	0	0.000011	0.00E+00	0.00E+00	0.00E+00	3.34E-06	*0.00*	0	0	1
	Endrin Aldehyde	0	0.00005					0	0.11	0	0	0.000011	0.00E+00	0.00E+00	0.00E+00	1.01E-04	*0.00*	0	0	1
	gamma-Chlordane	0	2.16286E-05					0	5.45	0	0	4.75829E-06	0.00E+00	0.00E+00	0.00E+00	8.74E-07	*0.00*	0	0	1
	Inorganics																			
X	Aluminum	9592	0.386114286					517.6634921	58.27114864	97.5278019	118.4612	0.084945143	2.16E+02	1.67E+00	2.03E+00	1.46E-03	*3.71*	0.451363078	0.548243792	0.00039313
	Antimony	5.405	0.000692857					0.428968254	0.148650889	0.080817619	0.06675175	0.000152429	1.48E-01	5.44E-01	4.49E-01	1.03E-03	*0.99*	0.54709339	0.451874748	0.001031862
X	Arsenic	144.785	0.024585714					1.285280217	0.149840096	0.242146793	0.911928323	0.005408857	1.16E+00	1.62E+00	6.09E+00	3.61E-02	*7.74*	0.208840138	0.786494979	0.004664883
	Barium	126.68	0.037342857					7.238857143	11.83503851	1.363800686	1.564498	0.008215429	2.94E+00	1.15E-01	1.32E-01	6.94E-04	*0.25*	0.464428446	0.532773874	0.002797681
	Beryllium	0.463	6.37857E-05					0.036746032	1.450568131	0.006922952	0.00571805	1.40329E-05	1.27E-02	4.77E-03	3.94E-03	9.67E-06	*0.01*	0.547051213	0.451839911	0.001108875
	Cadmium	11.11	0.00043					8.914575014	2.120009672	1.679505933	0.1372085	0.0000946	1.82E+00	7.92E-01	6.47E-02	4.46E-05	*0.86*	0.924426234	0.075521696	5.20693E-05
	Chromium	838.56	0.025785714					1.208557348	19.78047452	0.227692204	10.356216	0.005672857	1.06E+01	1.15E-02	5.24E-01	2.87E-04	*0.54*	0.021501531	0.977962767	0.000535702
	Cobalt	12.59	0.00146857					0.999206349	10.99	0.188250476	0.1554865	0.000323085	3.44E-01	1.71E-02	1.41E-02	2.94E-05	*0.03*	0.547144226	0.451916736	0.000939038
	Copper	377.55	0.021542857					4.059045824	33.43	0.764724233	4.6627425	0.004739429	5.43E+00	2.29E-02	1.39E-01	1.42E-04	*0.16*	0.140775996	0.858351535	0.000872468
	Cyanide	0	0.0025					0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	28394	2.401					1712.653968	7.01	322.6640076	350.6659	0.52822	6.74E+02	4.60E+01	5.00E+01	7.53E-02	*96.11*	0.478830772	0.520385354	0.000783874
	Lead	523.31	0.013072856					19.95362343	17.58264402	3.759262654	6.4628785	0.002876028	1.02E+01	2.14E-01	3.68E-01	1.64E-04	*0.58*	0.367653431	0.632065295	0.000281274
	Manganese	292.85	0.469714286					3.400691583	193.41	0.640690294	3.6166975	0.103337143	4.36E+00	3.31E-03	1.87E-02	5.34E-04	*0.02*	0.146922886	0.829379874	0.023697239
	Mercury	0.765	0.000203929					0.077602208	0.070330576	0.014620256	0.00944775	4.48643E-05	2.41E-02	2.08E-01	1.34E-01	6.38E-04	*0.34*	0.606325825	0.391813579	0.001860595
	Nickel	51.75	0.002842857					2.248762324	87.91322008	0.423666822	0.6391125	0.000625429	1.06E+00	4.82E-03	7.27E-03	7.11E-06	*0.01*	0.398405989	0.601005873	0.000588138
	Selenium	3.022	0.000857143					0.331240324	0.4395661	0.062405677	0.0373217	0.000188571	9.99E-02	1.42E-01	8.49E-02	4.29E-04	*0.23*	0.624581741	0.373530959	0.001887301
	Silver	0.7035	0.00025					0.055833333	398.246887	0.010519	0.008688225	0.000055	1.93E-02	2.64E-05	2.18E-05	1.38E-07	*0.00*	0.546094753	0.451049918	0.00285533
	Thallium	2.5277778	0.000778571					0.200617286	0.164354697	0.037796297	0.031218056	0.000171286	6.92E-02	2.30E-01	1.90E-01	1.04E-03	*0.42*	0.546302638	0.451221621	0.002475741
X	Vanadium	48.87	0.001878929					3.878571429	0.428489138	0.730722857	0.6035445	0.000413364	1.33E+00	1.71E+00	1.41E+00	9.65E-04	*3.11*	0.547488883	0.452201407	0.00030971
	Zinc	1819.5	0.127785714					159.257482	351.6528803	30.0041096	22.470825	0.028112857	5.25E+01	8.53E-02	6.39E-02	7.99E-05	*0.15*	0.571473677	0.427990871	0.000535452

Table E.1-70. Average Exposure Calculations for Shrew - Station NRSO

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0.0025	0	26.5937491	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025	0	3736.31185	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0	0.00058333	0	6844.04418	0	0	0.00012833	1.28E-04	0.00E+00	0.00E+00	1.88E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005	0	17	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0005	0	8.32444981	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.32E-05	*0.00*	0	0	1
	Semivolatile Organics															
	2-Methylnaphthalene	0	0.0025	0	170.89	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.22E-06	*0.00*	0	0	1
	Acenaphthylene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Anthracene	0	0.0025	0	1189.21	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	4.62E-07	*0.00*	0	0	1
	Benzo(a)anthracene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(a)pyrene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(b)fluoranthene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(g,h,i)perylene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Benzo(k)fluoranthene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenz(a,h)anthracene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenzofuran	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	0	0.0025	0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Fluorene	0	0.0025	0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Indeno(1,2,3-cd)pyrene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Naphthalene	0	0.0025	0	166.49	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.30E-06	*0.00*	0	0	1
	N-nitrosodiphenylamine	0	0.0025	0	329.67	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pyrene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pesticides and PCBs															
	4,4'-DDD	0	0.00005	0	18.68	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	5.89E-07	*0.00*	0	0	1
	4,4'-DDE	0	0.00005	0	2.26	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	4.87E-06	*0.00*	0	0	1
	4,4'-DDT	0	0.00005	0	1.76	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	6.26E-06	*0.00*	0	0	1
	Aldrin	0	0.000025	0	0.44	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.25E-05	*0.00*	0	0	1
	alpha-Chlordane	0	2.1729E-05	0	5.45	0	0	4.7803E-06	4.78E-06	0.00E+00	0.00E+00	8.78E-07	*0.00*	0	0	1
	Aroclor 1248	0	0.0005	0	1.55	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	7.12E-05	*0.00*	0	0	1
	Aroclor 1254	0	0.0005	0	0.08	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.36E-03	*0.00*	0	0	1
	Aroclor 1260	0	0.0005	0	0.76	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.45E-04	*0.00*	0	0	1
	beta-BHC	0	0.000025	0	8.79	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	6.26E-07	*0.00*	0	0	1
	delta-BHC	0	0.000025	0	3.52	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.56E-06	*0.00*	0	0	1
	Endosulfan I	0	0.000025	0	3.30	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Endosulfan Sulfate	0	0.00005	0	3.30	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	3.34E-06	*0.00*	0	0	1
	Endrin Aldehyde	0	0.00005	0	0.11	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	1.01E-04	*0.00*	0	0	1
	gamma-Chlordane	0	2.1629E-05	0	5.45	0	0	4.7583E-06	4.76E-06	0.00E+00	0.00E+00	8.74E-07	*0.00*	0	0	1
	Inorganics															
X	Aluminum	4608	0.38611429	248.6857143	58.2711486	46.85238857	56.9088	0.08494514	1.04E+02	8.04E-01	9.77E-01	1.46E-03	*1.78*	0.45117124	0.54801077	0.00081799
	Antimony	0.89	0.00069286	0.07063492	0.14865089	0.013307619	0.0109915	0.00015243	2.45E-02	8.95E-02	7.39E-02	1.03E-03	*0.16*	0.54424445	0.44952165	0.0062339
X	Arsenic	111.42	0.02458571	1.068274766	0.1498401	0.201262966	0.70177887	0.00540886	9.08E-01	1.34E+00	4.68E+00	3.61E-02	*6.06*	0.22154528	0.77250078	0.00595394
	Barium	37.62	0.03734286	2.149714286	11.8350385	0.405006171	0.464607	0.00821543	8.78E-01	3.42E-02	3.93E-02	6.94E-04	*0.07*	0.46137272	0.52926847	0.00935881
	Beryllium	0.273	6.3786E-05	0.021666667	1.45056813	0.004082	0.00337155	1.4033E-05	7.47E-03	2.81E-03	2.32E-03	9.67E-06	*0.01*	0.54662936	0.45149148	0.00187917
	Cadmium	0.981	0.00043	1.294597716	2.12000967	0.24390221	0.01211535	0.0000946	2.56E-01	1.15E-01	5.71E-03	4.46E-05	*0.12*	0.95232577	0.04730486	0.00036937
	Chromium	97.87	0.02578571	1.395630744	19.7804745	0.262936832	1.2086945	0.00567286	1.48E+00	1.33E-02	6.11E-02	2.87E-04	*0.07*	0.17798422	0.81817577	0.00384001
	Cobalt	5.99	0.00146857	0.475396825	10.99	0.089564762	0.0739765	0.00032309	1.64E-01	8.15E-03	6.73E-03	2.94E-05	*0.01*	0.5465787	0.45144964	0.00197166
	Copper	96.88	0.02154286	2.834448072	33.43	0.534010017	1.196468	0.00473943	1.74E+00	1.60E-02	3.58E-02	1.42E-04	*0.05*	0.30774818	0.6895205	0.00273132
	Cyanide	0	0.0025	0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	17216	2.401	1038.425397	7.01	195.6393448	212.6176	0.52822	4.09E+02	2.79E+01	3.03E+01	7.53E-02	*58.31*	0.47858719	0.52012064	0.00129217
	Lead	85.4	0.01307286	4.620295364	17.582644	0.870463647	1.05469	0.00287603	1.93E+00	4.95E-02	6.00E-02	1.64E-04	*0.11*	0.45147834	0.54702996	0.00149169
	Manganese	307	0.46971429	3.511911577	193.41	0.661644141	3.79145	0.10333714	4.56E+00	3.42E-03	1.96E-02	5.34E-04	*0.02*	0.14521104	0.83210955	0.0226794
	Mercury	0.814	0.00020393	0.078172807	0.07033058	0.014727757	0.0100529	4.4864E-05	2.48E-02	2.09E-01	1.43E-01	6.38E-04	*0.35*	0.59325066	0.40494215	0.00180718
	Nickel	8.2	0.00284286	3.630518421	87.9132201	0.68398967	0.10127	0.00062543	7.86E-01	7.78E-03	1.15E-03	7.11E-06	*0.01*	0.8703431	0.12886108	0.00079583
	Selenium	0.922	0.00085714	0.138750683	0.4395661	0.026140629	0.0113867	0.00018857	3.77E-02	5.95E-02	2.59E-02	4.29E-04	*0.09*	0.69309306	0.30190715	0.00499979
	Silver	1.094	0.00025	0.086825397	398.246887	0.016357905	0.0135109	0.000055	2.99E-02	4.11E-05	3.39E-05	1.38E-07	*0.00*	0.5466519	0.4515101	0.001838
	Thallium	0.9	0.00077857	0.071428571	0.1643547	0.013457143	0.011115	0.00017129	2.47E-02	8.19E-02	6.76E-02	1.04E-03	*0.15*	0.54386735	0.44921018	0.00692247
X	Vanadium	16.19	0.00187893	1.284920635	0.42848914	0.242079048	0.1999465	0.00041336	4.42E-01	5.65E-01	4.67E-01	9.65E-04	*1.03*	0.54714683	0.45191889	0.00093429
	Zinc	290	0.12778571	87.19711481	351.65288	16.42793643	3.5815	0.02811286	2.00E+01	4.67E-02	1.02E-02	7.99E-05	*0.06*	0.81985757	0.17873942	0.00140301

Table E.1-71. Average Exposure Calculations for Shrew - Station KFSO

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0.0025	0	26.59374907	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025	0	3736.311853	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0	0.0025	0	6844.044183	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	8.04E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005	0	17	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0015	0	8.324449805	0	0	0.00033	3.30E-04	0.00E+00	0.00E+00	3.96E-05	*0.00*	0	0	1
	Semivolatile Organics															
	2-Methylnaphthalene	0	0.0025	0	170.89	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.22E-06	*0.00*	0	0	1
	Acenaphthylene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Anthracene	0	0.0025	0	1189.21	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	4.62E-07	*0.00*	0	0	1
	Benzo(a)anthracene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(a)pyrene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(b)fluoranthene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(g,h,i)perylene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Benzo(k)fluoranthene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenz(a,h)anthracene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenzofuran	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	0	0.0025	0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Fluorene	0	0.0025	0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Indeno(1,2,3-cd)pyrene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Naphthalene	0	0.0025	0	166.49	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.30E-06	*0.00*	0	0	1
	N-nitrosodiphenylamine	0	0.0025	0	329.67	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pyrene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pesticides and PCBs															
	4,4'-DDD	0	0.00005	0	18.68	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	5.89E-07	*0.00*	0	0	1
	4,4'-DDE	0	0.00005	0	2.26	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	4.87E-06	*0.00*	0	0	1
	4,4'-DDT	0	0.00005	0	1.76	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	6.26E-06	*0.00*	0	0	1
	Aldrin	0	0.000025	0	0.44	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.25E-05	*0.00*	0	0	1
	alpha-Chlordane	0	0.000025	0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Aroclor 1248	0	0.0005	0	1.55	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	7.12E-05	*0.00*	0	0	1
	Aroclor 1254	0	0.0005	0	0.08	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.36E-03	*0.00*	0	0	1
	Aroclor 1260	0	0.0005	0	0.76	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.45E-04	*0.00*	0	0	1
	beta-BHC	0	0.000025	0	8.79	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	6.26E-07	*0.00*	0	0	1
	delta-BHC	0	0.000025	0	3.52	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.56E-06	*0.00*	0	0	1
	Endosulfan I	0	0.000025	0	3.30	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Endosulfan Sulfate	0	0.00005	0	3.30	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	3.34E-06	*0.00*	0	0	1
	Endrin Aldehyde	0	0.00005	0	0.11	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	1.01E-04	*0.00*	0	0	1
	gamma-Chlordane	0	0.000025	0	5.45	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.01E-06	*0.00*	0	0	1
	Inorganics															
X	Aluminum	5604	0.140333333	302.4380952	58.27114864	56.97933714	69.2094	0.030873333	1.26E+02	9.78E-01	1.19E+00	5.30E-04	*2.17*	0.451430146	0.548325254	0.0002446
	Antimony	0.865	0.0006	0.068650794	0.148650889	0.01293381	0.01068275	0.000132	2.37E-02	8.70E-02	7.19E-02	8.88E-04	*0.16*	0.544614485	0.449827283	0.005558232
X	Arsenic	39.695	0.012683333	0.51550688	0.149840096	0.097121496	0.250018958	0.002790333	3.50E-01	6.48E-01	1.67E+00	1.86E-02	*2.34*	0.277544874	0.714481168	0.007973958
	Barium	50.985	0.032083333	2.913428571	11.83503851	0.548889943	0.62966475	0.007058333	1.19E+00	4.64E-02	5.32E-02	5.96E-04	*0.10*	0.462958765	0.531087915	0.00595332
	Beryllium	0.3645	4.56667E-05	0.028928571	1.450568131	0.005450143	0.004501575	1.00467E-05	9.96E-03	3.76E-03	3.10E-03	6.93E-06	*0.01*	0.547106172	0.451885305	0.001008524
	Cadmium	1.0435	0.00056	1.359751279	2.120009672	0.256177141	0.012887225	0.0001232	2.69E-01	1.21E-01	6.08E-03	5.81E-05	*0.13*	0.951667808	0.047874518	0.000457673
	Chromium	101.59	0.0062	1.392146808	19.78047452	0.262280459	1.2546365	0.001364	1.52E+00	1.33E-02	6.34E-02	6.90E-05	*0.08*	0.172748303	0.826353313	0.000898384
	Cobalt	9.025	0.000985	0.716269841	10.99	0.134945238	0.11145875	0.0002167	2.47E-01	1.23E-02	1.01E-02	1.97E-05	*0.02*	0.547177283	0.451944039	0.000878677
	Copper	90.89	0.007183333	2.787089698	33.43	0.525087699	1.1224915	0.001580333	1.65E+00	1.57E-02	3.36E-02	4.73E-05	*0.05*	0.318397152	0.680644582	0.000958266
	Cyanide	0	0.0025	0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	14884	1.209333333	897.7650794	7.01	169.138941	183.8174	0.266053333	3.53E+02	2.41E+01	2.62E+01	3.79E-02	*50.38*	0.478845463	0.520401319	0.000753218
	Lead	160.31	0.003308333	7.680446202	17.58264402	1.446996064	1.9798285	0.000727833	3.43E+00	8.23E-02	1.13E-01	4.14E-05	*0.19*	0.422165994	0.577621658	0.000212348
	Manganese	638.3	0.5925	5.785516576	193.41	1.089991323	7.883005	0.13035	9.10E+00	5.64E-03	4.08E-02	6.74E-04	*0.05*	0.119735236	0.865945853	0.01431891
	Mercury	0.5875	0.000115833	0.075222014	0.070330576	0.014171827	0.007255625	2.54833E-05	2.15E-02	2.02E-01	1.03E-01	3.62E-04	*0.31*	0.660600842	0.338211286	0.001187871
	Nickel	11.805	0.001633333	3.302349915	87.91322008	0.622162724	0.14579175	0.000359333	7.68E-01	7.08E-03	1.66E-03	4.09E-06	*0.01*	0.809776836	0.189755473	0.000467691
	Selenium	0.39	0.00075	0.073847828	0.4395661	0.013912931	0.0048165	0.000165	1.89E-02	3.17E-02	1.10E-02	3.75E-04	*0.04*	0.736350882	0.254916386	0.008732732
	Silver	0.5935	0.000375	0.047103175	398.246887	0.008874238	0.007329725	0.0000825	1.63E-02	2.23E-05	1.84E-05	2.07E-07	*0.00*	0.544884303	0.45005014	0.005065557
	Thallium	0.875	0.00085	0.069444444	0.164354697	0.013083333	0.01080625	0.000187	2.41E-02	7.96E-02	6.57E-02	1.14E-03	*0.15*	0.543404899	0.448828218	0.007766883
X	Vanadium	25.175	0.000933333	1.998015873	0.428489138	0.37642619	0.31091125	0.000205333	6.88E-01	8.78E-01	7.26E-01	4.79E-04	*1.60*	0.547494941	0.452206411	0.000298648
	Zinc	334	0.05855	91.33230383	351.6528803	17.20700604	4.1249	0.012881	2.13E+01	4.89E-02	1.17E-02	3.66E-05	*0.06*	0.806145595	0.193250933	0.000603473

Table E.1-72. Average Exposure Calculations for Shrew - Station WSS

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0.0025	0	26.59374907	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025	0	3736.311853	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0	0.000583333	0	6844.044183	0	0	0.000128333	1.28E-04	0.00E+00	0.00E+00	1.88E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005	0	17	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0005	0	8.324449805	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.32E-05	*0.00*	0	0	1
	Semivolatile Organics															
	2-Methylnaphthalene	0	0.0025	0	170.89	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.22E-06	*0.00*	0	0	1
	Acenaphthylene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Anthracene	0	0.0025	0	1189.21	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	4.62E-07	*0.00*	0	0	1
	Benzo(a)anthracene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(a)pyrene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(b)fluoranthene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(g,h,i)perylene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Benzo(k)fluoranthene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenz(a,h)anthracene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenzofuran	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	0	0.0025	0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Fluorene	0	0.0025	0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Indeno(1,2,3-cd)pyrene	0	0.0025	0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Naphthalene	0	0.0025	0	166.49	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.30E-06	*0.00*	0	0	1
	N-nitrosodiphenylamine	0	0.0025	0	329.67	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pyrene	0	0.0025	0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pesticides and PCBs															
	4,4'-DDD	0	0.00005	0	18.68	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	5.89E-07	*0.00*	0	0	1
	4,4'-DDE	0	0.00005	0	2.26	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	4.87E-06	*0.00*	0	0	1
	4,4'-DDT	0	0.00005	0	1.76	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	6.26E-06	*0.00*	0	0	1
	Aldrin	0	0.000025	0	0.44	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.25E-05	*0.00*	0	0	1
	alpha-Chlordane	0	2.17286E-05	0	5.45	0	0	4.78029E-06	4.78E-06	0.00E+00	0.00E+00	8.78E-07	*0.00*	0	0	1
	Aroclor 1248	0	0.0005	0	1.55	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	7.12E-05	*0.00*	0	0	1
	Aroclor 1254	0	0.0005	0	0.08	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.36E-03	*0.00*	0	0	1
	Aroclor 1260	0	0.0005	0	0.76	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.45E-04	*0.00*	0	0	1
	beta-BHC	0	0.000025	0	8.79	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	6.26E-07	*0.00*	0	0	1
	delta-BHC	0	0.000025	0	3.52	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.56E-06	*0.00*	0	0	1
	Endosulfan I	0	0.000025	0	3.30	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Endosulfan Sulfate	0	0.00005	0	3.30	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	3.34E-06	*0.00*	0	0	1
	Endrin Aldehyde	0	0.00005	0	0.11	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	1.01E-04	*0.00*	0	0	1
	gamma-Chlordane	0	2.16286E-05	0	5.45	0	0	4.75829E-06	4.76E-06	0.00E+00	0.00E+00	8.74E-07	*0.00*	0	0	1
	Inorganics															
X	Aluminum	8088	0.386114286	436.4952381	58.27114864	82.23570286	99.8868	0.084945143	1.82E+02	1.41E+00	1.71E+00	1.46E-03	*3.13*	0.451330084	0.548203716	0.0004662
	Antimony	0.862	0.000692857	0.068412698	0.148650889	0.012888952	0.0106457	0.000152429	2.37E-02	8.67E-02	7.16E-02	1.03E-03	*0.16*	0.544134265	0.449430642	0.006435093
	Arsenic	8.93	0.024585714	0.179815912	0.149840096	0.033877318	0.056245605	0.005408857	9.55E-02	2.26E-01	3.75E-01	3.61E-02	*0.64*	0.354618305	0.588763289	0.056618406
	Barium	34.6	0.037342857	1.977142857	11.83503851	0.372493714	0.42731	0.008215429	8.08E-01	3.15E-02	3.61E-02	6.94E-04	*0.07*	0.46099615	0.528836481	0.010167369
	Beryllium	0.216	6.37857E-05	0.017142857	1.450568131	0.003229714	0.0026676	1.40329E-05	5.91E-03	2.23E-03	1.84E-03	9.67E-06	*0.00*	0.54635842	0.451267695	0.002373884
	Cadmium	0.195	0.00043	0.358373178	2.120009672	0.067517507	0.00240825	0.0000946	7.00E-02	3.18E-02	1.14E-03	4.46E-05	*0.03*	0.964255395	0.034393569	0.001351036
	Chromium	13.48	0.025785714	1.593877085	19.78047452	0.300286443	0.166478	0.005672857	4.72E-01	1.52E-02	8.42E-03	2.87E-04	*0.02*	0.635611208	0.352381152	0.01200764
	Cobalt	3.91	0.00146857	0.31031746	10.99	0.05846381	0.0482885	0.000323085	1.07E-01	5.32E-03	4.39E-03	2.94E-05	*0.01*	0.546006013	0.450976623	0.003017364
	Copper	26.74	0.021542857	2.017777647	33.43	0.380149309	0.330239	0.004739429	7.15E-01	1.14E-02	9.88E-03	1.42E-04	*0.02*	0.531582386	0.461790227	0.006627387
	Cyanide	0	0.0025	0	141.9	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.88E-06	*0.00*	0	0	1
X	Iron	9233	2.401	556.9111111	7.01	104.9220533	114.02755	0.52822	2.19E+02	1.50E+01	1.63E+01	7.53E-02	*31.30*	0.478053098	0.51954019	0.002406712
	Lead	67.87	0.013072856	3.838373774	17.58264402	0.723149619	0.8381945	0.002876028	1.56E+00	4.11E-02	4.77E-02	1.64E-04	*0.09*	0.462306805	0.535854561	0.001838634
	Manganese	147.52	0.469714286	2.130450849	193.41	0.40137694	1.821872	0.103337143	2.33E+00	2.08E-03	9.42E-03	5.34E-04	*0.01*	0.172517554	0.783066663	0.044415783
	Mercury	0.102	0.000203929	0.061181039	0.070330576	0.011526508	0.0012597	4.48643E-05	1.28E-02	1.64E-01	1.79E-02	6.38E-04	*0.18*	0.898327725	0.09817574	0.003496535
	Nickel	8.02	0.002842857	3.651530315	87.91322008	0.687948311	0.099047	0.000625429	7.88E-01	7.83E-03	1.13E-03	7.11E-06	*0.01*	0.873451239	0.125754687	0.000794073
	Selenium	0.545	0.000857143	0.094376964	0.4395661	0.01778062	0.00673075	0.000188571	2.47E-02	4.05E-02	1.53E-02	4.29E-04	*0.06*	0.719864865	0.272500646	0.007634489
	Silver	0.099	0.00025	0.007857143	398.246887	0.001480286	0.00122265	0.000055	2.76E-03	3.72E-06	3.07E-06	1.38E-07	*0.00*	0.536736845	0.443320703	0.019942452
	Thallium	0.77	0.000778571	0.061111111	0.164354697	0.011513333	0.0095095	0.000171286	2.12E-02	7.01E-02	5.79E-02	1.04E-03	*0.13*	0.543232456	0.448685788	0.008081756
X	Vanadium	18.72	0.001878929	1.485714286	0.428489138	0.279908571	0.231192	0.000413364	5.12E-01	6.53E-01	5.40E-01	9.65E-04	*1.19*	0.547215925	0.451975956	0.000808119
	Zinc	54.04	0.127785714	50.25348745	351.6528803	9.467757036	0.667394	0.028112857	1.02E+01	2.69E-02	1.90E-03	7.99E-05	*0.03*	0.931566585	0.06566729	0.002766125

Table E.1-73. Average Exposure Calculations for Shrew - Station WG

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0.0025	0	26.5937491	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025	0	3736.31185	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0.082	0.00058333	0.032272287	6844.04418	0.006080099	0.0010127	0.00012833	7.22E-03	8.88E-07	1.48E-07	1.88E-08	*0.00*	0.84198692	0.14024117	0.01777191
	Tetrachloroethene	0.1185	0.0005	0.048139795	17	0.009069537	0.00146348	0.00011	1.06E-02	5.45E-04	8.79E-05	6.61E-06	*0.00*	0.85215887	0.13750571	0.01033542
	Trichloroethene	0.042	0.0005	0.017088942	8.32444981	0.003219557	0.0005187	0.00011	3.85E-03	3.87E-04	6.23E-05	1.32E-05	*0.00*	0.83662732	0.13478831	0.02858437
	Semivolatile Organics															
	2-Methylnaphthalene	0.003	0.0025	0.001276842	170.89	0.000240557	0.00003705	0.00055	8.28E-04	1.41E-06	2.17E-07	3.22E-06	*0.00*	0.29066576	0.04476762	0.66456662
	Acenaphthylene	0.001	0.0025	0.000429127	158.52	8.08475E-05	0.00001235	0.00055	6.43E-04	5.10E-07	7.79E-08	3.47E-06	*0.00*	0.12569628	0.01920094	0.85510278
	Anthracene	0.018	0.0025	0.007840042	1189.21	0.001477064	0.0002223	0.00055	2.25E-03	1.24E-06	1.87E-07	4.62E-07	*0.00*	0.65665849	0.09882794	0.24451357
	Benzo(a)anthracene	0.13	0.0025	0.059252849	1.55	0.011163237	0.0016055	0.00055	1.33E-02	7.22E-03	1.04E-03	3.56E-04	*0.01*	0.83816033	0.12054447	0.04129521
	Benzo(a)pyrene	0.16	0.0025	0.073990484	1.55	0.013939807	0.001976	0.00055	1.65E-02	9.02E-03	1.28E-03	3.56E-04	*0.01*	0.84659118	0.12000626	0.03340255
	Benzo(b)fluoranthene	0.29	0.0025	0.137241003	1.55	0.025856205	0.0035815	0.00055	3.00E-02	1.67E-02	2.32E-03	3.56E-04	*0.02*	0.86222687	0.11943228	0.01834085
	Benzo(g,h,i)perylene	0.12	0.0025	0.058275651	158.52	0.010979133	0.001482	0.00055	1.30E-02	6.93E-05	9.35E-06	3.47E-06	*0.00*	0.84382605	0.11390246	0.04227149
	Benzo(k)fluoranthene	0.2	0.0025	0.095654604	1.55	0.018021327	0.00247	0.00055	2.10E-02	1.17E-02	1.60E-03	3.56E-04	*0.01*	0.85647293	0.11738803	0.02613904
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	0.23	0.0025	0.104831964	1.55	0.019750342	0.0028405	0.00055	2.31E-02	1.28E-02	1.84E-03	3.56E-04	*0.01*	0.85348416	0.12274834	0.0237675
	Dibenz(a,h)anthracene	0.046	0.0025	0.021263939	1.55	0.004006126	0.0005681	0.00055	5.12E-03	2.59E-03	3.67E-04	3.56E-04	*0.00*	0.7818012	0.11086552	0.10733328
	Dibenzofuran	0	0.0025	0	158.52	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	0.41	0.0025	0.184837353	148.65	0.034823357	0.0050635	0.00055	4.04E-02	2.34E-04	3.41E-05	3.70E-06	*0.00*	0.86117863	0.12521992	0.01360145
	Fluorene	0.014	0.0025	0.006033703	148.65	0.00113675	0.0001729	0.00055	1.86E-03	7.65E-06	1.16E-06	3.70E-06	*0.00*	0.61127086	0.0929745	0.29575464
	Indeno(1,2,3-cd)pyrene	0.14	0.0025	0.069142316	1.55	0.013026412	0.001729	0.00055	1.53E-02	8.43E-03	1.12E-03	3.56E-04	*0.01*	0.85109842	0.11296657	0.035935
	Naphthalene	0.012	0.0025	0.005010339	166.49	0.000943948	0.0001482	0.00055	1.64E-03	5.67E-06	8.90E-07	3.30E-06	*0.00*	0.57482514	0.09024766	0.3349272
	N-nitrosodiphenylamine	0	0.0025	0	329.67	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0.16	0.0025	0.069716547	158.52	0.013134597	0.001976	0.00055	1.57E-02	8.29E-05	1.25E-05	3.47E-06	*0.00*	0.83870347	0.12617654	0.03511999
	Pyrene	0.34	0.0025	0.152382397	158.52	0.028708844	0.004199	0.00055	3.35E-02	1.81E-04	2.65E-05	3.47E-06	*0.00*	0.85806019	0.12550121	0.0164386
	Pesticides and PCBs															
	4,4'-DDD	0.009	0.00005	0.004163594	18.68	0.000784421	0.00011115	0.000011	9.07E-04	4.20E-05	5.95E-06	5.89E-07	*0.00*	0.86526154	0.12260483	0.01213363
	4,4'-DDE	0.0032	0.00005	0.001463106	2.26	0.000275649	0.00003952	0.000011	3.26E-04	1.22E-04	1.75E-05	4.87E-06	*0.00*	0.84511107	0.1211641	0.03372483
	4,4'-DDT	0.000165	0.00005	7.69325E-05	1.76	1.44941E-05	2.0378E-06	0.000011	2.75E-05	8.24E-06	1.16E-06	6.26E-06	*0.00*	0.52644816	0.07401433	0.39953752
	Aldrin	0.00008	0.000025	3.7756E-05	0.44	7.11323E-06	9.88E-07	0.0000055	1.36E-05	1.62E-05	2.25E-06	1.25E-05	*0.00*	0.52298427	0.0726405	0.40437523
	alpha-Chlordane	0.00098	2.1729E-05	0.000459264	5.45	8.65252E-05	1.2103E-05	4.7803E-06	1.03E-04	1.59E-05	2.22E-06	8.78E-07	*0.00*	0.83673213	0.11704062	0.04622725
	Aroclor 1248	0.035	0.0005	0.016325404	1.55	0.003075706	0.00043225	0.00011	3.62E-03	1.99E-03	2.80E-04	7.12E-05	*0.00*	0.85012256	0.11947354	0.03040391
	Aroclor 1254	0.00165	0.0005	0.000778717	0.08	0.00014671	2.0378E-05	0.00011	2.77E-04	1.81E-03	2.52E-04	1.36E-03	*0.00*	0.52947232	0.07354166	0.39698602
	Aroclor 1260	0.011	0.0005	0.005252772	0.76	0.000989622	0.00013585	0.00011	1.24E-03	1.31E-03	1.79E-04	1.45E-04	*0.00*	0.80100727	0.10995795	0.08903478
	beta-BHC	0.00008	0.000025	3.39825E-05	8.79	6.40231E-06	9.88E-07	0.0000055	1.29E-05	7.28E-07	1.12E-07	6.26E-07	*0.00*	0.49667623	0.07664672	0.42667706
	delta-BHC	0.00008	0.000025	3.44244E-05	3.52	6.48555E-06	9.88E-07	0.0000055	1.30E-05	1.84E-06	2.81E-07	1.56E-06	*0.00*	0.49990555	0.07615495	0.4239395
	Endosulfan I	0.00044	0.000025	0.000189038	3.30	3.56147E-05	5.434E-06	0.0000055	4.65E-05	1.08E-05	1.65E-06	1.67E-06	*0.00*	0.76510629	0.11673792	0.11815579
	Endosulfan Sulfate	0.000165	0.00005	6.96787E-05	3.30	1.31275E-05	2.0378E-06	0.000011	2.62E-05	3.98E-06	6.18E-07	3.34E-06	*0.00*	0.50171431	0.07788013	0.42040556
	Endrin Aldehyde	0.000165	0.00005	7.51761E-05	0.11	1.41632E-05	2.0378E-06	0.000011	2.72E-05	1.29E-04	1.86E-05	1.01E-04	*0.00*	0.52068732	0.07491472	0.40439796
	gamma-Chlordane	0.00059	2.1629E-05	0.000276495	5.45	5.20917E-05	7.2865E-06	4.7583E-06	6.41E-05	9.56E-06	1.34E-06	8.74E-07	*0.00*	0.81220073	0.11360921	0.07419005
	Inorganics															
X	Aluminum	13754.7619	0.38611429	742.3204837	58.2711486	139.8531791	169.87131	0.08494514	3.10E+02	2.40E+00	2.92E+00	1.46E-03	*5.32*	0.45141679	0.54830903	0.00027419
X	Antimony	5.9894737	0.00069286	0.475355056	0.14865089	0.089556892	0.07397	0.00015243	1.64E-01	6.02E-01	4.98E-01	1.03E-03	*1.10*	0.54714848	0.45192025	0.00093126
X	Arsenic	136.383333	0.02458571	1.232163843	0.1498401	0.232139668	0.85901042	0.00540886	1.10E+00	1.55E+00	5.73E+00	3.61E-02	*7.32*	0.2116983	0.78336912	0.00493257
	Barium	78.5904762	0.03734286	4.490884354	11.8350385	0.846082612	0.97059238	0.00821543	1.82E+00	7.15E-02	8.20E-02	6.94E-04	*0.15*	0.46363475	0.53186338	0.00450187
	Beryllium	1.2159524	6.3786E-05	0.096504159	1.45056813	0.018181384	0.01501701	1.4033E-05	3.32E-02	1.25E-02	1.04E-02	9.67E-06	*0.02*	0.5474271	0.45215038	0.00042252
	Cadmium	5.2114286	0.00043	4.883583518	2.12000967	0.920067135	0.06436114	0.0000946	9.85E-01	4.34E-01	3.04E-02	4.46E-05	*0.46*	0.93453098	0.06537293	9.6087E-05
	Chromium	560.990476	0.02578571	1.241549482	19.7804745	0.233907922	6.92823238	0.00567286	7.17E+00	1.18E-02	3.50E-01	2.87E-04	*0.36*	0.03263309	0.96657547	0.00079143
	Cobalt	15.7238095	0.00146857	1.247921389	10.99	0.23510839	0.19418905	0.00032309	4.30E-01	2.14E-02	1.77E-02	2.94E-05	*0.04*	0.54724665	0.45200133	0.00075203
	Copper	482.752381	0.02154286	4.331177086	33.43	0.815993763	5.96199191	0.00473943	6.78E+00	2.44E-02	1.78E-01	1.42E-04	*0.20*	0.12030471	0.87899654	0.00069875
	Cyanide	0.8715	0.0025	0.069166667	141.9	0.013031	0.01076303	0.00055	2.43E-02	9.18E-05	7.58E-05	3.88E-06	*0.00*	0.53528535	0.44212183	0.02259281
X	Iron	20480	2.401	1235.301587	7.01	232.730819	252.928	0.52822	4.86E+02	3.32E+01	3.61E+01	7.53E-02	*69.35*	0.47868577	0.52022777	0.00108645
	Lead	428.638095	0.01307286	16.98558389	17.582644	3.200084005	5.29368048	0.00287603	8.50E+00	1.82E-01	3.01E-01	1.64E-04	*0.48*	0.37662933	0.62303218	0.00033849
	Manganese	702.280952	0.46971429	6.174980986	193.41	1.163366418	8.67316976	0.10333714	9.94E+00	6.02E-03	4.48E-02	5.34E-04	*0.05*	0.11704037	0.87256341	0.01039622
	Mercury	1.3652381	0.00020393	0.083091504	0.07033058	0.015654439	0.01686069	4.4864E-05	3.26E-02	2.23E-01	2.40E-01	6.38E-04	*0.46*	0.48078753	0.51783457	0.0013779
	Nickel	28.3047619	0.00284286	2.630733022	87.9132201	0.495630101	0.34956381	0.00062543	8.46E-01	5.64E-03	3.98E-03	7.11E-06	*0.01*	0.58597632	0.41328425	0.00073944
	Selenium	3.6542857	0.00085714	0.380733939	0.4395661	0.071730274	0.04513043	0.00018857	1.17E-01	1.63E-01	1.03E-01	4.29E-04	*0.27*	0.61282118	0.38556778	0.00161104
	Silver	0.3811905	0.00025	0.030253214	398.246887	0.005699706	0.0047077	0.000055	1.05E-02	1.43E-05	1.18E-05	1.38E-07	*0.00*	0.5447795	0.44996358	0.00525692
	Thallium	0.3595238	0.00077857	0.028533635	0.1643547	0.005375737	0.00444012	0.00017129	9.99E-03	3.27E-02	2.70E-02	1.04E-03	*0.06*	0.53826581	0.44458356	0.01715062
X	Vanadium	53.9380952	0.00187893	4.280801206	0.42848914	0.806502947	0.66613548	0.00041336	1.47E+00	1.88E+00	1.55E+00	9.65E-04	*3.44*	0.54750482	0.45221457	0.00028062
	Zinc	866.338095	0.12778571	124.852442	351.65288	23.52220008	10.6992755	0.02811286	3.42E+01	6.69E-02	3.04E-02	7.99E-05	*0.10*	0.68678782	0.31239136	0.00082082

Table E.1-74. Average Exposure Calculations for Shrew - Station WH

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0.0025	0	26.59374907	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	2.7	0.0025	0.823846224	3736.311853	0.155212629	0.033345	0.00055	1.89E-01	4.15E-05	8.92E-06	1.47E-07	*0.00*	0.820763444	0.176328159	0.002908397
	cis-1,2-Dichloroethene	0	0.000583333	0	6844.044183	0	0	0.000128333	0.00E+00	0.00E+00	0.00E+00	1.88E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005	0	17	0	0	0.00011	0.00E+00	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0005	0	8.324449805	0	0	0.00011	0.00E+00	0.00E+00	0.00E+00	1.32E-05	*0.00*	0	0	1
	Semivolatile Organics															
	2-Methylnaphthalene	0.3	0.0025	0.107474058	170.89	0.020248112	0.003705	0.00055	2.45E-02	1.18E-04	2.17E-05	3.22E-06	*0.00*	0.826348591	0.151205281	0.022446128
	Acenaphthylene	0.3	0.0025	0.10836116	158.52	0.020415243	0.003705	0.00055	2.47E-02	1.29E-04	2.34E-05	3.47E-06	*0.00*	0.827525004	0.150180931	0.022294065
	Anthracene	0.3	0.0025	0.109985047	1189.21	0.020721183	0.003705	0.00055	2.50E-02	1.74E-05	3.12E-06	4.62E-07	*0.00*	0.829637699	0.148341322	0.022020979
	Benzo(a)anthracene	0.3	0.0025	0.115094255	1.55	0.021683758	0.003705	0.00055	2.59E-02	1.40E-02	2.40E-03	3.56E-04	*0.02*	0.835959761	0.142836448	0.021203791
	Benzo(a)pyrene	0	0.0025	0	1.55	0	0	0.00055	0.00E+00	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(b)fluoranthene	0.3	0.0025	0.11950158	1.55	0.022514098	0.003705	0.00055	2.68E-02	1.46E-02	2.40E-03	3.56E-04	*0.02*	0.84104806	0.138405861	0.020546079
	Benzo(g,h,i)perylene	0.3	0.0025	0.12262913	158.52	0.023103328	0.003705	0.00055	2.74E-02	1.46E-04	2.34E-05	3.47E-06	*0.00*	0.84447149	0.135424942	0.020103568
	Benzo(k)fluoranthene	0.66	0.0025	0.265696802	1.55	0.050057277	0.008151	0.00055	5.88E-02	3.24E-02	5.27E-03	3.56E-04	*0.04*	0.851918736	0.138720881	0.009360383
	Carbazole	0.3	0	na	158.52	No BCF	0.003705	0	3.71E-03	No BCF	2.34E-05	0.00E+00	*0.00*	0	1	0
	Chrysene	0.3	0.0025	0.115094255	1.55	0.021683758	0.003705	0.00055	2.59E-02	1.40E-02	2.40E-03	3.56E-04	*0.02*	0.835959761	0.142836448	0.021203791
	Dibenz(a,h)anthracene	0.3	0.0025	0.116727624	1.55	0.021991484	0.003705	0.00055	2.62E-02	1.42E-02	2.40E-03	3.56E-04	*0.02*	0.83788305	0.141161763	0.020955187
	Dibenzofuran	0.3	0.0025	0.108573452	158.52	0.020455238	0.003705	0.00055	2.47E-02	1.29E-04	2.34E-05	3.47E-06	*0.00*	0.82780417	0.14993785	0.02225798
	Fluoranthene	0.3	0.0025	0.113839675	148.65	0.021447395	0.003705	0.00055	2.57E-02	1.44E-04	2.49E-05	3.70E-06	*0.00*	0.834451223	0.144149992	0.021398784
	Fluorene	0.3	0.0025	0.108828751	148.65	0.020503337	0.003705	0.00055	2.48E-02	1.38E-04	2.49E-05	3.70E-06	*0.00*	0.828138697	0.149646563	0.022214739
	Indeno(1,2,3-cd)pyrene	0.3	0.0025	0.12471068	1.55	0.023495492	0.003705	0.00055	2.78E-02	1.52E-02	2.40E-03	3.56E-04	*0.02*	0.846669385	0.133511146	0.019819468
	Naphthalene	0.3	0.0025	0.105432292	166.49	0.019863444	0.003705	0.00055	2.41E-02	1.19E-04	2.23E-05	3.30E-06	*0.00*	0.823578998	0.153616877	0.022804125
	N-nitrosodiphenylamine	0.3	0.0025	0.103065579	329.67	0.019417555	0.003705	0.00055	2.37E-02	5.89E-05	1.12E-05	1.67E-06	*0.00*	0.820255989	0.156510355	0.023233656
	Phenanthrene	0.3	0.0025	0.110028108	158.52	0.020729296	0.003705	0.00055	2.50E-02	1.31E-04	2.34E-05	3.47E-06	*0.00*	0.829693017	0.148293154	0.022013829
	Pyrene	0.3	0.0025	0.113173213	158.52	0.021321833	0.003705	0.00055	2.56E-02	1.35E-04	2.34E-05	3.47E-06	*0.00*	0.833638514	0.144857651	0.021503835
	Pesticides and PCBs															
	4,4'-DDD	0.00245	0.00005	0.000954022	18.68	0.000179738	3.02575E-05	0.000011	2.21E-04	9.62E-06	1.62E-06	5.89E-07	*0.00*	0.813310493	0.136914689	0.049774819
	4,4'-DDE	0.00245	0.00005	0.000942884	2.26	0.000177639	3.02575E-05	0.000011	2.19E-04	7.86E-05	1.34E-05	4.87E-06	*0.00*	0.811520884	0.138227155	0.050251961
	4,4'-DDT	0.00245	0.00005	0.00096152	1.76	0.00018115	3.02575E-05	0.000011	2.22E-04	1.03E-04	1.72E-05	6.26E-06	*0.00*	0.814496274	0.136045058	0.049458668
	Aldrin	0.00125	0.000025	0.000496561	0.44	9.3552E-05	1.54375E-05	0.0000055	1.14E-04	2.13E-04	3.51E-05	1.25E-05	*0.00*	0.817123045	0.134837635	0.048039319
	alpha-Chlordane	0.00125	2.17286E-05	0.000493074	5.45	9.28952E-05	1.54375E-05	4.78029E-06	1.13E-04	1.71E-05	2.83E-06	8.78E-07	*0.00*	0.821260224	0.136478568	0.042261209
	Aroclor 1248	0.0245	0.0005	0.009618968	1.55	0.001812214	0.000302575	0.00011	2.22E-03	1.17E-03	1.96E-04	7.12E-05	*0.00*	0.81455541	0.136001689	0.049442901
	Aroclor 1254	0.0245	0.0005	0.009732591	0.08	0.00183362	0.000302575	0.00011	2.25E-03	2.27E-02	3.74E-03	1.36E-03	*0.03*	0.816322727	0.134705571	0.048971702
	Aroclor 1260	0.0245	0.0005	0.009847556	0.76	0.00185528	0.000302575	0.00011	2.27E-03	2.45E-03	3.99E-04	1.45E-04	*0.00*	0.818076963	0.133419046	0.048503991
	beta-BHC	0.00125	0.000025	0.000446933	8.79	8.42022E-05	1.54375E-05	0.0000055	1.05E-04	9.58E-06	1.76E-06	6.26E-07	*0.00*	0.800860139	0.146828495	0.052311366
	delta-BHC	0.00125	0.000025	0.000452744	3.52	8.52969E-05	1.54375E-05	0.0000055	1.06E-04	2.43E-05	4.39E-06	1.56E-06	*0.00*	0.802912259	0.145315439	0.051772302
	Endosulfan I	0.00125	0.000025	0.000452035	3.30	8.51635E-05	1.54375E-05	0.0000055	1.06E-04	2.58E-05	4.68E-06	1.67E-06	*0.00*	0.80266437	0.145498211	0.051837419
	Endosulfan Sulfate	0.00245	0.00005	0.00087086	3.30	0.00016407	3.02575E-05	0.000011	2.05E-04	4.98E-05	9.18E-06	3.34E-06	*0.00*	0.799064981	0.147362088	0.053572931
	Endrin Aldehyde	0.00245	0.00005	0.000939569	0.11	0.000177015	3.02575E-05	0.000011	2.18E-04	1.62E-03	2.77E-04	1.01E-04	*0.00*	0.81098144	0.138622773	0.050395786
	gamma-Chlordane	0.00125	2.16286E-05	0.000493074	5.45	9.28952E-05	1.54375E-05	4.75829E-06	1.13E-04	1.71E-05	2.83E-06	8.74E-07	*0.00*	0.821419986	0.136505118	0.042074896
	Inorganics															
X	Aluminum	10695	0.386114286	577.1904762	58.27114864	108.7426857	132.08325	0.084945143	2.41E+02	1.87E+00	2.27E+00	1.46E-03	*4.13*	0.451381379	0.548266021	0.0003526
X	Antimony	21.6954545	0.000692857	1.721861468	0.148650889	0.324398701	0.267938863	0.000152429	5.92E-01	2.18E+00	1.80E+00	1.03E-03	*3.99*	0.547517603	0.452225129	0.000257268
X	Arsenic	114.1090909	0.024585714	1.086413307	0.149840096	0.204680267	0.718716109	0.005408857	9.29E-01	1.37E+00	4.80E+00	3.61E-02	*6.20*	0.220369416	0.773807127	0.005823457
	Barium	81.4545455	0.037342857	4.654545457	11.83503851	0.876916364	1.005963637	0.008215429	1.89E+00	7.41E-02	8.50E-02	6.94E-04	*0.16*	0.463708151	0.53194758	0.00434427
	Beryllium	0.9245455	6.37857E-05	0.073376627	1.450568131	0.013824157	0.011418137	1.40329E-05	2.53E-02	9.53E-03	7.87E-03	9.67E-06	*0.02*	0.54735421	0.452090173	0.000555617
	Cadmium	5.8790909	0.00043	5.374765966	2.120009672	1.012605908	0.072606773	0.0000946	1.09E+00	4.78E-01	3.42E-02	4.46E-05	*0.51*	0.933013098	0.066899738	8.71643E-05
	Chromium	346.4636364	0.025785714	1.282292161	19.78047452	0.241583843	4.27882591	0.005672857	4.53E+00	1.22E-02	2.16E-01	2.87E-04	*0.23*	0.053375924	0.945370705	0.00125337
	Cobalt	12.1954545	0.00146857	0.967893214	10.99	0.182351082	0.150613863	0.000323085	3.33E-01	1.66E-02	1.37E-02	2.94E-05	*0.03*	0.547127605	0.451903007	0.000969388
	Copper	247.8727273	0.021542857	3.632278016	33.43	0.684321178	3.061228182	0.004739429	3.75E+00	2.05E-02	9.16E-02	1.42E-04	*0.11*	0.182471595	0.816264654	0.00126375
	Cyanide	0.569	0.0025	0.04515873	141.9	0.008507905	0.00702715	0.00055	1.61E-02	6.00E-05	4.95E-05	3.88E-06	*0.00*	0.528932285	0.436874484	0.034193231
X	Iron	24718.18182	2.401	1490.937951	7.01	280.89271	305.2695455	0.52822	5.87E+02	4.01E+01	4.35E+01	7.53E-02	*83.68*	0.478774962	0.5203247	0.000900338
X	Lead	1515.727273	0.013072856	47.07002479	17.58264402	8.867992671	18.71923182	0.002876028	2.76E+01	5.04E-01	1.06E+00	1.64E-04	*1.57*	0.321419368	0.678476391	0.000104241
	Manganese	250.3	0.469714286	3.055381894	193.41	0.575633949	3.091205	0.103337143	3.77E+00	2.98E-03	1.60E-02	5.34E-04	*0.02*	0.152680919	0.819909979	0.027409102
	Mercury	0.5385	0.000203929	0.074452955	0.070330576	0.014026937	0.006650475	4.48643E-05	2.07E-02	1.99E-01	9.46E-02	6.38E-04	*0.29*	0.676901357	0.320933616	0.002165027
	Nickel	23.8181818	0.002842857	2.751465109	87.91322008	0.518376027	0.294154545	0.000625429	8.13E-01	5.90E-03	3.35E-03	7.11E-06	*0.01*	0.637486566	0.361744296	0.000769137
	Selenium	2.7272727	0.000857143	0.30723904	0.4395661	0.057883835	0.033681818	0.000188571	9.18E-02	1.32E-01	7.66E-02	4.29E-04	*0.21*	0.63085744	0.36708738	0.00205518
	Silver	0.2645455	0.00025	0.020995675	398.246887	0.003955585	0.003267137	0.000055	7.28E-03	9.93E-06	8.20E-06	1.38E-07	*0.00*	0.543519673	0.448923017	0.00755731
	Thallium	0.5615909	0.000778571	0.044570706	0.164354697	0.008397121	0.006935648	0.000171286	1.55E-02	5.11E-02	4.22E-02	1.04E-03	*0.09*	0.541608076	0.447344123	0.011047801
X	Vanadium	75.5954545	0.001878929	5.999639246	0.428489138	1.130332034	0.933603863	0.000413364	2.06E+00	2.64E+00	2.18E+00	9.65E-04	*4.82*	0.547548835	0.452250925	0.00020024
	Zinc	977.6818182	0.127785714	129.9033535	351.6528803	24.4737918	12.07437045	0.028112857	3.66E+01	6.96E-02	3.43E-02	7.99E-05	*0.10*	0.669116571	0.330114819	0.000768609

Table E.1-75. Average Exposure Calculations for Shrew - Station WS

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)				C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																		
	2-Butanone	0	0.0025				0	26.59374907	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	2.07E-05	*0.00*	0	0	1
	Acetone	0	0.0025				0	3736.311853	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.47E-07	*0.00*	0	0	1
	cis-1,2-Dichloroethene	0	0.000583333				0	6844.044183	0	0	0.000128333	1.28E-04	0.00E+00	0.00E+00	1.88E-08	*0.00*	0	0	1
	Tetrachloroethene	0	0.0005				0	17	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	6.61E-06	*0.00*	0	0	1
	Trichloroethene	0	0.0005				0	8.324449805	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.32E-05	*0.00*	0	0	1
	Semivolatile Organics																		
	2-Methylnaphthalene	0	0.0025				0	170.89	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.22E-06	*0.00*	0	0	1
	Acenaphthylene	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Anthracene	0	0.0025				0	1189.21	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	4.62E-07	*0.00*	0	0	1
	Benzo(a)anthracene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(a)pyrene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(b)fluoranthene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Benzo(g,h,i)perylene	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Benzo(k)fluoranthene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Carbazole	0	0				na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00*	0	0	0
	Chrysene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenz(a,h)anthracene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Dibenzofuran	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Fluoranthene	0	0.0025				0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Fluorene	0	0.0025				0	148.65	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.70E-06	*0.00*	0	0	1
	Indeno(1,2,3-cd)pyrene	0	0.0025				0	1.55	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.56E-04	*0.00*	0	0	1
	Naphthalene	0	0.0025				0	166.49	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.30E-06	*0.00*	0	0	1
	N-nitrosodiphenylamine	0	0.0025				0	329.67	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Phenanthrene	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pyrene	0	0.0025				0	158.52	0	0	0.00055	5.50E-04	0.00E+00	0.00E+00	3.47E-06	*0.00*	0	0	1
	Pesticides and PCBs																		
	4,4'-DDD	0	0.00005				0	18.68	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	5.89E-07	*0.00*	0	0	1
	4,4'-DDE	0	0.00005				0	2.26	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	4.87E-06	*0.00*	0	0	1
	4,4'-DDT	0	0.00005				0	1.76	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	6.26E-06	*0.00*	0	0	1
	Aldrin	0	0.000025				0	0.44	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.25E-05	*0.00*	0	0	1
	alpha-Chlordane	0	2.17286E-05				0	5.45	0	0	4.78029E-06	4.78E-06	0.00E+00	0.00E+00	8.78E-07	*0.00*	0	0	1
	Aroclor 1248	0	0.0005				0	1.55	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	7.12E-05	*0.00*	0	0	1
	Aroclor 1254	0	0.0005				0	0.08	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.36E-03	*0.00*	0	0	1
	Aroclor 1260	0	0.0005				0	0.76	0	0	0.00011	1.10E-04	0.00E+00	0.00E+00	1.45E-04	*0.00*	0	0	1
	beta-BHC	0	0.000025				0	8.79	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	6.26E-07	*0.00*	0	0	1
	delta-BHC	0	0.000025				0	3.52	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.56E-06	*0.00*	0	0	1
	Endosulfan I	0	0.000025				0	3.30	0	0	0.0000055	5.50E-06	0.00E+00	0.00E+00	1.67E-06	*0.00*	0	0	1
	Endosulfan Sulfate	0	0.00005				0	3.30	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	3.34E-06	*0.00*	0	0	1
	Endrin Aldehyde	0	0.00005				0	0.11	0	0	0.000011	1.10E-05	0.00E+00	0.00E+00	1.01E-04	*0.00*	0	0	1
	gamma-Chlordane	0	2.16286E-05				0	5.45	0	0	4.75829E-06	4.76E-06	0.00E+00	0.00E+00	8.74E-07	*0.00*	0	0	1
	Inorganics																		
X	Aluminum	8500	0.386114286				458.7301587	58.27114864	86.4247619	104.975	0.084945143	1.91E+02	1.48E+00	1.80E+00	1.46E-03	*3.29*	0.451340283	0.548216104	0.000443613
	Antimony	3.95	0.000692857				0.313492063	0.148650889	0.059061905	0.0487825	0.000152429	1.08E-01	3.97E-01	3.28E-01	1.03E-03	*0.73*	0.546885524	0.451703059	0.001411417
X	Arsenic	167.91	0.024585714				1.427023202	0.149840096	0.268851171	1.057581135	0.005408857	1.33E+00	1.79E+00	7.06E+00	3.61E-02	*8.89*	0.20186429	0.794074522	0.004061188
	Barium	119.285	0.037342857				6.816285714	11.83503851	1.284188229	1.47316975	0.008215429	2.77E+00	1.09E-01	1.24E-01	6.94E-04	*0.23*	0.464347909	0.532681485	0.002970606
	Beryllium	0.5275	6.37857E-05				0.041865079	1.450568131	0.007887381	0.006514625	1.40329E-05	1.44E-02	5.44E-03	4.49E-03	9.67E-06	*0.01*	0.547125397	0.451901184	0.00097342
	Cadmium	8.095	0.00043				6.930911706	2.120009672	1.305783765	0.09997325	0.0000946	1.41E+00	6.16E-01	4.72E-02	4.46E-05	*0.66*	0.928820475	0.071112235	6.72902E-05
	Chromium	504	0.025785714				1.250492827	19.78047452	0.235592849	6.2244	0.005672857	6.47E+00	1.19E-02	3.15E-01	2.87E-04	*0.13*	0.036437524	0.962685094	0.000877382
	Cobalt	18.99	0.00146857				1.507142857	10.99	0.283945714	0.2345265	0.000323085	5.19E-01	2.58E-02	2.13E-02	2.94E-05	*0.05*	0.547317438	0.452059801	0.000622761
	Copper	306.26	0.021542857				3.840878124	33.43	0.723621439	3.782311	0.004739429	4.51E+00	2.16E-02	1.13E-01	1.42E-04	*0.13*	0.160424314	0.838524972	0.001050715
	Cyanide	3.61	0.0025				0.286507937	141.9	0.053978095	0.0445835	0.00055	9.91E-02	3.80E-04	3.14E-04	3.88E-06	*0.00*	0.544619377	0.449831323	0.0055493
X	Iron	29765	2.401				1795.349206	7.01	338.2437905	367.59775	0.52822	7.06E+02	4.82E+01	5.24E+01	7.53E-02	*100.75*	0.478848061	0.520404143	0.000747795
	Lead	294.8	0.013072856				12.55717392	17.58264402	2.365771566	3.64078	0.002876028	6.01E+00	1.35E-01	2.07E-01	1.64E-04	*0.34*	0.39367669	0.605844724	0.000478586
	Manganese	1036	0.469714286				8.049901198	193.41	1.516601386	12.7946	0.103337143	1.44E+01	7.84E-03	6.62E-02	5.34E-04	*0.07*	0.105213315	0.887617732	0.007168953
	Mercury	0.98	0.000203929				0.079903666	0.070330576	0.015053851	0.012103	4.48643E-05	2.72E-02	2.14E-01	1.72E-01	6.38E-04	*0.39*	0.553415499	0.444935182	0.001649319
	Nickel	30.135	0.002842857				2.588223266	87.91322008	0.487621263	0.37216725	0.000625429	8.60E-01	5.55E-03	4.23E-03	7.11E-06	*0.01*	0.566728687	0.432544421	0.000726893
	Selenium	2.069	0.000857143				0.250922613	0.4395661	0.04727382	0.02555215	0.000188571	7.30E-02	1.08E-01	5.81E-02	4.29E-04	*0.17*	0.647457605	0.349959739	0.002582656
	Silver	0.213	0.00025				0.016904762	398.246887	0.003184857	0.00263055	0.000055	5.87E-03	8.00E-06	6.61E-06	1.38E-07	*0.00*	0.542527471	0.448103502	0.009369026
	Thallium	0.7575	0.000778571				0.060119048	0.164354697	0.011326429	0.009355125	0.000171286	2.09E-02	6.89E-02	5.69E-02	1.04E-03	*0.13*	0.543160019	0.448625958	0.008214023
X	Vanadium	37.365	0.001878929				2.96547619	0.428489138	0.558695714	0.46145775	0.000413364	1.02E+00	1.30E+00	1.08E+00	9.65E-04	*2.38*	0.547436678	0.452158288	0.000405034
	Zinc	1541.5	0.127785714				150.8276786	351.6528803	28.41593465	19.037525	0.028112857	4.75E+01	8.08E-02	5.41E-02	7.99E-05	*0.14*	0.598462375	0.400945546	0.000592079

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0.1075	0	0.097091709	26.593749	0.01829208	0.0013276	0	1.96E-02	6.88E-04	4.99E-05	0.00E+00	*7.38E-04*	0.9323321	0.0676679	0
	Acetone	0.59	0	0.522138469	3736.3119	0.09837089	0.0072865	0	1.06E-01	2.63E-05	1.95E-06	0.00E+00	*2.83E-05*	0.9310365	0.0689635	0
	cis-1,2-Dichloroethene	0	0.0007513	0	6844.0442	0	0	0.0001653	0.00E+00	0.00E+00	0.00E+00	2.41E-08	*2.41E-08*	0	0	1
	Tetrachloroethene	0	0	0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0	0	0	8.3244498	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Semivolatile Organics															
	2-Methylnaphthalene	0	0	0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0	0	0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	1.1	0	1.22398576	1.55	0.23059892	0.013585	0	2.44E-01	1.49E-01	8.79E-03	0.00E+00	*1.58E-01*	0.9443657	0.0556343	0
	Benzo(a)pyrene	1.2	0	1.354736794	1.55	0.25523241	0.01482	0	2.70E-01	1.65E-01	9.59E-03	0.00E+00	*1.75E-01*	0.9451218	0.0548782	0
	Benzo(b)fluoranthene	3.7	0	4.274697667	1.55	0.80535304	0.045695	0	8.51E-01	5.21E-01	2.96E-02	0.00E+00	*5.50E-01*	0.9463074	0.0536926	0
	Benzo(g,h,i)perylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	1.5	0	1.669071491	1.55	0.31445307	0.018525	0	3.33E-01	2.03E-01	1.20E-02	0.00E+00	*2.15E-01*	0.9443657	0.0556343	0
	Dibenz(a,h)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	3	0	3.301755689	148.65	0.62205077	0.03705	0	6.59E-01	4.18E-03	2.49E-04	0.00E+00	*4.43E-03*	0.943787	0.056213	0
	Fluorene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0.83	0	1.00071814	1.55	0.1885353	0.0102505	0	1.99E-01	1.22E-01	6.63E-03	0.00E+00	*1.29E-01*	0.9484344	0.0515656	0
	Naphthalene	0	0.0031184	0	166.49	0	0	0.000686	0.00E+00	0.00E+00	0.00E+00	4.12E-06	*4.12E-06*	0	0	1
	N-nitrosodiphenylamine	0	0	0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0.89	0	0.946724654	158.52	0.17836292	0.0109915	0	1.89E-01	1.13E-03	6.93E-05	0.00E+00	*1.19E-03*	0.9419528	0.0580472	0
	Pyrene	2.5	0	2.735354942	158.52	0.51534087	0.030875	0	5.46E-01	3.25E-03	1.95E-04	0.00E+00	*3.45E-03*	0.9434747	0.0565253	0
	Pesticides and PCBs															
	4,4'-DDD	0.032	0	0.036140459	18.68	0.00680886	0.0003952	0	7.20E-03	3.64E-04	2.12E-05	0.00E+00	*3.86E-04*	0.9451421	0.0548579	0
	4,4'-DDE	0.032	0	0.035718537	2.26	0.00672937	0.0003952	0	7.12E-03	2.98E-03	1.75E-04	0.00E+00	*3.15E-03*	0.94453	0.05547	0
	4,4'-DDT	0	0	0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0	0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0.049	0.0000021	0.05605957	5.45	0.01056162	0.0006052	4.62E-07	1.12E-02	1.94E-03	1.11E-04	8.48E-08	*2.05E-03*	0.9457688	0.0541898	4.137E-05
	Aroclor 1248	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1254	0	0	0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0	0	0	0.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	beta-BHC	0	0	0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0	0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0.042	0	0.04405173	3.30	0.00829935	0.0005187	0	8.82E-03	2.52E-03	1.57E-04	0.00E+00	*2.67E-03*	0.9411774	0.0588226	0
	Endosulfan Sulfate	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0	0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0.0119	0.0000014	0.013614467	5.45	0.00256497	0.000147	3.08E-07	2.71E-03	4.71E-04	2.70E-05	5.65E-08	*4.98E-04*	0.9457006	0.0541859	0.0001136
	Inorganics															
X	Aluminum	29700	2.18	1602.857143	58.271149	301.978286	366.795	0.4796	6.69E+02	5.18E+00	6.29E+00	8.23E-03	*1.15E+01*	0.451217	0.5480664	0.0007166
	Antimony	5.4	0.0009546	0.428571429	0.1486509	0.08074286	0.06669	0.00021	1.48E-01	5.43E-01	4.49E-01	1.41E-03	*9.93E-01*	0.5468795	0.4516981	0.0014225
X	Arsenic	321	0.0463257	2.254859741	0.1498401	0.42481558	2.0218185	0.0101917	2.46E+00	2.84E+00	1.35E+01	6.80E-02	*1.64E+01*	0.1729124	0.8229393	0.0041483
		151	0.0434637	8.628571429	11.835039	1.62562286	1.86485	0.009562	3.50E+00	1.37E-01	1.58E-01	8.08E-04	*2.96E-01*	0.464459	0.532809	0.002732
	Beryllium	2	0.0001505	0.158730159	1.4505681	0.02990476	0.0247	3.311E-05	5.46E-02	2.06E-02	1.70E-02	2.28E-05	*3.77E-02*	0.5473266	0.4520674	0.000606
X	Cadmium	18.5	0.0025	13.37086455	2.1200097	2.51907088	0.228475	0.00055	2.75E+00	1.19E+00	1.08E-01	2.59E-04	*1.30E+00*	0.9166605	0.0831394	0.0002001
X	Chromium	1860	0.058864	1.145741605	19.780475	0.21585772	22.971	0.0129501	2.32E+01	1.09E-02	1.16E+00	6.55E-04	*1.17E+00*	0.0093043	0.9901375	0.0005582
	Cobalt	46.3	0.0039065	3.674603175	10.99	0.69229524	0.571805	0.0008594	1.26E+00	6.30E-02	5.20E-02	7.82E-05	*1.15E-01*	0.5472864	0.4520342	0.0006794
	Copper	1075	0.0712382	5.350501945	33.43	1.00803457	13.27625	0.0156724	1.43E+01	3.02E-02	3.97E-01	4.69E-04	*4.28E-01*	0.0704921	0.9284119	0.001096
	Cyanide	0	0	0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	43800	6.8492234	2641.904762	7.01	497.734857	540.93	1.5068291	1.04E+03	7.10E+01	7.72E+01	2.15E-01	*1.48E+02*	0.4785122	0.5200392	0.0014486
X	Lead	1200	0.0759	38.98364953	17.582644	7.34451957	14.82	0.016698	2.22E+01	4.18E-01	8.43E-01	9.50E-04	*1.26E+00*	0.3311144	0.6681328	0.0007528
	Manganese	901.5	0.5791672	7.321529656	193.41	1.37937619	11.133525	0.1274168	1.26E+01	7.13E-03	5.76E-02	6.59E-04	*6.54E-02*	0.1091251	0.8807947	0.0100802
	Mercury	3.3	0.0006096	0.092211837	0.0703306	0.01737271	0.040755	0.0001341	5.83E-02	2.47E-01	5.79E-01	1.91E-03	*8.28E-01*	0.2981835	0.6995148	0.0023017
	Nickel	57.7	0.0039395	2.186022044	87.91322	0.41184655	0.712595	0.0008667	1.13E+00	4.68E-03	8.11E-03	9.86E-06	*1.28E-02*	0.3659855	0.6332443	0.0007702
	Selenium	11.1	0.0009109	0.859625124	0.4395661	0.16195337	0.137085	0.0002004	2.99E-01	3.68E-01	3.12E-01	4.56E-04	*6.81E-01*	0.5412179	0.4581124	0.0006697
	Silver	1.6	0.0003127	0.126984127	398.24689	0.02392381	0.01976	6.88E-05	4.38E-02	6.01E-05	4.96E-05	1.73E-07	*1.10E-04*	0.5467973	0.4516302	0.0015724
	Thallium	4.4	0.0008144	0.349206349	0.1643547	0.06579048	0.05434	0.0001792	1.20E-01	4.00E-01	3.31E-01	1.09E-03	*7.32E-01*	0.5468429	0.4516679	0.0014892
X	Vanadium	115	0.0060955	9.126984127	0.4284891	1.71952381	1.42025	0.001341	3.14E+00	4.01E+00	3.31E+00	3.13E-03	*7.33E+00*	0.5474247	0.4521484	0.0004269
	Zinc	3470	0.626	196.8174659	351.65288	37.0804106	42.8545	0.13772	8.01E+01	1.05E-01	1.22E-01	3.92E-04	*2.28E-01*	0.4630847	0.5351954	0.0017199

Table E.1-77. Maximun Exposure Calculations for Shrew - Station 21

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0	0	26.593749	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0	0	3736.3119	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0	0.0007513	0	6844.0442	0	0	0.0001653	1.65E-04	0.00E+00	0.00E+00	2.41E-08	*2.41E-08*	0	0	1
	Tetrachloroethene	0	0	0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0.019	0	0.016119357	8.3244498	0.003036887	0.0002347	0	3.27E-03	3.65E-04	2.82E-05	0.00E+00	*3.93E-04*	0.9282753	0.0717247	0
	Semivolatile Organics															
	2-Methylnaphthalene	0.14	0	0.12424306	170.89	0.023407392	0.001729	0	2.51E-02	1.37E-04	1.01E-05	0.00E+00	*1.47E-04*	0.9312153	0.0687847	0
	Acenaphthylene	0.038	0	0.03400147	158.52	0.006405877	0.0004693	0	6.88E-03	4.04E-05	2.96E-06	0.00E+00	*4.34E-05*	0.9317399	0.0682601	0
	Anthracene	0.42	0	0.381437505	1189.21	0.071862826	0.005187	0	7.70E-02	6.04E-05	4.36E-06	0.00E+00	*6.48E-05*	0.9326799	0.0673201	0
	Benzo(a)anthracene	0.39	0	0.370645481	1.55	0.069829609	0.0048165	0	7.46E-02	4.52E-02	3.12E-03	0.00E+00	*4.83E-02*	0.9354755	0.0645245	0
	Benzo(a)pyrene	0.89	0	0.858171542	1.55	0.161679519	0.0109915	0	1.73E-01	1.05E-01	7.11E-03	0.00E+00	*1.12E-01*	0.9363443	0.0636557	0
	Benzo(b)fluoranthene	3.1	0	3.058974072	1.55	0.576310715	0.038285	0	6.15E-01	3.73E-01	2.48E-02	0.00E+00	*3.98E-01*	0.937707	0.062293	0
	Benzo(g,h,i)perylene	0.71	0	0.718939675	158.52	0.135448235	0.0087685	0	1.44E-01	8.54E-04	5.53E-05	0.00E+00	*9.10E-04*	0.9391992	0.0608008	0
	Benzo(k)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0.94	0	0.893350646	1.55	0.168307262	0.011609	0	1.80E-01	1.09E-01	7.51E-03	0.00E+00	*1.16E-01*	0.9354755	0.0645245	0
	Dibenz(a,h)anthracene	0.24	0	0.231326477	1.55	0.043581908	0.002964	0	4.65E-02	2.82E-02	1.92E-03	0.00E+00	*3.01E-02*	0.9363209	0.0636791	0
	Dibenzofuran	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	2.5	0	2.350033811	148.65	0.44274637	0.030875	0	4.74E-01	2.98E-03	2.08E-04	0.00E+00	*3.19E-03*	0.9348108	0.0651892	0
	Fluorene	0.24	0	0.215672784	148.65	0.040632752	0.002964	0	4.36E-02	2.73E-04	1.99E-05	0.00E+00	*2.93E-04*	0.9320133	0.0679867	0
	Indeno(1,2,3-cd)pyrene	0.62	0	0.638463084	1.55	0.120286445	0.007657	0	1.28E-01	7.78E-02	4.95E-03	0.00E+00	*8.28E-02*	0.9401532	0.0598468	0
	Naphthalene	2.5	0.0031184	2.176477143	166.49	0.410048294	0.030875	0.000686	4.42E-01	2.46E-03	1.85E-04	4.12E-06	*2.65E-03*	0.9285317	0.0699147	0.0015535
	N-nitrosodiphenylamine	0	0	0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0.6	0	0.545124062	158.52	0.102701373	0.00741	0	1.10E-01	6.48E-04	4.67E-05	0.00E+00	*6.95E-04*	0.9327045	0.0672955	0
	Pyrene	2.4	0	2.24282477	158.52	0.422548187	0.02964	0	4.52E-01	2.67E-03	1.87E-04	0.00E+00	*2.85E-03*	0.9344521	0.0655479	0
	Pesticides and PCBs															
	4,4'-DDD	0.035	0	0.033761532	18.68	0.006360673	0.0004323	0	6.79E-03	3.40E-04	2.31E-05	0.00E+00	*3.64E-04*	0.9363676	0.0636324	0
	4,4'-DDE	0.036	0	0.034320737	2.26	0.006466027	0.0004446	0	6.91E-03	2.86E-03	1.97E-04	0.00E+00	*3.06E-03*	0.9356643	0.0643357	0
	4,4'-DDT	0.0044	0	0.004277665	1.76	0.000805912	5.434E-05	0	8.60E-04	4.58E-04	3.09E-05	0.00E+00	*4.89E-04*	0.9368325	0.0631675	0
	Aldrin	0	0	0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0.062	0.0000021	0.0605837	5.45	0.011413969	0.0007657	4.62E-07	1.22E-02	2.10E-03	1.41E-04	8.48E-08	*2.24E-03*	0.9370974	0.0628647	3.793E-05
	Aroclor 1248	0.24	0	0.233418538	1.55	0.043976052	0.002964	0	4.69E-02	2.84E-02	1.92E-03	0.00E+00	*3.04E-02*	0.9368556	0.0631444	0
	Aroclor 1254	0	0	0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0.42	0	0.418189758	0.76	0.07878695	0.005187	0	8.40E-02	1.04E-01	6.84E-03	0.00E+00	*1.11E-01*	0.9382308	0.0617692	0
	beta-BHC	0	0	0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0.0018	0	0.001615015	3.52	0.000304269	2.223E-05	0	3.26E-04	8.65E-05	6.32E-06	0.00E+00	*9.28E-05*	0.931914	0.068086	0
	Endosulfan I	0.068	0	0.06091623	3.30	0.011476618	0.0008398	0	1.23E-02	3.48E-03	2.55E-04	0.00E+00	*3.74E-03*	0.9318146	0.0681854	0
	Endosulfan Sulfate	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0.009	0	0.00855001	0.11	0.001610822	0.0001112	0	1.72E-03	1.47E-02	1.02E-03	0.00E+00	*1.57E-02*	0.9354519	0.0645481	0
	gamma-Chlordane	0.047	0.0000014	0.045926353	5.45	0.008652525	0.0005805	3.08E-07	9.23E-03	1.59E-03	1.07E-04	5.65E-08	*1.70E-03*	0.9371017	0.062865	3.336E-05
	Inorganics															
X	Aluminum	18400	2.18	993.015873	58.271149	187.0841905	227.24	0.4796	4.15E+02	3.21E+00	3.90E+00	8.23E-03	*7.12E+00*	0.4510185	0.5478253	0.0011562
	Antimony	2	0.0009546	0.158730159	0.1486509	0.029904762	0.0247	0.00021	5.48E-02	2.01E-01	1.66E-01	1.41E-03	*3.69E-01*	0.5455602	0.4506084	0.0038314
X	Arsenic	248.25722	0.0463257	1.880735484	0.1498401	0.354330565	1.5636481	0.0101917	1.93E+00	2.36E+00	1.04E+01	6.80E-02	*1.29E+01*	0.1837652	0.8109492	0.0052857
	Barium	181	0.0434637	10.34285714	11.835039	1.948594286	2.23535	0.009562	4.19E+00	1.65E-01	1.89E-01	8.08E-04	*3.54E-01*	0.4646695	0.5330503	0.0022802
	Beryllium	1.1	0.0001505	0.087301587	1.4505681	0.016447619	0.013585	3.311E-05	3.01E-02	1.13E-02	9.37E-03	2.28E-05	*2.07E-02*	0.5470553	0.4518433	0.0011013
X	Cadmium	20.5	0.0025	14.5078242	2.1200097	2.733274079	0.253175	0.00055	2.99E+00	1.29E+00	1.19E-01	2.59E-04	*1.41E+00*	0.9150569	0.084759	0.0001841
X	Chromium	5033.9072	0.058864	1.071806539	19.780475	0.201928352	62.168754	0.0129501	6.24E+01	1.02E-02	3.14E+00	6.55E-04	*3.15E+00*	0.0032369	0.9965555	0.0002076
	Cobalt	29.9	0.0039065	2.373015873	10.99	0.44707619	0.369265	0.0008594	8.17E-01	4.07E-02	3.36E-02	7.82E-05	*7.44E-02*	0.5470825	0.4518658	0.0010517
	Copper	600.80892	0.0712382	4.588693965	33.43	0.864509943	7.4199901	0.0156724	8.30E+00	2.59E-02	2.22E-01	4.69E-04	*2.48E-01*	0.1041557	0.8939561	0.0018882
	Cyanide	0	0	0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	28000	6.8492234	1688.888889	7.01	318.1866667	345.8	1.5068291	6.65E+02	4.54E+01	4.93E+01	2.15E-01	*9.49E+01*	0.4781214	0.5196144	0.0022642
	Lead	722	0.0759	25.87156788	17.582644	4.874203388	8.9167	0.016698	1.38E+01	2.77E-01	5.07E-01	9.50E-04	*7.85E-01*	0.3530087	0.645782	0.0012093
	Manganese	268	0.5791672	3.201128666	193.41	0.603092641	3.3098	0.1274168	4.04E+00	3.12E-03	1.71E-02	6.59E-04	*2.09E-02*	0.1492689	0.8191947	0.0315364
X	Mercury	18.2	0.0006096	0.112795156	0.0703306	0.021250607	0.22477	0.0001341	2.46E-01	3.02E-01	3.20E+00	1.91E-03	*3.50E+00*	0.0863303	0.9131249	0.0005448
	Nickel	46.8	0.0039395	2.308321659	87.91322	0.434887801	0.57798	0.0008667	1.01E+00	4.95E-03	6.57E-03	9.86E-06	*1.15E-02*	0.4289958	0.5701493	0.000855
	Selenium	3.5	0.0009109	0.368883506	0.4395661	0.069497653	0.043225	0.0002004	1.13E-01	1.58E-01	9.83E-02	4.56E-04	*2.57E-01*	0.6154426	0.3827828	0.0017746
	Silver	0.3	0.0003127	0.023809524	398.24689	0.004485714	0.003705	6.88E-05	8.26E-03	1.13E-05	9.30E-06	1.73E-07	*2.07E-05*	0.5430968	0.4485737	0.0083295
	Thallium	0	0.0008144	0	0.1643547	0	0	0.0001792	1.79E-04	0.00E+00	0.00E+00	1.09E-03	*1.09E-03*	0	0	1
X	Vanadium	77.3	0.0060955	6.134920635	0.4284891	1.155819048	0.954655	0.001341	2.11E+00	2.70E+00	2.23E+00	3.13E-03	*4.93E+00*	0.5473107	0.4520543	0.000635
	Zinc	4856.1855	0.626	219.7558352	351.65288	41.40199936	59.973891	0.13772	1.02E+02	1.18E-01	1.71E-01	3.92E-04	*2.89E-01*	0.4078468	0.5907966	0.0013567

Table E.1-78. Maximun Exposure Calculations for Shrew - Station 22-TT22

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0	0	26.593749	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	2.4	0	1.353357868	3736.3119	0.254972622	0.02964	0	2.85E-01	6.82E-05	7.93E-06	0.00E+00	*7.62E-05*	0.8958584	0.1041416	0
	cis-1,2-Dichloroethene	0.073	0.0007513	0.044691432	6844.0442	0.008419866	0.0009016	0.0001653	9.49E-03	1.23E-06	1.32E-07	2.41E-08	*1.39E-06*	0.887545	0.0950331	0.0174219
	Tetrachloroethene	2.7622576	0	1.745563267	17	0.328864119	0.0341139	0	3.63E-01	1.98E-02	2.05E-03	0.00E+00	*2.18E-02*	0.9060167	0.0939833	0
	Trichloroethene	0.697726	0	0.441607395	8.3244498	0.083198833	0.0086169	0	9.18E-02	9.99E-03	1.04E-03	0.00E+00	*1.10E-02*	0.9061499	0.0938501	0
	Semivolatile Organics															
	2-Methylnaphthalene	0.013	0	0.00860686	170.89	0.001621533	0.0001606	0	1.78E-03	9.49E-06	9.39E-07	0.00E+00	*1.04E-05*	0.9099088	0.0900912	0
	Acenaphthylene	0.012	0	0.008010371	158.52	0.001509154	0.0001482	0	1.66E-03	9.52E-06	9.35E-07	0.00E+00	*1.05E-05*	0.9105804	0.0894196	0
	Anthracene	0.046	0	0.031166587	1189.21	0.005871785	0.0005681	0	6.44E-03	4.94E-06	4.78E-07	0.00E+00	*5.42E-06*	0.9117841	0.0882159	0
	Benzo(a)anthracene	0.3	0	0.212702535	1.55	0.040073158	0.003705	0	4.38E-02	2.59E-02	2.40E-03	0.00E+00	*2.83E-02*	0.9153688	0.0846312	0
	Benzo(a)pyrene	0.2	0	0.143870385	1.55	0.027105181	0.00247	0	2.96E-02	1.75E-02	1.60E-03	0.00E+00	*1.91E-02*	0.916484	0.083516	0
	Benzo(b)fluoranthene	0.44	0	0.323909799	1.55	0.061024606	0.005434	0	6.65E-02	3.95E-02	3.51E-03	0.00E+00	*4.30E-02*	0.9182348	0.0817652	0
	Benzo(g,h,i)perylene	0.19	0	0.143530769	158.52	0.027041197	0.0023465	0	2.94E-02	1.71E-04	1.48E-05	0.00E+00	*1.85E-04*	0.9201537	0.0798463	0
	Benzo(k)fluoranthene	0.54	0	0.401749339	1.55	0.075689575	0.006669	0	8.24E-02	4.90E-02	4.31E-03	0.00E+00	*5.33E-02*	0.9190248	0.0809752	0
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0.4	0	0.28360338	1.55	0.053430877	0.00494	0	5.84E-02	3.46E-02	3.20E-03	0.00E+00	*3.78E-02*	0.9153688	0.0846312	0
	Dibenz(a,h)anthracene	0.044	0	0.031639098	1.55	0.005960806	0.0005434	0	6.50E-03	3.86E-03	3.51E-04	0.00E+00	*4.21E-03*	0.9164541	0.0835459	0
	Dibenzofuran	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0.7968893	0	0.558842462	148.65	0.10528592	0.0098416	0	1.15E-01	7.08E-04	6.62E-05	0.00E+00	*7.74E-04*	0.9145158	0.0854842	0
	Fluorene	0.026	0	0.017430697	148.65	0.003283943	0.0003211	0	3.61E-03	2.21E-05	2.16E-06	0.00E+00	*2.43E-05*	0.9109303	0.0890697	0
	Indeno(1,2,3-cd)pyrene	0.22	0	0.169014549	1.55	0.031842341	0.002717	0	3.46E-02	2.06E-02	1.76E-03	0.00E+00	*2.24E-02*	0.9213816	0.0786184	0
	Naphthalene	0.025	0.0031184	0.01623721	166.49	0.00305909	0.0003088	0.000686	4.05E-03	1.84E-05	1.85E-06	4.12E-06	*2.43E-05*	0.7546063	0.0761614	0.1692323
	N-nitrosodiphenylamine	0	0	0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0.49	0	0.332121882	158.52	0.062571763	0.0060515	0	6.86E-02	3.95E-04	3.82E-05	0.00E+00	*4.33E-04*	0.9118156	0.0881844	0
	Pyrene	0.61	0	0.425276363	158.52	0.080122067	0.0075335	0	8.77E-02	5.05E-04	4.75E-05	0.00E+00	*5.53E-04*	0.9140557	0.0859443	0
	Pesticides and PCBs															
	4,4'-DDD	0.0096	0	0.006908482	18.68	0.001301558	0.0001186	0	1.42E-03	6.97E-05	6.35E-06	0.00E+00	*7.60E-05*	0.916514	0.083486	0
	4,4'-DDE	0.031	0	0.022048198	2.26	0.004153881	0.0003829	0	4.54E-03	1.84E-03	1.69E-04	0.00E+00	*2.01E-03*	0.915611	0.084389	0
	4,4'-DDT	0.0027	0	0.001958282	1.76	0.00036894	3.335E-05	0	4.02E-04	2.10E-04	1.90E-05	0.00E+00	*2.29E-04*	0.9171111	0.0828889	0
	Aldrin	0	0	0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0.0012	0.0000021	0.000874788	5.45	0.00016481	1.482E-05	4.62E-07	1.80E-04	3.03E-05	2.72E-06	8.48E-08	*3.31E-05*	0.9151434	0.0822913	0.0025654
	Aroclor 1248	0.0081	0	0.005877145	1.55	0.001107254	0.0001	0	1.21E-03	7.16E-04	6.47E-05	0.00E+00	*7.81E-04*	0.9171408	0.0828592	0
	Aroclor 1254	0	0	0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0.029	0	0.021541672	0.76	0.004058451	0.0003582	0	4.42E-03	5.35E-03	4.72E-04	0.00E+00	*5.82E-03*	0.9189082	0.0810918	0
	beta-BHC	0	0	0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0.00016	0	0.000107098	3.52	2.01773E-05	1.976E-06	0	2.22E-05	5.74E-06	5.62E-07	0.00E+00	*6.30E-06*	0.9108032	0.0891968	0
	Endosulfan I	0.0042931	0	0.002869153	3.30	0.000540548	5.302E-05	0	5.94E-04	1.64E-04	1.61E-05	0.00E+00	*1.80E-04*	0.9106759	0.0893241	0
	Endosulfan Sulfate	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0.0033	0	0.002338812	0.11	0.000440632	4.076E-05	0	4.81E-04	4.03E-03	3.73E-04	0.00E+00	*4.40E-03*	0.9153384	0.0846616	0
	gamma-Chlordane	0.00019	0.0000014	0.000138508	5.45	2.60949E-05	2.347E-06	3.08E-07	2.87E-05	4.79E-06	4.31E-07	5.65E-08	*5.28E-06*	0.9076677	0.081619	0.0107133
	Inorganics															
X	Aluminum	10257.806	2.18	553.5958958	58.271149	104.2974668	126.68391	0.4796	2.31E+02	1.79E+00	2.17E+00	8.23E-03	*3.97E+00*	0.450605	0.547323	0.0020721
X	Antimony	329	0.0009546	26.11111111	0.1486509	4.919333333	4.06315	0.00021	8.98E+00	3.31E+01	2.73E+01	1.41E-03	*6.04E+01*	0.5476457	0.4523309	2.338E-05
X	Arsenic	77.282967	0.0463257	0.825114344	0.1498401	0.155451542	0.4867668	0.0101917	6.52E-01	1.04E+00	3.25E+00	6.80E-02	*4.35E+00*	0.2382728	0.7461057	0.0156216
	Barium	49.414747	0.0434637	2.823699806	11.835039	0.531985043	0.6102721	0.009562	1.15E+00	4.50E-02	5.16E-02	8.08E-04	*9.73E-02*	0.4618651	0.5298333	0.0083017
	Beryllium	0.6854266	0.0001505	0.054398938	1.4505681	0.01024876	0.008465	3.311E-05	1.87E-02	7.07E-03	5.84E-03	2.28E-05	*1.29E-02*	0.5466912	0.4515425	0.0017663
	Cadmium	1.4344825	0.0025	1.751179669	2.1200097	0.32992225	0.0177159	0.00055	3.48E-01	1.56E-01	8.36E-03	2.59E-04	*1.64E-01*	0.9475403	0.0508801	0.0015796
	Chromium	64.954585	0.058864	1.434495508	19.780475	0.270258954	0.8021891	0.0129501	1.09E+00	1.37E-02	4.06E-02	6.55E-04	*5.49E-02*	0.2489952	0.7390736	0.0119312
	Cobalt	4.2506768	0.0039065	0.337355298	10.99	0.063557738	0.0524959	0.0008594	1.17E-01	5.78E-03	4.78E-03	7.82E-05	*1.06E-02*	0.5436326	0.4490163	0.007351
	Copper	29.339113	0.0712382	2.067800801	33.43	0.389573671	0.362338	0.0156724	7.68E-01	1.17E-02	1.08E-02	4.69E-04	*2.30E-02*	0.5075322	0.47205	0.0204178
	Cyanide	0	0	0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	9141.9692	6.8492234	551.4203632	7.01	103.8875964	112.90332	1.5068291	2.18E+02	1.48E+01	1.61E+01	2.15E-01	*3.11E+01*	0.4758986	0.5171987	0.0069026
X	Lead	32501.284	0.0759	558.5819911	17.582644	105.2368471	401.39085	0.016698	5.07E+02	5.99E+00	2.28E+01	9.50E-04	*2.88E+01*	0.2077134	0.7922536	3.296E-05
	Manganese	116.47624	0.5791672	1.813380999	193.41	0.34164098	1.4384815	0.1274168	1.91E+00	1.77E-03	7.44E-03	6.59E-04	*9.86E-03*	0.1791004	0.7541032	0.0667964
	Mercury	0.4649345	0.0006096	0.073173572	0.0703306	0.013785901	0.0057419	0.0001341	1.97E-02	1.96E-01	8.16E-02	1.91E-03	*2.80E-01*	0.7011464	0.2920332	0.0068204
	Nickel	11.365756	0.0039395	3.335067929	87.91322	0.628326798	0.1403671	0.0008667	7.70E-01	7.15E-03	1.60E-03	9.86E-06	*8.75E-03*	0.8164748	0.182399	0.0011262
	Selenium	5.7022402	0.0009109	0.52755618	0.4395661	0.099391584	0.0704227	0.0002004	1.70E-01	2.26E-01	1.60E-01	4.56E-04	*3.87E-01*	0.584606	0.4142153	0.0011787
	Silver	2.8820348	0.0003127	0.228732923	398.24689	0.043093283	0.0355931	6.88E-05	7.88E-02	1.08E-04	8.94E-05	1.73E-07	*1.98E-04*	0.5471801	0.4519464	0.0008736
	Thallium	0.5710909	0.0008144	0.045324678	0.1643547	0.008539169	0.007053	0.0001792	1.58E-02	5.20E-02	4.29E-02	1.09E-03	*9.60E-02*	0.5414368	0.4472027	0.0113605
X	Vanadium	40.579889	0.0060955	3.22062612	0.4284891	0.606765961	0.5011616	0.001341	1.11E+00	1.42E+00	1.17E+00	3.13E-03	*2.59E+00*	0.5469964	0.4517947	0.0012089
	Zinc	95.590558	0.626	60.59149828	351.65288	11.41543828	1.1805434	0.13772	1.27E+01	3.25E-02	3.36E-03	3.92E-04	*3.62E-02*	0.8964745	0.0927101	0.0108154

Table E.1-79. Maximun Exposure Calculations for Shrew - Station BW

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)					C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																			
	2-Butanone	0	0					0	26.593749	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0					0	3736.3119	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0.417	0.0007513					0.392278186	6844.0442	0.07390521	0.00515	0.0001653	7.92E-02	1.08E-05	7.52E-07	2.41E-08	*1.16E-05*	0.9329059	0.0650078	0.0020863
	Tetrachloroethene	0	0					0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0.053	0					0.051544695	8.3244498	0.009711021	0.0006546	0	1.04E-02	1.17E-03	7.86E-05	0.00E+00	*1.25E-03*	0.9368535	0.0631465	0
	Semivolatile Organics																			
	2-Methylnaphthalene	0.013	0					0.013225176	170.89	0.002491623	0.0001606	0	2.65E-03	1.46E-05	9.39E-07	0.00E+00	*1.55E-05*	0.9394647	0.0605353	0
	Acenaphthylene	0.019	0					0.019488648	158.52	0.003671661	0.0002347	0	3.91E-03	2.32E-05	1.48E-06	0.00E+00	*2.46E-05*	0.9399305	0.0600695	0
	Anthracene	0.069	0					0.071835182	1189.21	0.013533748	0.0008522	0	1.44E-02	1.14E-05	7.17E-07	0.00E+00	*1.21E-05*	0.9407649	0.0592351	0
	Benzo(a)anthracene	0.56	0					0.610093124	1.55	0.114941545	0.006916	0	1.22E-01	7.43E-02	4.47E-03	0.00E+00	*7.88E-02*	0.9432452	0.0567548	0
	Benzo(a)pyrene	1	0					1.105345642	1.55	0.208247119	0.01235	0	2.21E-01	1.35E-01	7.99E-03	0.00E+00	*1.43E-01*	0.9440156	0.0559844	0
	Benzo(b)fluoranthene	1.5	0					1.696755878	1.55	0.319668807	0.018525	0	3.38E-01	2.07E-01	1.20E-02	0.00E+00	*2.19E-01*	0.9452237	0.0547763	0
	Benzo(g,h,i)perylene	0.64	0					0.742896098	158.52	0.139961625	0.007904	0	1.48E-01	8.83E-04	4.99E-05	0.00E+00	*9.33E-04*	0.9465461	0.0534539	0
	Benzo(k)fluoranthene	0.72	0					0.823096206	1.55	0.155071325	0.008892	0	1.64E-01	1.00E-01	5.75E-03	0.00E+00	*1.06E-01*	0.9457684	0.0542316	0
	Carbazole	0	0					na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0.85	0					0.926034206	1.55	0.174464844	0.0104975	0	1.85E-01	1.13E-01	6.79E-03	0.00E+00	*1.20E-01*	0.9432452	0.0567548	0
	Dibenz(a,h)anthracene	0.32	0					0.353572176	1.55	0.066612998	0.003952	0	7.06E-02	4.31E-02	2.56E-03	0.00E+00	*4.56E-02*	0.9439949	0.0560051	0
	Dibenzofuran	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	1.2	0					1.293091775	148.65	0.24361849	0.01482	0	2.58E-01	1.64E-03	9.97E-05	0.00E+00	*1.74E-03*	0.9426556	0.0573444	0
	Fluorene	0.047	0					0.048416786	148.65	0.009121723	0.0005805	0	9.70E-03	6.14E-05	3.90E-06	0.00E+00	*6.53E-05*	0.9401732	0.0598268	0
	Indeno(1,2,3-cd)pyrene	0.74	0					0.873554133	1.55	0.164577599	0.009139	0	1.74E-01	1.06E-01	5.91E-03	0.00E+00	*1.12E-01*	0.9473913	0.0526087	0
	Naphthalene	0.026	0.0031184					0.025947854	166.49	0.004888576	0.0003211	0.000686	5.90E-03	2.94E-05	1.93E-06	4.12E-06	*3.54E-05*	0.829173	0.0544632	0.1163638
	N-nitrosodiphenylamine	0	0					0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0.57	0					0.593653399	158.52	0.1118443	0.0070395	0	1.19E-01	7.06E-04	4.44E-05	0.00E+00	*7.50E-04*	0.9407867	0.0592133	0
	Pyrene	1	0					1.071267929	158.52	0.201826878	0.01235	0	2.14E-01	1.27E-03	7.79E-05	0.00E+00	*1.35E-03*	0.9423374	0.0576626	0
	Pesticides and PCBs																			
	4,4'-DDD	0.017	0					0.018798233	18.68	0.003541587	0.00021	0	3.75E-03	1.90E-04	1.12E-05	0.00E+00	*2.01E-04*	0.9440363	0.0559637	0
	4,4'-DDE	0.004	0					0.004371476	2.26	0.000823586	0.0000494	0	8.73E-04	3.65E-04	2.19E-05	0.00E+00	*3.86E-04*	0.9434126	0.0565874	0
	4,4'-DDT	0.0013	0					0.00144881	1.76	0.000272956	1.606E-05	0	2.89E-04	1.55E-04	9.13E-06	0.00E+00	*1.64E-04*	0.9444484	0.0555516	0
	Aldrin	0	0					0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0.0024	0.0000021					0.002688372	5.45	0.000506489	2.964E-05	4.62E-07	5.37E-04	9.30E-05	5.44E-06	8.48E-08	*9.85E-05*	0.9439014	0.0552376	0.000861
	Aroclor 1248	0.028	0					0.031217357	1.55	0.00588135	0.0003458	0	6.23E-03	3.80E-03	2.24E-04	0.00E+00	*4.03E-03*	0.944469	0.055531	0
	Aroclor 1254	0	0					0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0.058	0					0.066201236	0.76	0.012472313	0.0007163	0	1.32E-02	1.64E-02	9.45E-04	0.00E+00	*1.74E-02*	0.945688	0.054312	0
	beta-BHC	0	0					0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0					0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0	0					0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0	0					0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0.0018	0					0.001960246	0.11	0.00036931	2.223E-05	0	3.92E-04	3.38E-03	2.03E-04	0.00E+00	*3.58E-03*	0.9432242	0.0567758	0
	gamma-Chlordane	0.0017	0.0000014					0.001904263	5.45	0.000358763	2.1E-05	3.08E-07	3.80E-04	6.59E-05	3.85E-06	5.65E-08	*6.98E-05*	0.9439492	0.0552404	0.0008104
	Inorganics																			
X	Aluminum	21849.759	2.18					1179.193326	58.271149	222.1600227	269.84452	0.4796	4.92E+02	3.81E+00	4.63E+00	8.23E-03	*8.45E+00*	0.4511009	0.5479253	0.0009738
X	Antimony	62.575443	0.0009546					4.966304984	0.1486509	0.935651859	0.7728067	0.00021	1.71E+00	6.29E+00	5.20E+00	1.41E-03	*1.15E+01*	0.5475912	0.4522859	0.0001229
X	Arsenic	3036.4849	0.0463257					11.01744742	0.1498401	2.075687094	19.1253	0.0101917	2.12E+01	1.39E+01	1.28E+02	6.80E-02	*1.42E+02*	0.0978582	0.9016613	0.0004805
	Barium	165.60448	0.0434637					9.46311336	11.835039	1.782850557	2.0452154	0.009562	3.84E+00	1.51E-01	1.73E-01	8.08E-04	*3.24E-01*	0.464571	0.5329374	0.0024916
	Beryllium	1.6523497	0.0001505					0.131138863	1.4505681	0.024706562	0.0204065	3.311E-05	4.51E-02	1.70E-02	1.41E-02	2.28E-05	*3.11E-02*	0.5472568	0.4520097	0.0007335
	Cadmium	12.2	0.0025					9.603157064	2.1200097	1.809234791	0.15067	0.00055	1.96E+00	8.53E-01	7.11E-02	2.59E-04	*9.25E-01*	0.9228648	0.0768546	0.0002805
X	Chromium	2034.6511	0.058864					1.138872812	19.780475	0.214563638	25.127941	0.0129501	2.54E+01	1.08E-02	1.27E+00	6.55E-04	*1.28E+00*	0.0084622	0.991027	0.0005107
	Cobalt	51.075761	0.0039065					4.053631854	10.99	0.763704241	0.6307857	0.0008594	1.40E+00	6.95E-02	5.74E-02	7.82E-05	*1.27E-01*	0.5473212	0.4520629	0.0006159
	Copper	1519.8909	0.0712382					5.862747247	33.43	1.104541581	18.770653	0.0156724	1.99E+01	3.30E-02	5.61E-01	4.69E-04	*5.95E-01*	0.0555301	0.943682	0.0007879
	Cyanide	0	0					0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	149490.54	6.8492234					9016.889444	7.01	1698.781971	1846.2081	1.5068291	3.55E+03	2.42E+02	2.63E+02	2.15E-01	*5.06E+02*	0.4790028	0.5205723	0.0004249
	Lead	866.17911	0.0759					29.9662673	17.582644	5.645644759	10.697312	0.016698	1.64E+01	3.21E-01	6.08E-01	9.50E-04	*9.30E-01*	0.3450956	0.6538837	0.0010207
	Manganese	1391.7841	0.5791672					9.845351362	193.41	1.854864197	17.188534	0.1274168	1.92E+01	9.59E-03	8.89E-02	6.59E-04	*9.91E-02*	0.0967546	0.896599	0.0066464
X	Mercury	15.541429	0.0006096					0.110712832	0.0703306	0.020858298	0.1919367	0.0001341	2.13E-01	2.97E-01	2.73E+00	1.91E-03	*3.03E+00*	0.0979589	0.9014113	0.0006298
	Nickel	41.403155	0.0039395					2.383041216	87.91322	0.448964965	0.511329	0.0008667	9.61E-01	5.11E-03	5.82E-03	9.86E-06	*1.09E-02*	0.4671071	0.5319912	0.0009017
	Selenium	13.761679	0.0009109					1.006314003	0.4395661	0.189589558	0.1699567	0.0002004	3.60E-01	4.31E-01	3.87E-01	4.56E-04	*8.18E-01*	0.5270085	0.4724345	0.0005571
	Silver	2.09261	0.0003127					0.16608016	398.24689	0.031289502	0.0258437	6.88E-05	5.72E-02	7.86E-05	6.49E-05	1.73E-07	*1.44E-04*	0.5469998	0.4517975	0.0012027
X	Thallium	13.298369	0.0008144					1.055426123	0.1643547	0.198842282	0.1642349	0.0001792	3.63E-01	1.21E+00	9.99E-01	1.09E-03	*2.21E+00*	0.5473884	0.4521184	0.0004932
X	Vanadium	92.330898	0.0060955					7.327849048	0.4284891	1.380566761	1.1402866	0.001341	2.52E+00	3.22E+00	2.66E+00	3.13E-03	*5.89E+00*	0.5473673	0.452101	0.0005317
	Zinc	2590.1629	0.626					178.8161959	351.65288	33.68897131	31.988512	0.13772	6.58E+01	9.58E-02	9.10E-02	3.92E-04	*1.87E-01*	0.5118722	0.4860353	0.0020925

Table E.1-80. Maximun Exposure Calculations for Shrew - Station CB-01

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0	0	26.5937491	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0	0	3736.31185	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0	0.004	0	6844.04418	0	0	0.00088	8.80E-04	0.00E+00	0.00E+00	1.29E-07	*1.29E-07*	0	0	1
	Tetrachloroethene	0	0	0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0	0.002	0	8.32444981	0	0	0.00044	4.40E-04	0.00E+00	0.00E+00	5.29E-05	*5.29E-05*	0	0	1
	Semivolatile Organics															
	2-Methylnaphthalene	0	0	0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0	0	0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(b)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(g,h,i)perylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0	0	na	158.52	No BCF		0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenz(a,h)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluorene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Naphthalene	0	0	0	166.49	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	N-nitrosodiphenylamine	0	0	0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pyrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pesticides and PCBs															
	4,4'-DDD	0	0	0	18.68	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDE	0	0	0	2.26	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDT	0	0	0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0	0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0	0	0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1248	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1254	0	0	0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0	0	0	0.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	beta-BHC	0	0	0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0	0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0	0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0	0	0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Inorganics															
X	Aluminum	14742.4021	0.3255	795.6216981	58.2711486	149.8951279	182.068665	0.07161	3.32E+02	2.57E+00	3.12E+00	1.23E-03	*5.70E+00*	0.45144321	0.54834112	0.00021567
	Antimony	2.04612006	0	0.162390481	0.14865089	0.030594367	0.02526958	0	5.59E-02	2.06E-01	1.70E-01	0.00E+00	*3.76E-01*	0.5476585	0.4523415	0
X	Arsenic	57.9592588	0.01975	0.67342882	0.1498401	0.12687399	0.36505639	0.004345	4.96E-01	8.47E-01	2.44E+00	2.90E-02	*3.31E+00*	0.25565239	0.73559239	0.00875522
	Barium	59.1429859	0.03575	3.379599196	11.8350385	0.636716489	0.73041588	0.007865	1.37E+00	5.38E-02	6.17E-02	6.65E-04	*1.16E-01*	0.46306742	0.53121256	0.00572001
	Beryllium	1.35169291	0.000043	0.107277215	1.45056813	0.020211027	0.01669341	0.00000946	3.69E-02	1.39E-02	1.15E-02	6.52E-06	*2.54E-02*	0.54751815	0.45222558	0.00025627
	Cadmium	9.26858512	0.00023	7.718513263	2.12000967	1.454167899	0.11446703	0.0000506	1.57E+00	6.86E-01	5.40E-02	2.39E-05	*7.40E-01*	0.92699772	0.07297003	3.2256E-05
	Chromium	332.360708	0.0121	1.285867448	19.7804745	0.242257427	4.10465475	0.002662	4.35E+00	1.22E-02	2.08E-01	1.35E-04	*2.20E-01*	0.05569681	0.94369117	0.00061201
	Cobalt	13.9810336	0.0019	1.109605843	10.99	0.209049741	0.17266577	0.000418	3.82E-01	1.90E-02	1.57E-02	3.80E-05	*3.48E-02*	0.54705944	0.4518467	0.00109386
	Copper	749.361679	0.01375	4.864309983	33.43	0.916436001	9.25461674	0.003025	1.02E+01	2.74E-02	2.77E-01	9.05E-05	*3.04E-01*	0.09007558	0.90962709	0.00029732
	Cyanide	0	0	0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	18702.1764	1.935	1128.067784	7.01	212.5279704	230.971879	0.4257	4.44E+02	3.03E+01	3.29E+01	6.07E-02	*6.33E+01*	0.47874688	0.52029418	0.00095894
	Lead	443.092953	0.0077	17.44634959	17.582644	3.286892263	5.47219797	0.001694	8.76E+00	1.87E-01	3.11E-01	9.63E-05	*4.98E-01*	0.37518242	0.62462421	0.00019336
	Manganese	687.783819	0.7775	6.087758715	193.41	1.146933742	8.49413017	0.17105	9.81E+00	5.93E-03	4.39E-02	8.84E-04	*5.07E-02*	0.11688957	0.8656779	0.01743253
	Mercury	2.94546414	0.0001475	0.090983401	0.07033058	0.017141273	0.03637648	0.00003245	5.36E-02	2.44E-01	5.17E-01	4.61E-04	*7.61E-01*	0.32009724	0.67929679	0.00060597
	Nickel	20.4333444	0.0022	2.863333859	87.9132201	0.539452099	0.2523518	0.000484	7.92E-01	6.14E-03	2.87E-03	5.51E-06	*9.01E-03*	0.68087888	0.31851023	0.00061089
	Selenium	4.98015009	0	0.477711902	0.4395661	0.090000922	0.08150485	0	1.52E-01	2.05E-01	1.40E-01	0.00E+00	*3.45E-01*	0.59404285	0.40595715	0
	Silver	0.4259608	0	0.033806413	398.246887	0.006369128	0.00526062	0	1.16E-02	1.60E-05	1.32E-05	0.00E+00	*2.92E-05*	0.5476585	0.4523415	0
	Thallium	2.54602991	0	0.202065866	0.1643547	0.038069209	0.03144347	0	6.95E-02	2.32E-01	1.91E-01	0.00E+00	*4.23E-01*	0.5476585	0.4523415	0
X	Vanadium	79.3449795	0.00165	6.297220592	0.42848914	1.186396359	0.9799105	0.000363	2.17E+00	2.77E+00	2.29E+00	8.47E-04	*5.06E+00*	0.54756674	0.45226572	0.00016754
	Zinc	638.314768	0.09175	112.9502029	351.65288	21.27981823	7.88318739	0.020185	2.92E+01	6.05E-02	2.24E-02	5.74E-05	*8.30E-02*	0.72918066	0.27012767	0.00069167

Table E.1-81. Maximun Exposure Calculations for Shrew - Station CB-02

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0	0	26.593749	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0	0	3736.3119	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0	0.004	0	6844.0442	0	0	0.00088	8.80E-04	0.00E+00	0.00E+00	1.29E-07	*1.29E-07*	0	0	1
	Tetrachloroethene	0	0	0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0	0.002	0	8.3244498	0	0	0.00044	4.40E-04	0.00E+00	0.00E+00	5.29E-05	*5.29E-05*	0	0	1
	Semivolatile Organics															
	2-Methylnaphthalene	0	0	0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0	0	0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(b)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(g,h,i)perylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenz(a,h)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluorene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Naphthalene	0	0	0	166.49	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	N-nitrosodiphenylamine	0	0	0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pyrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pesticides and PCBs															
	4,4'-DDD	0	0	0	18.68	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDE	0	0	0	2.26	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDT	0	0	0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0	0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0	0	0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1248	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1254	0	0	0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0	0	0	0.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	beta-BHC	0	0	0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0	0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0	0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0	0	0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Inorganics															
X	Aluminum	5408.9501	0.3255	291.9115935	58.271149	54.99614422	66.800534	0.07161	1.22E+02	9.44E-01	1.15E+00	1.23E-03	*2.09E+00*	0.4512753	0.5481371	0.0005876
	Antimony	1.7951181	0	0.142469688	0.1486509	0.026841289	0.0221697	0	4.90E-02	1.81E-01	1.49E-01	0.00E+00	*3.30E-01*	0.5476585	0.4523415	0
X	Arsenic	41.453916	0.01975	0.531530601	0.1498401	0.100140365	0.2610975	0.004345	3.66E-01	6.68E-01	1.74E+00	2.90E-02	*2.44E+00*	0.2739198	0.7141951	0.0118851
	Barium	170.72422	0.03575	9.755669873	11.835039	1.837968204	2.1084442	0.007865	3.95E+00	1.55E-01	1.78E-01	6.65E-04	*3.34E-01*	0.4648051	0.5332059	0.001989
	Beryllium	0.3397089	0.000043	0.02696102	1.4505681	0.005079456	0.0041954	9.46E-06	9.28E-03	3.50E-03	2.89E-03	6.52E-06	*6.40E-03*	0.5471005	0.4518806	0.0010189
	Cadmium	3.8386237	0.00023	3.829812593	2.1200097	0.721536693	0.047407	0.0000506	7.69E-01	3.40E-01	2.24E-02	2.39E-05	*3.63E-01*	0.9382861	0.0616481	6.58E-05
	Chromium	143.57212	0.0121	1.36025507	19.780475	0.256272055	1.7731157	0.002662	2.03E+00	1.30E-02	8.96E-02	1.35E-04	*1.03E-01*	0.1261151	0.8725749	0.00131
	Cobalt	5.3263523	0.0019	0.422726376	10.99	0.079641649	0.0657805	0.000418	1.46E-01	7.25E-03	5.99E-03	3.80E-05	*1.33E-02*	0.5460888	0.451045	0.0028662
	Copper	97.613109	0.01375	2.840094853	33.43	0.53507387	1.2055219	0.003025	1.74E+00	1.60E-02	3.61E-02	9.05E-05	*5.22E-02*	0.3068751	0.69139	0.0017349
	Cyanide	0	0	0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	6897.5723	1.935	416.0440414	7.01	78.3826974	85.185017	0.4257	1.64E+02	1.12E+01	1.22E+01	6.07E-02	*2.34E+01*	0.4779625	0.5194417	0.0025958
	Lead	238.18343	0.0077	10.57184652	17.582644	1.991735884	2.9415653	0.001694	4.93E+00	1.13E-01	1.67E-01	9.63E-05	*2.81E-01*	0.4035943	0.5960624	0.0003433
	Manganese	71.988994	0.7775	1.306082735	193.41	0.246065987	0.8890641	0.17105	1.31E+00	1.27E-03	4.60E-03	8.84E-04	*6.75E-03*	0.188386	0.6806597	0.1309544
	Mercury	0.3279057	0.0001475	0.070219932	0.0703306	0.013229435	0.0040496	3.245E-05	1.73E-02	1.88E-01	5.76E-02	4.61E-04	*2.46E-01*	0.7641983	0.2339272	0.0018745
	Nickel	9.9812753	0.0022	3.449624926	87.91322	0.649909336	0.1232688	0.000484	7.74E-01	7.39E-03	1.40E-03	5.51E-06	*8.80E-03*	0.8400429	0.1593315	0.0006256
	Selenium	1.9422207	0	0.239557752	0.4395661	0.04513268	0.0239864	0	6.91E-02	1.03E-01	5.46E-02	0.00E+00	*1.57E-01*	0.6529697	0.3470303	0
	Silver	0	0	0	398.24689	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Thallium	0.5408819	0	0.042927134	0.1643547	0.008087472	0.0066799	0	1.48E-02	4.92E-02	4.06E-02	0.00E+00	*8.99E-02*	0.5476585	0.4523415	0
X	Vanadium	31.911066	0.00165	2.532624262	0.4284891	0.477146411	0.3941017	0.000363	8.72E-01	1.11E+00	9.20E-01	8.47E-04	*2.03E+00*	0.5474304	0.4521531	0.0004165
	Zinc	314.05574	0.09175	89.50633671	351.65288	16.86299384	3.8785884	0.020185	2.08E+01	4.80E-02	1.10E-02	5.74E-05	*5.90E-02*	0.8122138	0.186814	0.0009722

Table E.1-82. Maximun Exposure Calculations for Shrew - Station CB-03

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)					C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																			
	2-Butanone	0	0					0	26.59374907	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0					0	3736.311853	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0	0.004					0	6844.044183	0	0	0.00088	8.80E-04	0.00E+00	0.00E+00	1.29E-07	*1.29E-07*	0	0	1
	Tetrachloroethene	0	0					0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0	0.002					0	8.324449805	0	0	0.00044	4.40E-04	0.00E+00	0.00E+00	5.29E-05	*5.29E-05*	0	0	1
	Semivolatile Organics																			
	2-Methylnaphthalene	0	0					0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0	0					0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)pyrene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(b)fluoranthene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(g,h,i)perylene	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0	0					na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenz(a,h)anthracene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0	0					0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluorene	0	0					0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Naphthalene	0	0					0	166.49	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	N-nitrosodiphenylamine	0	0					0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pyrene	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pesticides and PCBs																			
	4,4'-DDD	0	0					0	18.68	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDE	0	0					0	2.26	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDT	0	0					0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0					0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0	0					0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1248	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1254	0	0					0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0	0					0	0.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	beta-BHC	0	0					0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0					0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0	0					0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0	0					0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0					0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0	0					0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Inorganics																			
X	Aluminum	11284.00588	0.3255					608.9780953	58.27114864	114.7314732	139.3574727	0.07161	2.54E+02	1.97E+00	2.39E+00	1.23E-03	*4.36E+00*	0.451413371	0.548304878	0.000281751
	Antimony	4.8	0					0.380952381	0.148650889	0.071771429	0.05928	0	1.31E-01	4.83E-01	3.99E-01	0.00E+00	*8.82E-01*	0.547658498	0.452341502	0
X	Arsenic	594.5475445	0.01975					3.484197061	0.149840096	0.656422726	3.744757709	0.004345	4.41E+00	4.38E+00	2.50E+01	2.90E-02	*2.94E+01*	0.148999872	0.850013866	0.000986261
	Barium	66.58016156	0.03575					3.80458066	11.83503851	0.716782996	0.822264995	0.007865	1.55E+00	6.06E-02	6.95E-02	6.65E-04	*1.31E-01*	0.463363486	0.531552194	0.00508432
	Beryllium	0.660846891	0.000043					0.052448166	1.450568131	0.009881234	0.008161459	0.00000946	1.81E-02	6.81E-03	5.63E-03	6.52E-06	*1.24E-02*	0.547371505	0.452104458	0.000524037
	Cadmium	13.06217083	0.00023					10.13888453	2.120009672	1.910165845	0.16131781	0.0000506	2.07E+00	9.01E-01	7.61E-02	2.39E-05	*9.77E-01*	0.922101983	0.07787359	2.44263E-05
	Chromium	768	0.0121					1.215695612	19.78047452	0.229037053	9.4848	0.002662	9.72E+00	1.16E-02	4.80E-01	1.35E-04	*4.91E-01*	0.023571973	0.97615406	0.000273967
	Cobalt	63.39523092	0.0019					5.031367533	10.99	0.947909643	0.782931102	0.000418	1.73E+00	8.63E-02	7.12E-02	3.80E-05	*1.58E-01*	0.54752627	0.452232287	0.000241443
	Copper	376.4119981	0.01375					4.055812281	33.43	0.764115034	4.648688176	0.003025	5.42E+00	2.29E-02	1.39E-01	9.05E-05	*1.62E-01*	0.14108923	0.858352222	0.000558548
	Cyanide	0	0					0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	50627.25698	1.935					3053.707564	7.01	575.3185051	625.2466237	0.4257	1.20E+03	8.21E+01	8.92E+01	6.07E-02	*1.71E+02*	0.479036552	0.520608991	0.000354457
	Lead	273.8405358	0.0077					11.83161166	17.58264402	2.229075637	3.381930618	0.001694	5.61E+00	1.27E-01	1.92E-01	9.63E-05	*3.19E-01*	0.397148527	0.602549658	0.000301816
	Manganese	463.7515283	0.7775					4.652879557	193.41	0.876602509	5.727331375	0.17105	6.77E+00	4.53E-03	2.96E-02	8.84E-04	*3.50E-02*	0.129388132	0.845364576	0.025247293
	Mercury	2.450349294	0.0001475					0.089028884	0.070330576	0.016773042	0.030261814	0.00003245	4.71E-02	2.38E-01	4.30E-01	4.61E-04	*6.69E-01*	0.356362906	0.642947655	0.000689438
	Nickel	36.9580154	0.0022					2.454460239	87.91322008	0.462420309	0.45643149	0.000484	9.19E-01	5.26E-03	5.19E-03	5.51E-06	*1.05E-02*	0.502993911	0.496479622	0.000526467
	Selenium	5.259614111	0					0.497217671	0.4395661	0.093675809	0.064956234	0	1.59E-01	2.13E-01	1.48E-01	0.00E+00	*3.61E-01*	0.590522615	0.409477385	0
	Silver	3.2	0					0.253968254	398.246887	0.047847619	0.03952	0	8.74E-02	1.20E-04	9.92E-05	0.00E+00	*2.19E-04*	0.547658498	0.452341502	0
	Thallium	0.967913038	0					0.076818495	0.164354697	0.014472604	0.011953726	0	2.64E-02	8.81E-02	7.27E-02	0.00E+00	*1.61E-01*	0.547658498	0.452341502	0
X	Vanadium	62.41075564	0.00165					4.953234574	0.428489138	0.933189394	0.770772832	0.000363	1.70E+00	2.18E+00	1.80E+00	8.47E-04	*3.98E+00*	0.547541854	0.452245159	0.000212988
	Zinc	2098.535315	0.09175					166.8876155	351.6528803	31.44162676	25.91691114	0.020185	5.74E+01	8.94E-02	7.37E-02	5.74E-05	*1.63E-01*	0.547966653	0.451681561	0.000351785

Table E.1-83. Maximun Exposure Calculations for Shrew - Station CB-04

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0	0	26.59374907	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0	0	3736.311853	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0	0.004	0	6844.044183	0	0	0.00088	8.80E-04	0.00E+00	0.00E+00	1.29E-07	*1.29E-07*	0	0	1
	Tetrachloroethene	0	0	0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0	0.002	0	8.324449805	0	0	0.00044	4.40E-04	0.00E+00	0.00E+00	5.29E-05	*5.29E-05*	0	0	1
	Semivolatile Organics															
	2-Methylnaphthalene	0	0	0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0	0	0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(b)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(g,h,i)perylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenz(a,h)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluorene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Naphthalene	0	0	0	166.49	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	N-nitrosodiphenylamine	0	0	0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pyrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pesticides and PCBs															
	4,4'-DDD	0	0	0	18.68	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDE	0	0	0	2.26	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDT	0	0	0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0	0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0	0	0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1248	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1254	0	0	0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0	0	0	0.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	beta-BHC	0	0	0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0	0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0	0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0	0	0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Inorganics															
X	Aluminum	11027.3257	0.3255	595.125514	58.27114864	112.1216468	136.1874724	0.07161	2.48E+02	1.92E+00	2.34E+00	1.23E-03	*4.26E+00*	0.45141041	0.548301283	0.000288307
	Antimony	4.770623468	0	0.37862091	0.148650889	0.071332179	0.0589172	0	1.30E-01	4.80E-01	3.96E-01	0.00E+00	*8.76E-01*	0.547658498	0.452341502	0
X	Arsenic	181.6891961	0.01975	1.508736262	0.149840096	0.284245912	1.144369402	0.004345	1.43E+00	1.90E+00	7.64E+00	2.90E-02	*9.56E+00*	0.198362724	0.798605091	0.003032184
	Barium	76.62750766	0.03575	4.378714724	11.83503851	0.824949854	0.94634972	0.007865	1.78E+00	6.97E-02	8.00E-02	6.65E-04	*1.50E-01*	0.463672595	0.531906791	0.004420614
	Beryllium	0.772513831	0.000043	0.061310621	1.450568131	0.011550921	0.009540546	0.00000946	2.11E-02	7.96E-03	6.58E-03	6.52E-06	*1.45E-02*	0.547412971	0.452138707	0.000448322
	Cadmium	5.715249936	0.00023	5.255341897	2.120009672	0.990106413	0.070583337	0.0000506	1.06E+00	4.67E-01	3.33E-02	2.39E-05	*5.00E-01*	0.93341072	0.066541578	4.77025E-05
	Chromium	272.3036013	0.0121	1.303153197	19.78047452	0.245514062	3.362949476	0.002662	3.61E+00	1.24E-02	1.70E-01	1.35E-04	*1.83E-01*	0.067988238	0.931274596	0.000737166
	Cobalt	11.25055264	0.0019	0.892901003	10.99	0.168222549	0.138944325	0.000418	3.08E-01	1.53E-02	1.26E-02	3.80E-05	*2.80E-02*	0.546914244	0.451726781	0.001358974
	Copper	244.3024014	0.01375	3.61839201	33.43	0.681705055	3.017134657	0.003025	3.70E+00	2.04E-02	9.02E-02	9.05E-05	*1.11E-01*	0.184151801	0.815031043	0.000817156
	Cyanide	0	0	0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	39923.02314	1.935	2408.055364	7.01	453.6776305	493.0493357	0.4257	9.47E+02	6.47E+01	7.03E+01	6.07E-02	*1.35E+02*	0.478991029	0.520559518	0.000449452
	Lead	275.5444279	0.0077	11.89098638	17.58264402	2.240261834	3.402973684	0.001694	5.64E+00	1.27E-01	1.94E-01	9.63E-05	*3.21E-01*	0.396862676	0.602837232	0.000300092
	Manganese	1380.41729	0.7775	9.790441621	193.41	1.844519201	17.04815353	0.17105	1.91E+01	9.54E-03	8.81E-02	8.84E-04	*9.86E-02*	0.096755457	0.894272004	0.008972539
	Mercury	1.210417488	0.0001475	0.081919705	0.070330576	0.015433672	0.014948656	0.00003245	3.04E-02	2.19E-01	2.13E-01	4.61E-04	*4.32E-01*	0.507439911	0.491493174	0.001066916
	Nickel	76.71355888	0.0022	2.029988113	87.91322008	0.382449761	0.947412452	0.000484	1.33E+00	4.35E-03	1.08E-02	5.51E-06	*1.51E-02*	0.287481377	0.712154808	0.000363815
	Selenium	3.90442101	0	0.399667081	0.4395661	0.075297278	0.048219599	0	1.24E-01	1.71E-01	1.10E-01	0.00E+00	*2.81E-01*	0.609611249	0.390388751	0
	Silver	11.5	0	0.912698413	398.246887	0.171952381	0.142025	0	3.14E-01	4.32E-04	3.57E-04	0.00E+00	*7.88E-04*	0.547658498	0.452341502	0
	Thallium	5.3	0	0.420634921	0.164354697	0.079247619	0.065455	0	1.45E-01	4.82E-01	3.98E-01	0.00E+00	*8.80E-01*	0.547658498	0.452341502	0
X	Vanadium	68.38234999	0.00165	5.427170634	0.428489138	1.022478947	0.844522022	0.000363	1.87E+00	2.39E+00	1.97E+00	8.47E-04	*4.36E+00*	0.547552038	0.45225357	0.000194392
	Zinc	3066.066352	0.09175	188.988038	351.6528803	35.60534637	37.86591945	0.020185	7.35E+01	1.01E-01	1.08E-01	5.74E-05	*2.09E-01*	0.484482834	0.515242508	0.000274658

Table E.1-84. Maximun Exposure Calculations for Shrew - Station CB-05

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)					C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																			
	2-Butanone	0	0					0	26.5937491	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0					0	3736.31185	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0	0.004					0	6844.04418	0	0	0.00088	8.80E-04	0.00E+00	0.00E+00	1.29E-07	*1.29E-07*	0	0	1
	Tetrachloroethene	0	0					0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0	0.002					0	8.32444981	0	0	0.00044	4.40E-04	0.00E+00	0.00E+00	5.29E-05	*5.29E-05*	0	0	1
	Semivolatile Organics																			
	2-Methylnaphthalene	0	0					0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0	0					0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)pyrene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(b)fluoranthene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(g,h,i)perylene	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0	0					na	158.52	No BCF		0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenz(a,h)anthracene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0	0					0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluorene	0	0					0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Naphthalene	0	0					0	166.49	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	N-nitrosodiphenylamine	0	0					0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pyrene	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pesticides and PCBs																			
	4,4'-DDD	0	0					0	18.68	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDE	0	0					0	2.26	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDT	0	0					0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0					0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0	0					0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1248	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1254	0	0					0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0	0					0	0.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	beta-BHC	0	0					0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0					0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0	0					0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0	0					0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0					0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0	0					0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Inorganics																			
X	Aluminum	6209.90036	0.3255					335.1374799	58.2711486	63.13990122	76.6922695	0.07161	1.40E+02	1.08E+00	1.32E+00	1.23E-03	*2.40E+00*	0.45130947	0.54817868	0.00051185
	Antimony	1.15264161	0					0.091479493	0.14865089	0.017234736	0.01423512	0	3.15E-02	1.16E-01	9.58E-02	0.00E+00	*2.12E-01*	0.5476585	0.4523415	0
X	Arsenic	59.8135248	0.01975					0.688568829	0.1498401	0.129726367	0.37673549	0.004345	5.11E-01	8.66E-01	2.51E+00	2.90E-02	*3.41E+00*	0.25396364	0.73753021	0.00850615
	Barium	30.8692948	0.03575					1.763959702	11.8350385	0.332330008	0.38123579	0.007865	7.21E-01	2.81E-02	3.22E-02	6.65E-04	*6.10E-02*	0.46065403	0.52844402	0.01090195
	Beryllium	0.31167936	0.000043					0.024736457	1.45056813	0.004660348	0.00384924	0.00000946	8.52E-03	3.21E-03	2.65E-03	6.52E-06	*5.87E-03*	0.54705035	0.4518392	0.00111045
	Cadmium	0.68221942	0.00023					0.969901473	2.12000967	0.182729437	0.00842541	0.0000506	1.91E-01	8.62E-02	3.97E-03	2.39E-05	*9.02E-02*	0.95567067	0.0440647	0.00026464
	Chromium	137.917272	0.0121					1.363922206	19.7804745	0.256962944	1.70327831	0.002662	1.96E+00	1.30E-02	8.61E-02	1.35E-04	*9.92E-02*	0.13090963	0.86773421	0.00135615
	Cobalt	6.56837507	0.0019					0.521299609	10.99	0.098212846	0.08111943	0.000418	1.80E-01	8.94E-03	7.38E-03	3.80E-05	*1.64E-02*	0.54638495	0.4512896	0.00232545
	Copper	50.3873969	0.01375					2.385149925	33.43	0.449362246	0.62228435	0.003025	1.07E+00	1.34E-02	1.86E-02	9.05E-05	*3.21E-02*	0.41813913	0.57904606	0.00281481
	Cyanide	0	0					0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	11469.0522	1.935					691.7840985	7.01	130.3321242	141.642794	0.4257	2.72E+02	1.86E+01	2.02E+01	6.07E-02	*3.89E+01*	0.47845752	0.51997971	0.00156277
	Lead	61.8482959	0.0077					3.561104548	17.582644	0.670912097	0.76382645	0.001694	1.44E+00	3.82E-02	4.34E-02	9.63E-05	*8.17E-02*	0.46706829	0.5317524	0.00117931
	Manganese	225.930362	0.7775					2.849219297	193.41	0.536792915	2.79023997	0.17105	3.50E+00	2.78E-03	1.44E-02	8.84E-04	*1.81E-02*	0.15345346	0.79764833	0.04889821
	Mercury	0.28930486	0.0001475					0.069189789	0.07033058	0.013035356	0.00357291	0.00003245	1.66E-02	1.85E-01	5.08E-02	4.61E-04	*2.37E-01*	0.78334082	0.21470914	0.00195004
	Nickel	10.2319324	0.0022					3.427451	87.9132201	0.645731768	0.12636436	0.000484	7.73E-01	7.35E-03	1.44E-03	5.51E-06	*8.79E-03*	0.83581203	0.1635615	0.00062647
	Selenium	0.97962495	0					0.145055509	0.4395661	0.027328458	0.01209837	0	3.94E-02	6.22E-02	2.75E-02	0.00E+00	*8.97E-02*	0.69314375	0.30685625	0
	Silver	0.12087053	0					0.009592899	398.246887	0.001807302	0.00149275	0	3.30E-03	4.54E-06	3.75E-06	0.00E+00	*8.29E-06*	0.5476585	0.4523415	0
	Thallium	1.64528172	0					0.130577914	0.1643547	0.024600879	0.02031923	0	4.49E-02	1.50E-01	1.24E-01	0.00E+00	*2.73E-01*	0.5476585	0.4523415	0
X	Vanadium	25.8893714	0.00165					2.054712017	0.42848914	0.387107744	0.31973374	0.000363	7.07E-01	9.03E-01	7.46E-01	8.47E-04	*1.65E+00*	0.54737739	0.45210932	0.00051329
	Zinc	165.970839	0.09175					72.61159882	351.65288	13.68002522	2.04973986	0.020185	1.57E+01	3.89E-02	5.83E-03	5.74E-05	*4.48E-02*	0.86857578	0.13014263	0.00128159

Table E.1-85. Maximun Exposure Calculations for Shrew - Station CB-06

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0	0	26.5937491	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0	0	3736.31185	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0	0.004	0	6844.04418	0	0	0.00088	8.80E-04	0.00E+00	0.00E+00	1.29E-07	*1.29E-07*	0	0	1
	Tetrachloroethene	0	0	0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0	0.002	0	8.32444981	0	0	0.00044	4.40E-04	0.00E+00	0.00E+00	5.29E-05	*5.29E-05*	0	0	1
	Semivolatile Organics															
	2-Methylnaphthalene	0	0	0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0	0	0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(b)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(g,h,i)perylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenz(a,h)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluorene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Naphthalene	0	0	0	166.49	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	N-nitrosodiphenylamine	0	0	0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pyrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pesticides and PCBs															
	4,4'-DDD	0	0	0	18.68	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDE	0	0	0	2.26	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDT	0	0	0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0	0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0	0	0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1248	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1254	0	0	0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0	0	0	0.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	beta-BHC	0	0	0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0	0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0	0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0	0	0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Inorganics															
X	Aluminum	8560.63473	0.3255	462.002509	58.2711486	87.04127269	105.723839	0.07161	1.93E+02	1.49E+00	1.81E+00	1.23E-03	*3.31E+00*	0.45137291	0.54825574	0.00037135
	Antimony	4.71821984	0	0.374461892	0.14865089	0.07054862	0.05827002	0	1.29E-01	4.75E-01	3.92E-01	0.00E+00	*8.67E-01*	0.5476585	0.4523415	0
X	Arsenic	139.790435	0.01975	1.253816751	0.1498401	0.236219076	0.88047006	0.004345	1.12E+00	1.58E+00	5.88E+00	2.90E-02	*7.48E+00*	0.21071533	0.78540879	0.00387589
	Barium	51.070215	0.03575	2.918298	11.8350385	0.549807343	0.63071716	0.007865	1.19E+00	4.65E-02	5.33E-02	6.65E-04	*1.00E-01*	0.46264911	0.53073269	0.0066182
	Beryllium	0.38427094	0.000043	0.030497693	1.45056813	0.005745765	0.00474575	0.00000946	1.05E-02	3.96E-03	3.27E-03	6.52E-06	*7.24E-03*	0.54716513	0.451934	0.00090087
X	Cadmium	17.1554046	0.00023	12.59234844	2.12000967	2.372398446	0.21186925	0.0000506	2.58E+00	1.12E+00	9.99E-02	2.39E-05	*1.22E+00*	0.91799778	0.08198264	1.958E-05
	Chromium	497.126882	0.0121	1.251643779	19.7804745	0.235809688	6.139517	0.002662	6.38E+00	1.19E-02	3.10E-01	1.35E-04	*3.22E-01*	0.03697242	0.96261021	0.00041737
	Cobalt	13.8240634	0.0019	1.097147889	10.99	0.206702662	0.17072718	0.000418	3.78E-01	1.88E-02	1.55E-02	3.80E-05	*3.44E-02*	0.54705264	0.45184109	0.00110627
	Copper	236.035209	0.01375	3.585655542	33.43	0.675537504	2.91503484	0.003025	3.59E+00	2.02E-02	8.72E-02	9.05E-05	*1.07E-01*	0.18798364	0.81117459	0.00084177
	Cyanide	0	0	0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	16257.758	1.935	980.6266746	7.01	184.7500655	200.783312	0.4257	3.86E+02	2.64E+01	2.86E+01	6.07E-02	*5.50E+01*	0.47867786	0.52021917	0.00110297
	Lead	189.345635	0.0077	8.784726802	17.582644	1.65504253	2.33841859	0.001694	4.00E+00	9.41E-02	1.33E-01	9.63E-05	*2.27E-01*	0.4142624	0.58531359	0.00042401
	Manganese	93.6856521	0.7775	1.563134137	193.41	0.294494471	1.1570178	0.17105	1.62E+00	1.52E-03	5.98E-03	8.84E-04	*8.39E-03*	0.18149964	0.71308068	0.10541968
	Mercury	0.33932613	0.0001475	0.070504181	0.07033058	0.013282988	0.00419068	0.00003245	1.75E-02	1.89E-01	5.96E-02	4.61E-04	*2.49E-01*	0.75876272	0.23938364	0.00185364
	Nickel	27.5219595	0.0022	2.649986224	87.9132201	0.499257405	0.3398962	0.000484	8.40E-01	5.68E-03	3.87E-03	5.51E-06	*9.55E-03*	0.59461058	0.40481298	0.00057644
	Selenium	1.96777152	0	0.241863757	0.4395661	0.045567132	0.02430198	0	6.99E-02	1.04E-01	5.53E-02	0.00E+00	*1.59E-01*	0.65217851	0.34782149	0
	Silver	0.16550588	0	0.013135387	398.246887	0.002474707	0.002044	0	4.52E-03	6.21E-06	5.13E-06	0.00E+00	*1.13E-05*	0.5476585	0.4523415	0
	Thallium	4.13278275	0	0.327998631	0.1643547	0.061794942	0.05103987	0	1.13E-01	3.76E-01	3.11E-01	0.00E+00	*6.87E-01*	0.5476585	0.4523415	0
X	Vanadium	72.2600292	0.00165	5.734922951	0.42848914	1.080459484	0.89241136	0.000363	1.97E+00	2.52E+00	2.08E+00	8.47E-04	*4.61E+00*	0.54755775	0.45225829	0.00018396
	Zinc	2075.98896	0.09175	166.2973704	351.65288	31.33042459	25.6384637	0.020185	5.70E+01	8.91E-02	7.29E-02	5.74E-05	*1.62E-01*	0.54976196	0.44988385	0.00035419

Table E.1-86. Maximun Exposure Calculations for Shrew - Station DA

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)				C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																		
	2-Butanone	0	0				0	26.59374907	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0				0	3736.311853	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0	0.004				0	6844.044183	0	0	0.00088	8.80E-04	0.00E+00	0.00E+00	1.29E-07	*1.29E-07*	0	0	1
	Tetrachloroethene	0	0				0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0	0.002				0	8.324449805	0	0	0.00044	4.40E-04	0.00E+00	0.00E+00	5.29E-05	*5.29E-05*	0	0	1
	Semivolatile Organics																		
	2-Methylnaphthalene	0	0				0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0	0				0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0	0				0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)pyrene	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(b)fluoranthene	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(g,h,i)perylene	0	0				0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0	0				na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenz(a,h)anthracene	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0	0				0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0	0				0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluorene	0	0				0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Naphthalene	0	0				0	166.49	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	N-nitrosodiphenylamine	0	0				0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0	0				0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pyrene	0	0				0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pesticides and PCBs																		
	4,4'-DDD	0	0				0	18.68	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDE	0	0				0	2.26	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDT	0	0				0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0				0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0	0				0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1248	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1254	0	0				0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0	0				0	0.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	beta-BHC	0	0				0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0				0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0	0				0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0	0				0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0				0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0	0				0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Inorganics																		
X	Aluminum	9392.030187	0.3255				506.8714704	58.27114864	95.49458503	115.9915728	0.07161	2.12E+02	1.64E+00	1.99E+00	1.23E-03	*3.63E+00*	0.451387751	0.54827376	0.000338489
	Antimony	1.072153455	0				0.085091544	0.148650889	0.016031247	0.013241095	0	2.93E-02	1.08E-01	8.91E-02	0.00E+00	*1.97E-01*	0.547658498	0.452341502	0
X	Arsenic	195.1917703	0.01975				1.587058014	0.149840096	0.29900173	1.229415366	0.004345	1.53E+00	2.00E+00	8.20E+00	2.90E-02	*1.02E+01*	0.195073802	0.802091446	0.002834752
	Barium	65.96667038	0.03575				3.769524022	11.83503851	0.710178326	0.814688379	0.007865	1.53E+00	6.00E-02	6.88E-02	6.65E-04	*1.30E-01*	0.463341577	0.531527062	0.005131361
	Beryllium	0.529328866	0.000043				0.042010227	1.450568131	0.007914727	0.006537211	0.00000946	1.45E-02	5.46E-03	4.51E-03	6.52E-06	*9.97E-03*	0.547300245	0.4520456	0.000654155
	Cadmium	4.6	0.00023				4.422322865	2.120009672	0.833165628	0.05681	0.0000506	8.90E-01	3.93E-01	2.68E-02	2.39E-05	*4.20E-01*	0.936113568	0.06382958	5.68523E-05
	Chromium	391.1037027	0.0121				1.271922036	19.78047452	0.239630112	4.830130728	0.002662	5.07E+00	1.21E-02	2.44E-01	1.35E-04	*2.56E-01*	0.047241746	0.952233455	0.000524799
	Cobalt	25.7	0.0019				2.03968254	10.99	0.38427619	0.317395	0.000418	7.02E-01	3.50E-02	2.89E-02	3.80E-05	*6.39E-02*	0.547332441	0.452072193	0.000595366
	Copper	248.567987	0.01375				3.634964929	33.43	0.684827393	3.069814639	0.003025	3.76E+00	2.05E-02	9.18E-02	9.05E-05	*1.12E-01*	0.182248024	0.816946955	0.000805021
	Cyanide	0	0				0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	33506.5523	1.935				2021.030138	7.01	380.7620781	413.8059209	0.4257	7.95E+02	5.43E+01	5.90E+01	6.07E-02	*1.13E+02*	0.478949806	0.520514718	0.000535476
	Lead	213.5880944	0.0077				9.681706368	17.58264402	1.82403348	2.637812966	0.001694	4.46E+00	1.04E-01	1.50E-01	9.63E-05	*2.54E-01*	0.40865172	0.590968761	0.000379519
	Manganese	2850	0.7775				16.05163916	193.41	3.024128818	35.1975	0.17105	3.84E+01	1.56E-02	1.82E-01	8.84E-04	*1.99E-01*	0.078768372	0.916776351	0.004455277
	Mercury	3.4	0.0001475				0.092537239	0.070330576	0.017434016	0.04199	0.00003245	5.95E-02	2.48E-01	5.97E-01	4.61E-04	*8.45E-01*	0.293223212	0.70623101	0.000545777
	Nickel	17.26166693	0.0022				2.991704789	87.91322008	0.563637182	0.213181587	0.000484	7.77E-01	6.41E-03	2.42E-03	5.51E-06	*8.84E-03*	0.725119226	0.274258108	0.000622666
	Selenium	1.676503517	0				0.215068021	0.4395661	0.040518815	0.020704818	0	6.12E-02	9.22E-02	4.71E-02	0.00E+00	*1.39E-01*	0.661816569	0.338183431	0
	Silver	0.217615429	0				0.017271066	398.246887	0.003253869	0.002687551	0	5.94E-03	8.17E-06	6.75E-06	0.00E+00	*1.49E-05*	0.547658498	0.452341502	0
	Thallium	3.338972929	0				0.264997851	0.164354697	0.049925595	0.041236316	0	9.12E-02	3.04E-01	2.51E-01	0.00E+00	*5.55E-01*	0.547658498	0.452341502	0
X	Vanadium	37.91699439	0.00165				3.009285269	0.428489138	0.566949345	0.468274881	0.000363	1.04E+00	1.32E+00	1.09E+00	8.47E-04	*2.42E+00*	0.54746653	0.452182944	0.000350526
	Zinc	592.8533729	0.09175				110.2458585	351.6528803	20.77031973	7.321739155	0.020185	2.81E+01	5.91E-02	2.08E-02	5.74E-05	*7.99E-02*	0.738835356	0.260446629	0.000718015

Table E.1-87. Maximun Exposure Calculations for Shrew - Station NRSE

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0	0	26.59374907	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0	0	3736.311853	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0	0.000751254	0	6844.044183	0	0	0.000165276	1.65E-04	0.00E+00	0.00E+00	2.41E-08	*2.41E-08*	0	0	1
	Tetrachloroethene	0	0	0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0	0	0	8.324449805	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Semivolatile Organics															
	2-Methylnaphthalene	0	0	0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0	0	0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(b)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(g,h,i)perylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenz(a,h)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluorene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Naphthalene	0	0.003118404	0	166.49	0	0	0.000686049	6.86E-04	0.00E+00	0.00E+00	4.12E-06	*4.12E-06*	0	0	1
	N-nitrosodiphenylamine	0	0	0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pyrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pesticides and PCBs															
	4,4'-DDD	0	0	0	18.68	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDE	0	0	0	2.26	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDT	0	0	0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0	0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0	0.0000021	0	5.45	0	0	0.000000462	4.62E-07	0.00E+00	0.00E+00	8.48E-08	*8.48E-08*	0	0	1
	Aroclor 1248	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1254	0	0	0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0	0	0	0.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	beta-BHC	0	0	0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0	0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0	0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0	0.0000014	0	5.45	0	0	0.000000308	3.08E-07	0.00E+00	0.00E+00	5.65E-08	*5.65E-08*	0	0	1
	Inorganics															
X	Aluminum	8497.905308	2.18	458.6171118	58.27114864	86.40346387	104.9491305	0.4796	1.92E+02	1.48E+00	1.80E+00	8.23E-03	*3.29E+00*	0.450411695	0.547088203	0.002500102
	Antimony	1.018849629	0.000954619	0.080861082	0.148650889	0.015234228	0.012582793	0.000210016	2.80E-02	1.02E-01	8.46E-02	1.41E-03	*1.89E-01*	0.543554705	0.448951952	0.007493343
X	Arsenic	214.2984408	0.046325726	1.695221309	0.149840096	0.319379695	1.349758729	0.01019166	1.68E+00	2.13E+00	9.01E+00	6.80E-02	*1.12E+01*	0.190182798	0.803748317	0.006068884
	Barium	56.08302119	0.043463732	3.204744068	11.83503851	0.603773782	0.692625312	0.009562021	1.31E+00	5.10E-02	5.85E-02	8.08E-04	*1.10E-01*	0.462321409	0.530356765	0.007321827
	Beryllium	0.74927575	0.000150512	0.059466329	1.450568131	0.011203456	0.009253556	3.31127E-05	2.05E-02	7.72E-03	6.38E-03	2.28E-05	*1.41E-02*	0.546773465	0.451610504	0.001616031
	Cadmium	2.195450365	0.0025	2.456231254	2.120009672	0.462753968	0.027113812	0.00055	4.90E-01	2.18E-01	1.28E-02	2.59E-04	*2.31E-01*	0.943591336	0.055287172	0.001121493
	Chromium	250.7790993	0.058863979	1.310362726	19.78047452	0.246872338	3.097121876	0.012950075	3.36E+00	1.25E-02	1.57E-01	6.55E-04	*1.70E-01*	0.073540791	0.922601512	0.003857697
	Cobalt	8.010347293	0.003906503	0.635741849	10.99	0.119773764	0.098927789	0.000859431	2.20E-01	1.09E-02	9.00E-03	7.82E-05	*2.00E-02*	0.545514791	0.450570895	0.003914314
	Copper	303.8210614	0.071238205	3.832779303	33.43	0.722095621	3.752190108	0.015672405	4.49E+00	2.16E-02	1.12E-01	4.69E-04	*1.34E-01*	0.160824578	0.835684876	0.003490546
	Cyanide	0	0	0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	24290.88309	6.849223396	1465.164377	7.01	276.0369686	299.9924062	1.506829147	5.78E+02	3.94E+01	4.28E+01	2.15E-01	*8.24E+01*	0.477956129	0.519434806	0.002609064
	Lead	223.9132277	0.0759	10.05767489	17.58264402	1.894865949	2.765328362	0.016698	4.68E+00	1.08E-01	1.57E-01	9.50E-04	*2.66E-01*	0.405154924	0.591274756	0.00357032
	Manganese	247.7890443	0.579167241	3.034444467	193.41	0.571689338	3.060194697	0.127416793	3.76E+00	2.96E-03	1.58E-02	6.59E-04	*1.94E-02*	0.152073315	0.814032938	0.033893747
X	Mercury	4.4975748	0.00060956	0.095643063	0.070330576	0.018019153	0.055545049	0.000134103	7.37E-02	2.56E-01	7.90E-01	1.91E-03	*1.05E+00*	0.244498881	0.753681495	0.001819623
	Nickel	14.04764071	0.003939512	3.156336992	87.91322008	0.594653889	0.173488363	0.000866693	7.69E-01	6.76E-03	1.97E-03	9.86E-06	*8.75E-03*	0.773273046	0.225599928	0.001127025
	Selenium	2.362854775	0.000910899	0.27657741	0.4395661	0.052107184	0.029181256	0.000200398	8.15E-02	1.19E-01	6.64E-02	4.56E-04	*1.85E-01*	0.639439524	0.35810127	0.002459206
	Silver	2.24224359	0.000312716	0.17795584	398.246887	0.03352688	0.027691708	6.87975E-05	6.13E-02	8.42E-05	6.95E-05	1.73E-07	*1.54E-04*	0.54704373	0.451833731	0.001122539
	Thallium	1.02292501	0.000814409	0.081184525	0.164354697	0.015295164	0.012633124	0.00017917	2.81E-02	9.31E-02	7.69E-02	1.09E-03	*1.71E-01*	0.544167469	0.449458067	0.006374464
X	Vanadium	30.64261244	0.006095546	2.431953369	0.428489138	0.458180015	0.378436264	0.00134102	8.38E-01	1.07E+00	8.83E-01	3.13E-03	*1.96E+00*	0.546782056	0.4516176	0.001600344
	Zinc	485.2818221	0.626	103.2384822	351.6528803	19.45013004	5.993230503	0.13772	2.56E+01	5.53E-02	1.70E-02	3.92E-04	*7.27E-02*	0.760332622	0.234283712	0.005383666

Table E.1-88. Maximun Exposure Calculations for Shrew - Station JY

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0	0	26.59374907	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0	0	3736.311853	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0	0.000751254	0	6844.044183	0	0	0.000165276	0.00E+00	0.00E+00	0.00E+00	2.41E-08	*2.41E-08*	0	0	1
	Tetrachloroethene	0	0	0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0	0	0	8.324449805	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Semivolatile Organics															
	2-Methylnaphthalene	0	0	0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0	0	0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(b)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(g,h,i)perylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenz(a,h)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluorene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Naphthalene	0	0.003118404	0	166.49	0	0	0.000686049	0.00E+00	0.00E+00	0.00E+00	4.12E-06	*4.12E-06*	0	0	1
	N-nitrosodiphenylamine	0	0	0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pyrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pesticides and PCBs															
	4,4'-DDD	0	0	0	18.68	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDE	0	0	0	2.26	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDT	0	0	0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0	0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0	0.0000021	0	5.45	0	0	0.000000462	0.00E+00	0.00E+00	0.00E+00	8.48E-08	*8.48E-08*	0	0	1
	Aroclor 1248	0.143575715	0	0.312524202	1.55	0.05887956	0.00177316	0	6.07E-02	3.81E-02	1.15E-03	0.00E+00	*3.92E-02*	0.970765366	0.029234634	0
X	Aroclor 1254	1.366005812	0	3.008535998	0.08	0.566808182	0.016870172	0	5.84E-01	7.01E+00	2.09E-01	0.00E+00	*7.22E+00*	0.971096801	0.028903199	0
	Aroclor 1260	1.471641452	0	3.279477664	0.76	0.617853592	0.018174772	0	6.36E-01	8.15E-01	2.40E-02	0.00E+00	*8.39E-01*	0.971424589	0.028575411	0
	beta-BHC	0	0	0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0	0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0	0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0	0.0000014	0	5.45	0	0	0.000000308	0.00E+00	0.00E+00	0.00E+00	5.65E-08	*5.65E-08*	0	0	1
	Inorganics															
X	Aluminum	12295.11157	2.18	663.5457038	58.27114864	125.0120106	151.8446279	0.4796	2.77E+02	2.15E+00	2.61E+00	8.23E-03	*4.76E+00*	0.450759739	0.547510952	0.001729309
X	Antimony	19.5	0.000954619	1.547619048	0.148650889	0.291571429	0.240825	0.000210016	5.33E-01	1.96E+00	1.62E+00	1.41E-03	*3.58E+00*	0.547442547	0.452163135	0.000394318
X	Arsenic	282.3247183	0.046325726	2.059471119	0.149840096	0.388004359	1.778222238	0.01019166	2.18E+00	2.59E+00	1.19E+01	6.80E-02	*1.45E+01*	0.178276559	0.817040673	0.004682767
	Barium	181.9454499	0.043463732	10.39688285	11.83503851	1.95877273	2.247026307	0.009562021	4.22E+00	1.66E-01	1.90E-01	8.08E-04	*3.56E-01*	0.46467496	0.533056665	0.002268375
	Beryllium	0.655152625	0.000150512	0.05199624	1.450568131	0.009796092	0.008091135	3.31127E-05	1.79E-02	6.75E-03	5.58E-03	2.28E-05	*1.24E-02*	0.546646551	0.451505678	0.001847771
X	Cadmium	14.53709307	0.0025	11.03894666	2.120009672	2.07973755	0.179533099	0.00055	2.26E+00	9.81E-01	8.47E-02	2.59E-04	*1.07E+00*	0.920310889	0.079445729	0.000243382
	Chromium	1170.228904	0.058863979	1.181870537	19.78047452	0.222664409	14.45232697	0.012950075	1.47E+01	1.13E-02	7.31E-01	6.55E-04	*7.43E-01*	0.015159674	0.983958645	0.000881681
	Cobalt	16.62705381	0.003906503	1.319607446	10.99	0.248614043	0.205344115	0.000859431	4.55E-01	2.26E-02	1.87E-02	7.82E-05	*4.14E-02*	0.546623634	0.45148675	0.001889616
	Copper	501.8800457	0.071238205	4.375836373	33.43	0.824407573	6.198218565	0.015672405	7.04E+00	2.47E-02	1.85E-01	4.69E-04	*2.11E-01*	0.117131657	0.880641611	0.002226732
	Cyanide	0	0	0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	38229.19118	6.849223396	2305.887722	7.01	434.4292468	472.1305111	1.506829147	9.08E+02	6.20E+01	6.73E+01	2.15E-01	*1.30E+02*	0.478411223	0.519929395	0.001659382
	Lead	729.1526388	0.0759	26.07820656	17.58264402	4.913134116	9.005035509	0.016698	1.39E+01	2.79E-01	5.12E-01	9.50E-04	*7.93E-01*	0.352578467	0.646223244	0.001198289
	Manganese	365.2369469	0.579167241	3.953585616	193.41	0.74485553	4.510676294	0.127416793	5.38E+00	3.85E-03	2.33E-02	6.59E-04	*2.78E-02*	0.138373145	0.837956409	0.023670446
	Mercury	1.814930811	0.00060956	0.085930535	0.070330576	0.016189313	0.022414396	0.000134103	3.87E-02	2.30E-01	3.19E-01	1.91E-03	*5.51E-01*	0.417920172	0.578618013	0.003461815
	Nickel	75.32929506	0.003939512	2.039621748	87.91322008	0.384264737	0.930316794	0.000866693	1.32E+00	4.37E-03	1.06E-02	9.86E-06	*1.50E-02*	0.292116961	0.707224182	0.000658857
	Selenium	5.1	0.000910899	0.486111951	0.4395661	0.091583492	0.062985	0.000200398	1.55E-01	2.08E-01	1.43E-01	4.56E-04	*3.52E-01*	0.591743547	0.406961633	0.00129482
	Silver	1.042251471	0.000312716	0.082718371	398.246887	0.015584141	0.012871806	6.87975E-05	2.85E-02	3.91E-05	3.23E-05	1.73E-07	*7.16E-05*	0.546337627	0.451250521	0.002411853
	Thallium	4.036980396	0.000814409	0.32039527	0.164354697	0.060362469	0.049856708	0.00017917	1.10E-01	3.67E-01	3.03E-01	1.09E-03	*6.72E-01*	0.546769681	0.451607378	0.001622941
X	Vanadium	64.24470786	0.006095546	5.098786338	0.428489138	0.960611346	0.793422142	0.00134102	1.76E+00	2.24E+00	1.85E+00	3.13E-03	*4.10E+00*	0.547240114	0.451995935	0.000763951
	Zinc	2351.399389	0.626	173.2330007	351.6528803	32.63709734	29.03978245	0.13772	6.18E+01	9.28E-02	8.26E-02	3.92E-04	*1.76E-01*	0.527983639	0.469788408	0.002227953

Table E.1-89. Maximun Exposure Calculations for Shrew - Station NRSO

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0	0	26.59374907	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0	0	3736.311853	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0	0.000751254	0	6844.044183	0	0	0.000165276	1.65E-04	0.00E+00	0.00E+00	2.41E-08	*2.41E-08*	0	0	1
	Tetrachloroethene	0	0	0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0	0	0	8.324449805	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Semivolatile Organics															
	2-Methylnaphthalene	0	0	0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0	0	0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(b)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(g,h,i)perylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenz(a,h)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluorene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Naphthalene	0	0.003118404	0	166.49	0	0	0.000686049	6.86E-04	0.00E+00	0.00E+00	4.12E-06	*4.12E-06*	0	0	1
	N-nitrosodiphenylamine	0	0	0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pyrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pesticides and PCBs															
	4,4'-DDD	0	0	0	18.68	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDE	0	0	0	2.26	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDT	0	0	0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0	0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0	0.0000021	0	5.45	0	0	0.000000462	4.62E-07	0.00E+00	0.00E+00	8.48E-08	*8.48E-08*	0	0	1
	Aroclor 1248	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1254	0	0	0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0	0	0	0.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	beta-BHC	0	0	0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0	0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0	0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0	0.0000014	0	5.45	0	0	0.000000308	3.08E-07	0.00E+00	0.00E+00	5.65E-08	*5.65E-08*	0	0	1
	Inorganics															
X	Aluminum	6701.190468	2.18	361.651549	58.27114864	68.13515184	82.75970227	0.4796	1.51E+02	1.17E+00	1.42E+00	8.23E-03	*2.60E+00*	0.450109976	0.546721722	0.003168302
	Antimony	0.960320184	0.000954619	0.076215888	0.148650889	0.014359073	0.011859954	0.000210016	2.64E-02	9.66E-02	7.98E-02	1.41E-03	*1.78E-01*	0.543306576	0.448747008	0.007946417
X	Arsenic	200.5704324	0.046325726	1.617809645	0.149840096	0.304795337	1.263292869	0.01019166	1.58E+00	2.03E+00	8.43E+00	6.80E-02	*1.05E+01*	0.193118688	0.800423864	0.006457448
	Barium	59.70950409	0.043463732	3.411971662	11.83503851	0.642815461	0.737412376	0.009562021	1.39E+00	5.43E-02	6.23E-02	8.08E-04	*1.17E-01*	0.462527092	0.530592716	0.006880192
	Beryllium	0.466915969	0.000150512	0.037056823	1.450568131	0.006981505	0.005766412	3.31127E-05	1.28E-02	4.81E-03	3.98E-03	2.28E-05	*8.81E-03*	0.546239642	0.45116959	0.002590768
	Cadmium	2.1304011	0.0025	2.398196518	2.120009672	0.451820224	0.026310454	0.00055	4.79E-01	2.13E-01	1.24E-02	2.59E-04	*2.26E-01*	0.943886489	0.05496452	0.001148991
	Chromium	171.9424863	0.058863979	1.343919872	19.78047452	0.253194504	2.123489706	0.012950075	2.39E+00	1.28E-02	1.07E-01	6.55E-04	*1.21E-01*	0.105955336	0.888625393	0.005419271
	Cobalt	9.847463144	0.003906503	0.781544694	10.99	0.14724302	0.12161617	0.00085931	2.70E-01	1.34E-02	1.11E-02	7.82E-05	*2.45E-02*	0.545913441	0.450900162	0.003186397
	Copper	171.4491063	0.071238205	3.295447472	33.43	0.620862304	2.117396463	0.015672405	2.75E+00	1.86E-02	6.33E-02	4.69E-04	*8.24E-02*	0.225445832	0.768863247	0.005690921
	Cyanide	0	0	0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	28574.98568	6.849223396	1723.570565	7.01	324.7206944	352.9010731	1.506829147	6.79E+02	4.63E+01	5.03E+01	2.15E-01	*9.69E+01*	0.478143162	0.51963807	0.002218769
	Lead	144.4307715	0.0759	7.060389158	17.58264402	1.330177317	1.783720029	0.016698	3.13E+00	7.57E-02	1.01E-01	9.50E-04	*1.78E-01*	0.424895961	0.569770229	0.00533381
	Manganese	830	0.579167241	6.920324455	193.41	1.303789127	10.2505	0.127416793	1.17E+01	6.74E-03	5.30E-02	6.59E-04	*6.04E-02*	0.11160948	0.877483141	0.010907379
	Mercury	1.970886361	0.00060956	0.086770499	0.070330576	0.016347562	0.024340447	0.000134103	4.08E-02	2.32E-01	3.46E-01	1.91E-03	*5.80E-01*	0.400458509	0.596256429	0.003285062
	Nickel	12.97826052	0.003939512	3.221988307	87.91322008	0.607022597	0.160281517	0.000866693	7.68E-01	6.90E-03	1.82E-03	9.86E-06	*8.74E-03*	0.790218258	0.208653487	0.001128255
	Selenium	1.749979979	0.000910899	0.22193746	0.4395661	0.041813017	0.021612253	0.000200398	6.36E-02	9.51E-02	4.92E-02	4.56E-04	*1.45E-01*	0.657172156	0.339678206	0.003149638
	Silver	2.006534653	0.000312716	0.159248782	398.246887	0.030002471	0.024780703	6.87975E-05	5.49E-02	7.53E-05	6.22E-05	1.73E-07	*1.38E-04*	0.546971604	0.451774157	0.001254239
	Thallium	0.958383005	0.000814409	0.076062143	0.164354697	0.014330108	0.01183603	0.00017917	2.63E-02	8.72E-02	7.20E-02	1.09E-03	*1.60E-01*	0.543933965	0.449265203	0.006800831
X	Vanadium	25.16000618	0.006095546	1.996825888	0.428489138	0.376201997	0.310726076	0.00134102	6.88E-01	8.78E-01	7.25E-01	3.13E-03	*1.61E+00*	0.546591443	0.451460162	0.001948395
	Zinc	525.3011368	0.626	105.9569642	351.6528803	19.96229205	6.48746904	0.13772	2.66E+01	5.68E-02	1.84E-02	3.92E-04	*7.56E-02*	0.750815468	0.244004651	0.005179881

Table E.1-90. Maximun Exposure Calculations for Shrew - Station KFSO

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)					C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																			
	2-Butanone	0	0					0	26.59374907	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0					0	3736.311853	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0	0.004					0	6844.044183	0	0	0.00088	8.80E-04	0.00E+00	0.00E+00	1.29E-07	*1.29E-07*	0	0	1
	Tetrachloroethene	0	0					0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0	0.002					0	8.324449805	0	0	0.00044	4.40E-04	0.00E+00	0.00E+00	5.29E-05	*5.29E-05*	0	0	1
	Semivolatile Organics																			
	2-Methylnaphthalene	0	0					0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0	0					0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)pyrene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(b)fluoranthene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(g,h,i)perylene	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0	0					na	158.52	No BCF		0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenz(a,h)anthracene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0	0					0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluorene	0	0					0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Naphthalene	0	0					0	166.49	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	N-nitrosodiphenylamine	0	0					0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pyrene	0	0					0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pesticides and PCBs																			
	4,4'-DDD	0	0					0	18.68	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDE	0	0					0	2.26	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDT	0	0					0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0					0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0	0					0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1248	0	0					0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1254	0	0					0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0	0					0	0.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	beta-BHC	0	0					0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0					0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0	0					0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0	0					0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0					0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0	0					0	5.45	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Inorganics																			
X	Aluminum	6302.355836	0.3255					340.1271404	58.27114864	64.07995324	77.83409458	0.07161	1.42E+02	1.10E+00	1.34E+00	1.23E-03	*2.44E+00*	0.45131286	0.548182794	0.000504347
	Antimony	0.87900063	0					0.069761955	0.148650889	0.013143152	0.010855658	0	2.40E-02	8.84E-02	7.30E-02	0.00E+00	*1.61E-01*	0.547658498	0.452341502	0
X	Arsenic	46.05317511	0.01975					0.572516817	0.149840096	0.107862168	0.290065923	0.004345	4.02E-01	7.20E-01	1.94E+00	2.90E-02	*2.68E+00*	0.268131701	0.721067179	0.01080112
	Barium	60.79309621	0.03575					3.473891212	11.83503851	0.654481104	0.750794738	0.007865	1.41E+00	5.53E-02	6.34E-02	6.65E-04	*1.19E-01*	0.463139331	0.531295053	0.005565617
	Beryllium	0.413008266	0.000043					0.032778434	1.450568131	0.006175457	0.005100652	0.00000946	1.13E-02	4.26E-03	3.52E-03	6.52E-06	*7.78E-03*	0.54719943	0.451962332	0.000838239
	Cadmium	1.399090418	0.00023					1.71674334	2.120009672	0.323434445	0.017278767	0.0000506	3.41E-01	1.53E-01	8.15E-03	2.39E-05	*1.61E-01*	0.949145519	0.050705991	0.00014849
	Chromium	120.0135984	0.0121					1.376688262	19.78047452	0.259368069	1.482167941	0.002662	1.74E+00	1.31E-02	7.49E-02	1.35E-04	*8.82E-02*	0.148703339	0.849770458	0.001526203
	Cobalt	10.39140701	0.0019					0.824714842	10.99	0.155376276	0.128333877	0.000418	2.84E-01	1.41E-02	1.17E-02	3.80E-05	*2.59E-02*	0.546852801	0.451676032	0.001471167
	Copper	107.7310311	0.01375					2.915014169	33.43	0.549188669	1.330478234	0.003025	1.88E+00	1.64E-02	3.98E-02	9.05E-05	*5.63E-02*	0.291703952	0.706689306	0.001606742
	Cyanide	0	0					0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	17014.50719	1.935					1026.271862	7.01	193.3496188	210.1291637	0.4257	4.04E+02	2.76E+01	3.00E+01	6.07E-02	*5.76E+01*	0.478701344	0.520244694	0.001053962
	Lead	192.3578295	0.0077					8.897334095	17.58264402	1.676257744	2.375619194	0.001694	4.05E+00	9.53E-02	1.35E-01	9.63E-05	*2.31E-01*	0.413526189	0.586055907	0.000417903
	Manganese	815.5712761	0.7775					6.83804931	193.41	1.28828849	10.07230526	0.17105	1.15E+01	6.66E-03	5.21E-02	8.84E-04	*5.96E-02*	0.11171768	0.873449222	0.014833098
	Mercury	0.692246621	0.0001475					0.076692485	0.070330576	0.014448864	0.008549246	0.00003245	2.30E-02	2.05E-01	1.22E-01	4.61E-04	*3.27E-01*	0.627377892	0.371213111	0.001408997
	Nickel	14.1865754	0.0022					3.14827078	87.91322008	0.593134215	0.175204206	0.000484	7.69E-01	6.75E-03	1.99E-03	5.51E-06	*8.75E-03*	0.771484024	0.227886442	0.000629534
	Selenium	0.506986177	0					0.089505459	0.4395661	0.016862828	0.006261279	0	2.31E-02	3.84E-02	1.42E-02	0.00E+00	*5.26E-02*	0.729231529	0.270768471	0
	Silver	0.701292731	0					0.055658153	398.246887	0.010485996	0.008660965	0	1.91E-02	2.63E-05	2.17E-05	0.00E+00	*4.81E-05*	0.547658498	0.452341502	0
	Thallium	0.89027594	0					0.070656821	0.164354697	0.013311745	0.010994908	0	2.43E-02	8.10E-02	6.69E-02	0.00E+00	*1.48E-01*	0.547658498	0.452341502	0
X	Vanadium	28.79467582	0.00165					2.285291732	0.428489138	0.430548962	0.355614246	0.000363	7.87E-01	1.00E+00	8.30E-01	8.47E-04	*1.84E+00*	0.547405741	0.452132736	0.000461523
	Zinc	392.6366915	0.09175					96.30849152	351.6528803	18.1445198	4.84906314	0.020185	2.30E+01	5.16E-02	1.38E-02	5.74E-05	*6.54E-02*	0.788420212	0.210702704	0.000877084

Table E.1-91. Maximun Exposure Calculations for Shrew - Station WSS

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0.0000	0	0	26.59374907	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0.0000	0	0	3736.311853	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0.0000	0.000751254	0	6844.044183	0	0	0.000165276	1.65E-04	0.00E+00	0.00E+00	2.41E-08	*2.41E-08*	0	0	1
	Tetrachloroethene	0.0000	0	0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0.0000	0	0	8.324449805	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Semivolatile Organics															
	2-Methylnaphthalene	0.0000	0	0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0.0000	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0.0000	0	0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	0.0000	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)pyrene	0.0000	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(b)fluoranthene	0.0000	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(g,h,i)perylene	0.0000	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0.0000	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0.0000	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0.0000	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenz(a,h)anthracene	0.0000	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0.0000	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0.0000	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluorene	0.0000	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0.0000	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Naphthalene	0.0000	0.003118404	0	166.49	0	0	0.000686049	6.86E-04	0.00E+00	0.00E+00	4.12E-06	*4.12E-06*	0	0	1
	N-nitrosodiphenylamine	0.0000	0	0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0.0000	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pyrene	0.0000	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pesticides and PCBs															
	4,4'-DDD	0.0000	0	0	18.68	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDE	0.0000	0	0	2.26	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDT	0.0000	0	0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0.0000	0	0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0.0000	0.0000021	0	5.45	0	0	0.000000462	4.62E-07	0.00E+00	0.00E+00	8.48E-08	*8.48E-08*	0	0	1
	Aroclor 1248	0.0000	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1254	0.0000	0	0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0.0000	0	0	0.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	beta-BHC	0.0000	0	0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0.0000	0	0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0.0000	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0.0000	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0.0000	0	0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0.0000	0.0000014	0	5.45	0	0	0.000000308	3.08E-07	0.00E+00	0.00E+00	5.65E-08	*5.65E-08*	0	0	1
	Inorganics															
X	Aluminum	9201.4156	2.18	496.5843339	58.27114864	93.55648851	113.6374826	0.4796	2.08E+02	1.61E+00	1.95E+00	8.23E-03	*3.56E+00*	0.450497808	0.547192799	0.002309394
	Antimony	0.7600	0.000954619	0.06031746	0.148650889	0.01136381	0.009386	0.000210016	2.10E-02	7.64E-02	6.31E-02	1.41E-03	*1.41E-01*	0.542170993	0.447809067	0.01001994
	Arsenic	10.0063	0.046325726	0.194859084	0.149840096	0.036711451	0.063024796	0.01019166	1.10E-01	2.45E-01	4.21E-01	6.80E-02	*7.34E-01*	0.333959341	0.573328444	0.092712215
	Barium	39.8497	0.043463732	2.277126354	11.83503851	0.429010605	0.492143933	0.009562021	9.31E-01	3.62E-02	4.16E-02	8.08E-04	*7.86E-02*	0.460946569	0.528779604	0.010273827
	Beryllium	0.2998	0.000150512	0.023795436	1.450568131	0.00448306	0.003702808	3.31127E-05	8.22E-03	3.09E-03	2.55E-03	2.28E-05	*5.67E-03*	0.545452088	0.450519105	0.004028806
	Cadmium	0.3700	0.0025	0.596318592	2.120009672	0.112346423	0.0045695	0.00055	1.17E-01	5.30E-02	2.16E-03	2.59E-04	*5.54E-02*	0.956417147	0.038900644	0.004682209
	Chromium	18.4001	0.058863979	1.560993589	19.78047452	0.294091192	0.227241064	0.012950075	5.34E-01	1.49E-02	1.15E-02	6.55E-04	*2.70E-02*	0.550441546	0.425320192	0.024238263
	Cobalt	5.0097	0.003906503	0.397596048	10.99	0.074907095	0.061869921	0.000859431	1.38E-01	6.82E-03	5.63E-03	7.82E-05	*1.25E-02*	0.544238805	0.449516987	0.006244208
	Copper	33.8000	0.071238205	2.146528726	33.43	0.404406012	0.41743	0.015672405	8.38E-01	1.21E-02	1.25E-02	4.69E-04	*2.51E-02*	0.482867997	0.498418871	0.018713132
	Cyanide	0.0000	0	0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	10800.0000	6.849223396	651.4285714	7.01	122.7291429	133.38	1.506829147	2.58E+02	1.75E+01	1.90E+01	2.15E-01	*3.67E+01*	0.476403469	0.517747401	0.005849129
	Lead	81.9327	0.0759	4.468311135	17.58264402	0.841829818	1.011869288	0.016698	1.87E+00	4.79E-02	5.75E-02	9.50E-04	*1.06E-01*	0.450080796	0.540991688	0.008927516
	Manganese	189.2971	0.579167241	2.525384047	193.41	0.475782354	2.337819575	0.127416793	2.94E+00	2.46E-03	1.21E-02	6.59E-04	*1.52E-02*	0.161774677	0.79490129	0.043324033
	Mercury	0.1177	0.00060956	0.062221254	0.070330576	0.011722484	0.001453173	0.000134103	1.33E-02	1.67E-01	2.07E-02	1.91E-03	*1.89E-01*	0.880743468	0.109180982	0.01007555
	Nickel	9.4459	0.003939512	3.499422652	87.91322008	0.659291228	0.116657463	0.000866693	7.77E-01	7.50E-03	1.33E-03	9.86E-06	*8.84E-03*	0.848710314	0.150173986	0.0011157
	Selenium	0.7104	0.000910899	0.114611133	0.4395661	0.021592737	0.008773103	0.000200398	3.06E-02	4.91E-02	2.00E-02	4.56E-04	*6.95E-02*	0.706424427	0.28701939	0.006556183
	Silver	0.1011	0.000312716	0.008026337	398.246887	0.001512162	0.001248978	6.87975E-05	2.83E-03	3.80E-06	3.14E-06	1.73E-07	*7.11E-06*	0.534344591	0.441344808	0.024310602
	Thallium	1.1905	0.000814409	0.094481408	0.164354697	0.017800297	0.014702252	0.00017917	3.27E-02	1.08E-01	8.95E-02	1.09E-03	*1.99E-01*	0.544656087	0.449861644	0.00548227
X	Vanadium	23.7280	0.006095546	1.883172849	0.428489138	0.354789765	0.293040527	0.00134102	6.49E-01	8.28E-01	6.84E-01	3.13E-03	*1.52E+00*	0.546527177	0.451407081	0.002065741
	Zinc	71.8382	0.626	55.17219326	351.6528803	10.39444121	0.88720233	0.13772	1.14E+01	2.96E-02	2.52E-03	3.92E-04	*3.25E-02*	0.910246983	0.0776928	0.012060217

Table E.1-92. Maximun Exposure Calculations for Shrew - Station WG

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0	0	26.5937491	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0	0	3736.31185	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0.082	0.00075125	0.032272287	6844.04418	0.006080099	0.0010127	0.00016528	7.26E-03	8.88E-07	1.48E-07	2.41E-08	*1.06E-06*	0.83770133	0.13952736	0.02277131
	Tetrachloroethene	0	0	0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0.042	0	0.017088942	8.32444981	0.003219557	0.0005187	0	3.74E-03	3.87E-04	6.23E-05	0.00E+00	*4.49E-04*	0.86124548	0.13875452	0
	Semivolatile Organics															
	2-Methylnaphthalene	0	0	0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0.001	0	0.000429127	158.52	8.08475E-05	0.00001235	0	9.32E-05	5.10E-07	7.79E-08	0.00E+00	*5.88E-07*	0.86748577	0.13251423	0
	Anthracene	0.018	0	0.007840042	1189.21	0.001477064	0.0002223	0	1.70E-03	1.24E-06	1.87E-07	0.00E+00	*1.43E-06*	0.86918635	0.13081365	0
	Benzo(a)anthracene	0.13	0	0.059252849	1.55	0.011163237	0.0016055	0	1.28E-02	7.22E-03	1.04E-03	0.00E+00	*8.26E-03*	0.87426321	0.12573679	0
	Benzo(a)pyrene	0.16	0	0.073990484	1.55	0.013939807	0.001976	0	1.59E-02	9.02E-03	1.28E-03	0.00E+00	*1.03E-02*	0.8758467	0.1241533	0
	Benzo(b)fluoranthene	0.29	0	0.137241003	1.55	0.025856205	0.0035815	0	2.94E-02	1.67E-02	2.32E-03	0.00E+00	*1.90E-02*	0.8783363	0.1216637	0
	Benzo(g,h,i)perylene	0.12	0	0.058275651	158.52	0.010979133	0.001482	0	1.25E-02	6.93E-05	9.35E-06	0.00E+00	*7.86E-05*	0.8810702	0.1189298	0
	Benzo(k)fluoranthene	0.2	0	0.095654604	1.55	0.018021327	0.00247	0	2.05E-02	1.17E-02	1.60E-03	0.00E+00	*1.33E-02*	0.8794612	0.1205388	0
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0.23	0	0.104831964	1.55	0.019750342	0.0028405	0	2.26E-02	1.28E-02	1.84E-03	0.00E+00	*1.46E-02*	0.87426321	0.12573679	0
	Dibenz(a,h)anthracene	0.046	0	0.021263939	1.55	0.004006126	0.0005681	0	4.57E-03	2.59E-03	3.67E-04	0.00E+00	*2.96E-03*	0.87580413	0.12419587	0
	Dibenzofuran	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0.41	0	0.184837353	148.65	0.034823357	0.0050635	0	3.99E-02	2.34E-04	3.41E-05	0.00E+00	*2.68E-04*	0.87305342	0.12694658	0
	Fluorene	0.014	0	0.006033703	148.65	0.00113675	0.0001729	0	1.31E-03	7.65E-06	1.16E-06	0.00E+00	*8.81E-06*	0.86797996	0.13202004	0
	Indeno(1,2,3-cd)pyrene	0.14	0	0.069142316	1.55	0.013026412	0.001729	0	1.48E-02	8.43E-03	1.12E-03	0.00E+00	*9.54E-03*	0.88282266	0.11717734	0
	Naphthalene	0.012	0.0031184	0.005010339	166.49	0.000943948	0.0001482	0.00068605	1.78E-03	5.67E-06	8.90E-07	4.12E-06	*1.07E-05*	0.53084558	0.08334286	0.38581156
	N-nitrosodiphenylamine	0	0	0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0.16	0	0.069716547	158.52	0.013134597	0.001976	0	1.51E-02	8.29E-05	1.25E-05	0.00E+00	*9.53E-05*	0.86923085	0.13076915	0
	Pyrene	0.34	0	0.152382397	158.52	0.028708844	0.004199	0	3.29E-02	1.81E-04	2.65E-05	0.00E+00	*2.08E-04*	0.87240124	0.12759876	0
	Pesticides and PCBs															
	4,4'-DDD	0.009	0	0.004163594	18.68	0.000784421	0.00011115	0	8.96E-04	4.20E-05	5.95E-06	0.00E+00	*4.79E-05*	0.87588926	0.12411074	0
	4,4'-DDE	0.0032	0	0.001463106	2.26	0.000275649	0.00003952	0	3.15E-04	1.22E-04	1.75E-05	0.00E+00	*1.39E-04*	0.87460704	0.12539296	0
	4,4'-DDT	0	0	0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0	0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0.00098	0.0000021	0.000459264	5.45	8.65252E-05	1.2103E-05	4.62E-07	9.91E-05	1.59E-05	2.22E-06	8.48E-08	*1.82E-05*	0.8731964	0.12214118	0.00466242
	Aroclor 1248	0.035	0	0.016325404	1.55	0.003075706	0.00043225	0	3.51E-03	1.99E-03	2.80E-04	0.00E+00	*2.27E-03*	0.8767801	0.1232199	0
	Aroclor 1254	0	0	0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0.011	0	0.005252772	0.76	0.000989622	0.00013585	0	1.13E-03	1.31E-03	1.79E-04	0.00E+00	*1.48E-03*	0.87929512	0.12070488	0
	beta-BHC	0	0	0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0	0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0.00044	0	0.000189038	3.30	3.56147E-05	5.434E-06	0	4.10E-05	1.08E-05	1.65E-06	0.00E+00	*1.25E-05*	0.8676207	0.1323793	0
	Endosulfan Sulfate	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0	0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0.00059	0.0000014	0.000276495	5.45	5.20917E-05	7.2865E-06	3.08E-07	5.97E-05	9.56E-06	1.34E-06	5.65E-08	*1.10E-05*	0.8727596	0.12208008	0.00516032
	Inorganics															
X	Aluminum	16081.0807	2.18	867.867846	58.2711486	163.5063022	198.601346	0.4796	3.63E+02	2.81E+00	3.41E+00	8.23E-03	*6.22E+00*	0.45094333	0.54773395	0.00132272
X	Antimony	9.17110102	0.00095462	0.72786516	0.14865089	0.137129796	0.1132631	0.00021002	2.51E-01	9.22E-01	7.62E-01	1.41E-03	*1.69E+00*	0.54719954	0.45196242	0.00083804
X	Arsenic	262.614483	0.04632573	1.956887972	0.1498401	0.368677694	1.65407732	0.01019166	2.03E+00	2.46E+00	1.10E+01	6.80E-02	*1.36E+01*	0.18135138	0.81363537	0.00501324
	Barium	94.0695635	0.04346373	5.375403629	11.8350385	1.012726044	1.16175911	0.00956202	2.18E+00	8.56E-02	9.82E-02	8.08E-04	*1.85E-01*	0.46369239	0.53192949	0.00437812
	Beryllium	1.49785631	0.00015051	0.118877485	1.45056813	0.022396518	0.01849853	3.3113E-05	4.09E-02	1.54E-02	1.28E-02	2.28E-05	*2.82E-02*	0.54721542	0.45197554	0.00080904
	Cadmium	6.37937163	0.0025	5.735303459	2.12000967	1.080531172	0.07878524	0.00055	1.16E+00	5.10E-01	3.72E-02	2.59E-04	*5.47E-01*	0.93159967	0.06792613	0.00047419
	Chromium	929.878287	0.05886398	1.200216248	19.7804745	0.226120741	11.4839968	0.01295008	1.17E+01	1.14E-02	5.81E-01	6.55E-04	*5.93E-01*	0.01928853	0.9796068	0.00110467
	Cobalt	20.8035458	0.0039065	1.651075067	10.99	0.311062543	0.25692379	0.00085943	5.69E-01	2.83E-02	2.34E-02	7.82E-05	*5.18E-02*	0.54683108	0.45165809	0.00151083
	Copper	626.935356	0.07123821	4.640550483	33.43	0.874279711	7.74265164	0.01567241	8.63E+00	2.62E-02	2.32E-01	4.69E-04	*2.58E-01*	0.10127648	0.89690803	0.00181549
	Cyanide	1.26535994	0	0.100425392	141.9	0.018920144	0.0156272	0	3.45E-02	1.33E-04	1.10E-04	0.00E+00	*2.43E-04*	0.5476585	0.4523415	0
X	Iron	28489.6832	6.8492234	1718.425337	7.01	323.7513335	351.847588	1.50682915	6.77E+02	4.62E+01	5.02E+01	2.15E-01	*9.66E+01*	0.47813999	0.51963462	0.0022254
	Lead	520.811167	0.0759	19.87669728	17.582644	3.744769767	6.43201791	0.016698	1.02E+01	2.13E-01	3.66E-01	9.50E-04	*5.80E-01*	0.36736891	0.63099298	0.00163811
	Manganese	1014.54184	0.57916724	7.935810906	193.41	1.495106775	12.5295917	0.12741679	1.42E+01	7.73E-03	6.48E-02	6.59E-04	*7.32E-02*	0.10564546	0.88535116	0.00900337
	Mercury	2.95398618	0.00060956	0.091014424	0.07033058	0.017147118	0.03648173	0.0001341	5.38E-02	2.44E-01	5.19E-01	1.91E-03	*7.64E-01*	0.3189393	0.67856636	0.00249434
	Nickel	34.714728	0.00393951	2.494747916	87.9132201	0.470010507	0.42872689	0.00086669	9.00E-01	5.35E-03	4.88E-03	9.86E-06	*1.02E-02*	0.52246373	0.47657286	0.00096342
	Selenium	4.52708879	0.0009109	0.445453828	0.4395661	0.083923501	0.05590955	0.0002004	1.40E-01	1.91E-01	1.27E-01	4.56E-04	*3.19E-01*	0.59931041	0.39925852	0.00143107
	Silver	0.95834773	0.00031272	0.076059344	398.246887	0.01432958	0.01183559	6.8797E-05	2.62E-02	3.60E-05	2.97E-05	1.73E-07	*6.59E-05*	0.54622229	0.45115526	0.00262246
	Thallium	0.43825934	0.00081441	0.034782487	0.1643547	0.006553021	0.0054125	0.00017917	1.21E-02	3.99E-02	3.29E-02	1.09E-03	*7.39E-02*	0.53957892	0.44566813	0.01475294
X	Vanadium	65.0856944	0.00609555	5.165531304	0.42848914	0.973186098	0.80380833	0.00134102	1.78E+00	2.27E+00	1.88E+00	3.13E-03	*4.15E+00*	0.54724552	0.4520004	0.00075409
	Zinc	1085.55479	0.626	134.4402597	351.65288	25.32854494	13.4066016	0.13772	3.89E+01	7.20E-02	3.81E-02	3.92E-04	*1.11E-01*	0.65157389	0.34488328	0.00354283

Table E.1-93. Maximun Exposure Calculations for Shrew - Station WH

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)				C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics																		
	2-Butanone	0	0				0	26.59374907	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	2.7	0				0.823846224	3736.311853	0.155212629	0.033345	0	1.89E-01	4.15E-05	8.92E-06	0.00E+00	*5.05E-05*	0.823157513	0.176842487	0
	cis-1,2-Dichloroethene	0	0.000751254				0	6844.044183	0	0	0.000165276	0.00E+00	0.00E+00	0.00E+00	2.41E-08	*2.41E-08*	0	0	1
	Tetrachloroethene	0	0				0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0	0				0	8.324449805	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Semivolatile Organics																		
	2-Methylnaphthalene	0	0				0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0	0				0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0	0				0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)pyrene	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(b)fluoranthene	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(g,h,i)perylene	0	0				0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0.66	0				0.265696802	1.55	0.050057277	0.008151	0	5.82E-02	3.24E-02	5.27E-03	0.00E+00	*3.77E-02*	0.85996837	0.14003163	0
	Carbazole	0	0				na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenz(a,h)anthracene	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0	0				0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0	0				0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluorene	0	0				0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Naphthalene	0	0.003118404				0	166.49	0	0	0.000686049	6.86E-04	0.00E+00	0.00E+00	4.12E-06	*4.12E-06*	0	0	1
	N-nitrosodiphenylamine	0	0				0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0	0				0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pyrene	0	0				0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pesticides and PCBs																		
	4,4'-DDD	0	0				0	18.68	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDE	0	0				0	2.26	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDT	0	0				0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0				0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0	0.0000021				0	5.45	0	0	0.000000462	4.62E-07	0.00E+00	0.00E+00	8.48E-08	*8.48E-08*	0	0	1
	Aroclor 1248	0	0				0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1254	0	0				0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0	0				0	0.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	beta-BHC	0	0				0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0				0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0	0				0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0	0				0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0				0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0	0.0000014				0	5.45	0	0	0.000000308	3.08E-07	0.00E+00	0.00E+00	5.65E-08	*5.65E-08*	0	0	1
	Inorganics																		
X	Aluminum	13414.1878	2.18				723.9402942	58.27114864	136.3903514	165.6652194	0.4796	3.03E+02	2.34E+00	2.84E+00	8.23E-03	*5.19E+00*	0.450824779	0.547589951	0.00158527
X	Antimony	26.58913691	0.000954619				2.110248961	0.148650889	0.397570904	0.328375841	0.000210016	7.26E-01	2.67E+00	2.21E+00	1.41E-03	*4.88E+00*	0.547500107	0.452210677	0.000289216
X	Arsenic	424	0.046325726				2.744399134	0.149840096	0.517044797	2.670564	0.01019166	3.20E+00	3.45E+00	1.78E+01	6.80E-02	*2.13E+01*	0.161687636	0.835125279	0.003187084
	Barium	94.21544898	0.043463732				5.383739942	11.83503851	1.014296605	1.163560795	0.009562021	2.19E+00	8.57E-02	9.83E-02	8.08E-04	*1.85E-01*	0.463695529	0.531933101	0.004371371
	Beryllium	1.187202995	0.000150512				0.09422246	1.450568131	0.017751511	0.014661957	3.31127E-05	3.24E-02	1.22E-02	1.01E-02	2.28E-05	*2.24E-02*	0.547099597	0.451879874	0.001020529
	Cadmium	10.38747908	0.0025				8.450522184	2.120009672	1.592078379	0.128285367	0.00055	1.72E+00	7.51E-01	6.05E-02	2.59E-04	*8.12E-01*	0.925135489	0.074544914	0.000319598
	Chromium	837.3738867	0.058863979				1.208671969	19.78047452	0.227713799	10.3415675	0.012950075	1.06E+01	1.15E-02	5.23E-01	6.55E-04	*5.35E-01*	0.021518505	0.977257738	0.001223757
	Cobalt	21.2385173	0.003906503				1.685596611	10.99	0.317566402	0.262295689	0.000859431	5.81E-01	2.89E-02	2.39E-02	7.82E-05	*5.28E-02*	0.546847999	0.451672065	0.001479936
	Copper	572	0.071238205				4.529551941	33.43	0.853367586	7.0642	0.015672405	7.93E+00	2.55E-02	2.11E-01	4.69E-04	*2.37E-01*	0.107568608	0.890455855	0.001975537
	Cyanide	0.739903842	0				0.058722527	141.9	0.011063324	0.009137812	0	2.02E-02	7.80E-05	6.44E-05	0.00E+00	*1.42E-04*	0.547658498	0.452341502	0
X	Iron	58501.20916	6.849223396				3528.644362	7.01	664.7965978	722.4899331	1.506829147	1.39E+03	9.48E+01	1.03E+02	2.15E-01	*1.98E+02*	0.478686475	0.520228534	0.001084992
X	Lead	1850.878196	0.0759				55.30407633	17.58264402	10.41928798	22.85834573	0.016698	3.33E+01	5.93E-01	1.30E+00	9.50E-04	*1.89E+00*	0.3129448	0.686553673	0.000501527
	Manganese	442.3902382	0.579167241				4.505620141	193.41	0.848858835	5.463519442	0.127416793	6.44E+00	4.39E-03	2.82E-02	6.59E-04	*3.33E-02*	0.131814573	0.848399582	0.019785846
	Mercury	0.702595454	0.00060956				0.076826891	0.070330576	0.014474186	0.008677054	0.000134103	2.33E-02	2.06E-01	1.23E-01	1.91E-03	*3.31E-01*	0.621600725	0.372640152	0.005759123
	Nickel	41.74349934	0.003939512				2.377974244	87.91322008	0.448010348	0.515532217	0.000866693	9.64E-01	5.10E-03	5.86E-03	9.86E-06	*1.10E-02*	0.464543807	0.534557516	0.000898677
	Selenium	3.262620476	0.000910899				0.350373819	0.4395661	0.066010428	0.040293363	0.000200398	1.07E-01	1.50E-01	9.17E-02	4.56E-04	*2.42E-01*	0.619791847	0.378326557	0.001881596
	Silver	0.323167174	0.000312716				0.025648188	398.246887	0.004832119	0.003991115	6.87975E-05	8.89E-03	1.21E-05	1.00E-05	1.73E-07	*2.23E-05*	0.543421274	0.448841743	0.007736983
	Thallium	0.852549301	0.000814409				0.067662643	0.164354697	0.012747642	0.010528984	0.00017917	2.35E-02	7.76E-02	6.41E-02	1.09E-03	*1.43E-01*	0.543475141	0.448886235	0.007638623
X	Vanadium	96.53774325	0.006095546				7.661725655	0.428489138	1.443469113	1.192241129	0.00134102	2.64E+00	3.37E+00	2.78E+00	3.13E-03	*6.15E+00*	0.547379997	0.452111472	0.00050853
	Zinc	2139.272788	0.626				167.9433731	351.6528803	31.64053149	26.42001893	0.13772	5.82E+01	9.00E-02	7.51E-02	3.92E-04	*1.65E-01*	0.5436679	0.453965706	0.002366393

Table E.1-94. Maximun Exposure Calculations for Shrew - Station WS

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0	0	0	26.59374907	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acetone	0	0	0	3736.311853	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	cis-1,2-Dichloroethene	0	0.000751254	0	6844.044183	0	0	0.000165276	1.65E-04	0.00E+00	0.00E+00	2.41E-08	*2.41E-08*	0	0	1
	Tetrachloroethene	0	0	0	17	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Trichloroethene	0	0	0	8.324449805	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Semivolatile Organics															
	2-Methylnaphthalene	0	0	0	170.89	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Acenaphthylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Anthracene	0	0	0	1189.21	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(a)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(b)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(g,h,i)perylene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Benzo(k)fluoranthene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Carbazole	0	0	na	158.52	No BCF	0	0	0.00E+00	No BCF	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Chrysene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenz(a,h)anthracene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Dibenzofuran	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluoranthene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Fluorene	0	0	0	148.65	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Indeno(1,2,3-cd)pyrene	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Naphthalene	0	0.003118404	0	166.49	0	0	0.000686049	6.86E-04	0.00E+00	0.00E+00	4.12E-06	*4.12E-06*	0	0	1
	N-nitrosodiphenylamine	0	0	0	329.67	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Phenanthrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pyrene	0	0	0	158.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Pesticides and PCBs															
	4,4'-DDD	0	0	0	18.68	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDE	0	0	0	2.26	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	4,4'-DDT	0	0	0	1.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aldrin	0	0	0	0.44	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	alpha-Chlordane	0	0.0000021	0	5.45	0	0	0.000000462	4.62E-07	0.00E+00	0.00E+00	8.48E-08	*8.48E-08*	0	0	1
	Aroclor 1248	0	0	0	1.55	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1254	0	0	0	0.08	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Aroclor 1260	0	0	0	0.76	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	beta-BHC	0	0	0	8.79	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	delta-BHC	0	0	0	3.52	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan I	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endosulfan Sulfate	0	0	0	3.30	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	Endrin Aldehyde	0	0	0	0.11	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
	gamma-Chlordane	0	0.0000014	0	5.45	0	0	0.000000308	3.08E-07	0.00E+00	0.00E+00	5.65E-08	*5.65E-08*	0	0	1
	Inorganics															
X	Aluminum	10522.95716	2.18	567.9056247	58.27114864	106.9934197	129.958521	0.4796	2.37E+02	1.84E+00	2.23E+00	8.23E-03	*4.07E+00*	0.450628503	0.547351546	0.002019951
	Antimony	4.943664383	0.000954619	0.392354316	0.148650889	0.073919553	0.061054255	0.000210016	1.35E-01	4.97E-01	4.11E-01	1.41E-03	*9.09E-01*	0.546807678	0.451638762	0.00155356
X	Arsenic	226.4372629	0.046325726	1.76246376	0.149840096	0.332048172	1.4262151	0.01019166	1.77E+00	2.22E+00	9.52E+00	6.80E-02	*1.18E+01*	0.187761738	0.806475231	0.005763031
	Barium	140.1247062	0.043463732	8.007126068	11.83503851	1.508542551	1.730540121	0.009562021	3.25E+00	1.27E-01	1.46E-01	8.08E-04	*2.74E-01*	0.464360585	0.532696027	0.002943388
	Beryllium	0.664849306	0.000150512	0.052765818	1.450568131	0.00994108	0.008210889	3.31127E-05	1.82E-02	6.85E-03	5.66E-03	2.28E-05	*1.25E-02*	0.546661283	0.451517846	0.001820871
	Cadmium	10.71244039	0.0025	8.660027273	2.120009672	1.631549138	0.132298639	0.00055	1.76E+00	7.70E-01	6.24E-02	2.59E-04	*8.32E-01*	0.924705959	0.07498232	0.000311721
	Chromium	727.8938984	0.058863979	1.220072082	19.78047452	0.22986158	8.989489645	0.012950075	9.23E+00	1.16E-02	4.54E-01	6.55E-04	*4.67E-01*	0.024897539	0.973699769	0.001402692
	Cobalt	25.34258449	0.003906503	2.011316229	10.99	0.378931978	0.312980918	0.000859431	6.93E-01	3.45E-02	2.85E-02	7.82E-05	*6.30E-02*	0.546979091	0.451780342	0.001240567
	Copper	414.0805733	0.071238205	4.159231512	33.43	0.783599217	5.113895081	0.015672405	5.91E+00	2.34E-02	1.53E-01	4.69E-04	*1.77E-01*	0.132517694	0.864831881	0.002650425
	Cyanide	5.720822811	0	0.454033556	141.9	0.085539922	0.070652162	0	1.56E-01	6.03E-04	4.98E-04	0.00E+00	*1.10E-03*	0.547658498	0.452341502	0
X	Iron	37158.63137	6.849223396	2241.314273	7.01	422.2636091	458.9090975	1.506829147	8.83E+02	6.02E+01	6.55E+01	2.15E-01	*1.26E+02*	0.478388353	0.519904539	0.001707108
	Lead	366.8012861	0.0759	14.97886576	17.58264402	2.822018308	4.529995883	0.016698	7.37E+00	1.61E-01	2.58E-01	9.50E-04	*4.19E-01*	0.382973067	0.614760865	0.002266068
	Manganese	1214.698571	0.579167241	8.972691322	193.41	1.690455045	15.00152735	0.127416793	1.68E+01	8.74E-03	7.76E-02	6.59E-04	*8.70E-02*	0.100506268	0.891918147	0.007575585
	Mercury	1.366469468	0.00060956	0.083100344	0.070330576	0.015656105	0.016875898	0.000134103	3.27E-02	2.23E-01	2.40E-01	1.91E-03	*4.64E-01*	0.479276741	0.51661799	0.004105269
	Nickel	36.21892271	0.003939512	2.467385514	87.91322008	0.464855431	0.447303695	0.000866693	9.13E-01	5.29E-03	5.09E-03	9.86E-06	*1.04E-02*	0.509137224	0.489913523	0.000949253
	Selenium	2.633887327	0.000910899	0.299491916	0.4395661	0.056424277	0.032528508	0.000200398	8.92E-02	1.28E-01	7.40E-02	4.56E-04	*2.03E-01*	0.632891332	0.364860875	0.002247792
	Silver	0.223601106	0.000312716	0.01774612	398.246887	0.003343369	0.002761474	6.87975E-05	6.17E-03	8.40E-06	6.93E-06	1.73E-07	*1.55E-05*	0.54155553	0.447300722	0.011143748
	Thallium	1.104317671	0.000814409	0.08764426	0.164354697	0.016512179	0.013638323	0.00017917	3.03E-02	1.00E-01	8.30E-02	1.09E-03	*1.85E-01*	0.544423252	0.449669332	0.005907416
X	Vanadium	44.88778927	0.006095546	3.562522958	0.428489138	0.671179325	0.554364197	0.00134102	1.23E+00	1.57E+00	1.29E+00	3.13E-03	*2.86E+00*	0.547059892	0.451847079	0.001093029
	Zinc	2044.305037	0.626	165.460586	351.6528803	31.1727744	25.24716721	0.13772	5.66E+01	8.86E-02	7.18E-02	3.92E-04	*1.61E-01*	0.551168021	0.446396942	0.002435037

Table E.1-95. Average Exposure Calculations for Shrew - Wetland Reference

	Mean Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	RTV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0.0086	0.0025	0.016919547	26.59374907	0.003187643	0.00010621	0.00055	3.84E-03	1.20E-04	3.99E-06	2.07E-05	*0.00*	0.829283262	0.027631131	0.143085607
	Acetone	0.0341	0.0025	0.065736211	3736.311853	0.012384702	0.000421135	0.00055	1.34E-02	3.31E-06	1.13E-07	1.47E-07	*0.00*	0.927287598	0.031531906	0.041180496
	cis-1,2-Dichloroethene	0.0115	0.0005	0.02406845	6844.044183	0.004534496	0.000142025	0.00011	4.79E-03	6.63E-07	2.08E-08	1.61E-08	*0.00*	0.947346936	0.029671864	0.0229812
	Tetrachloroethene	0.012916667	0.0005	0.027904275	17	0.005257165	0.000159521	0.00011	5.53E-03	3.16E-04	9.58E-06	6.61E-06	*0.00*	0.951232832	0.02886374	0.019903428
	Trichloroethene	0.009083333	0.0005	0.019653755	8.324449805	0.003702767	0.000112179	0.00011	3.92E-03	4.45E-04	1.35E-05	1.32E-05	*0.00*	0.943393073	0.028581068	0.028025859
	Semivolatile Organics															
	2-Methylnaphthalene	0.194666667	0.0025	0.440597351	170.89	0.083008541	0.002404133	0.00055	8.60E-02	4.86E-04	1.41E-05	3.22E-06	*0.00*	0.965634697	0.027967177	0.006398126
	Acenaphthylene	0.2425	0.0025	0.553390925	158.52	0.10425885	0.002994875	0.00055	1.08E-01	6.58E-04	1.89E-05	3.47E-06	*0.00*	0.967117324	0.027780812	0.005101865
	Anthracene	0.440166667	0.0025	1.019523969	1189.21	0.192078316	0.005436058	0.00055	1.98E-01	1.62E-04	4.57E-06	4.62E-07	*0.00*	0.969777208	0.027445917	0.002776875
	Benzo(a)anthracene	1.36	0.0025	3.296394631	1.55	0.621040748	0.016796	0.00055	6.38E-01	4.02E-01	1.09E-02	3.56E-04	*0.41*	0.972828383	0.02631007	0.000861547
	Benzo(a)pyrene	1.233333333	0.0025	3.032988468	1.55	0.571415027	0.015231667	0.00055	5.87E-01	3.70E-01	9.85E-03	3.56E-04	*0.38*	0.973123713	0.025939633	0.000936654
	Benzo(b)fluoranthene	2.188333333	0.0025	5.507236987	1.55	1.037563448	0.027025917	0.00055	1.07E+00	6.71E-01	1.75E-02	3.56E-04	*0.69*	0.974110508	0.025373127	0.000516364
	Benzo(g,h,i)perylene	0.375833333	0.0025	0.970589493	158.52	0.18285906	0.004641542	0.00055	1.88E-01	1.15E-03	2.93E-05	3.47E-06	*0.00*	0.972392847	0.024682408	0.002924745
	Benzo(k)fluoranthene	2.0225	0.0025	5.143974654	1.55	0.969124825	0.024977875	0.00055	9.95E-01	6.27E-01	1.62E-02	3.56E-04	*0.64*	0.974334886	0.025112157	0.000552957
	Carbazole	0.3226	0	na	158.52	No BCF	0.00398411	0	3.98E-03	No BCF	2.51E-05	0.00E+00	*0.00*	0	1	0
	Chrysene	1.61	0.0025	3.902349526	1.55	0.735202651	0.0198835	0.00055	7.56E-01	4.76E-01	1.29E-02	3.56E-04	*0.49*	0.972958546	0.02631359	0.000727864
	Dibenz(a,h)anthracene	0.234166667	0.0025	0.575632576	1.55	0.108449177	0.002891958	0.00055	1.12E-01	7.01E-02	1.87E-03	3.56E-04	*0.07*	0.969238329	0.025846179	0.004915492
	Dibenzofuran	0.357	0.0025	0.816278778	158.52	0.153786922	0.00440895	0.00055	1.59E-01	9.70E-04	2.78E-05	3.47E-06	*0.00*	0.968761707	0.027773636	0.003464657
	Fluoranthene	3.293333333	0.0025	7.895433492	148.65	1.48749967	0.040672667	0.00055	1.53E+00	1.00E-02	2.74E-04	3.70E-06	*0.01*	0.973034562	0.02660566	0.000359778
	Fluorene	0.568333333	0.0025	1.302547046	148.65	0.245399863	0.007018917	0.00055	2.53E-01	1.65E-03	4.72E-05	3.70E-06	*0.00*	0.970079641	0.027746177	0.002174181
	Indeno(1,2,3-cd)pyrene	0.5175	0.0025	1.359128889	1.55	0.256059883	0.006391125	0.00055	2.63E-01	1.66E-01	4.13E-03	3.56E-04	*0.17*	0.973607991	0.024300762	0.002091247
	Naphthalene	0.221333	0.0025	0.491435426	166.49	0.092586434	0.002733463	0.00055	9.59E-02	5.56E-04	1.64E-05	3.30E-06	*0.00*	0.965750849	0.028512209	0.005736942
	N-nitrosodiphenylamine	0.367	0.0025	0.796574416	329.67	0.15007462	0.00453245	0.00055	1.55E-01	4.55E-04	1.37E-05	1.67E-06	*0.00*	0.967243194	0.029212011	0.003544795
	Phenanthrene	2.408333333	0.0025	5.580419998	158.52	1.051351128	0.029742917	0.00055	1.08E+00	6.63E-03	1.88E-04	3.47E-06	*0.01*	0.971993636	0.027497879	0.000508485
	Pyrene	2.576666667	0.0025	6.141133365	158.52	1.156989526	0.031821833	0.00055	1.19E+00	7.30E-03	2.01E-04	3.47E-06	*0.01*	0.972782172	0.026755395	0.000462433
	Pesticides and PCBs															
	4,4'-DDD	0.094716667	0.00005	0.233016511	18.68	0.043900311	0.001169751	0.000011	4.51E-02	2.35E-03	6.26E-05	5.89E-07	*0.00*	0.973808274	0.025947722	0.000244005
	4,4'-DDE	0.012583333	0.00005	0.03059539	2.26	0.005764171	0.000155404	0.000011	5.93E-03	2.55E-03	6.88E-05	4.87E-06	*0.00*	0.971941313	0.026203893	0.001854795
	4,4'-DDT	0.034166667	0.00005	0.084715504	1.76	0.015960401	0.000421958	0.000011	1.64E-02	9.08E-03	2.40E-04	6.26E-06	*0.01*	0.973589407	0.025739589	0.000671003
	Aldrin	0.000765833	0.000025	0.001922049	0.44	0.000362114	9.45804E-06	0.0000055	3.77E-04	8.24E-04	2.15E-05	1.25E-05	*0.00*	0.960331089	0.025082843	0.014586068
	alpha-Chlordane	0.0018275	0.000025	0.004554363	5.45	0.000858042	2.25696E-05	0.0000055	8.86E-04	1.58E-04	4.14E-06	1.01E-06	*0.00*	0.968322701	0.025470407	0.006206893
	Aroclor 1248	0.063833333	0.0005	0.158335323	1.55	0.029830375	0.000788342	0.00011	3.07E-02	1.93E-02	5.10E-04	7.12E-05	*0.02*	0.970765402	0.025654884	0.003579713
	Aroclor 1254	0.015766667	0.0005	0.039570376	0.08	0.007455059	0.000194718	0.00011	7.76E-03	9.22E-02	2.41E-03	1.36E-03	*0.10*	0.960731046	0.025093289	0.014175665
	Aroclor 1260	0.048833333	0.0005	0.124007131	0.76	0.023362943	0.000603092	0.00011	2.41E-02	3.08E-02	7.95E-04	1.45E-04	*0.03*	0.970381682	0.025049459	0.004568859
	beta-BHC	0.000794167	0.000025	0.001793957	8.79	0.000337981	9.80796E-06	0.0000055	3.53E-04	3.84E-05	1.12E-06	6.26E-07	*0.00*	0.956670202	0.027761825	0.015567973
	delta-BHC	0.0009275	0.000025	0.002122385	3.52	0.000399857	1.14546E-05	0.0000055	4.17E-04	1.14E-04	3.26E-06	1.56E-06	*0.00*	0.959323088	0.027481515	0.013195398
	Endosulfan I	0.000780833	0.000025	0.001783974	3.30	0.000336101	9.64329E-06	0.0000055	3.51E-04	1.02E-04	2.93E-06	1.67E-06	*0.00*	0.956886699	0.027454674	0.015658627
	Endosulfan Sulfate	0.002533333	0.00005	0.005689088	3.30	0.001071824	3.12867E-05	0.000011	1.11E-03	3.25E-04	9.49E-06	3.34E-06	*0.00*	0.962044469	0.028082186	0.009873345
	Endrin Aldehyde	0.002366667	0.00005	0.005734128	0.11	0.00108031	2.92283E-05	0.000011	1.12E-03	9.87E-03	2.67E-04	1.01E-04	*0.01*	0.964099092	0.026084195	0.009816712
	gamma-Chlordane	0.002144167	0.0000017	0.005343537	5.45	0.001006722	2.64805E-05	0.000000374	1.03E-03	1.85E-04	4.86E-06	6.87E-08	*0.00*	0.974017937	0.025620212	0.00036185
	Inorganics															
X	Aluminum	8195	0.142	442.2698413	58.27114864	83.3236381	101.20825	0.03124	1.85E+02	1.43E+00	1.74E+00	5.36E-04	*3.17*	0.451464163	0.548366573	0.000169265
	Antimony	0.7516667	0.00055	0.059656087	0.148650889	0.011239207	0.009283084	0.000121	2.06E-02	7.56E-02	6.24E-02	8.14E-04	*0.14*	0.544448415	0.449690116	0.005861469
X	Arsenic	20.55	0.0032	0.323871056	0.149840096	0.061017307	0.129434175	0.000704	1.91E-01	4.07E-01	8.64E-01	4.70E-03	*1.28*	0.319202496	0.677114638	0.003682866
	Barium	47.8833333	0.0451	2.736190474	11.83503851	0.515498285	0.591359166	0.009922	1.12E+00	4.36E-02	5.00E-02	8.38E-04	*0.09*	0.461593634	0.52952189	0.008884476
	Beryllium	0.6558333	0.00005	0.052050262	1.450568131	0.009806269	0.008099541	0.000011	1.79E-02	6.76E-03	5.58E-03	7.58E-06	*0.01*	0.547322264	0.452063787	0.000613949
	Cadmium	1.3033333	0.000075	1.622658356	2.120009672	0.305708834	0.016096166	0.0000165	3.22E-01	1.44E-01	7.59E-03	7.78E-06	*0.15*	0.949932909	0.05001582	5.12707E-05
	Chromium	129.1	0.00088	1.36997295	19.78047452	0.258102904	1.594385	0.0001936	1.85E+00	1.30E-02	8.06E-02	9.79E-06	*0.09*	0.139313154	0.860582349	0.000104497
	Cobalt	8.3666667	0.00025	0.664021167	10.99	0.125101588	0.103328334	0.000055	2.28E-01	1.14E-02	9.40E-03	5.00E-06	*0.02*	0.547526668	0.452232616	0.000240716
	Copper	56.8333333	0.0039	2.462169352	33.43	0.463872706	0.701891666	0.000858	1.17E+00	1.39E-02	2.10E-02	2.57E-05	*0.03*	0.397620273	0.601644271	0.000735456
	Cyanide	0.4349983	0.0025	0.034523675	141.9	0.00650426	0.005372229	0.00055	1.24E-02	4.58E-05	3.79E-05	3.88E-06	*0.00*	0.523418975	0.432320736	0.044260288
X	Iron	15518.33333	2.78	936.026455	7.01	176.3473841	191.6514167	0.6116	3.69E+02	2.52E+01	2.73E+01	8.72E-02	*52.58*	0.478411308	0.519929487	0.001659204
	Lead	331.8666667	0.0063	13.81659047	17.58264402	2.603045645	4.098553334	0.001386	6.70E+00	1.48E-01	2.33E-01	7.88E-05	*0.38*	0.388341262	0.611451965	0.000206774
	Manganese	133.4833333	0.52	1.990015443	193.41	0.374918909	1.648519166	0.1144	2.14E+00	1.94E-03	8.52E-03	5.91E-04	*0.01*	0.175372922	0.771115074	0.053512004
	Mercury	0.279	0.00013	0.068894305	0.070330576	0.012979687	0.00344565	0.0000286	1.65E-02	1.85E-01	4.90E-02	4.07E-04	*0.23*	0.788849928	0.209411886	0.001738186
	Nickel	18.9166667	0.0018	2.921330199	87.91322008	0.550378609	0.233620834	0.000396	7.84E-01	6.26E-03	2.66E-03	4.50E-06	*0.01*	0.701659621	0.297835532	0.000504847
	Selenium	0.7566667	0.00095	0.120039576	0.4395661	0.022615456	0.009344834	0.000209	3.22E-02	5.14E-02	2.13E-02	4.75E-04	*0.07*	0.703013844	0.290489276	0.006496879
	Silver	1.11	0.0002	0.088095238	398.246887	0.016597143	0.0137085	0.000044	3.03E-02	4.17E-05	3.44E-05	1.10E-07	*0.00*	0.546864519	0.451685711	0.00144977
	Thallium	0.465	0.00075	0.036904762	0.164354697	0.006952857	0.00574275	0.000165	1.29E-02	4.23E-02	3.49E-02	1.00E-03	*0.08*	0.540632107	0.446538016	0.012829876
X	Vanadium	55.6666667	0.000275	4.417989421	0.428489138	0.832349207	0.687483334	0.0000605	1.52E+00	1.94E+00	1.60E+00	1.41E-04	*3.55*	0.547636699	0.452323496	3.98054E-05
	Zinc	154.6	0.0161	70.94083327	351.6528803	13.36525299	1.90931	0.003542	1.53E+01	3.80E-02	5.43E-03	1.01E-05	*0.04*	0.874797823	0.124970342	0.000231835

Table E.1-96. Maximun Exposure Calculations for Shrew - Wetland Reference

	Maximum Concentrations Compound	C_{Soil} (mg/Kg)	C_{Water} (mg/L)	C_{Prey} (mg/Kg)	TRV mg/Kg day	DOSE prey	DOSE soil/ sediment	DOSE water	Total Dose	HQ Prey	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ Prey	% HQ soil/ sediment	% HQ water
	Volatile Organics															
	2-Butanone	0.013178	0.003201562	0.025926262	26.593749	0.004884508	0.0001627	0.0007043	5.75E-03	1.84E-04	6.12E-06	2.65E-05	*2.16E-04*	0.8492433	0.0282962	0.1224605
	Acetone	0.0711052	0	0.137072889	3736.3119	0.025824532	0.0008781	0	2.67E-02	6.91E-06	2.35E-07	0.00E+00	*7.15E-06*	0.9671138	0.0328862	0
	cis-1,2-Dichloroethene	0	0.001061097	0	6844.0442	0	0	0.0002334	0.00E+00	0.00E+00	0.00E+00	3.41E-08	*3.41E-08*	0	0	1
	Tetrachloroethene	0.0325995	0.001061097	0.070425783	17	0.013268218	0.0004026	0.0002334	1.39E-02	7.97E-04	2.42E-05	1.40E-05	*8.35E-04*	0.9542554	0.0289555	0.0167892
	Trichloroethene	0.0119261	0.001061097	0.025804711	8.3244498	0.004861607	0.0001473	0.0002334	5.24E-03	5.84E-04	1.77E-05	2.80E-05	*6.30E-04*	0.9273742	0.0280958	0.04453
	Semivolatile Organics															
	2-Methylnaphthalene	0.2890972	0.002561097	0.654326074	170.89	0.123275032	0.0035704	0.0005634	1.27E-01	7.21E-04	2.09E-05	3.30E-06	*7.46E-04*	0.9675549	0.0280228	0.0044223
	Acenaphthylene	0.6904717	0.002561097	1.575673297	158.52	0.296856849	0.0085273	0.0005634	3.06E-01	1.87E-03	5.38E-05	3.55E-06	*1.93E-03*	0.9702865	0.0278718	0.0018416
	Anthracene	1.6563297	0.002561097	3.836428226	1189.21	0.722783078	0.0204557	0.0005634	7.44E-01	6.08E-04	1.72E-05	4.74E-07	*6.25E-04*	0.971741	0.0275015	0.0007575
X	Benzo(a)anthracene	5.4058582	0.002561097	13.10282497	1.55	2.468572224	0.0667623	0.0005634	2.54E+00	1.60E+00	4.32E-02	3.64E-04	*1.64E+00*	0.9734509	0.0263269	0.0002222
X	Benzo(a)pyrene	4.9039159	0.002561097	12.05961114	1.55	2.272030738	0.0605634	0.0005634	2.33E+00	1.47E+00	3.92E-02	3.64E-04	*1.51E+00*	0.9738008	0.0259577	0.0002415
X	Benzo(b)fluoranthene	9.3625594	0.002561097	23.5621479	1.55	4.439108664	0.1156276	0.0005634	4.56E+00	2.87E+00	7.48E-02	3.64E-04	*2.95E+00*	0.9744932	0.0253831	0.0001237
	Benzo(g,h,i)perylene	0.6265755	0.002561097	1.618131141	158.52	0.304855907	0.0077382	0.0005634	3.13E-01	1.92E-03	4.88E-05	3.55E-06	*1.98E-03*	0.9734905	0.0247103	0.0017992
X	Benzo(k)fluoranthene	9.4638839	0.002561097	24.07019977	1.55	4.534825636	0.116879	0.0005634	4.65E+00	2.93E+00	7.56E-02	3.64E-04	*3.01E+00*	0.9747559	0.025123	0.0001211
	Carbazole	0.99	0	na	158.52	No BCF	0.0122265	0	1.22E-02	No BCF	7.71E-05	0.00E+00	*7.71E-05*	0	1	0
X	Chrysene	6.6836553	0.002561097	16.19997454	1.55	3.052075203	0.0825431	0.0005634	3.14E+00	1.97E+00	5.34E-02	3.64E-04	*2.03E+00*	0.9734923	0.026328	0.0001797
	Dibenz(a,h)anthracene	0.3496419	0.002561097	0.85949581	1.55	0.161929011	0.0043181	0.0005634	1.67E-01	1.05E-01	2.79E-03	3.64E-04	*1.08E-01*	0.9707361	0.0258861	0.0033777
	Dibenzofuran	1	0.002561097	2.286495177	158.52	0.430775691	0.01235	0.0005634	4.44E-01	2.72E-03	7.79E-05	3.55E-06	*2.80E-03*	0.9708953	0.0278348	0.0012699
	Fluoranthene	15	0.002561097	35.9609825	148.65	6.775049104	0.18525	0.0005634	6.96E+00	4.56E-02	1.25E-03	3.79E-06	*4.68E-02*	0.973306	0.0266131	8.094E-05
	Fluorene	1.3694174	0.002561097	3.138528791	148.65	0.591298824	0.0169123	0.0005634	6.09E-01	3.98E-03	1.14E-04	3.79E-06	*4.10E-03*	0.9712936	0.0277809	0.0009255
	Indeno(1,2,3-cd)pyrene	1.4051547	0.002561097	3.690408382	1.55	0.695272939	0.0173537	0.0005634	7.13E-01	4.50E-01	1.12E-02	3.64E-04	*4.61E-01*	0.9748775	0.0243324	0.00079
	Naphthalene	0.359048	0.00268329	0.797210014	166.49	0.150194367	0.0044342	0.0005903	1.55E-01	9.02E-04	2.66E-05	3.55E-06	*9.32E-04*	0.9676292	0.0285677	0.0038032
	N-nitrosodiphenylamine	2.0346376	0.002561097	4.416185886	329.67	0.832009421	0.0251278	0.0005634	8.58E-01	2.52E-03	7.62E-05	1.71E-06	*2.60E-03*	0.9700464	0.0292967	0.0006569
	Phenanthrene	12	0.002561097	27.80555293	158.52	5.238566173	0.1482	0.0005634	5.39E+00	3.30E-02	9.35E-04	3.55E-06	*3.40E-02*	0.9723864	0.027509	0.0001046
	Pyrene	10.735819	0.002561097	25.58735941	158.52	4.820658513	0.1325874	0.0005634	4.95E+00	3.04E-02	8.36E-04	3.55E-06	*3.13E-02*	0.9731215	0.0267647	0.0001137
	Pesticides and PCBs															
	4,4'-DDD	0.39	0.000133479	0.959455632	18.68	0.180761441	0.0048165	2.937E-05	1.86E-01	9.68E-03	2.58E-04	1.57E-06	*9.94E-03*	0.9738918	0.0259499	0.0001582
	4,4'-DDE	0.0233725	0.000133479	0.056828304	2.26	0.010706452	0.0002886	2.937E-05	1.10E-02	4.74E-03	1.28E-04	1.30E-05	*4.88E-03*	0.9711537	0.0261827	0.0026636
	4,4'-DDT	0.13	0.000133479	0.322332163	1.76	0.060727379	0.0016055	2.937E-05	6.24E-02	3.45E-02	9.13E-04	1.67E-05	*3.55E-02*	0.9737844	0.0257447	0.0004709
	Aldrin	0.001149	3.45647E-05	0.00288366	0.44	0.000543282	1.419E-05	7.604E-06	5.65E-04	1.24E-03	3.23E-05	1.73E-05	*1.29E-03*	0.9614314	0.0251116	0.013457
	alpha-Chlordane	0.0041992	3.45647E-05	0.010465003	5.45	0.001971607	5.186E-05	7.604E-06	2.03E-03	3.62E-04	9.52E-06	1.40E-06	*3.73E-04*	0.9707225	0.0255335	0.003744
	Aroclor 1248	0.29	0.001376372	0.71933019	1.55	0.135521808	0.0035815	0.0003028	1.39E-01	8.77E-02	2.32E-03	1.96E-04	*9.02E-02*	0.9721368	0.0256911	0.0021721
	Aroclor 1254	0.022723	0.001376372	0.057029135	0.08	0.010744289	0.0002806	0.0003028	1.13E-02	1.33E-01	3.47E-03	3.74E-03	*1.40E-01*	0.9484952	0.0247737	0.0267311
	Aroclor 1260	0.2	0.001376372	0.507879035	0.76	0.09568441	0.00247	0.0003028	9.85E-02	1.26E-01	3.26E-03	3.99E-04	*1.30E-01*	0.9718375	0.025087	0.0030755
	beta-BHC	0.0004	3.45647E-05	0.000903567	8.79	0.000170232	4.94E-06	7.604E-06	1.83E-04	1.94E-05	5.62E-07	8.65E-07	*2.08E-05*	0.9313683	0.0270276	0.0416041
	delta-BHC	0.0011491	3.45647E-05	0.002629461	3.52	0.00049539	1.419E-05	7.604E-06	5.17E-04	1.41E-04	4.04E-06	2.16E-06	*1.47E-04*	0.9578574	0.0274395	0.0147031
	Endosulfan I	0.00022	3.45647E-05	0.000502635	3.30	9.46965E-05	2.717E-06	7.604E-06	1.05E-04	2.87E-05	8.24E-07	2.31E-06	*3.19E-05*	0.9017191	0.0258718	0.0724091
	Endosulfan Sulfate	0.0049027	0.000133479	0.011009904	3.30	0.002074266	6.055E-05	2.937E-05	2.16E-03	6.29E-04	1.84E-05	8.91E-06	*6.56E-04*	0.9584538	0.0279774	0.0135688
	Endrin Aldehyde	0.0045635	0.000133479	0.011056657	0.11	0.002083074	5.636E-05	2.937E-05	2.17E-03	1.90E-02	5.15E-04	2.68E-04	*1.98E-02*	0.960474	0.0259861	0.0135399
	gamma-Chlordane	0.0036127	3.45647E-05	0.009003204	5.45	0.001696204	4.462E-05	7.604E-06	1.75E-03	3.11E-04	8.19E-06	1.40E-06	*3.21E-04*	0.9701328	0.025518	0.0043492
	Inorganics															
X	Aluminum	12241.886	12.8339515	660.6732292	58.271149	124.4708364	151.1873	2.8234693	2.78E+02	2.14E+00	2.59E+00	4.85E-02	*4.78E+00*	0.4469625	0.5428987	0.0101388
	Antimony	1.048384	0.026670019	0.083205079	0.1486509	0.015675837	0.0129475	0.0058674	3.45E-02	1.05E-01	8.71E-02	3.95E-02	*2.32E-01*	0.4544935	0.3753914	0.1701151
X	Arsenic	32.733934	0.019270225	0.449899718	0.1498401	0.084761107	0.2061747	0.0042394	2.95E-01	5.66E-01	1.38E+00	2.83E-02	*1.97E+00*	0.2871552	0.6984823	0.0143625
	Barium	72.000322	0.049689781	4.114304105	11.835039	0.775134893	0.889204	0.0109318	1.68E+00	6.55E-02	7.51E-02	9.24E-04	*1.42E-01*	0.4626923	0.5307823	0.0065254
	Beryllium	1.03341	0.000117393	0.082016667	1.4505681	0.01545194	0.0127626	2.583E-05	2.82E-02	1.07E-02	8.80E-03	1.78E-05	*1.95E-02*	0.5471577	0.4519278	0.0009145
	Cadmium	2.165775	0.000600328	2.429800286	2.1200097	0.457774374	0.0267473	0.0001321	4.85E-01	2.16E-01	1.26E-02	6.23E-05	*2.29E-01*	0.944539	0.0551885	0.0002725
	Chromium	410	0.012844476	1.267907388	19.780475	0.238873752	5.0635	0.0028258	5.31E+00	1.21E-02	2.56E-01	1.43E-04	*2.68E-01*	0.0450263	0.954441	0.0005326
	Cobalt	12.514165	0.010286733	0.993187686	10.99	0.18711656	0.1545499	0.0022631	3.44E-01	1.70E-02	1.41E-02	2.06E-04	*3.13E-02*	0.5440549	0.4493651	0.0065801
	Copper	93.458266	0.022229555	2.807668133	33.43	0.528964676	1.1542096	0.0048905	1.69E+00	1.58E-02	3.45E-02	1.46E-04	*5.05E-02*	0.3133557	0.6837472	0.0028971
	Cyanide	0	0	0	141.9	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	*0.00E+00*	0	0	0
X	Iron	22525.473	23.02489696	1358.67934	7.01	255.9751876	278.18959	5.0654773	5.39E+02	3.65E+01	3.97E+01	7.22E-01	*7.69E+01*	0.4747048	0.5159013	0.0093939
	Lead	523.52589	0.257642406	19.96026638	17.582644	3.760514187	6.4655448	0.0566813	1.03E+01	2.14E-01	3.68E-01	3.22E-03	*5.85E-01*	0.3657113	0.6287764	0.0055123
	Manganese	209.69863	1.395585926	2.707967218	193.41	0.510181024	2.5897781	0.3070289	3.41E+00	2.64E-03	1.34E-02	1.59E-03	*1.76E-02*	0.1497455	0.7601371	0.0901174
	Mercury	0.71	9.88935E-05	0.07692199	0.0703306	0.014492103	0.0087685	2.176E-05	2.33E-02	2.06E-01	1.25E-01	3.09E-04	*3.31E-01*	0.6224499	0.3766156	0.0009345
	Nickel	27.3	0.007213819	2.655571258	87.91322	0.500309625	0.337155	0.001587	8.39E-01	5.69E-03	3.84E-03	1.81E-05	*9.54E-03*	0.5962799	0.4018287	0.0018915
	Selenium	1.6876867	0.001308681	0.216118665	0.4395661	0.040716757	0.0208429	0.0002879	6.18E-02	9.26E-02	4.74E-02	6.55E-04	*1.41E-01*	0.6583402	0.3370047	0.0046551
	Silver	2.9	0.000413217	0.23015873	398.24689	0.043361905	0.035815	9.091E-05	7.93E-02	1.09E-04	8.99E-05	2.28E-07	*1.99E-04*	0.5470304	0.4518227	0.0011468
	Thallium	0.7282834	0.000738329	0.057800266	0.1643547	0.01088957	0.0089943	0.0001624	2.00E-02	6.63E-02	5.47E-02	9.88E-04	*1.22E-01*	0.5432209	0.4486762	0.0081029
X	Vanadium	98.96388	0.01634224	7.854276214	0.4284891	1.479745639	1.2222039	0.0035953	2.71E+00	3.45E+00	2.85E+00	8.39E-03	*6.31E+00*	0.5469307	0.4517404	0.0013289
	Zinc	231.83604	0.128337647	81.02423201	351.65288	15.26496531	2.8631751	0.0282343	1.82E+01	4.34E-02	8.14E-03	8.03E-05	*5.16E-02*	0.8407496	0.1576953	0.0015551

Table E.1-97. Maximum Exposure Calculations for Muskrat - Station 01

	Maximum Concentrations																				
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
		Reach 6		Reach 5																	
	Inorganics																				
X	Arsenic	171	0.004871445	0	9.01	0.05	0	4.534878348	4.534878348	0.20433303	0.000492016	4.74E+00	0.00E+00	8.27E+01	3.73E+00	8.97E-03	*8.65E+01*	0	0.95678526	0.04311093	0.00010381
	Chromium	88.8548213	0.003317488	0.200	1.25	7.24	0.0059698	0.628614353	0.634583953	0.156840846	0.000335084	7.92E-01	8.25E-04	8.69E-02	2.16E-02	4.63E-05	*1.09E-01*	0.00754156	0.79414832	0.19788882	0.0004233
X	Copper	1250	0.0068	40.550	63.31	12.23	1.2103364	31.85420432	33.06454072	2.92875	0.0006868	3.60E+01	9.89E-02	2.60E+00	2.39E-01	5.61E-05	*2.94E+00*	0.03362808	0.88498708	0.08136778	1.9081E-05
X	Lead	384	0.007092017	0.213	35.02	6.43	0.0063427	17.61962202	17.62616472	0.899712	0.000716294	1.85E+01	9.66E-04	2.74E+00	1.40E-01	1.11E-04	*2.88E+00*	0.00034236	0.95105571	0.04856327	3.8663E-05
	Mercury	0.63	0.000069	0	0.02	0.03	0	0.011103974	0.011103974	0.00147609	0.000006969	1.26E-02	0.00E+00	4.32E-01	5.74E-02	2.71E-04	*4.89E-01*	0	0.88217564	0.11727069	0.00055367

Table E.1-98. Maximum Exposure Calculations for Muskrat - Station 02

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 6	Reach 5																	
	Inorganics																				
X	Arsenic	56.4	0.0048714	0	2.97	0.05	0	1.495714261	1.495714261	0.0673941	0.00049202	1.56E+00	0.00E+00	2.73E+01	1.23E+00	8.97E-03	*2.85E+01*	0	0.95658349	0.04310184	0.00031467
	Chromium	103	0.0033175	0.200	1.92	7.24	0.0059696	0.968475827	0.974445427	0.241329	0.00033506	1.22E+00	8.25E-04	1.34E-01	3.33E-02	4.63E-05	*1.68E-01*	0.00490877	0.79637223	0.19844348	0.00027552
	Copper	128	0.0068	40.550	6.48	12.23	1.2103364	3.261870523	4.472206923	0.299904	0.0006868	4.77E+00	9.89E-02	2.67E-01	2.45E-02	5.61E-05	*3.90E-01*	0.25359055	0.68342945	0.0628361	0.0001439
X	Lead	357.78615	0.007092	0.213	32.63	6.43	0.0063427	16.41700074	16.42334344	0.8382929	0.00071629	1.73E+01	9.86E-04	2.55E+00	1.30E-01	1.11E-04	*2.68E+00*	0.00036743	0.95102916	0.04856192	4.1495E-05
	Mercury	0.37	0.000069	0	0.01	0.03	0	0.006521381	0.006521381	0.0008869	6.969E-06	7.40E-03	0.00E+00	2.53E-01	3.37E-02	2.71E-04	*2.87E-01*	0	0.88183256	0.11722508	0.00094236

Table E.1-99. Maximum Exposure Calculations for Muskrat - Station 03

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 6	Reach 5																	
	Inorganics																				
X	Arsenic	79.34062	0.00487145	0	4.18	0.05	0	2.104093923	2.104093923	0.0848065	0.00049202	2.20E+00	0.00E+00	3.84E+01	1.73E+00	8.97E-03	*4.01E+01*	0	0.95667053	0.04310576	0.00022371
	Chromium	180.40043	0.00331747	0.200	3.37	7.24	0.0059696	1.696247138	1.702216738	0.4226782	0.00033506	2.13E+00	8.25E-04	2.34E-01	5.84E-02	4.63E-05	*2.94E-01*	0.00280892	0.79814756	0.19888586	0.00015766
	Copper	171	0.0088	40.550	8.66	12.23	1.2103364	4.357655152	5.567991552	0.400653	0.0006868	5.97E+00	9.89E-02	3.56E-01	3.28E-02	5.61E-05	*4.88E-01*	0.20275912	0.73000725	0.06711857	0.00011505
X	Lead	308.90628	0.00709202	0.213	28.17	6.43	0.0063427	14.17415022	14.18049292	0.7237674	0.00071629	1.49E+01	9.86E-04	2.20E+00	1.13E-01	1.11E-04	*2.32E+00*	0.00042554	0.95096762	0.04855878	4.8057E-05
	Mercury	0.6346459	0.000069	0	0.02	0.03	0	0.011185859	0.011185859	0.001487	6.969E-06	1.27E-02	0.00E+00	4.35E-01	5.78E-02	2.71E-04	*4.93E-01*	0	0.88217922	0.11727117	0.00054961

Table E.1-100. Maximum Exposure Calculations for Muskrat - Station 04

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 6	Reach 5																	
	Inorganics																				
X	Arsenic	121.27314	0.00487145	0	6.39	0.05	0	3.21613408	3.21613408	0.1449129	0.00049202	3.36E+00	0.00E+00	5.87E+01	2.64E+00	8.97E-03	*6.13E+01*	0	0.95674454	0.04310911	0.00014637
	Chromium	337.45278	0.00331747	0.200	6.31	7.24	0.0059696	3.17295984	3.17892944	0.7906519	0.00033506	3.97E+00	8.25E-04	4.38E-01	1.09E-01	4.63E-05	*5.49E-01*	0.00150371	0.79925105	0.19916084	8.4401E-05
X	Copper	433.37222	0.0068	40.550	21.95	12.23	1.2103364	11.04378176	12.25411818	1.0153911	0.0006868	1.33E+01	9.89E-02	9.03E-01	8.30E-02	5.61E-05	*1.08E+00*	0.09120712	0.83222446	0.07651666	5.1755E-05
X	Lead	612.08059	0.00709202	0.213	55.82	6.43	0.0063427	28.08528902	28.09163172	1.4341048	0.00071629	2.95E+01	9.86E-04	4.37E+00	2.23E-01	1.11E-04	*4.59E+00*	0.00021481	0.95119078	0.04857017	2.4259E-05
X	Mercury	1.3198168	0.000069	0	0.05	0.03	0	0.02326224	0.02326224	0.0030923	8.969E-06	2.64E-02	0.00E+00	9.04E-01	1.20E-01	2.71E-04	*1.02E+00*	0	0.882431	0.11730464	0.00026436

Table E.1-101. Maximum Exposure Calculations for Muskrat - Station 05

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 5	Reach 5																	
	Inorganics																				
X	Arsenic	22.471139	0	0	1.18	0.05	0	0.595929139	0.595929139	0.0268514	0	6.23E-01	0.00E+00	1.09E+01	4.90E-01	0.00E+00	*1.14E+01*	0	0.95688459	0.04311541	0
	Chromium	136.29401	0.00085	0.200	2.55	7.24	0.0059696	1.281528681	1.287498281	0.3193369	0.00008585	1.61E+00	8.25E-04	1.77E-01	4.41E-02	1.19E-05	*2.22E-01*	0.00371493	0.79750572	0.19872593	5.3425E-05
	Copper	75.036462	0.0017	40.550	3.80	12.23	1.2103364	1.912181435	3.122517835	0.1758104	0.0001717	3.30E+00	9.89E-02	1.56E-01	1.44E-02	1.40E-05	*2.70E-01*	0.3669354	0.57971243	0.05330012	5.2054E-05
X	Lead	568.54414	0	0.213	51.85	6.43	0.0063427	26.08762118	26.09396388	1.3320989	0	2.74E+01	9.86E-04	4.06E+00	2.07E-01	0.00E+00	*4.26E+00*	0.00023127	0.95119819	0.04857055	0
	Mercury	1.0301522	0	0	0.04	0.03	0	0.018156798	0.018156798	0.0024136	0	2.06E-02	0.00E+00	7.06E-01	9.38E-02	0.00E+00	*7.99E-01*	0	0.88266434	0.11733566	0

Table E.1-102. Maximum Exposure Calculations for Muskrat - Station 06

	Maximum Concentrations																				
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 4	Reach 3																	
	Inorganics																				
X	Arsenic	115.42909	0	2.100	6.08	0.05	0.0626808	3.061151274	3.123832074	0.1379297	0	3.26E+00	1.14E+00	5.58E+01	2.52E+00	0.00E+00	5.95E+01	0.01921685	0.93849628	0.04228687	0
	Chromium	442	0.0043	1.200	8.26	7.24	0.0358176	4.155983648	4.191801248	1.035606	0.0004343	5.23E+00	4.95E-03	5.74E-01	1.43E-01	6.00E-05	7.22E-01	0.00685132	0.79497123	0.19809437	8.3074E-05
	Copper	357.47681	0.0052	49.500	18.11	12.23	1.477476	9.10971156	10.58718756	0.8375682	0.0005252	1.14E+01	1.21E-01	7.45E-01	6.85E-02	4.29E-05	9.34E-01	0.12931638	0.79732933	0.07330832	4.5968E-05
X	Lead	442.40826	0.0057	1.500	40.35	6.43	0.044772	20.29988233	20.34465433	1.0365626	0.0005757	2.14E+01	6.96E-03	3.16E+00	1.61E-01	8.95E-05	3.32E+00	0.00209393	0.9494004	0.04847875	2.6925E-05
X	Mercury	3.2	0	0	0.11	0.03	0	0.056401136	0.056401136	0.0074976	0	6.39E-02	0.00E+00	2.19E+00	2.91E-01	0.00E+00	2.48E+00	0	0.88266434	0.11733566	0

Table E.1-103. Maximum Exposure Calculations for Muskrat - Station 07

	Maximum Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 3	Reach 3																	
	Inorganics																				
X	Arsenic	80.645325	0	2.100	4.25	0.05	0.0626808	2.138694377	2.201375177	0.0983655	0	2.30E+00	1.14E+00	3.90E+01	1.78E+00	0.00E+00	4.19E+01	0.02727932	0.93078143	0.04193925	0
	Chromium	239.37056	0.0031	1.200	4.47	7.24	0.0358176	2.250724241	2.286541841	0.5608452	0.0003131	2.85E+00	4.95E-03	3.11E-01	7.75E-02	4.33E-05	3.93E-01	0.01257773	0.7903656	0.19694672	0.00010995
	Copper	230.43242	0.0036	49.500	11.67	12.23	1.477476	5.872193148	7.349669148	0.5399032	0.0003636	7.89E+00	1.21E-01	4.80E-01	4.41E-02	2.97E-05	5.45E-01	0.18726084	0.74426373	0.06842935	4.6084E-05
X	Lead	340.23995	0.0043	1.500	31.03	6.43	0.044772	15.61189422	15.65666622	0.7971822	0.0004343	1.65E+01	5.96E-03	2.43E+00	1.24E-01	6.75E-05	2.56E+00	0.00272099	0.9488043	0.04844831	2.6394E-05
X	Mercury	2.4744909	0.00022	0	0.09	0.03	0	0.04361378	0.04361378	0.0057977	0.00002222	4.94E-02	0.00E+00	1.69E+00	2.25E-01	8.63E-04	1.92E+00	0	0.8822676	0.11728291	0.00044949

Table E.1-104. Maximum Exposure Calculations for Muskrat - Station 08

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach 2																	
	Inorganics																				
X	Arsenic	28.9	0.01975	2.7000	1.52	0.05	0.0805896	0.76642096	0.84701056	0.0345335	0.00199475	8.84E-01	1.47E+00	1.40E+01	6.30E-01	3.64E-02	*1.61E+01*	0.09121229	0.86744461	0.03908541	0.00225768
	Chromium	119	0.0121	2.5000	2.22	7.24	0.07462	1.118918674	1.193538674	0.278817	0.0012221	1.47E+00	1.03E-02	1.55E-01	3.85E-02	1.69E-04	*2.04E-01*	0.05063866	0.75932108	0.18921092	0.00082934
	Copper	133	0.01375	65.1000	6.74	12.23	1.9431048	3.38928734	5.33239214	0.311619	0.00138875	5.65E+00	1.59E-01	2.77E-01	2.55E-02	1.14E-04	*4.62E-01*	0.34419259	0.60036267	0.05519875	0.000246
	Lead	70.7	0.0077	1.0000	6.45	6.43	0.029848	3.244066189	3.273914189	0.1656501	0.0007777	3.44E+00	4.64E-03	5.04E-01	2.57E-02	1.21E-04	*5.35E-01*	0.00867588	0.94294875	0.04814931	0.00022605
	Mercury	1	0.0001475	0.0200	0.04	0.03	0.000597	0.017625355	0.018222315	0.002343	1.4898E-05	2.06E-02	2.32E-02	6.85E-01	9.11E-02	5.79E-04	*8.00E-01*	0.0290065	0.8564224	0.11384722	0.00072387

Table E.1-105. Maximum Exposure Calculations for Muskrat - Station 09

	Maximum Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach 2																	
	Inorganics																				
X	Arsenic	34.868122	0.01975	2.7000	1.84	0.05	0.0805896	0.924694092	1.005283692	0.041665	0.00199475	1.05E+00	1.47E+00	1.69E+01	7.80E-01	3.64E-02	1.91E+01	0.07682931	0.88154812	0.03972089	0.00190168
	Chromium	58.897282	0.0121	2.5000	1.10	7.24	0.07462	0.55379217	0.62841217	0.1379963	0.0012221	7.68E-01	1.03E-02	7.65E-02	1.91E-02	1.69E-04	1.05E-01	0.09720821	0.72143055	0.17976919	0.00159204
	Copper	63.10423	0.01375	65.1000	3.20	12.23	1.9431048	1.608108029	3.551212829	0.1478532	0.00138875	3.70E+00	1.59E-01	1.31E-01	1.21E-02	1.14E-04	3.03E-01	0.52509892	0.43457038	0.03995542	0.00037529
	Lead	43.611698	0.0077	1.0000	3.98	6.43	0.029848	2.001120741	2.030968741	0.1021822	0.0007777	2.13E+00	4.64E-03	3.11E-01	1.59E-02	1.21E-04	3.32E-01	0.01398735	0.93776366	0.04788455	0.00036445
	Mercury	0.3851834	0.0001475	0.0200	0.01	0.03	0.000597	0.006788994	0.007385954	0.0009025	1.4898E-05	8.30E-03	2.32E-02	2.64E-01	3.51E-02	5.79E-04	3.23E-01	0.071894	0.81762244	0.10868941	0.00179416

Table E.1-106. Maximum Exposure Calculations for Muskrat - Station 10

	Maximum Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	1436.0303	0.04632573	4.4000	75.69	0.05	0.1313312	38.08317435	38.21450555	1.7159557	0.0046789	3.99E+01	2.40E+00	6.95E+02	3.13E+01	8.53E-02	*7.28E+02*	0.00328861	0.95362566	0.04296857	0.00011716
X	Chromium	2319.7299	0.05886398	1.0000	43.35	7.24	0.029848	21.81167282	21.84152082	5.4351271	0.00594526	2.73E+01	4.12E-03	3.01E+00	7.51E-01	8.21E-04	*3.77E+00*	0.00109403	0.79947213	0.19921593	0.00021791
X	Copper	2303.5915	0.07123821	59.6000	116.67	12.23	1.7789408	58.70326042	60.48220122	5.397315	0.00719506	6.59E+01	1.45E-01	4.80E+00	4.41E-01	5.88E-04	*5.39E+00*	0.02699999	0.89097269	0.08191811	0.0001092
X	Lead	814.07364	0.0759	0.5500	74.24	6.43	0.0164164	37.35373074	37.37014714	1.9073745	0.0076659	3.93E+01	2.55E-03	5.81E+00	2.96E-01	1.19E-03	*6.11E+00*	0.00041788	0.95083499	0.048552	0.00019513
X	Mercury	18.748657	0.00060956	0.0000	0.66	0.03	0	0.330451728	0.330451728	0.0439281	6.1566E-05	3.74E-01	0.00E+00	1.28E+01	1.71E+00	2.39E-03	*1.46E+01*	0	0.88251922	0.11731636	0.00016442

Table E.1-107. Maximum Exposure Calculations for Muskrat - Station 11

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	473	0.04632573	4.4000	24.93	0.05	0.1313312	12.54384478	12.67517598	0.5852019	0.0046789	1.32E+01	2.40E+00	2.29E+02	1.03E+01	8.53E-02	*2.42E+02*	0.00991549	0.94705859	0.04267267	0.00035326
X	Chromium	900	0.05886398	1.0000	16.82	7.24	0.029848	8.462410143	8.492258143	2.1087	0.00594526	1.06E+01	4.12E-03	1.17E+00	2.91E-01	8.21E-04	*1.47E+00*	0.00281402	0.79782099	0.19880449	0.00056051
X	Copper	402	0.07123821	59.6000	20.36	12.23	1.7789408	10.24431211	12.02325291	0.941886	0.00719506	1.30E+01	1.45E-01	8.37E-01	7.70E-02	5.88E-04	*1.06E+00*	0.13713344	0.78970462	0.07260729	0.00055465
X	Lead	606	0.0759	0.5500	55.26	6.43	0.0164164	27.80628162	27.82269802	1.419858	0.0076659	2.93E+01	2.55E-03	4.32E+00	2.21E-01	1.19E-03	*4.55E+00*	0.00056124	0.95063489	0.04854179	0.00026208
X	Mercury	3.7	0.00060956	0.0000	0.13	0.03	0	0.065213813	0.065213813	0.0086691	6.1566E-05	7.39E-02	0.00E+00	2.53E+00	3.37E-01	2.39E-03	*2.87E+00*	0	0.88192945	0.11723796	0.00083259

Table E.1-108. Maximum Exposure Calculations for Muskrat - Station 12

	Maximum Concentrations																				
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	3200.0793	0.04632573	4.4000	168.67	0.05	0.1313312	84.86532416	84.99665536	3.8238708	0.0046789	8.88E+01	2.40E+00	1.55E+03	6.97E+01	8.53E-02	*1.62E+03*	0.00147854	0.9554194	0.04304939	5.2675E-05
X	Chromium	1033.1956	0.05886398	1.0000	19.31	7.24	0.029848	9.714805521	9.744653521	2.4207773	0.00594526	1.22E+01	4.12E-03	1.34E+00	3.34E-01	8.21E-04	*1.68E+00*	0.00245231	0.79816821	0.19889101	0.00048846
X	Copper	1401.9034	0.07123821	59.6000	71.00	12.23	1.7789408	35.72521443	37.50415523	3.2846597	0.00719506	4.08E+01	1.45E-01	2.92E+00	2.69E-01	5.88E-04	*3.34E+00*	0.04360575	0.87570364	0.08051424	0.00017637
X	Lead	861.12774	0.0759	0.5500	78.53	6.43	0.0184164	39.51280584	39.52922224	2.0176223	0.0076659	4.16E+01	2.55E-03	6.14E+00	3.14E-01	1.19E-03	*6.48E+00*	0.00039506	0.95086684	0.04855363	0.00018448
X	Mercury	44.8	0.00060956	0.0000	1.57	0.03	0	0.789615898	0.789615898	0.1049664	6.1566E-05	8.95E-01	0.00E+00	3.07E+01	4.08E+00	2.39E-03	*3.48E+01*	0	0.8828036	0.11732758	6.8816E-05

Table E.1-109. Maximum Exposure Calculations for Muskrat - Station 13

	Maximum Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	4210	0.04632573	4.4000	221.90	0.05	0.1313312	111.6481745	111.7795057	5.0306553	0.0046789	1.17E+02	2.40E+00	2.04E+03	9.18E+01	8.53E-02	*2.13E+03*	0.00112427	0.95577047	0.04306521	4.0054E-05
X	Chromium	711.2516	0.05886398	1.0000	13.29	7.24	0.029848	6.687669693	6.717517693	1.6664625	0.00594526	8.39E+00	4.12E-03	9.24E-01	2.30E-01	8.21E-04	*1.16E+00*	0.0035576	0.79710717	0.19862661	0.00070862
X	Copper	1780.0133	0.07123821	59.6000	90.15	12.23	1.7789408	45.36072655	47.13966735	4.1705712	0.00719506	5.13E+01	1.45E-01	3.71E+00	3.41E-01	5.88E-04	*4.20E+00*	0.03466543	0.8839243	0.08127007	0.00014021
X	Lead	1147.0018	0.0759	0.5500	104.60	6.43	0.0164164	52.63012315	52.64653955	2.6874252	0.0076659	5.53E+01	2.55E-03	8.18E+00	4.18E-01	1.19E-03	*8.60E+00*	0.00029664	0.9510042	0.04856064	0.00013852
X	Mercury	13.948807	0.00060956	0.0000	0.49	0.03	0	0.245852674	0.245852674	0.032682	6.1566E-05	2.79E-01	0.00E+00	9.55E+00	1.27E+00	2.39E-03	*1.08E+01*	0	0.88246929	0.11730973	0.00022098

Table E.1-110. Maximum Exposure Calculations for Muskrat - Station 14

	Maximum Concentrations																				
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	73.4	0.04632573	4.4000	3.87	0.05	0.1313312	1.94655012	2.07788132	0.0877079	0.0046789	2.17E+00	2.40E+00	3.55E+01	1.60E+00	8.53E-02	*3.96E+01*	0.06051381	0.8969169	0.04041338	0.00215591
	Chromium	216	0.05886398	1.0000	4.04	7.24	0.029848	2.030978434	2.060826434	0.506088	0.00594526	2.57E+00	4.12E-03	2.81E-01	6.99E-02	8.21E-04	*3.55E-01*	0.0116011	0.78938562	0.19670253	0.00231076
	Copper	64.9	0.07123821	59.6000	3.29	12.23	1.7789408	1.653870289	3.432811089	0.1520607	0.00719506	3.59E+00	1.45E-01	1.35E-01	1.24E-02	5.88E-04	*2.94E-01*	0.49524156	0.46042303	0.04233237	0.00200304
	Lead	130	0.0759	0.5500	11.86	6.43	0.0164164	5.965043912	5.981460312	0.30459	0.0076659	6.29E+00	2.55E-03	9.27E-01	4.73E-02	1.19E-03	*9.78E-01*	0.00260838	0.94777771	0.04839589	0.00121802
X	Mercury	1.4	0.00060956	0.0000	0.05	0.03	0	0.024675497	0.024675497	0.0032802	6.1566E-05	2.80E-02	0.00E+00	9.59E-01	1.27E-01	2.39E-03	*1.09E+00*	0	0.88072477	0.11707782	0.00219741

Table E.1-111. Maximum Exposure Calculations for Muskrat - Station 15

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	193	0.04632573	4.4000	10.17	0.05	0.1313312	5.118312987	5.249644187	0.2306215	0.0046789	5.48E+00	2.40E+00	9.34E+01	4.21E+00	8.53E-02	*1.00E+02*	0.02394394	0.93315674	0.04204628	0.00085304
	Chromium	483.24958	0.05886398	1.0000	9.03	7.24	0.029848	4.543840206	4.573688206	1.1322538	0.00594526	5.71E+00	4.12E-03	6.28E-01	1.56E-01	8.21E-04	*7.89E-01*	0.00522559	0.79550594	0.19822761	0.00104086
X	Copper	469	0.07123821	59.6000	23.75	12.23	1.7789408	11.95169746	13.73063826	1.098867	0.00719506	1.48E+01	1.45E-01	9.77E-01	8.98E-02	5.88E-04	*1.21E+00*	0.11990138	0.80554956	0.07406411	0.00048495
X	Lead	150.60226	0.0759	0.5500	13.73	6.43	0.0164164	6.910377826	6.926794226	0.3528611	0.0076659	7.29E+00	2.55E-03	1.07E+00	5.49E-02	1.19E-03	*1.13E+00*	0.00225273	0.94827408	0.04842124	0.00105195
X	Mercury	1.3	0.00060956	0.0000	0.05	0.03	0	0.022912961	0.022912961	0.0030459	5.1566E-05	2.60E-02	0.00E+00	8.90E-01	1.18E-01	2.39E-03	*1.01E+00*	0	0.88057592	0.11705803	0.00236605

Table E.1-112. Maximum Exposure Calculations for Muskrat - Station 16

	Maximum Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach 2																	
	Inorganics																				
X	Arsenic	13.6	0.01975	2.7000	0.72	0.05	0.0805896	0.360668687	0.441258287	0.016251	0.00199475	4.60E-01	1.47E+00	6.58E+00	2.96E-01	3.64E-02	*8.38E+00*	0.17538386	0.78490855	0.03536849	0.00434109
	Chromium	38.4	0.0121	2.5000	0.72	7.24	0.07462	0.361062833	0.435682833	0.0899712	0.0012221	5.27E-01	1.03E-02	4.99E-02	1.24E-02	1.69E-04	*7.28E-02*	0.14162722	0.68528979	0.17076348	0.00231952
	Copper	32.5	0.01375	65.1000	1.65	12.23	1.9431048	0.828209312	2.771314112	0.0761475	0.00138875	2.85E+00	1.59E-01	6.77E-02	6.23E-03	1.14E-04	*2.33E-01*	0.68206629	0.29071703	0.0267292	0.00048748
	Lead	15.4	0.0077	1.0000	1.40	6.43	0.029848	0.706628279	0.736476279	0.0360822	0.0007777	7.73E-01	4.64E-03	1.10E-01	5.61E-03	1.21E-04	*1.20E-01*	0.03859641	0.9137401	0.04665785	0.00100564
	Mercury	0.37	0.0001475	0.0200	0.01	0.03	0.000597	0.006521381	0.007118341	0.0008669	1.4898E-05	8.00E-03	2.32E-02	2.53E-01	3.37E-02	5.79E-04	*3.11E-01*	0.07461861	0.8151575	0.10836173	0.00186215

Table E.1-113. Maximum Exposure Calculations for Muskrat - Station 18

	Maximum Concentrations																				
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	1105.3876	0.04632573	4.4000	58.26	0.05	0.1313312	29.31460972	29.44594092	1.3208808	0.0046789	3.08E+01	2.40E+00	5.35E+02	2.41E+01	8.53E-02	*5.81E+02*	0.00426795	0.95265516	0.04292484	0.00015205
X	Chromium	3018.8869	0.05886398	1.0000	56.42	7.24	0.029848	28.38582155	28.41546955	7.0732521	0.00594528	3.55E+01	4.12E-03	3.92E+00	9.77E-01	8.21E-04	*4.90E+00*	0.00084092	0.79971511	0.19927647	0.0001675
X	Copper	1114.8618	0.07123821	59.6000	56.46	12.23	1.7789408	28.41042885	30.18936965	2.6121212	0.00719506	3.28E+01	1.45E-01	2.32E+00	2.14E-01	5.88E-04	*2.68E+00*	0.05422164	0.8659423	0.07961676	0.0002193
X	Lead	508.93653	0.0759	0.5500	46.41	6.43	0.0164164	23.35252906	23.36894546	1.1924383	0.0076659	2.46E+01	2.55E-03	3.63E+00	1.85E-01	1.19E-03	*3.82E+00*	0.00066817	0.95048565	0.04853416	0.00031201
X	Mercury	5.7642291	0.00060956	0.0000	0.20	0.03	0	0.101596583	0.101596583	0.0135056	6.1566E-05	1.15E-01	0.00E+00	3.95E+00	5.25E-01	2.39E-03	*4.48E+00*	0	0.88219248	0.11727293	0.00053459

Table E.1-114. Maximum Exposure Calculations for Muskrat - Station 19

	Maximum Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	4250	0.04632573	4.4000	224.01	0.05	0.1313312	112.7089647	112.8402959	5.0784525	0.0046789	1.18E+02	2.40E+00	2.06E+03	9.26E+01	8.53E-02	2.15E+03	0.0011137	0.95578094	0.04306568	3.9677E-05
X	Chromium	2333.0023	0.05886398	1.0000	43.60	7.24	0.029848	21.93646911	21.96631711	5.4662244	0.00594528	2.74E+01	4.12E-03	3.03E+00	7.55E-01	8.21E-04	3.79E+00	0.00108782	0.7994781	0.19921741	0.00021668
X	Copper	1296.9484	0.07123821	59.6000	65.69	12.23	1.7789408	33.0506087	34.8295495	3.0387502	0.00719506	3.79E+01	1.45E-01	2.70E+00	2.48E-01	5.88E-04	3.10E+00	0.04696812	0.87261193	0.08022998	0.00018997
X	Lead	601.09791	0.0759	0.5500	54.82	6.43	0.0164164	27.58134945	27.59776585	1.4083724	0.0076659	2.90E+01	2.55E-03	4.29E+00	2.19E-01	1.19E-03	4.51E+00	0.00056581	0.95062851	0.04854146	0.00026422
X	Mercury	6.1446911	0.00060956	0.0000	0.22	0.03	0	0.108302362	0.108302362	0.014397	6.1566E-05	1.23E-01	0.00E+00	4.21E+00	5.59E-01	2.39E-03	4.77E+00	0	0.88222168	0.11727681	0.00050151

Table E.1-115. Maximum Exposure Calculations for Muskrat - Station 20

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	321	0.04632573	4.4000	16.92	0.05	0.1313312	8.512841807	8.644173007	0.3835725	0.0046789	9.03E+00	2.40E+00	1.55E+02	7.00E+00	8.53E-02	*1.65E+02*	0.01453997	0.94247584	0.04246618	0.00051801
X	Chromium	1832.781	0.05886398	1.0000	34.25	7.24	0.029848	17.23304924	17.26289724	4.2942058	0.00594526	2.16E+01	4.12E-03	2.38E+00	5.93E-01	8.21E-04	*2.98E+00*	0.00138422	0.79919355	0.19914651	0.00027572
X	Copper	1075	0.07123821	59.6000	54.45	12.23	1.7789408	27.39461572	29.17355652	2.518725	0.00719506	3.17E+01	1.45E-01	2.24E+00	2.06E-01	5.88E-04	*2.59E+00*	0.05611893	0.86419773	0.07945636	0.00022698
X	Lead	1200	0.0759	0.5500	109.43	8.43	0.0164164	55.0619438	55.0783602	2.8116	0.0076659	5.79E+01	2.55E-03	8.56E+00	4.37E-01	1.19E-03	*9.00E+00*	0.00028354	0.95102248	0.04856158	0.0001324
X	Mercury	3.3	0.00060956	0.0000	0.12	0.03	0	0.058163671	0.058163671	0.0077319	8.1586E-05	8.60E-02	0.00E+00	2.26E+00	3.00E-01	2.39E-03	*2.56E+00*	0	0.88184045	0.11722613	0.00093342

Table E.1-116. Maximum Exposure Calculations for Muskrat - Station 21

	Maximum Concentrations																				
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	248.25722	0.04632573	4.4000	13.08	0.05	0.1313312	6.58372111	6.71505231	0.29665	0.0046789	7.02E+00	2.40E+00	1.20E+02	5.41E+00	8.53E-02	*1.28E+02*	0.0187178	0.93833572	0.04227963	0.00066685
X	Chromium	5033.9072	0.05886398	1.0000	94.07	7.24	0.029848	47.33220857	47.36205657	11.794445	0.00594526	5.92E+01	4.12E-03	6.54E+00	1.63E+00	8.21E-04	*8.17E+00*	0.00050451	0.80003805	0.19935695	0.00010049
X	Copper	600.80892	0.07123821	59.8000	30.43	12.23	1.7789408	15.31063202	17.08957282	1.4076953	0.00719506	1.85E+01	1.45E-01	1.25E+00	1.15E-01	5.88E-04	*1.51E+00*	0.09613577	0.82740212	0.07607328	0.00038883
X	Lead	722	0.0759	0.5500	65.84	6.43	0.0164164	33.12893619	33.14535259	1.691646	0.0076659	3.48E+01	2.55E-03	5.15E+00	2.63E-01	1.19E-03	*5.42E+00*	0.00047113	0.95076066	0.04854821	0.00022
X	Mercury	18.2	0.00060956	0.0000	0.64	0.03	0	0.320781459	0.320781459	0.0426426	8.1566E-05	3.63E-01	0.00E+00	1.25E+01	1.66E+00	2.39E-03	*1.41E+01*	0	0.88251484	0.11731578	0.00016938

Table E.1-117. Maximum Exposure Calculations for Muskrat - Station AM

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach2																	
	Inorganics																				
X	Arsenic	121	0.01975	2.700	6.38	0.05	0.0805896	3.208890525	3.289480125	0.1445865	0.00199475	3.44E+00	1.47E+00	5.85E+01	2.64E+00	3.64E-02	*6.27E+01*	0.02345406	0.93388626	0.04207915	0.00058053
	Chromium	322	0.0121	2.500	6.02	7.24	0.07462	3.027662296	3.102282296	0.754446	0.0012221	3.86E+00	1.03E-02	4.18E-01	1.04E-01	1.69E-04	*5.33E-01*	0.01934188	0.78478518	0.19555617	0.00031677
	Copper	197	0.01375	65.100	9.98	12.23	1.9431048	5.020222601	6.963327401	0.461571	0.00138875	7.43E+00	1.59E-01	4.10E-01	3.77E-02	1.14E-04	*6.07E-01*	0.26165226	0.67600707	0.06215367	0.000187
X	Lead	150	0.0077	1.000	13.88	8.43	0.029848	6.882742976	6.912590976	0.35145	0.0007777	7.26E+00	4.64E-03	1.07E+00	5.46E-02	1.21E-04	*1.13E+00*	0.00410857	0.9474074	0.04837698	0.00010705
X	Mercury	1.9	0.0001475	0	0.07	0.03	0	0.033488174	0.033488174	0.0044517	1.4898E-05	3.80E-02	0.00E+00	1.30E+00	1.73E-01	5.79E-04	*1.47E+00*	0	0.88231789	0.1172896	0.00039251

Table E.1-118. Maximum Exposure Calculations for Muskrat - Station AS

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 3	Reach 3																	
	Inorganics																				
X	Arsenic	121	0	2.100	6.38	0.05	0.0626808	3.208890525	3.271571325	0.1445865	0	3.42E+00	1.14E+00	5.85E+01	2.64E+00	0.00E+00	*6.23E+01*	0.01834833	0.93932736	0.04232431	0
X	Chromium	918	0.0031	1.200	17.16	7.24	0.0358176	8.631658346	8.667475946	2.150874	0.0003131	1.08E+01	4.95E-03	1.19E+00	2.97E-01	4.33E-05	*1.49E+00*	0.00331072	0.79784889	0.19881144	2.8941E-05
X	Copper	576	0.0036	49.500	29.17	12.23	1.477476	14.67841735	16.15589335	1.349568	0.0003636	1.75E+01	1.21E-01	1.20E+00	1.10E-01	2.97E-05	*1.43E+00*	0.08439911	0.83848761	0.0770925	2.077E-05
X	Lead	661	0.0043	1.500	60.28	6.43	0.044772	30.32995405	30.37472605	1.548723	0.0004343	3.19E+01	6.96E-03	4.71E+00	2.41E-01	6.75E-05	*4.96E+00*	0.00140246	0.95007095	0.04851299	1.3604E-05
X	Mercury	3.1	0.00022	0	0.11	0.03	0	0.0546386	0.0546386	0.0072633	0.00002222	6.19E-02	0.00E+00	2.12E+00	2.82E-01	8.63E-04	*2.41E+00*	0	0.88234762	0.11729355	0.00035883

Table E.1-119. Maximum Exposure Calculations for Muskrat - Station BW

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	3036.48489	0.046325726	4.4000	160.04	0.05	0.1313312	80.52663972	80.65817092	3.628386894	0.004678898	8.43E+01	2.40E+00	1.47E+03	6.82E+01	8.53E-02	*1.54E+03*	0.00155806	0.95534059	0.04304584	5.5509E-05
X	Chromium	2034.65106	0.058863979	1.0000	38.02	7.24	0.029848	19.13116866	19.16101666	4.78718744	0.005945262	2.39E+01	4.12E-03	2.64E+00	6.59E-01	8.21E-04	*3.31E+00*	0.00124709	0.7993252	0.19917931	0.0002484
X	Copper	1519.89093	0.071238205	59.8000	76.98	12.23	1.7789408	38.7319331	40.5108739	3.561104459	0.007195059	4.41E+01	1.45E-01	3.17E+00	2.91E-01	5.86E-04	*3.60E+00*	0.04035785	0.8786901	0.08078882	0.00016323
X	Lead	866.179113	0.0759	0.5500	78.99	6.43	0.0184184	39.74458803	39.76100443	2.029457661	0.0076659	4.18E+01	2.55E-03	6.18E+00	3.15E-01	1.19E-03	*6.50E+00*	0.00039275	0.95087005	0.04855379	0.0001834
X	Mercury	15.5414294	0.00060956	0.0000	0.54	0.03	0	0.273923208	0.273923208	0.036413569	6.15655E-05	3.10E-01	0.00E+00	1.06E+01	1.42E+00	2.39E-03	*1.21E+01*	0	0.88248927	0.11731236	0.00019834

Table E.1-120. Maximum Exposure Calculations for Muskrat - Station CB-01

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach 2																	
	Inorganics																				
X	Arsenic	57.959259	0.01975	2.700	3.05	0.05	0.0805896	1.537065425	1.617655025	0.0692573	0.00199475	1.69E+00	1.47E+00	2.80E+01	1.26E+00	3.64E-02	*3.08E+01*	0.04771701	0.91009475	0.04100715	0.00118109
	Chromium	332.36071	0.0121	2.500	8.21	7.24	0.07462	3.125080701	3.199700701	0.7787211	0.0012221	3.98E+00	1.03E-02	4.32E-01	1.08E-01	1.69E-04	*5.50E-01*	0.01875042	0.78526641	0.19567808	0.00030709
X	Copper	749.36168	0.01375	65.100	37.95	12.23	1.9431048	19.09825603	21.03936083	1.7557544	0.00138875	2.28E+01	1.59E-01	1.56E+00	1.44E-01	1.14E-04	*1.86E+00*	0.08523696	0.83768353	0.07701858	6.0919E-05
X	Lead	443.09295	0.0077	1.000	40.41	6.43	0.029848	20.33129941	20.36114741	1.0381668	0.0007777	2.14E+01	4.64E-03	3.16E+00	1.61E-01	1.21E-04	*3.33E+00*	0.00139476	0.95005664	0.04851226	3.6341E-05
X	Mercury	2.9454641	0.0001475	0	0.10	0.03	0	0.051914851	0.051914851	0.0069012	1.4898E-05	5.88E-02	0.00E+00	2.02E+00	2.68E-01	5.79E-04	*2.29E+00*	0	0.88244083	0.11730594	0.00025323

Table E.1-121. Maximum Exposure Calculations for Muskrat - Station CB-02

	Maximum Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach 2																	
	Inorganics																				
X	Arsenic	41.453916	0.01975	2.700	2.18	0.05	0.0805896	1.09934775	1.17993735	0.0495345	0.00199475	1.23E+00	1.47E+00	2.01E+01	9.04E-01	3.64E-02	*2.25E+01*	0.06544197	0.8927142	0.04022401	0.00161982
	Chromium	143.57212	0.0121	2.500	2.68	7.24	0.07462	1.349962382	1.424582382	0.3363895	0.0012221	1.76E+00	1.03E-02	1.87E-01	4.65E-02	1.69E-04	*2.43E-01*	0.04234494	0.76606913	0.19089242	0.00069351
	Copper	97.613109	0.01375	65.100	4.94	12.23	1.9431048	2.487510332	4.430615132	0.2287075	0.00138875	4.66E+00	1.59E-01	2.03E-01	1.87E-02	1.14E-04	*3.61E-01*	0.41691163	0.53371902	0.04907137	0.00029797
X	Lead	238.18343	0.0077	1.000	21.72	6.43	0.029848	10.92903548	10.95888348	0.5580638	0.0007777	1.15E+01	4.64E-03	1.70E+00	8.67E-02	1.21E-04	*1.79E+00*	0.00259148	0.94888839	0.0484526	6.7522E-05
	Mercury	0.3279057	0.0001475	0	0.01	0.03	0	0.005779454	0.005779454	0.0007683	1.4898E-05	6.58E-03	0.00E+00	2.25E-01	2.99E-02	5.79E-04	*2.55E-01*	0	0.88066065	0.1170693	0.00227005

Table E.1-122. Maximum Exposure Calculations for Muskrat - Station CB-03

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach 2																		
	Inorganics																					
X	Arsenic	594.54754	0.01975	2.700	31.34	0.05	0.0805896	15.76725605	15.84784565	0.7104427	0.00199475	1.86E+01	1.47E+00	2.88E+02	1.30E+01	3.64E-02	3.02E+02	0.00486644	0.95211271	0.0429004	0.00012045	
X	Chromium	768	0.0121	2.500	14.35	7.24	0.07462	7.221256655	7.295876655	1.799424	0.0012221	9.10E+00	1.03E-02	9.98E-01	2.49E-01	1.69E-04	1.26E+00	0.00820313	0.79384803	0.19781449	0.00013435	
X	Copper	376.412	0.01375	65.100	19.06	12.23	1.9431048	9.592243757	11.53534856	0.8819333	0.00138875	1.24E+01	1.59E-01	7.84E-01	7.21E-02	1.14E-04	1.02E+00	0.15646641	0.77240504	0.07101672	0.00011183	
X	Lead	273.84054	0.0077	1.000	24.97	6.43	0.029848	12.56516016	12.59500816	0.6416084	0.0007777	1.32E+01	4.64E-03	1.95E+00	9.97E-02	1.21E-04	2.06E+00	0.00225482	0.94921704	0.04846939	5.875E-05	
X	Mercury	2.4503493	0.0001475	0	0.09	0.03	0	0.043188276	0.043188276	0.0057412	1.4898E-05	4.89E-02	0.00E+00	1.68E+00	2.23E-01	5.79E-04	1.90E+00	0	0.88239568	0.11729994	0.00030438	

Table E.1-123. Maximum Exposure Calculations for Muskrat - Station CB-04

	Maximum Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach 2																	
	Inorganics																				
X	Arsenic	181.6892	0.01975	2.700	9.58	0.05	0.0805896	4.818353222	4.898942822	0.2171059	0.00199475	5.12E+00	1.47E+00	8.79E+01	3.98E+00	3.64E-02	*9.34E+01*	0.01574617	0.94144438	0.0424197	0.00038975
	Chromium	272.3036	0.0121	2.500	5.09	7.24	0.07462	2.560383064	2.635003064	0.6380073	0.0012221	3.27E+00	1.03E-02	3.54E-01	8.82E-02	1.69E-04	*4.52E-01*	0.02279007	0.78197961	0.19485707	0.00037325
	Copper	244.3024	0.01375	65.100	12.37	12.23	1.9431048	8.225646889	8.168751689	0.5724005	0.00138875	8.74E+00	1.59E-01	5.09E-01	4.68E-02	1.14E-04	*7.15E-01*	0.22225859	0.71210955	0.06547302	0.00015885
X	Lead	275.54443	0.0077	1.000	25.13	6.43	0.029848	12.64334317	12.67319117	0.6456006	0.0007777	1.33E+01	4.64E-03	1.97E+00	1.00E-01	1.21E-04	*2.07E+00*	0.00224091	0.94923062	0.04847008	5.8388E-05
	Mercury	1.2104175	0.0001475	0	0.04	0.03	0	0.021334038	0.021334038	0.002836	1.4898E-05	2.42E-02	0.00E+00	8.29E-01	1.10E-01	5.79E-04	*9.40E-01*	0	0.88212064	0.11726338	0.00061598

Table E.1-124. Maximum Exposure Calculations for Muskrat - Station CB-06

	Maximum Concentrations																				
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach 2																	
	Inorganics																				
X	Arsenic	139.79044	0.01975	2.700	7.37	0.05	0.0805896	3.707208297	3.787797897	0.1670398	0.00199475	3.96E+00	1.47E+00	6.76E+01	3.05E+00	3.64E-02	*7.22E+01*	0.0203672	0.93691314	0.04221553	0.00050413
	Chromium	497.12688	0.0121	2.500	9.29	7.24	0.07462	4.674323968	4.748943968	1.1647683	0.0012221	5.91E+00	1.03E-02	6.46E-01	1.61E-01	1.69E-04	*8.17E-01*	0.01261552	0.79025796	0.1969199	0.00020661
	Copper	236.03521	0.01375	65.100	11.95	12.23	1.9431048	6.01497103	7.95807583	0.5530305	0.00138875	8.51E+00	1.59E-01	4.92E-01	4.52E-02	1.14E-04	*6.96E-01*	0.22826501	0.70660494	0.06496691	0.00016314
X	Lead	189.34563	0.0077	1.000	17.27	6.43	0.029848	8.688115578	8.717963578	0.4436368	0.0007777	9.16E+00	4.64E-03	1.35E+00	6.90E-02	1.21E-04	*1.42E+00*	0.00325767	0.94823805	0.0484194	8.488E-05
	Mercury	0.3393261	0.0001475	0	0.01	0.03	0	0.005980743	0.005980743	0.000795	1.4898E-05	6.79E-03	0.00E+00	2.32E-01	3.09E-02	5.79E-04	*2.64E-01*	0	0.88072794	0.11707824	0.00219381

Table E.1-125. Maximum Exposure Calculations for Muskrat - Station NRSE

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	214.298441	0.048325726	4.4000	11.30	0.05	0.1313312	5.683142447	5.814473647	0.256071636	0.004678698	6.08E+00	2.40E+00	1.04E+02	4.67E+00	8.53E-02	*1.11E+02*	0.02161751	0.93546218	0.04215015	0.00077016
	Chromium	250.779099	0.058863979	1.0000	4.69	7.24	0.029848	2.357995104	2.387843104	0.58757543	0.005945262	2.98E+00	4.12E-03	3.26E-01	8.12E-02	8.21E-04	*4.12E-01*	0.01001153	0.79091156	0.19708277	0.00199414
	Copper	303.821061	0.071238205	59.8000	15.39	12.23	1.7789408	7.742382533	9.521323333	0.711852747	0.007195059	1.02E+01	1.45E-01	6.33E-01	5.82E-02	5.88E-04	*8.37E-01*	0.17371839	0.75606464	0.06951435	0.00070262
X	Lead	223.913228	0.0759	0.5500	20.42	6.43	0.0164164	10.27424797	10.29066437	0.524628693	0.0076659	1.06E+01	2.55E-03	1.60E+00	8.16E-02	1.19E-03	*1.68E+00*	0.00151661	0.9493012	0.04847368	0.0007083
X	Mercury	4.4975748	0.00060956	0.0000	0.16	0.03	0	0.079271352	0.079271352	0.010537818	8.15655E-06	8.99E-02	0.00E+00	3.08E+00	4.10E-01	2.39E-03	*3.49E+00*	0	0.88205968	0.11725527	0.00068505

Table E.1-126. Maximum Exposure Calculations for Muskrat - Station JY

	Maximum Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	282.324716	0.046325726	4.4000	14.68	0.05	0.1313312	7.467182757	7.618513957	0.337358276	0.004678898	7.98E+00	2.40E+00	1.37E+02	6.15E+00	8.53E-02	*1.45E+02*	0.01649775	0.94053573	0.04237876	0.00058776
X	Chromium	1170.2289	0.058863979	1.0000	21.87	7.24	0.029648	11.0032655	11.0331335	2.741846323	0.005945262	1.38E+01	4.12E-03	1.52E+00	3.79E-01	8.21E-04	*1.90E+00*	0.00216589	0.79844317	0.19895953	0.00043141
X	Copper	501.880046	0.071238205	59.6000	25.42	12.23	1.7789408	12.78959182	14.56853242	1.175904947	0.007195059	1.58E+01	1.45E-01	1.05E+00	9.61E-02	5.88E-04	*1.29E+00*	0.11293692	0.81195341	0.07485289	0.00045678
X	Lead	729.152639	0.0759	0.5500	66.50	6.43	0.0164164	33.45713469	33.47355109	1.708404633	0.0076659	3.52E+01	2.55E-03	5.20E+00	2.66E-01	1.19E-03	*5.47E+00*	0.00046651	0.95078711	0.04854854	0.00021785
X	Mercury	1.81493081	0.00080956	0.0000	0.08	0.03	0	0.0319888	0.0319888	0.004252383	6.15655E-05	3.63E-02	0.00E+00	1.24E+00	1.65E-01	2.39E-03	*1.41E+00*	0	0.88118744	0.11713867	0.00189589

Table E.1-127. Maximum Exposure Calculations for Muskrat - Station KFSE

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach2																	
	Inorganics																				
X	Arsenic	52.128722	0.01975	2.700	2.75	0.05	0.0805896	1.38244101	1.46303061	0.0622902	0.00199475	1.53E+00	1.47E+00	2.52E+01	1.14E+00	3.64E-02	*2.79E+01*	0.05276552	0.90514434	0.04078409	0.00130605
	Chromium	88.575803	0.0121	2.500	1.66	7.24	0.07462	0.832849747	0.907469747	0.2075331	0.0012221	1.12E+00	1.03E-02	1.15E-01	2.87E-02	1.69E-04	*1.54E-01*	0.06685032	0.74613074	0.18592409	0.00109485
	Copper	110.92609	0.01375	65.100	5.62	12.23	1.9431048	2.82676991	4.76987471	0.2598898	0.00138875	5.03E+00	1.59E-01	2.31E-01	2.12E-02	1.14E-04	*4.11E-01*	0.38621382	0.56185215	0.051658	0.00027603
	Lead	129.59614	0.0077	1.000	11.82	6.43	0.029848	5.946512748	5.976360748	0.3036438	0.0007777	6.28E+00	4.64E-03	9.24E-01	4.72E-02	1.21E-04	*9.76E-01*	0.00475227	0.94677901	0.04834489	0.00012382
	Mercury	0.907898	0.0001475	0	0.03	0.03	0	0.016002024	0.016002024	0.0021272	1.4698E-05	1.81E-02	0.00E+00	6.22E-01	8.27E-02	5.79E-04	*7.05E-01*	0	0.88193962	0.11723931	0.00082106

Table E.1-128. Maximum Exposure Calculations for Muskrat - Station LP

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 3	Reach 3																	
	Inorganics																				
X	Arsenic	148.67573	0	2.100	7.84	0.05	0.0626808	3.942844088	4.005524888	0.1776571	0	4.18E+00	1.14E+00	7.19E+01	3.24E+00	0.00E+00	*7.63E+01*	0.014984	0.94254663	0.04246937	0
	Chromium	76.832498	0.0031	1.200	1.44	7.24	0.0358178	0.72243123	0.75824883	0.1800185	0.0003131	9.39E-01	4.95E-03	9.98E-02	2.49E-02	4.33E-05	*1.30E-01*	0.03816146	0.76970622	0.19179873	0.00033359
	Copper	367.41592	0.0036	49.500	18.61	12.23	1.477476	9.362993392	10.84046939	0.8608555	0.0003636	1.17E+01	1.21E-01	7.65E-01	7.04E-02	2.97E-05	*9.57E-01*	0.12626178	0.80014037	0.07356678	3.1072E-05
X	Lead	139.74372	0.0043	1.500	12.74	6.43	0.044772	6.412134115	6.456906115	0.3274195	0.0004343	6.78E+00	6.96E-03	9.97E-01	5.09E-02	6.75E-05	*1.05E+00*	0.00659891	0.94507899	0.04825809	6.4011E-05
	Mercury	0.7280095	0.00022	0	0.03	0.03	0	0.012831425	0.012831425	0.0017057	0.00002222	1.46E-02	0.00E+00	4.99E-01	6.63E-02	8.63E-04	*5.66E-01*	0	0.88131725	0.11715658	0.00152616

Table E.1-129. Maximum Exposure Calculations for Muskrat - Station TT-28

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	987	0.048325726	4.4000	52.02	0.05	0.1313312	26.17499957	26.30633077	1.17939591	0.004678898	2.75E+01	2.40E+00	4.77E+02	2.15E+01	8.53E-02	5.01E+02	0.00477735	0.95215036	0.04290209	0.0001702
X	Chromium	4240	0.058863979	1.0000	79.24	7.24	0.029648	39.66735445	39.69720245	9.93432	0.005945262	4.98E+01	4.12E-03	5.51E+00	1.37E+00	8.21E-04	6.89E+00	0.00059691	0.79984743	0.19933437	0.00011929
X	Copper	1330	0.071236205	59.6000	67.36	12.23	1.7789408	33.8928734	35.6718142	3.11619	0.007195059	3.88E+01	1.45E-01	2.77E+00	2.55E-01	5.88E-04	3.17E+00	0.04585466	0.87363576	0.08032411	0.00018548
X	Lead	657	0.0759	0.5500	59.92	6.43	0.0164184	30.14641423	30.16283063	1.539351	0.0076659	3.17E+01	2.55E-03	4.69E+00	2.39E-01	1.19E-03	4.93E+00	0.00051771	0.95069565	0.04854489	0.00024175
X	Mercury	5	0.00060956	0.0000	0.18	0.03	0	0.088126774	0.088126774	0.011715	6.15655E-05	9.99E-02	0.00E+00	3.42E+00	4.55E-01	2.39E-03	3.88E+00	0	0.8821204	0.11726335	0.00061625

Table E.1-130. Maximum Exposure Calculations for Muskrat - Station TT-29

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
	Inorganics		Reach 1	Reach 1																	
X	Arsenic	1050	0.048325726	4.4000	55.34	0.05	0.1313312	27.84574423	27.97707543	1.2546765	0.004678808	2.92E+01	2.40E+00	5.06E+02	2.29E+01	8.53E-02	*5.33E+02*	0.00449204	0.95243309	0.04291483	0.00016004
X	Chromium	5500	0.058863979	1.0000	102.78	7.24	0.029648	51.71472865	51.74457665	12.8865	0.005945262	6.46E+01	4.12E-03	7.15E+00	1.78E+00	8.21E-04	*8.93E+00*	0.00046178	0.80007907	0.19936717	9.1979E-05
X	Copper	1340	0.071238205	59.8000	67.87	12.23	1.7789408	34.14770704	35.92664784	3.13962	0.007196059	3.91E+01	1.45E-01	2.79E+00	2.57E-01	5.86E-04	*3.19E+00*	0.04552811	0.87393803	0.08035172	0.00018414
X	Lead	649	0.0759	0.5500	59.19	6.43	0.0164184	29.77933461	29.79575101	1.520607	0.0076659	3.13E+01	2.55E-03	4.63E+00	2.36E-01	1.19E-03	*4.87E+00*	0.00052408	0.95068675	0.04854443	0.00024473
X	Mercury	13.3	0.00060956	0.0000	0.47	0.03	0	0.23441722	0.23441722	0.0311619	6.15655E-05	2.66E-01	0.00E+00	9.11E+00	1.21E+00	2.39E-03	*1.03E+01*	0	0.88245978	0.11730846	0.00023176

Table E.1-131. Maximum Exposure Calculations for Muskrat - Station TT-30

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach2																	
	Inorganics																				
X	Arsenic	1052.4743	0.01975	2.700	55.47	0.05	0.0805896	27.91136324	27.99195284	1.2576332	0.00199475	2.93E+01	1.47E+00	5.09E+02	2.29E+01	3.84E-02	*5.34E+02*	0.00275505	0.95418307	0.04299368	6.8193E-05
X	Chromium	4813.5968	0.0121	2.500	89.95	7.24	0.07462	45.26070072	45.33532072	11.276257	0.0012221	5.66E+01	1.03E-02	6.25E+00	1.56E+00	1.69E-04	*7.82E+00*	0.00131803	0.79944998	0.19921041	2.1586E-05
X	Copper	3269.3079	0.01375	65.100	165.58	12.23	1.9431048	83.31296074	85.25606554	7.6599883	0.00138875	9.29E+01	1.59E-01	6.81E+00	6.26E-01	1.14E-04	*7.60E+00*	0.02091216	0.89663424	0.08243865	1.4946E-05
X	Lead	640.39345	0.0077	1.000	58.40	6.43	0.029848	29.38442339	29.41427139	1.5004418	0.0007777	3.09E+01	4.64E-03	4.57E+00	2.33E-01	1.21E-04	*4.81E+00*	0.00096547	0.95047572	0.04853388	2.5156E-05
X	Mercury	89.2	0.0001475	0	3.12	0.03	0	1.572181655	1.572181655	0.2089956	1.4898E-05	1.78E+00	0.00E+00	6.11E+01	8.12E+00	5.79E-04	*6.92E+01*	0	0.88265898	0.11733467	8.3638E-06

Table E.1-132. Maximum Exposure Calculations for Muskrat - Station TT-31

	Maximum Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach2																	
	Inorganics																				
X	Arsenic	30.3	0.01975	2.700	1.60	0.05	0.0805896	0.803548619	0.884138219	0.0362064	0.00199475	9.22E-01	1.47E+00	1.47E+01	6.60E-01	3.64E-02	*1.68E+01*	0.08737522	0.87120713	0.03925494	0.00216271
	Chromium	295	0.0121	2.500	5.51	7.24	0.07462	2.773789991	2.848409991	0.691185	0.0012221	3.54E+00	1.03E-02	3.83E-01	9.55E-02	1.69E-04	*4.89E-01*	0.02107423	0.78337568	0.19520494	0.00034515
	Copper	181	0.01375	65.100	9.17	12.23	1.9431048	4.612488786	6.555593586	0.424083	0.00138875	6.98E+00	1.59E-01	3.77E-01	3.47E-02	1.14E-04	*5.71E-01*	0.27833929	0.66071417	0.06074761	0.00019893
X	Lead	332	0.0077	1.000	30.28	6.43	0.029848	*15.23380445*	*15.26365245*	0.777876	0.0007777	1.60E+01	*4.64E-03*	2.37E+00	1.21E-01	1.21E-04	*2.49E+00*	0.00186058	0.9496019	0.04848904	*4.8478E-05*
X	Mercury	1.8	0.0001475	0	0.06	0.03	0	0.031725639	0.031725639	0.0042174	1.4898E-05	3.60E-02	0.00E+00	1.23E+00	1.64E-01	5.79E-04	*1.40E+00*	0	0.88229865	0.11728704	0.0004143

Table E.1-133. Maximum Exposure Calculations for Muskrat - Station TT-32

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach2																	
	Inorganics																				
X	Arsenic	403	0.01975	2.700	21.24	0.05	0.0805896	10.68746183	10.76805143	0.4815568	0.00198475	1.13E+01	1.47E+00	1.95E+02	8.78E+00	3.64E-02	*2.05E+02*	0.0071625	0.94986126	0.04279895	0.00017729
X	Chromium	699	0.0121	2.500	13.06	7.24	0.07462	6.572471878	6.647091878	1.637757	0.0012221	8.29E+00	1.03E-02	9.08E-01	2.26E-01	1.69E-04	*1.14E+00*	0.00900547	0.79319522	0.19785182	0.00014749
X	Copper	403	0.01375	65.100	20.41	12.23	1.9431048	10.26979547	12.21290027	0.944229	0.00138875	1.32E+01	1.59E-01	8.40E-01	7.72E-02	1.14E-04	*1.08E+00*	0.14766897	0.78046749	0.071758	0.00010554
X	Lead	288	0.0077	1.000	26.26	6.43	0.029848	13.21486651	13.24471451	0.674784	0.0007777	1.39E+01	4.64E-03	2.05E+00	1.05E-01	1.21E-04	*2.16E+00*	0.00214421	0.94932502	0.0484749	5.5868E-05
X	Mercury	4.3	0.0001475	0	0.15	0.03	0	0.075789026	0.075789026	0.0100749	1.4898E-05	8.59E-02	0.00E+00	2.95E+00	3.92E-01	5.79E-04	*3.34E+00*	0	0.88251123	0.1173153	0.00017347

Table E.1-134. Maximum Exposure Calculations for Muskrat - Station TT-33

	Maximum Concentrations																				
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 2	Reach2																	
	Inorganics																				
X	Arsenic	288	0.01975	2.700	15.18	0.05	0.0805896	7.637689845	7.718279445	0.3441398	0.00199475	8.06E+00	1.47E+00	1.39E+02	6.28E+00	3.64E-02	1.47E+02	0.00999324	0.94708553	0.04267388	0.00024735
X	Chromium	1950.4771	0.0121	2.500	36.45	7.24	0.07482	18.33970797	18.41432797	4.5699678	0.0012221	2.30E+01	1.03E-02	2.53E+00	6.31E-01	1.69E-04	3.18E+00	0.00324639	0.797881	0.19881944	5.3168E-05
X	Copper	489	0.01375	65.100	24.77	12.23	1.9431048	12.46136473	14.40446953	1.145727	0.00138875	1.56E+01	1.59E-01	1.02E+00	9.37E-02	1.14E-04	1.27E+00	0.12494577	0.80129225	0.07367268	8.93E-05
X	Lead	274.64279	0.0077	1.000	25.05	8.43	0.029848	12.6019716	12.6318198	0.8434881	0.0007777	1.33E+01	4.64E-03	1.96E+00	1.00E-01	1.21E-04	2.06E+00	0.00224825	0.94922345	0.04846971	5.8579E-05
X	Mercury	5.4245797	0.0001475	0	0.19	0.03	0	0.095610142	0.095610142	0.0127098	1.4898E-05	1.08E-01	0.00E+00	3.72E+00	4.94E-01	5.79E-04	4.21E+00	0	0.88254297	0.11731952	0.00013751

Table E.1-135. Maximum Exposure Calculations for Muskrat - Station UF

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 6	Reach 5																	
	Inorganics																				
X	Arsenic	127	0.0048714	0	6.69	0.05	0	3.368009064	3.368009064	0.1517561	0.00049202	3.52E+00	0.00E+00	6.14E+01	2.77E+00	8.97E-03	*6.42E+01*	0	0.95675085	0.04310938	0.00013977
	Chromium	545	0.0033175	0.200	10.18	7.24	0.0058698	5.124459475	5.130429075	1.276935	0.00033506	6.41E+00	8.25E-04	7.08E-01	1.76E-01	4.63E-05	*8.85E-01*	0.00093163	0.79973472	0.19928136	5.2291E-05
X	Copper	553	0.0068	40.550	28.01	12.23	1.2103364	14.09229999	15.30263639	1.295679	0.0006868	1.66E+01	9.89E-02	1.15E+00	1.06E-01	5.61E-05	*1.36E+00*	0.07291621	0.84898477	0.07805764	4.1376E-05
X	Lead	860	0.007092	0.213	78.43	6.43	0.0063427	39.46105973	39.46740243	2.01498	0.00071629	4.15E+01	9.86E-04	6.13E+00	3.13E-01	1.11E-04	*6.45E+00*	0.0001529	0.95125632	0.04857352	1.7267E-05
X	Mercury	2	0.000069	0	0.07	0.03	0	0.03525071	0.03525071	0.004686	6.969E-06	3.99E-02	0.00E+00	1.37E+00	1.82E-01	2.71E-04	*1.55E+00*	0	0.88251035	0.11731518	0.00017447

Table E.1-136. Maximum Exposure Calculations for Muskrat - Station WG

	Maximum Concentrations																				
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (s+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	262.814483	0.048325726	4.4000	13.84	0.05	0.1313312	6.96447212	7.09580332	0.313805924	0.004678898	7.41E+00	2.40E+00	1.27E+02	5.72E+00	8.53E-02	1.35E+02	0.01771326	0.93933119	0.04232448	0.00063107
X	Chromium	929.878287	0.058863979	1.0000	17.38	7.24	0.029848	8.743346048	8.773194048	2.178704825	0.005945262	1.10E+01	4.12E-03	1.21E+00	3.01E-01	8.21E-04	1.51E+00	0.00272389	0.7979075	0.19882605	0.00054256
X	Copper	626.935356	0.071238205	59.6000	31.75	12.23	1.7769408	15.97642153	17.75336233	1.468909538	0.007195059	1.92E+01	1.45E-01	1.31E+00	1.20E-01	5.88E-04	1.57E+00	0.09250157	0.83074378	0.07638052	0.00037413
X	Lead	520.811167	0.0759	0.5500	47.50	6.43	0.0164184	23.89739599	23.91381239	1.220260564	0.0076659	2.51E+01	2.55E-03	3.71E+00	1.90E-01	1.19E-03	3.91E+00	0.00065295	0.95050689	0.04853525	0.00030491
X	Mercury	2.95398618	0.00060956	0.0000	0.10	0.03	0	0.052065055	0.052065055	0.00692119	6.15655E-05	5.90E-02	0.00E+00	2.02E+00	2.69E-01	2.39E-03	2.29E+00	0	0.88174404	0.11721332	0.00104264

Table E.1-137. Maximum Exposure Calculations for Muskrat - Station WH

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	424	0.046325726	4.4000	22.35	0.05	0.1313312	11.24437672	11.37570792	0.50665032	0.004678698	1.19E+01	2.40E+00	2.05E+02	9.24E+00	8.53E-02	*2.17E+02*	0.01104827	0.94593803	0.04262209	0.00039361
X	Chromium	837.373887	0.058863979	1.0000	15.65	7.24	0.029848	7.873558969	7.903404969	1.961967016	0.005945262	9.87E+00	4.12E-03	1.09E+00	2.71E-01	8.21E-04	*1.36E+00*	0.00302371	0.79781969	0.19875433	0.00080228
X	Copper	572	0.071238205	59.6000	26.97	12.23	1.7789408	14.5764839	16.3554247	1.340196	0.007195059	1.77E+01	1.45E-01	1.19E+00	1.10E-01	5.88E-04	*1.45E+00*	0.10048914	0.82339918	0.07570524	0.00040644
X	Lead	1850.8782	0.0759	0.5500	188.79	6.43	0.0164164	84.92745937	84.94387577	4.336607614	0.0076659	8.93E+01	2.55E-03	1.32E+01	6.74E-01	1.19E-03	*1.39E+01*	0.00018386	0.9511618	0.04856868	8.5856E-05
	Mercury	0.70259545	0.00060956	0.0000	0.02	0.03	0	0.012383494	0.012383494	0.001846181	8.15655E-05	1.41E-02	0.00E+00	4.81E-01	6.40E-02	2.39E-03	*5.48E-01*	0	0.87680793	0.11682301	0.00436906

Table E.1-138. Maximum Exposure Calculations for Muskrat - Station WS

	Maximum Concentrations																				
	Compound	$C_{sediment}$ (mg/Kg)	C_{water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	226.437263	0.046325726	4.4000	11.93	0.05	0.1313312	6.005061054	6.136392254	0.270576679	0.004678898	6.41E+00	2.40E+00	1.10E+02	4.94E+00	8.53E-02	1.17E+02	0.02048322	0.93658623	0.0422008	0.00072975
X	Chromium	727.893898	0.058863979	1.0000	13.60	7.24	0.029848	6.844151899	6.873999899	1.705455404	0.005945262	8.59E+00	4.12E-03	9.46E-01	2.36E-01	8.21E-04	1.19E+00	0.0034766	0.79718492	0.19864599	0.00069249
X	Copper	414.080573	0.071238205	59.6000	20.97	12.23	1.7789408	10.55218675	12.33110855	0.970190783	0.007195059	1.33E+01	1.45E-01	8.63E-01	7.93E-02	5.88E-04	1.09E+00	0.1336696	0.79288984	0.07290013	0.00054084
X	Lead	366.801286	0.0759	0.5500	33.45	6.43	0.0184164	16.83086983	16.84707623	0.859415413	0.0076659	1.77E+01	2.55E-03	2.62E+00	1.34E-01	1.19E-03	2.75E+00	0.00092674	0.95012477	0.04851574	0.00043276
X	Mercury	1.36646947	0.00060956	0.0000	0.05	0.03	0	0.024084509	0.024084509	0.003201636	6.15655E-06	2.73E-02	0.00E+00	9.36E-01	1.24E-01	2.39E-03	1.06E+00	0	0.88067728	0.11707151	0.00225121

Table E.1-139. Maximum Exposure Calculations for Muskrat - Station WW

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Reach 1	Reach 1																	
	Inorganics																				
X	Arsenic	54.6	0.048325726	4.4000	2.88	0.05	0.1313312	1.4479787	1.5793099	0.065243178	0.004678898	1.65E+00	2.40E+00	2.64E+01	1.19E+00	8.53E-02	*3.01E+01*	0.07963173	0.87797152	0.03955973	0.00283702
X	Chromium	15472.3996	0.058863979	1.0000	289.14	7.24	0.029648	145.4819905	145.5116385	36.25183231	0.005945262	1.82E+02	4.12E-03	2.01E+01	5.01E+00	8.21E-04	*2.51E+01*	0.00016421	0.80036473	0.19943835	3.2708E-05
X	Copper	414.61725	0.071238205	59.6000	21.00	12.23	1.7789408	10.56584207	12.34478287	0.971448216	0.007195059	1.33E+01	1.45E-01	8.64E-01	7.94E-02	5.88E-04	*1.09E+00*	0.13351977	0.79302741	0.07291279	0.00054003
X	Lead	347.285088	0.0759	0.5500	31.67	6.43	0.0184164	15.93515998	15.95157638	0.81366896	0.0076659	1.68E+01	2.55E-03	2.48E+00	1.26E-01	1.19E-03	*2.61E+00*	0.00097874	0.95005219	0.04851203	0.00045704
	Mercury	1.19339372	0.00060956	0.0000	0.04	0.03	0	0.021033968	0.021033968	0.002796121	6.15655E-06	2.39E-02	0.00E+00	8.17E-01	1.09E-01	2.39E-03	*9.28E-01*	0	0.88038984	0.1170333	0.00257686

Table E.1-140. Maximum Exposure Calculations for Muskrat - Pond Reference

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Pond Ref	Pond Ref																	
	Inorganics																				
X	Arsenic	18.2874013	0.00115	0.0000	0.98	0.05	0	0.484977429	0.484977429	0.021852184	0.00011615	5.07E-01	0.00E+00	8.85E+00	3.99E-01	2.12E-03	9.25E+00	0	0.95666535	0.04310553	0.00022912
	Chromium	86.836256	0	0.1800	1.62	7.24	0.00537264	0.816493348	0.821865988	0.203457348	0	1.03E+00	7.42E-04	1.13E-01	2.81E-02	0.00E+00	1.42E-01	0.00523995	0.79632787	0.19843238	0
	Copper	50.8506686	0.0014	21.0000	3.08	12.23	0.626808	1.550679705	2.177487705	0.142573117	0.0001414	2.32E+00	5.12E-02	1.27E-01	1.17E-02	1.16E-05	1.90E-01	0.27015231	0.66833817	0.06144857	6.0943E-05
X	Lead	491.355174	0.00115	0.0000	44.81	6.43	0	22.54580914	22.54580914	1.151245172	0.00011615	2.37E+01	0.00E+00	3.50E+00	1.79E-01	1.81E-05	3.68E+00	0	0.95141355	0.04858155	4.9014E-06
	Mercury	0.29818025	0.000115	0.0000	0.01	0.03	0	0.005220282	0.005220282	0.00069395	0.000011615	5.93E-03	0.00E+00	2.03E-01	2.70E-02	4.51E-04	2.30E-01	0	0.88093427	0.11710567	0.00196006

Table E.1-141. Maximum Exposure Calculations for Muskrat - River Reference

	Maximum Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			River Ref	River Ref																	
	Inorganics																				
X	Arsenic	24.8031387	0.019270225	0.0000	1.31	0.05	0	0.657773198	0.657773198	0.029838015	0.001946293	6.89E-01	0.00E+00	1.20E+01	5.41E-01	3.55E-02	*1.26E+01*	0	0.95418298	0.04299368	0.00282334
	Chromium	512	0.012844476	0.1800	9.57	7.24	0.00537264	4.614171104	4.619543744	1.199618	0.001297292	8.02E+00	7.42E-04	6.65E-01	1.66E-01	1.79E-04	*8.32E-01*	0.0008924	0.79983549	0.19925863	0.00021548
	Copper	344	0.022229555	21.0000	17.42	12.23	0.626808	8.78627703	9.39308503	0.805992	0.002245185	1.02E+01	5.12E-02	7.17E-01	6.59E-02	1.84E-04	*8.34E-01*	0.0614438	0.85932753	0.07900858	0.00022009
X	Lead	224.954707	0.257642408	0.0000	20.51	6.43	0	10.3220362	10.3220362	0.527068879	0.026021883	1.09E+01	0.00E+00	1.60E+00	6.19E-02	4.04E-03	*1.69E+00*	0	0.94914167	0.04848554	0.00239279
	Mercury	0.42343578	9.85935E-05	0.0000	0.01	0.03	0	0.007463206	0.007463206	0.00099211	9.98525E-06	8.47E-03	0.00E+00	2.90E-01	3.86E-02	3.88E-04	*3.29E-01*	0	0.88182289	0.11719721	0.0011799

Table E.1-142. Maximum Exposure Calculations for Muskrat - Wetland Reference

	Maximum Concentrations																			
	Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	*TOTAL HQ*	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
			Wetland Ref	Wetland Ref																	
	Inorganics																				
X	Arsenic	32.7339343	0.0032	0.0000	1.73	0.05	0	0.868095965	0.868095965	0.03911476	0.0003232	9.08E-01	0.00E+00	1.58E+01	7.13E-01	5.90E-03	*1.66E+01*	0	0.95654382	0.04310006	0.00035613
	Chromium	410	0.00068	0.1800	7.66	7.24	0.00537264	3.855097954	3.860470694	0.96063	0.00008888	4.82E+00	7.42E-04	5.33E-01	1.33E-01	1.23E-05	*6.66E-01*	0.00111436	0.79961553	0.19925166	1.8435E-05
	Copper	93.4582662	0.0039	21.0000	4.73	12.23	0.626808	2.381630967	3.008438967	0.218972718	0.0003939	3.23E+00	5.12E-02	1.95E-01	1.79E-02	3.22E-05	*2.64E-01*	0.19419013	0.73784833	0.0678395	0.00012203
X	Lead	523.525895	0.0063	0.0000	47.74	6.43	0	24.02196117	24.02196117	1.226621172	0.0006363	2.52E+01	0.00E+00	3.73E+00	1.91E-01	9.89E-05	*3.92E+00*	0	0.95139424	0.04858056	2.5201E-05
	Mercury	0.71	0.00013	0.0000	0.02	0.03	0	0.012514002	0.012514002	0.00166353	0.00001313	1.42E-02	0.00E+00	4.86E-01	5.46E-02	5.10E-04	*5.51E-01*	0	0.88184785	0.11722709	0.00092526

Table E.1-143. Summary of Muskrat Station Sediment 95% UCL/Maximum Concentrations[1] for Selected Metals

PARAMETER	station 01 95% UCL/ Max Conc.	UCL ref	station 02 95% UCL/ Max Conc.	UCL ref	station 03 95% UCL/ Max Conc.	UCL ref	station 04 95% UCL/ Max Conc.	UCL ref	station 05 95% UCL/ Max Conc.	UCL ref	station 06 95% UCL/ Max Conc.	UCL ref	station 07 95% UCL/ Max Conc.	UCL ref	station 08 95% UCL/ Max Conc.	UCL ref	station 09 95% UCL/ Max Conc.	UCL ref	station 10 95% UCL/ Max Conc.	UCL ref	station 11 95% UCL/ Max Conc.	UCL ref	station 12 95% UCL/ Max Conc.	UCL ref	station 13 95% UCL/ Max Conc.	UCL ref
Units	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Arsenic	171	*15	56.4	*3	79.34062028	2	121.2731381	2	22.47113923	2	115.4290872	2	80.6453251	2	28.9	*1	34.86812163	2	1436.03032	2	473	*1	3200.079324	2	4210	*3
Chromium	66.85482133	13	103	*3	180.4004295	2	337.4527832	2	136.2940101	2	442	*3	239.370556	2	119	*1	58.89728161	2	2319.72986	2	900	*1	1033.195605	2	711.2515964	2
Copper	1250	*15	128	*3	171	*2	433.3722185	2	75.03646204	2	357.4768132	2	230.432421	2	133	*1	63.10422998	2	2303.59154	7	402	*1	1401.903422	2	1780.013326	2
Lead	384	*15	357.7861501	2	308.9062807	2	612.080586	2	568.5441386	2	442.4082608	2	340.239951	2	70.7	*1	43.61169845	2	814.073638	2	606	*1	861.1277361	2	1147.001784	2
Mercury	0.63	*15	0.37	*3	0.634645913	2	1.319816807	2	1.030152171	2	3.2	*3	2.47449091	3	1.0	*1	0.385183384	2	18.7486567	2	3.7	*1	44.8	*4	13.94880702	2

PARAMETER	station 14 95% UCL/ Max Conc.	UCL ref	station 15 95% UCL/ Max Conc.	UCL ref	station 16 95% UCL/ Max Conc.	UCL ref	station 18 95% UCL/ Max Conc.	UCL ref	station 19 95% UCL/ Max Conc.	UCL ref	station 20 95% UCL/ Max Conc.	UCL ref	station AM 95% UCL/ Max Conc.	UCL ref	station AS 95% UCL/ Max Conc.	UCL ref	station KFSF 95% UCL/ Max Conc.	UCL ref	station LP 95% UCL/ Max Conc.	UCL ref	station TT-2 95% UCL/ Max Conc	UCL ref	station TT-29 95% UCL/ Max Conc	UCL ref
Units	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Arsenic	73.4	*1	193	*2	13.6	*1	1105.387594	2	4250	*2	321	*2	121	*1	121	*1	52.12872203	2	148.675728	6	987	*1	1050	*1
Chromium	216	*1	483.2495845	2	38.4	*1	3018.886932	2	2333.002285	2	1832.780975	2	322	*1	918	*1	88.57580285	2	76.8324976	3	4240	*1	5500	*1
Copper	64.9	*1	469	*2	32.5	*1	1114.861816	2	1296.948448	2	1075	*2	197	*1	576	*1	110.9260916	2	367.415918	3	1330	*1	1340	*1
Lead	130	*1	150.6022639	2	15.4	*1	508.9365347	2	601.0979101	2	1200	*2	150	*1	661	*1	129.5961385	2	139.743721	3	657	*1	649	*1
Mercury	1.4	*1	1.3	*1	0.37	*1	5.764229061	2	6.14469113	2	3.3	*2	1.9	*1	3.1	*1	0.907897963	3	0.72800946	3	5	*1	13.3	*1

PARAMETER	station TT-30 95% UCL/ Max Conc.	UCL ref	station TT-31 95% UCL/ Max Conc.	UCL ref	station TT-32 95% UCL/ Max Conc.	UCL ref	station TT-33 95% UCL/ Max Conc.	UCL ref	station WW 95% UCL/ Max Conc.	UCL ref	lake no 03IP 95% UCL/ Max Conc.	UCL ref	station UF 95% UCL/ Max Conc.	UCL ref
Units	mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Arsenic	1052.474344	2	30.3	*1	403	*2	288	*2	54.6	*13	18.28740135	3	127	*1
Chromium	4813.596831	2	295	*1	699	*2	1950.477098	2	15472.39962	2	86.83625597	3	545	*1
Copper	3269.307871	2	181	*1	403	*2	489	*2	414.6172498	2	60.8506686	2	553	*1
Lead	640.3934483	2	332	*1	288	*2	274.6427908	2	347.2850875	2	491.3551737	3	860	*1
Mercury	89.2	*3	1.8	*1	4.3	*2	5.424579665	2	1.193393718	2	0.296180247	2	2.0	*1

UCL = Upper Confidence Limit

[1] The lesser value of the maximum detected concentration and the 95% UCL concentration, as used in the maximum exposure case calculations, is provided.

UCL References. * Maximum detected value is shown

1. Sample size too small/not enough distinct values
2. 95% Student's-t UCL
3. 95% Approximate Gamma UCL
4. 95% Adjusted Gamma UCL
5. 95% H-UCL
6. 95% Chebyshev (MVUE) UCL
7. 97.5% Chebyshev (MVUE) UCL
8. 99% Chebyshev (MVUE) UCL
9. 95% CLT UCL
10. 95% Adjusted-CLT UCL
11. 95% Modified-t UCL
12. 95% Jackknife UCL
13. 95% Chebyshev (Mean, Sd) UCL
14. 97.5% Chebyshev (Mean, Sd) UCL
15. 99% Chebyshev (Mean, Sd) UCL
16. 95% Standard Bootstrap UCL
17. 95% Bootstrap-t UCL
18. 95% Hall's Bootstrap UCL
19. 95% Percentile Bootstrap UCL
20. 95% BCA Bootstrap UCL

In the case that the 95% UCL reference displays a "1" indicating that the sample size was too small to calculate a 95% UCL (<4) or did not contain enough distinct observations, the maximum detected concentration, if available, is used in the 95% UCL HQ calculation.

APPENDIX E.2

ADDITIONAL FISH TISSUE COMPARISONS

TABLE E.2-1
COMPARISON OF COPC CONCENTRATIONS IN BROWN BULLHEAD TISSUE 3 TO REFERENCE SAMPLES AND TISSUE RESIDUE BENCHMARKS
REACH 3
WELLS G&H SUPERFUND SITE OU3

	Brown Bullhead - Fillet						Brown Bullhead - Offal													
Chemical of Potential Concern	Study Area Average Conc. mg/kg bw	Reference Average Conc. mg/kg bw	Ratio	Study Area (1) Average Conc. u g/g lipid	Reference Average Conc. u g/g lipid	Ratio	Study Area Average Conc. mg/kg bw	Reference Average Conc. mg/kg bw	Ratio	Study Area (1) Average Conc. u g/g lipid	Reference Average Conc. u g/g lipid	Ratio	Tissue Benchmark Conc. mg/kg	Species (2)	Effect	Endpoint	Fraction	Exposure Route	Life-Stage	Effect	ERED Reference ID (3)
SVOCs																					
Benzo(g,h,i)perylene	0.53	0.55	1.0	112	55	2.0	nd	nd		nd	nd		29.56	*Cyprinus carpio* (common carp)	Physiological	NOED	Liver	Injection	na	No significant increase in EROD enzyme and CYP 1A protein content	URS218
Pesticides																					
4,4'-DDD	0.0056	0.0035	1.6	1.2	0.39	3.2	0.019	0.0069	2.7	1.5	0.45	3.3	0.6	*Pimephales promelas* (fathead minnow)	Reproduction	LOED	Whole Body	Combined	Adult	Sig. different from control	JAW4
4,4'-DDE	0.0077	0.019	0.40	1.7	2.4	0.70	0.023	0.039	0.59	1.9	2.6	0.75	na								
4,4'-DDT	0.0016	0.0016	1.0	0.32	0.20	1.6	0.0027	0.0039	0.71	0.25	0.26	1.0	12.2	*Pimephales promelas* (fathead minnow)	Reproduction	NOED	Whole Body	Ingestion	Adult	Hatchability	JA219
Aldrin	0.00033	0.00082	0.40	0.073	0.10	0.72	0.0014	0.0020	0.70	0.13	0.14	1.0	na								
alpha-Chlordane	0.0056	0.00082	6.8	1.3	0.10	12.3	0.020	0.0020	10	1.6	0.14	12	na								
Aroclor-1248	0.0030	0.0079	0.38	0.67	1.0	0.67	0.013	0.020	0.67	1.2	1.3	0.90	3.7999 [a]	*Ictalurus punctatus* (channel catfish)	Growth	LOED	Brain	Ingestion	Immature	40% reduction in mean weight	URS104
Aroclor-1254	0.02	0.007	2.29	0.0003	0.0001	3.23	0.06	0.02	3.7	0.0006	0.0001	5.54	4,240	*Brachydanio rerio* (zerba fish)	Growth	NOED	Whole Body	Water	na	Weight	JA41
Aroclor-1260	0.031	0.071	0.43	6.8	8.0	0.85	0.088	0.14	0.65	7.9	8.7	0.90	3.7999 [a]	*Ictalurus punctatus* (channel catfish)	Growth	LOED	Brain	Ingestion	Immature	40% reduction in mean weight	URS104
beta-BHC	0.00031	0.00082	0.38	0.069	0.10	0.67	0.0013	0.0020	0.66	0.12	0.14	0.89	na								
delta-BHC	0.00045	0.00082	0.55	0.096	0.10	0.93	0.0015	0.0020	0.77	0.14	0.14	1.0	na								
Endosulfan I	0.00030	0.00082	0.37	0.068	0.10	0.66	0.0013	0.0020	0.66	0.12	0.14	0.89	na								
Endosulfan sulfate	0.00060	0.0016	0.38	0.13	0.20	0.67	0.0025	0.0039	0.66	0.23	0.26	0.89	na								
Endrin aldehyde	0.00073	0.0016	0.47	0.16	0.20	0.80	0.0049	0.0039	1.3	0.44	0.26	1.7	0.08	*Lepomis macrochirus* (bluegill)	Growth	NOED	Whole Body	Absorption	na	No increase in mortality	JA23
gamma-Chlordane	0.0035	0.00082	4.3	0.80	0.10	7.8	0.013	0.0020	6.3	0.98	0.14	7.2	na								
Inorganics																					
Aluminum	2.1	1.2	1.8				67	13	5.2				na								
Antimony	0.080	0.044	1.8				0.14	0.049	2.8				na								
Arsenic	0.14	0.042	3.4				1.2	0.046	27				0.52	*Lepomis macrochirus* (bluegill)	Mortality	NOED	Whole Body	Absorption	Immature	No effect on mortality	URS10
Barium	0.074	0.085	0.87				5.7	4.2	1.4				na								
Cadmium	0.011	0.0060	1.8				0.080	0.0068	12				0.9	*Cyprinodon variegatus* (sheepshead minnow)	Development	LOED	Whole Body	Absorption	Egg-embryo	Decreased time to hatch	URS198
Chromium	0.092	0.043	2.1				1.4	0.26	5.6				na								
Cobalt	0.029	0.020	1.5				0.15	0.022	6.6				na								
Copper	0.46	0.21	2.2				2.4	0.97	2.5				13	*Lepomis macrochirus* (bluegill)	Growth	LOED	Gill	Combined	Immature	Effect on growth - over 22 month period	JB5
Iron	8.7	18	0.50				306	329	0.93				na								
Lead	0.040	0.060	0.66				1.7	0.67	2.5				0.451	*Pimephales promelas* (fathead minnow)	Behavior	LOED	Brain	Absorption	Immature	Sig. reduction in feeding rate and ineffetive feeding behaviors	URS230
Manganese	0.12	0.30	0.39				3.4	36	0.10				na								
Mercury	0.037	0.044	0.85	8.9	5.3	1.7	0.038	0.018	2.1	3.8	1.2	3.2	0.135	*Perca flavescens* (yellow perch)	Growth	NOED	Whole Body	Combined	Adult	No effect after 2 years, tissue concentration after one year	URS232
Nickel	0.025	0.020	1.3				0.094	0.022	4.2				na								
Selenium	0.35	0.62	0.57				0.56	0.75	0.75				3	*Micropterus salmoides* (largemouth bass)	Mortality	NOED	Whole Body	Absorption	Immature	No effect on survivorship	URS160
Silver	0.019	0.016	1.2				0.078	0.018	4.4				0.12	*Lepomis macrochirus* (bluegill)	Mortality	NOED	Whole Body	Water	Juvenile	na	JA88
Zinc	5.9	6.2	1.0				31	22	1.4				na								

ERED - U.S. Army Corps of Engineers and U.S. Environmental Protection Agency Environmental Residue-Effects Database (last update - February 1998)
Conc. - concentration
ID - identification number
na - no test data available in the ERED database
NOED - no observed effect dose
LOED - lowest observed effect dose
nd - not detected in this data set
Ratio = study area average concentration divided by reference average concentration
(1) With exception of mercury, lipid normalized tissue concentrations were not calculated for inorganic COPCs because inorganics are not expected to preferentially concentrate in lipid material
(2) ERED database records of several freshwater fish were queried - members of Ictaluridae, Centrachidae, Cyprinadae, Percidae, and Esocidae.
(3) Citations for primary references are provided in the ERED database
(4) Value for Endrin
a Test involved PCBs, specific congeners not indicated

TABLE E.2-2
COMPARISON OF COPC CONCENTRATIONS IN BROWN BULLHEAD TISSUE TO TISSUE RESIDUE BENCHMARKS
REACH 6
WELLS G&H SUPERFUND SITE OU3

	Brown Bullhead - Fillet						Brown Bullhead - Offal													
Chemical of Potential Concern	Study Area Average Conc. mg/kg bw	Reference Average Conc. mg/kg bw	Ratio	Study Area(1) Average Conc. u g/g lipid	Reference Average Conc. u g/g lipid	Ratio	Study Area Average Conc. mg/kg bw	Reference Average Conc. mg/kg bw	Ratio	Study Area(1) Average Conc. u g/g lipid	Reference Average Conc. u g/g lipid	Ratio	Tissue Benchmark Conc. mg/kg	Species (2)	Effect	Endpoint	Fraction	Exposure Route	Life-Stage	Effect	ERED Reference ID (3)
SVOCs																					
Benzo(g,h,i)perylene	0.55	0.55	1.0	110	55	2.0	nd	nd		nd	nd		29.56	*Cyprinus carpio* (common carp)	Physiological	NOED	Liver	Injection	na	No significant increase in EROD enzyme and CYP 1A protein content.	URS218
Pesticides																					
4,4'-DDD	0.0040	0.0035	1.2	0.80	0.39	2.1	0.023	0.0069	3.3	1.2	0.45	2.5	0.6	*Pimephales promelas* (fathead minnow)	Reproduction	LOED	Whole Body	Combined	Adult	Sig. different from control	JAW4
4,4'-DDE	0.0061	0.019	0.32	1.2	2.4	0.51	0.033	0.039	0.86	1.7	2.6	0.64	na								
4,4'-DDT	0.00055	0.0016	0.35	0.11	0.20	0.55	0.0020	0.0039	0.51	0.098	0.26	0.37	12.2	*Pimephales promelas* (fathead minnow)	Reproduction	NOED	Whole Body	Ingestion	Adult	Hatchability	JA219
Aldrin	0.00028	0.00082	0.34	0.055	0.10	0.54	0.0010	0.0020	0.50	0.050	0.14	0.37	na								
alpha-Chlordane	0.0036	0.00082	4.4	0.72	0.10	7.0	0.019	0.0020	9.5	0.95	0.14	7.0	na								
Aroclor-1248	0.0079	0.0079	1.0	1.6	1.0	1.6	0.033	0.020	1.7	1.7	1.3	1.3	3.7999 [a]	*Ictalurus punctatus* (channel catfish)	Growth	LOED	Brain	Ingestion	Immature	40% reduction in mean weight	URS104
Aroclor-1254	0.02	0.007	2.17	0.0003	0.0001	2.94	0.08	0.02	4.6	0.0004	0.0001	3.92	4,240	*Brachydanio rerio* (zerba fish)	Growth	NOED	Whole Body	Water	na	Weight	JA41
Aroclor-1260	0.025	0.071	0.35	5.0	8.0	0.63	0.14	0.14	1.0	7.0	8.7	0.80	3.7999 [a]	*Ictalurus punctatus* (channel catfish)	Growth	LOED	Brain	Ingestion	Immature	40% reduction in mean weight	URS104
beta-BHC	0.00028	0.00082	0.34	0.055	0.10	0.54	0.0010	0.0020	0.50	0.050	0.14	0.37	na								
delta-BHC	0.00028	0.00082	0.34	0.055	0.10	0.54	0.0010	0.0020	0.50	0.050	0.14	0.37	na								
Endosulfan I	0.00038	0.00082	0.47	0.076	0.10	0.74	0.0020	0.0020	1.0	0.10	0.14	0.74	na								
Endosulfan sulfate	0.00055	0.0016	0.35	0.11	0.20	0.55	0.0020	0.0039	0.51	0.098	0.26	0.37	na								
Endrin aldehyde	0.00055	0.0016	0.35	0.11	0.20	0.55	0.0020	0.0039	0.51	0.098	0.26	0.37	0.08	*Lepomis macrochirus* (bluegill)	Growth	NOED	Whole Body	Absorption	na	No increase in mortality	JA23
gamma-Chlordane	0.0025	0.00082	3.1	0.50	0.10	4.9	0.014	0.0020	7.0	0.70	0.14	5.2	na								
Inorganics																					
Aluminum	1.3	1.2	1.1				4.9	13	0.4				na								
Antimony	0.050	0.044	1.1				0.049	0.049	1.0				na								
Arsenic	0.17	0.042	4.07				0.096	0.046	2.10				0.52	*Lepomis macrochirus* (bluegill)	Mortality	NOED	Whole Body	Absorption	Immature	No effect on mortality	URS10
Barium	0.080	0.085	0.9				1.2	4.2	0.3				na								
Cadmium	0.023	0.0060	3.8				0.017	0.0068	2.5				0.9	*Cyprinodon variegatus* (sheepshead minnow)	Development	LOED	Whole Body	Absorption	Egg-embryo	Decreased time to hatch	URS198
Chromium	0.097	0.043	2.3				0.38	0.26	1.5				na								
Cobalt	0.054	0.020	2.7				0.023	0.022	1.01				na								
Copper	0.80	0.21	3.9				0.71	0.97	0.74				13	*Lepomis macrochirus* (bluegill)	Growth	LOED	Gill	Combined	Immature	Effect on growth - over 22 month period	JB5
Iron	44	18	2				181	329	0.55				na								
Lead	2.3	0.060	38.3				0.26	0.67	0.39				0.451	*Pimephales promelas* (fathead minnow)	Behavior	LOED	Brain	Absorption	Immature	Sig. reduction in feeding rate and ineffetive feeding behaviors	URS230
Manganese	1.5	0.30	4.79				6.6	36	0.19				na								
Mercury	0.018	0.044	0.4	3.6	5.3	0.68	0.0092	0.018	0.5	0.46	1.2	0.39	0.135	*Perca flavescens* (yellow perch)	Growth	NOED	Whole Body	Combined	Adult	No effect after 2 years, tissue concentration after one year	URS232
Nickel	0.023	0.020	1.15				0.023	0.022	1.01				na								
Selenium	0.45	0.62	0.7				0.52	0.75	0.7				3	*Micropterus salmoides* (largemouth bass)	Mortality	NOED	Whole Body	Absorption	Immature	No effect on survivorship	URS160
Silver	0.019	0.016	1.2				0.018	0.018	1.0				0.12	*Lepomis macrochirus* (bluegill)	Mortality	NOED	Whole Body	Water	Juvenile	na	JA88
Zinc	6.9	6.2	1.1				22	22	1.0				na								

ERED - U.S. Army Corps of Engineers and U.S. Environmental Protection Agency Environmental Residue-Effects Database (last update - February 1998)
Conc. - concentration
ID - identification number
na - no test data available in the ERED database
NOED - no observed effect dose
LOED - lowest observed effect dose
nd - not detected in this data set
Ratio = study area average concentration divided by reference average concentration
(1) With exception of mercury, lipid normalized tissue concentrations were not calculated for inorganic COPCs because inorganics are not expected to preferentially concentrate in lipid material
(2) ERED database records of several freshwater fish were queried - members of Ictaluridae, Centrachidae, Cyprinadae, Percidae, and Esocidae.
(3) Citations for primary references are provided in the ERED database
(4) Value for Endrin
a Test involved PCBs, specific congeners not indicated

TABLE E.2-3
COMPARISON OF COPC CONCENTRATIONS IN EEL TISSUE TO TISSUE RESIDUE BENCHMARKS
REACH 6
WELLS G&H SUPERFUND SITE OU3

	Eel - Whole Body														
Chemical of Potential Concern	Study Area Average Conc. mg/kg bw	Reference Average Conc. mg/kg bw	Ratio	Study Area (1) Average Conc. u g/g lipid	Reference Average Conc. u g/g lipid	Ratio	Tissue Benchmark Conc. mg/kg	Species (2)	Effect	Endpoint	Fraction	Exposure Route	Life-Stage	Effect	ERED Reference ID (3)
SVOCs															
Benzo(g,h,i)perylene	1.9	2.2	0.86	35	32	1.1	29.56	*Cyprinus carpio* (common carp)	Physiological	NOED	Liver	Injection	na	No significant increase in EROD enzyme and CYP 1A protein content	URS218
Pesticides															
4,4'-DDD	0.17	0.012	14	1.9	0.16	12	0.6	*Pimephales promelas* (fathead minnow)	Reproduction	LOED	Whole Body	Combined	Adult	Sig. different from control	JAW4
4,4'-DDE	0.35	0.075	4.6	4.3	1.1	3.9	na								
4,4'-DDT	0.026	0.0043	6.1	0.32	0.059	5.3	12.2	*Pimephales promelas* (fathead minnow)	Reproduction	NOED	Whole Body	Ingestion	Adult	Hatchability	JA219
Aldrin	0.0014	0.0010	1.3	0.016	0.013	1.2	na								
alpha-Chlordane	0.053	0.0023	23	0.64	0.027	23	na								
Aroclor-1248	0.013	0.010	1.3	0.15	0.13	1.2	3.7999 *	*Ictalurus punctatus* (channel catfish)	Growth	LOED	Brain	Ingestion	Immature	40% reduction in mean weight	URS104
Aroclor-1254	0.15	0.01	14.9	0.0002	0.00001	15.6	4,240	*Brachydonio rerio* (zerba fish)	Growth	NOED	Whole Body	Water	na	Weight	JA41
Aroclor-1260	0.53	0.11	4.9	6.7	1.6	4.2	3.7999 *	*Ictalurus punctatus* (channel catfish)	Growth	LOED	Brain	Ingestion	Immature	40% reduction in mean weight	URS104
beta-BHC	0.0014	0.0010	1.4	0.016	0.013	1.3	na								
delta-BHC	0.0013	0.0010	1.2	0.015	0.013	1.2	na								
Endosulfan I	0.0013	0.0010	1.3	0.015	0.013	1.2	na								
Endosulfan sulfate	0.0041	0.0021	2.0	0.046	0.026	1.8	na								
Endrin aldehyde	0.0071	0.0022	3.3	0.084	0.029	2.9	0.08	*Lepomis macrochirus* (bluegill)	Growth	NOED	Whole Body	Absorption	na	No increase in mortality	JA23
gamma-Chlordane	0.017	0.0011	15	0.21	0.014	16	na								
Inorganics															
Aluminum	1.6	3.0	0.53				na								
Antimony	0.051	0.050	1.0				na								
Arsenic	0.047	0.048	1.0				0.52	*Lepomis macrochirus* (bluegill)	Mortality	NOED	Whole Body	Absorption	Immature	No effect on mortality	URS10
Barium	0.21	0.26	0.82				na								
Cadmium	0.021	0.030	0.70				0.9	*Cyprinodon variegatus* (sheepshead minnow)	Development	LOED	Whole Body	Absorption	Egg-embryo	Decreased time to hatch	URS198
Chromium	0.083	0.098	0.9				na								
Cobalt	0.022	0.023	1.0				na								
Copper	0.42	0.40	1.04				13	*Lepomis macrochirus* (bluegill)	Growth	LOED	Gill	Combined	Immature	Effect on growth - over 22 month period	JB5
Iron	24	37	0.6				na								
Lead	0.26	0.082	3.19				0.451	*Pimephales promelas* (fathead minnow)	Behavior	LOED	Brain	Absorption	Immature	Sig. reduction in feeding rate and ineffetive feeding behaviors	URS230
Manganese	2.2	3.0	0.75				na								
Mercury	0.050	0.23	0.21	0.69	3.7	0.19	0.135	*Perca flavescens* (yellow perch)	Growth	NOED	Whole Body	Combined	Adult	No effect after 2 years, tissue concentration after one year	URS232
Nickel	0.029	0.034	0.9				na								
Selenium	0.82	0.78	1.0				3	*Micropterus salmoides* (largemouth bass)	Mortality	NOED	Whole Body	Absorption	Immature	No effect on survivorship	URS160
Silver	0.022	0.018	1.2				0.12	*Lepomis macrochirus* (bluegill)	Mortality	NOED	Whole Body	Water	Juvenile	na	JA88
Zinc	28	27	1.0				na								

ERED - U.S. Army Corps of Engineers and U.S. Environmental Protection Agency Environmental Residue-Effects Database (last update - February 1998)
Conc. - concentration
ID - identification number
na - *no* test data available in the ERED database
NOED - no observed effect dose
LOED - lowest observed effect dose
nd - not detected in this data set
Ratio = study area average concentration divided by reference average concentration
(1) With exception of mercury, lipid normalized tissue concentrations were not calculated for inorganic COPCs because inorganics are not expected to preferentially concentrate in lipid material
(2) ERED database records of several freshwater fish were queried - members of Ictaluridae, Centrachidae, Cyprinadae, Percidae, and Esocidae.
(3) Citations for primary references are provided in the ERED database
(4) Value for Endrin
a Test involved PCBs, specific congeners not indicated

APPENDIX E.3

TOXICITY REFERENCE VALUES

TABLE E.3-1

COMPARISON OF TOXICITY REFERENCE VALUES FOR MUSKRAT

WELLS G&H SUPERFUND SITE OU3

Chemical of Potential Concern [1]	Test Species	Body Weight (kg) [2]	Exposure Route and Duration Class	Duration	System	Test TRV mg/kg - d [3]	Test TRV Type	Source [4]	Wildlife TRV (mg/kg-d) [5,6]
Arsenic									
Arsenite	mouse	0.03	oral in water (chronic)	3 gen	reproductive	1.26	LOAEL	Sample et al., 1996	0.55
Arsenate	mouse	0.03	oral in water (chronic)	26 months	tumors	0.07	LOAEL	Eisler, 2000	0.03
Arsenite	mouse	0.03	oral (chronic)	2 yr	growth	1	LOAEL	Eisler, 2000	0.44
Arsenite	rat	0.35	oral in water (subchronic)	6 wk	serum uric acid	1.2	LOAEL	Eisler, 2000	0.96
Arsenate	rat	0.35	oral in diet (subchronic)	10 wk	serum uric acid	50	LOAEL	Eisler, 2000	4.02
Asrenic trioxide	rat	0.35	oral in diet (subchronic)	21 d	systemic	50	LOAEL	Eisler, 2000	4.02
Asrenic trioxide	rat	0.35	single oral dose	96h	mortality	15.1	LD50*	Eisler, 2000	1.21
Arsenite	rat	0.35	oral (subchronic)	23 d	growth	8	NOAEL	ATSDR, 2000	0.64
Arsenite	rat	0.35	oral (chronic)	2 yr	growth	4	LOAEL	ATSDR, 2000	0.32
Arsenate	rat	0.35	oral (chronic)	2 yr	growth	2	LOAEL	ATSDR, 2000	0.16
Arsenate	rat	0.35	oral (chronic)	27 months	growth	7	LOAEL	ATSDR, 2000	0.56
Arsenate	rat	0.35	oral (chronic)	27 months	growth	30	LOAEL	ATSDR, 2000	2.41
Arsenite	cotton rat	1.20	oral in water(intermediate)	6 wk	systemic, immune	5	LOAEL	Eisler, 2000	0.55
Cadmium									
Cadmium chloride	rat	0.30	oral gavage (chronic)	6 wk	reproductive	1.0	NOAEL	Sample et al., 1996	0.78
Cadmium chloride	rat	0.30	oral gavage (chronic)	6 wk	reproductive	10.0	LOAEL	Sample et al., 1996	7.76
Cadmium chloride	rat	0.35	oral in water (subchronic)	14 wk	reproductive	40	LOAEL	ATSDR, 1999	32.17
Cadmium chloride	rat	0.35	oral in water (subchronic)	12 wk	reproductive	8.58	LOAEL	ATSDR, 1999	6.90
Cadmium chloride	rat	0.35	oral in water (subchronic)	14 wk	reproductive	5.8	LOAEL	ATSDR, 1999	4.66
Cadmium chloride	rat	0.35	oral in water (subchronic)	14 wk	reproductive	11.6	LOAEL	ATSDR, 1999	9.33
Cadmium acetate	rat	0.35	oral in water (subchronic)	120 d	reproductive	12.6	LOAEL	ATSDR, 1999	10.13
Cadmium chloride	mouse	0.03	oral in water (chronic)	6 months	reproductive	2.5	LOAEL	ATSDR, 1999	1.09
Chromium									
Chromium oxide (Cr III)	rat	0.35	oral in food (subchronic)	90 d and 2 yr	reproductive	2737.00	NOAEL	Sample, 1996	2200.95
Chromium Chloride (Cr III)	rat	0.35	oral in food (subchronic)	20 weeks	systemic	9.00	NOAEL	ATSDR, 2000	7.24
Chromium Chloride (Cr III)	rat	0.35	oral in water (subchronic)	12 weeks	reproductive	40.00	LOAEL	ATSDR, 2000	32.17
Chromium Chloride (Cr III)	mouse	0.03	oral in water (subchronic)	12 weeks	reproductive	5.00	LOAEL	ATSDR, 2000	2.18
Chromium sulfate (Cr III)	mouse	0.03	oral in food (subchronic)	7 wk	reproductive	9.10	LOAEL	ATSDR, 2000	3.96
Potassium dichromate (Cr VI)	rat	0.35	oral in water (chronic)	1 yr		3.28	NOAEL	Sample, 1996	2.64
Potassium dichromate (Cr VI)	rat	0.35	oral in food (subchronic)	20 d	reproductive	37	LOAEL	ATSDR, 2000	29.75
Potassium dichromate (Cr VI)	rat	0.35	oral in food (subchronic)	3 months	reproductive	45	LOAEL	ATSDR, 2000	36.19
Potassium dichromate (Cr VI)	rat	0.35	oral in water (subchronic)	12 wk	reproductive	42	LOAEL	ATSDR, 2000	33.77
Potassium dichromate (Cr VI)	rat	0.35	oral in water (subchronic)	90 d	reproductive	20	LOAEL	ATSDR, 2000	16.08
Potassium dichromate (Cr VI)	mouse	0.03	oral in water (subchronic)	12 weeks	reproductive	6.00	LOAEL	ATSDR, 2000	2.61
Potassium dichromate (Cr VI)	mouse	0.03	oral in water (subchronic)	20 d	reproductive	52.00	LOAEL	ATSDR, 2000	22.63
Potassium dichromate (Cr VI)	mouse	0.03	oral in water (subchronic)	20 d	reproductive	60.00	LOAEL	ATSDR, 2000	26.11
Potassium dichromate (Cr VI)	mouse	0.03	oral in water (subchronic)	19 d	reproductive	46.00	LOAEL	ATSDR, 2000	20.02
Potassium dichromate (Cr VI)	mouse	0.03	oral in food (subchronic)	7 wk	reproductive	15.20	LOAEL	ATSDR, 2000	6.61
Cr VI (form unknown)	rat	0.35	oral in food (subchronic)	3 months	mortality	80.00	LOAEL	Eisler, 2000	64.33
Copper									
Copper sulfate	mink	1.0	oral in diet (chronic)	357 d	reproductive	11.7	NOAEL	Sample et al., 1996	12.23
Copper sulfate	mink	1.0	oral in diet (chronic)	357 d	reproductive	15.1	LOAEL	Sample et al., 1996	15.83
Copper acetate	rat	0.35	oral in diet (chronic)	60-73 d	reproductive	130.0	LOAEL	ATSDR, 2002	104.54
Copper gluconate	mouse	0.03	oral in water (chronic)	850 d	life span	4.2	LOAEL	ATSDR, 2002	1.83
Lead									
Lead acetate	rat	0.35	oral in diet (chronic)	3 gen	reproductive	8.0	NOAEL	Sample et al., 1996	6.43
Lead acetate	rat	0.35	oral in diet (chronic)	3 gen	reproductive	80.0	LOAEL	Sample et al., 1996	64.33
Lead (form unknown)	rat	0.35	oral in water (subchronic)	6-7 wk	reproductive	0.3	LOAEL	Eisler, 2000	0.27
Lead (form unknown)	rat	0.35	oral in diet (subchronic)	3 wk	mortality	200.0	LOAEL	Eisler, 2000	160.83
Lead (form unknown)	rat	0.35	oral in water (chronic)	life time	mortality	0.1	LOAEL	Eisler, 2000	0.06
Lead (form unknown)	rat	0.35	oral in diet (subchronic)	130 d	reproductive	52.6	LOAEL	Eisler, 2000	42.30
Lead acetate	rat	0.35	oral in water (subchronic)	14 - 50 d	reproductive	502.0	LOAEL	ATSDR, 1999	403.68
Lead acetate	rat	0.35	oral in water (subchronic)	60 d	reproductive	90.0	LOAEL	ATSDR, 1999	72.37
Lead acetate	rat	0.35	oral in diet (subchronic)	30 d	reproductive	0.3	LOAEL	ATSDR, 1999	0.24
Lead acetate	mouse	0.03	oral in water (subchronic)	11 wk	reproductive	10.5	LOAEL	Eisler, 2000	4.57
Lead (form unknown)	mouse	0.03	oral in water (subchronic)	9 months	reproductive	13.1	NOAEL	Eisler, 2000	5.70
Lead acetate	mouse	0.03	oral in water (chronic)	multi-gen	mortality	605.0	NOAEL	ATSDR, 1999	263.24
Lead acetate	mouse	0.03	oral in water (subchronic)	12 wk	reproductive	141.0	NOAEL	ATSDR, 1999	61.35
Lead acetate	cotton rat	1.20	oral in water (subchronic)	7-13 wk	immune, systemic	0.1	LOAEL	Eisler, 2000	0.14

TABLE E.3-1

COMPARISON OF TOXICITY REFERENCE VALUES FOR MUSKRAT

WELLS G&H SUPERFUND SITE OU3

Chemical of Potential Concern [1]	Test Species	Body Weight (kg) [2]	Exposure Route and Duration Class	Duration	System	Test TRV mg/kg - d [3]	Test TRV Type	Source [4]	Wildlife TRV (mg/kg-d) [5,6]
Mercury									
Methyl mercury chloride	rat	0.35	oral in diet (chronic)	3 gen	reproductive	0.032	NOAEL	Sample et al., 1996	0.03
Methyl mercury chloride	rat	0.35	oral in diet (chronic)	3 gen	reproductive	0.16	LOAEL	Sample et al., 1996	0.13
Mercuric sulfide	mouse	0.03	oral in diet (chronic)	20 months	reproductive, systemic	13.2	NOAEL	Sample et al., 1996	5.74
Mercuric chloride	mink	1.0	oral in diet (chronic)	6 months	reproductive	1.0	NOAEL	Sample et al., 1996	1.05
Methyl mercury chloride	mink	1.0	oral in diet (subchronic)	93 d	mortality, growth	0.15	NOAEL	Sample et al., 1996	0.16
Methyl mercury chloride	mink	1.0	oral in diet (subchronic)	93 d	mortality, growth	0.25	LOAEL	Sample et al., 1996	0.26

d - day

wk - week

gen - generations

UF - Uncertainty Factor

COPC - Chemical of Potential Concern

TRV - Reference Toxicity Value

NOAEL - No Observed Adverse Effect Level

LOAEL - Lowest Observed Adverse Effect Level

1 COPC or COPC and analyte/compound used in toxicological testing

2 Body weight for mouse and rat based on USEPA (1985b *cited in* Sample *et al.*, 1996), other body weights are actual body weights of animals used in test

3 TRV s for studies in which dose was administered five times per week were multiplied for a factor of 0.7.

4 Documents cited are review documents (i.e., secondary sources). Citations for primary sources may be obtained from these documents.

5 The bold values were selected for use in calculating LOAEL HQ's

6 Test NOAELs and LOAELs were adjusted for wildlife species body weight using the following equation: $NOAEL_{wildlife} = NOAEL_{test} * (BW_{test}/BW_{wildlife})^{0.25}$ (Sample *et al.*, 1996)

a An LD_{50} was divided by 10 to obtain a LOAEL

TABLE E.3-2

COMPARISON OF TOXICITY REFERENCE VALUES FOR MALLARD

WELLS G&H SUPERFUND SITE OU3

Chemical of Potential Concern [1]	Test Species	Body Weight (kg) [2]	Exposure Route and Duration Class	Duration	System	Test TRV mg/kg - d [3]	Test TRV Type	Source [7]	Wildlife TRV (mg/kg-d) [8]
Antimony									
Potassium tartrate	rat	0.35	oral in water (subchronic)	lifetime, >1 year	lifespan	0.26	LOAEL	ATSDR, 1992	0.26
Potassium tartrate	mouse	0.03	oral in water (chronic)	lifetime, >1 year	lifespan	1.25	LOAEL	Sample et al., 1996	**1.25**
Potassium tartrate	mouse	0.03	oral in water (chronic)	lifetime, >1 year	lifespan	0.35	LOAEL	ATSDR, 1992	0.35
Arsenic									
Sodium arsenite	mallard	1.00	oral in diet (chronic)	128 d	mortality	5.14	NOAEL	Sample et al., 1996	5.14
Sodium arsenite	mallard	1.00	oral in diet (chronic)	128 d	mortality	12.84	LOAEL	Sample et al., 1996	**12.84**
Sodium arsenate	mallard	1.00	oral in diet (subchronic)	10 wk	growth	3	LOAEL	Camardese et al., 1990	3.00
Sodium arsenate	mallard	1.00	oral in diet (subchronic)	4 wk	growth	20	LOAEL	Eisler, 2000	20.00
Copper acetoarsentie	Brown-headed cowbird	0.05	oral in diet (chronic)	7 months	morality	7.38	LOAEL	Sample et al., 1996	7.38
Chromium									
Chromic potassium sulfate (Cr III)	black duck	1.25	oral in diet (chronic)	10 months	reproductive	1.0	NOAEL	Sample et al., 1996	1.00
Chromic potassium sulfate (Cr III)	black duck	1.25	oral in diet (chronic)	10 months	reproductive	5.0	LOAEL	Sample et al., 1996	**5.00**
Chromium VI (form unknown)	chickens	1.50	oral in diet (subchronic)	32 d	growth	7.1	NOAEL	Eisler, 2000	7.07
Lead									
Lead acetate	Japanese quail	0.15	oral in diet (chronic)	12 wk	reproductive	1.1	NOAEL	Sample et al., 1996	1.13
Lead acetate	Japanese quail	0.15	oral in diet (chronic)	12 wk	reproductive	11.3	LOAEL	Sample et al., 1996	**11.30**
metallic	American kestrel	0.13	oral in diet (chronic)	7 months	reproductive	3.9	NOAEL	Sample et al., 1996	3.85
Lead nitrate	mallard	1.00	oral in diet (chronic)	12 wk	systemic, mortality	2.5	NOAEL	Eisler, 2000	2.50
Total lead, sediment	mallard	1.00	oral in diet (chronic)	15 wk	mortality	960.0	LOAEL	Eisler, 2000	960
Mercury									
Methyl mercury dicyandiamide	mallard	1.00	oral in diet (chronic)	3 gen	reproductive	0.064	LOAEL	Sample et al., 1996	**0.06**
methly mercury	mallard	1.00	oral in diet (chronic)	2 gen	reproductive	3.0	LOAEL	Eisler, 2000	3.00

d - day

wk - week

gen - generations

UF - Uncertainty Factor

COPC - Chemical of Potential Concern

TRV - Reference Toxicity Value

NOAEL - No Observed Adverse Effect Level

LOAEL - Lowest Observed Adverse Effect Level

1 COPC or COPC and analyte/compound used in toxicological testing

2 Body weight for mouse and rat based on USEPA (1985b *cited in* Sample *et al*., 1996), other body weights are actual body weights of animals used in test

3 Lowest carcinogenic LOAEL from PAH toxicological data summarized in ATSDR, 1995b; test used benzo(a)pyrene. USEPA has classified benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, chrysene, and indeno(1,2,3-cd)pyrene as carcinogens (ATSDR, 1995b).

4 Lowest non-carcinogenic NOAEL from PAH toxicological data summarized in ATSDR (1995b); test used benzo(a)pyrene. USEPA has indicated that acenaphthylene, anthracene, benzo(g,h,i)perylene, fluoranthene, fluorene, phenanthrene and pyrene are not classifiable as carcinogens (ATSDR, 1995b). Carbazole and dibenzofuran were included in this group for the development of HQs.

5 TRV s for studies in which dose was administered five times per week were multiplied for a factor of 0.7.

6 LOAELs were divided by a UF of 10 to obtain NOAELs.

conversion and 10 for the LOAEL to NOAEL conversion)

7 Documents cited are review documents (i.e., secondary sources). Citations for primary sources may be obtained from these documents.

8 Test NOAELs from test species were not adjusted for body weight of mallard (Sample et al., 1996).

TABLE E.3-3

COMPARISON OF TOXICITY REFERENCE VALUES FOR SHREW

WELLS G&H SUPERFUND SITE OU3

Chemical of Potential Concern [1]	Test Species	Body Weight (kg) [2]	Exposure Route and Duration Class	Duration	System	Test TRV mg/kg - d [3]	Test TRV Type	Source [4]	Wildlife TRV (mg/kg-d) [5,6]
Aroclor 1254									
Aroclor 1254	mouse	0.03	oral in diet (chronic)	12 months	reproductive	0.7	LOAEL	Sample et al., 1996	**0.81**
Antimony									
Antimony potassium tartrate	mouse	0.03	oral in water (chronic)	lifetime, >1 year	lifespan	1.25	LOAEL	Sample et al., 1996	**1.49**
Arsenic									
Arsenite	mouse	0.03	oral in water (chronic)	3 gen	reproductive	1.26	LOAEL	Sample et al., 1996	**1.50**
Arsenate	mouse	0.03	oral in water (chronic)	26 months	tumors	0.07	LOAEL	Eisler, 2000	0.08
Arsenite	mouse	0.03	oral (chronic)	2 yr	growth	1	LOAEL	Eisler, 2000	1.19
Arsenite	rat	0.35	oral in water (subchronic)	6 wk	serum uric acid	1.2	LOAEL	Eisler, 2000	2.64
Arsenate	rat	0.35	oral in diet (subchronic)	10 wk	serum uric acid	50	LOAEL	Eisler, 2000	109.89
Asrenic trioxide	rat	0.35	oral in diet (subchronic)	21 d	systemic	50	LOAEL	Eisler, 2000	109.89
Asrenic trioxide	rat	0.35	single oral dose	96h	mortality	15.1	LD50*	Eisler, 2000	33.19
Arsenite	rat	0.35	oral (subchronic)	23 d	growth	8	NOAEL	ATSDR, 2000	17.58
Arsenite	rat	0.35	oral (chronic)	2 yr	growth	4	LOAEL	ATSDR, 2000	8.79
Arsenate	rat	0.35	oral (chronic)	2 yr	growth	2	LOAEL	ATSDR, 2000	4.40
Arsenate	rat	0.35	oral (chronic)	27 months	growth	7	LOAEL	ATSDR, 2000	15.38
Arsenate	rat	0.35	oral (chronic)	27 months	growth	30	LOAEL	ATSDR, 2000	65.93
Arsenite	cotton rat	1.20	oral in water(intermediate)	6 wk	systemic, immune	5	LOAEL	Eisler, 2000	14.95
Cadmium									
Cadmium chloride	rat	0.30	oral gavage (chronic)	6 wk	reproductive	1.0	NOAEL	Sample et al., 1996	2.12
Cadmium chloride	rat	0.30	oral gavage (chronic)	6 wk	reproductive	10.0	LOAEL	Sample et al., 1996	**21.20**
Cadmium chloride	rat	0.35	oral in water (subchronic)	14 wk	reproductive	40	LOAEL	ATSDR, 1999	87.91
Cadmium chloride	rat	0.35	oral in water (subchronic)	12 wk	reproductive	8.58	LOAEL	ATSDR, 1999	18.86
Cadmium chloride	rat	0.35	oral in water (subchronic)	14 wk	reproductive	5.8	LOAEL	ATSDR, 1999	12.75
Cadmium chloride	rat	0.35	oral in water (subchronic)	14 wk	reproductive	11.6	LOAEL	ATSDR, 1999	25.49
Cadmium acetate	rat	0.35	oral in water (subchronic)	120 d	reproductive	12.6	LOAEL	ATSDR, 1999	27.69
Cadmium chloride	mouse	0.03	oral in water (chronic)	6 months	reproductive	2.5	LOAEL	ATSDR, 1999	2.97
Chromium									
Chromium oxide (Cr III)	rat	0.35	oral in food (subchronic)	90 d and 2 yr	reproductive	2737.00	NOAEL	Sample, 1996	6015.46
Chromium Chloride (Cr III)	rat	0.35	oral in food (subchronic)	20 weeks	systemic	9.00	NOAEL	ATSDR, 2000	19.78
Chromium Chloride (Cr III)	rat	0.35	oral in water (subchronic)	12 weeks	reproductive	40.00	LOAEL	ATSDR, 2000	**87.91**
Chromium Chloride (Cr III)	mouse	0.03	oral in water (subchronic)	12 weeks	reproductive	5.00	LOAEL	ATSDR, 2000	5.95
Chromium sulfate (Cr III)	mouse	0.03	oral in food (subchronic)	7 wk	reproductive	9.10	LOAEL	ATSDR, 2000	10.82
Potassium dichromate (Cr VI)	rat	0.35	oral in water (chronic)	1 yr		3.28	NOAEL	Sample, 1996	7.21
Potassium dichromate (Cr VI)	rat	0.35	oral in food (subchronic)	20 d	reproductive	37	LOAEL	ATSDR, 2000	81.32
Potassium dichromate (Cr VI)	rat	0.35	oral in food (subchronic)	3 months	reproductive	45	LOAEL	ATSDR, 2000	98.90
Potassium dichromate (Cr VI)	rat	0.35	oral in water (subchronic)	12 wk	reproductive	42	LOAEL	ATSDR, 2000	92.31
Potassium dichromate (Cr VI)	rat	0.35	oral in water (subchronic)	90 d	reproductive	20	LOAEL	ATSDR, 2000	43.96
Potassium dichromate (Cr VI)	mouse	0.03	oral in water (subchronic)	12 weeks	reproductive	6.00	LOAEL	ATSDR, 2000	7.14
Potassium dichromate (Cr VI)	mouse	0.03	oral in water (subchronic)	20 d	reproductive	52.00	LOAEL	ATSDR, 2000	61.84
Potassium dichromate (Cr VI)	mouse	0.03	oral in water (subchronic)	20 d	reproductive	60.00	LOAEL	ATSDR, 2000	71.35
Potassium dichromate (Cr VI)	mouse	0.03	oral in water (subchronic)	19 d	reproductive	46.00	LOAEL	ATSDR, 2000	54.70
Potassium dichromate (Cr VI)	mouse	0.03	oral in food (subchronic)	7 wk	reproductive	15.20	LOAEL	ATSDR, 2000	18.08
Cr VI (form unknown)	rat	0.35	oral in food (subchronic)	3 months	mortality	80.00	LOAEL	Eisler, 2000	175.83
Lead									
Lead acetate	rat	0.35	oral in diet (chronic)	3 gen	reproductive	8.0	NOAEL	Sample et al., 1996	17.58
Lead acetate	rat	0.35	oral in diet (chronic)	3 gen	reproductive	80.0	LOAEL	Sample et al., 1996	**175.83**
Lead (form unknown)	rat	0.35	oral in water (subchronic)	6-7 wk	reproductive	0.3	LOAEL	Eisler, 2000	0.73
Lead (form unknown)	rat	0.35	oral in diet (subchronic)	3 wk	mortality	200.0	LOAEL	Eisler, 2000	439.57
Lead (form unknown)	rat	0.35	oral in water (chronic)	life time	mortality	0.1	LOAEL	Eisler, 2000	0.15
Lead (form unknown)	rat	0.35	oral in diet (subchronic)	130 d	reproductive	52.6	LOAEL	Eisler, 2000	115.61
Lead acetate	rat	0.35	oral in water (subchronic)	14 - 50 d	reproductive	502.0	LOAEL	ATSDR, 1999	1103.31
Lead acetate	rat	0.35	oral in water (subchronic)	60 d	reproductive	90.0	LOAEL	ATSDR, 1999	197.80
Lead acetate	rat	0.35	oral in diet (subchronic)	30 d	reproductive	0.3	LOAEL	ATSDR, 1999	0.66
Lead acetate	mouse	0.03	oral in water (subchronic)	11 wk	reproductive	10.5	LOAEL	Eisler, 2000	12.49
Lead (form unknown)	mouse	0.03	oral in water (subchronic)	9 months	reproductive	13.1	NOAEL	Eisler, 2000	15.58
Lead acetate	mouse	0.03	oral in water (chronic)	multi-gen	mortality	605.0	NOAEL	ATSDR, 1999	719.47
Lead acetate	mouse	0.03	oral in water (subchronic)	12 wk	reproductive	141.0	NOAEL	ATSDR, 1999	167.68
Lead acetate	cotton rat	1.20	oral in water (subchronic)	7-13 wk	immune, systemic	0.1	LOAEL	Eisler, 2000	0.39

TABLE E.3-3

COMPARISON OF TOXICITY REFERENCE VALUES FOR SHREW

WELLS G&H SUPERFUND SITE OU3

Chemical of Potential Concern [1]	Test Species	Body Weight (kg) [2]	Exposure Route and Duration Class	Duration	System	Test TRV mg/kg - d [3]	Test TRV Type	Source [4]	Wildlife TRV (mg/kg-d) [5,6]
Mercury									
Methyl mercury chloride	rat	0.35	oral in diet (chronic)	3 gen	reproductive	0.032	NOAEL	Sample et al., 1996	0.07
Methyl mercury chloride	rat	0.35	oral in diet (chronic)	3 gen	reproductive	0.16	LOAEL	Sample et al., 1996	**0.35**
Mercuric sulfide	mouse	0.03	oral in diet (chronic)	20 months	reproductive, systemic	13.2	NOAEL	Sample et al., 1996	15.70
Mercuric chloride	mink	1.0	oral in diet (chronic)	6 months	reproductive	1.0	NOAEL	Sample et al., 1996	2.86
Methyl mercury chloride	mink	1.0	oral in diet (subchronic)	93 d	mortality, growth	0.15	NOAEL	Sample et al., 1996	0.43
Methyl mercury chloride	mink	1.0	oral in diet (subchronic)	93 d	mortality, growth	0.25	LOAEL	Sample et al., 1996	0.71

d - day

wk - week

gen - generations

UF - Uncertainty Factor

COPC - Chemical of Potential Concern

TRV - Reference Toxicity Value

NOAEL - No Observed Adverse Effect Level

LOAEL - Lowest Observed Adverse Effect Level

1 COPC or COPC and analyte/compound used in toxicological testing

2 Body weight for mouse and rat based on USEPA (1985b *cited in* Sample *et al.*, 1996), other body weights are actual body weights of animals used in test

3 TRVs for studies in which dose was administered five times per week were multiplied for a factor of 0.7.

4 Documents cited are review documents (i.e., secondary sources). Citations for primary sources may be obtained from these documents.

5 The bold values were selected for use in calculating LOAEL HQ's

6 Test NOAELs and LOAELs were adjusted for wildlife species body weight using the following equation: $NOAEL_{wildlife} = NOAEL_{test} * (BW_{test}/BW_{wildlife}) \wedge 0.25$ (Sample *et al.*, 1996)

a An LD_{50} was divided by 10 to obtain a LOAEL

APPENDIX E.4

BASELINE ECOLOGICAL RISK ASSESSMENT SUPPLEMENTAL DATA - SURFACE WATER

Appendix E.4

Evaluation of Additional Surface Water Data

After completion of the Aberjona River Study (Wells G&H Site OU-3) Baseline Ecological Risk Assessment (BERA), additional surface water data were compiled to address the fate and transport of contaminants through both the Industri-Plex Superfund site study area (north of Route 128) and the Aberjona River Study area (south of Route 128). These data were collected to provide the basis of the comprehensive RI along the Aberjona River and Hall's Brook Holding Area (HBHA) from the Industri-Plex site to the Mystic Lakes (merging both study areas). A subset of these data were collected within the Aberjona River Study area (south of Route 128) and qualitatively evaluated in this appendix to supplement the surface water data set evaluated in the BERA. The purpose of this evaluation is to supplement the data used in the BERA for the evaluation of the potential ecological risks to aquatic receptors associated with the exposure to COPCs in surface water within the Aberjona River Study area. This qualitative assessment of the data includes a comparison of maximum and average values against water quality benchmarks to evaluate potential adverse effects of surface water COPCs on aquatic organisms.

Surface water samples collected within the Aberjona River Study Area, south of Route 128, included samples from gauging stations SW-05 to SW-10, and location SW-MC-13 (Figure 2-31). Surface water at location SW-MC-13 was sampled by Menzie-Cura Associates on June 17, 1999. Gauging stations SW-05 to SW-10 were sampled during baseflow conditions, monthly from July 2001 to October 2002 for total metals, dissolved metals, and TSS. In addition, samples were collected at SW-05 to SW-10 during 6 storm events between April 26, 2002 and October 18, 2002. Analyses included total and filtered inorganics in all samples. Only one sample (SW-MC-13, June 1999), was analyzed for organics (VOCs, SVOCs, pesticides, and PCBs). Among the 127 organic analytes tested in the sample, there were no concentrations measured above detection limits. The organic analyte list and corresponding detection limits are presented in Table E.4-1. The results from the grab sample at SW-MC-13 were included with baseflow results from results at SW-05, since there was only one sample collected at SW-MC-13. As there were no detected organic compounds, the results of the organic analyses are not further

evaluated.

Dissolved metals concentrations from all samples, both baseflow and storm events, are summarized in Tables E.4-2 to E.4-13. Only filtered samples were screened for metals, as described below.

Maximum detected levels of chemicals were compared to surface water quality criteria. The sets of criteria used in the screening, in order of selection, consisted of:

- USEPA Ambient Water Quality Criteria (AWQC) (USEPA, 2002);
- USEPA Ecotox Thresholds for Surface Water based on Great Lakes Water Quality Initiative Tier II methodology (USEPA, 1996), were used when a screening value from above was not available;
- Secondary Chronic Values (SCVs) for aquatic biota developed by Oak Ridge National Laboratory (Suter & Tsao, 1996), were used when a screening value from above was not available.

As presented in the AWQC document (USEPA, 2002), criteria for metals are based on a hardness value of 100 mg/L as $CaCO_3$ and are given as dissolved metals. When comparing metal concentrations to benchmarks, dissolved (filtered) concentrations were selected over total concentrations, because dissolved concentrations correspond to NAWQC and represent the most bioavailable form of the metal; thus total concentrations of metals were not used for screening purposes. Equations presented in the AWQC document (USEPA, 2002) were used to adjust criteria to site specific conditions, based on an average hardness for all of the filtered samples of 116 mg/L as $CaCO_3$.

If a chemical was detected in 5% or fewer of all surface water samples, it was excluded from further consideration. Calcium, magnesium, potassium, and sodium were excluded from the

screening process and eliminated as COPCs because they are nutrients and occur naturally at high concentrations. COPCs with maximum concentrations which were below screening levels were also excluded from further consideration. Reasons for exclusion are shown in Table E.4-14.

Among the metals in surface water, maximum concentrations of seven were measured above ecological benchmarks, including barium, cadmium, copper, iron, lead, manganese, and silver. Each of these compounds, with the exception of silver, were identified as COPCs in surface water in the BERA. Site specific analytical data and toxicity values from the literature for each of these COPCs are presented below.

Barium. Barium was detected in 132 of 133 samples. The Tier II value (USEPA, 1996) for barium (4.0 µg/L) was exceeded by all concentrations detected in the surface water samples. The average concentration of total barium in the surface water samples (38.6 µg/L) was similar to that reported for regional reference locations (31 µg/L, BERA Table 4-5). Based on the comparable concentrations at reference locations, the incremental risk of barium to aquatic life in surface water in the study area is not substantially higher than reference water bodies.

Cadmium. Cadmium was detected in only 7 of 133 samples, however, the detection limits were generally 0.2 µg/L to 0.4 µg/L, some of which exceeded NAWQC for cadmium of 0.27µg/L (at 116 mg/L $CaCO_3$). This criterion continuous concentration (CCC) is an estimate of the highest concentration in surface water to which an aquatic community can be exposed indefinitely without adverse effects. The corresponding criterion maximum concentration (CMC) for cadmium is 2.3 µg/L (at 116 mg/L $CaCO_3$); this is an estimate of the highest concentrations to which an aquatic community can be exposed briefly without resulting in an unacceptable effect (EPA, 1999, 2001, 2002). Though the detection levels exceed the CCC, they are below the CMC.

The maximum detected concentration of 0.3 µg/L was an estimated value, observed at gauging station SW-09 during a storm event, and was the only detected value above the CCC (at 116

mg/L $CaCO_3$). All of the other 6 detected values ranged from 0.11 to 0.2 µg/L and were measured at SW-08 (reach 4) during storm events. None of the baseflow samples had detected cadmium concentrations above the NAWQC value of 0.27 µg/L (at 116 mg/L $CaCO_3$).

The literature review of cadmium effects by Eisler (1985) concluded that freshwater organisms were the most sensitive biota. Concentrations of 0.8 to 9.9 µg/L in water were lethal to several species of aquatic insects, crustaceans, and teleosts. Eisler (1985) also reported that cadmium concentrations ranging from 0.7 to 5.0 µg/L were associated with sublethal effects (decreased growth, inhibited reproduction, and population alterations) in these same groups. Cadmium has also been shown to be highly toxic to South African clawed frog (*Xenopus laevis*) embryos (Herkovits *et al.*, 1997). At the most sensitive embryonic stage, a concentration of 1 mg Cd (II)/L arrested development in 100% of exposed individuals. Mammals and birds are less sensitive to the biocidal properties of cadmium than freshwater biota (Eisler, 2000).

Although the CCC for cadmium was exceeded once during a storm event, the surface water data collected indicates that the baseflow conditions all had cadmium concentrations below detection (Tables E.4-2 to E.4-7). These comparisons indicate that the potential for adverse effects to the aquatic community due to exposure to cadmium in surface water is negligible.

Copper. Copper was detected in 56 of 133 of the filtered samples. The NAWQC CCC for copper is 10.2 µg/L (at 116 mg/L $CaCO_3$), and was exceeded in four samples. Three of the samples exceeding the CCC were all collected on April 26, 2002, during a storm event. The maximum concentration was observed at gauging station SW-06 (51.7 µg/L), with the other two values above the CCC collected in the same event downstream at gauging stations SW-07 (20.3 µg/L) and SW-08 (14.3 µg/L). One baseflow sample at SW-08 had a copper concentration above the NAWQC (12.4 µg/L). Two stormwater samples also exceeded the CMC of 15µg/L (at 116 mg/L $CaCO_3$).

Mean acute toxicity values for freshwater species range from 7.2 µg/L for the daphnid, *D. pulicaria,* to 10,200 µg/L for bluegill sunfish, *L. macrochirus* (USEPA, 1985). Chronic toxicity

values for freshwater species range from 3.9 µg/L for brook trout to 60.4 µg/L for northern pike (USEPA, 1985). Site surface water data are generally below acute toxicity values and are on the low end of chronic toxicity values.

Overall there were few exceedences of ambient water quality standards for copper. The surface water data indicate that the risk to aquatic organisms from exposure to copper is low, but AWQC for dissolved copper values may be exceeded below reach 1 during storm events.

Iron. Iron was detected in 69 of 133 filtered samples. The NAWQC CCC for iron of 1,000 µg/L was exceeded in only one baseflow sample at SW-05 in July 2001. No other iron concentration in any other storm event or baseflow sample exceeded the NAWQC. Iron also exceeded the NAWQC at reference locations (Table 4-5) in total metal samples. Based on limited exceedences of the NAWQC, the data indicate that the potential for adverse effects to the aquatic community due to exposure to dissolved iron in surface water is negligible.

Lead. Lead was detected in only 8 of the 133 surface water samples. The maximum detected concentration of 3.8 µg/L was measured at SW-08 during a storm event on August 31, 2002 and was the only sample with lead concentrations exceeding the NAWQC CCC of 3.0 µg/L (at 116 mg/L $CaCO_3$). No baseflow samples exceeded the NAWQC value for lead.

Based on a review of toxicity testing literature, Eisler (1988b) reported adverse effects to aquatic biota associated with lead concentrations ranging from 1 to 5.1 µg/L. The CMC value for lead is 75µg/L (at 116 mg/L $CaCO_3$). Site surface water data are all below acute toxicity values and are on the low end of chronic toxicity values.

Based on the low detection frequency and the limited number of exceedences of ambient water quality standards for lead, the surface water data indicate that the risk to aquatic organisms from exposure to lead is low.

Manganese. The Tier II for manganese is 80 µg/L. The majority of the samples exceeded this

Tier II screening value. Concentrations of filtered manganese in surface water samples were generally lower at SW-09 and SW-10 (Upper and Lower Mystic Lakes). The majority of the total manganese samples in the surface water samples reported for regional reference locations also exceeded the Tier II value.

Manganese is an essential nutrient for animals, important for growth and reproduction (NAS, 1980). Manganese toxicity can decrease with increasing water hardness (Davies, 1980; Lewis *et al.*, 1979) and be affected by pH (Lewis *et al.*, 1979). The permanganate forms of manganese are more toxic than the manganous salts (Doudoroff and Katz, 1953). However, permanganates are not persistent in aquatic environments and they are rapidly converted to relatively nontoxic substances through the oxidation of organic materials (USEPA, 1985). Most of the available toxicity information is for manganous salts.

Daphnia spp. exhibited 16% reproductive impairment after three weeks of exposure to 4,100 µg/L (Biesinger and Christensen, 1972 *cited in* Lewis *et al.*, 1979). The LCV for daphnids is <1,100 µg/L (Suter and Tsao, 1996). Davies (1980) reported that the acute toxicity of manganese to fish decreases with increasing water hardness, as well as increasing fish size. The 96-hour LC_{50} for rainbow trout in soft water (hardness = 36 mg/L as $CaCO_3$) was 14,500 µg/L and the 144-hour LC_{50} was 5,700 µg/L (Davies, 1980). England and Cummings (1971, *cited in* Lewis *et al.*, 1979) reported a 96-hour LC_{50} in young rainbow trout of 16,00 µg/L.

For early life stages of brown trout (*Salmo trutta*), Stubblefield *et al.* (1997) reported 25% inhibition concentrations (IC_{25}s, based on combined endpoints of survival and body weight) of 5,590 µg/L at hardness levels of approximately 150 mg/L as $CaCO_3$. This work demonstrated an inverse relationship between water hardness and the toxicity of manganese to fish. Each of these studies indicates that the observed concentrations of manganese on site are generally lower than those associated with harm to sensitive aquatic species, consequently the risk from exposure to manganese in surface water in the study area is low. In addition, the maximum total manganese concentration observed for all of the storm event and baseflow data of 807 ug/L was lower than the maximum total manganese observed for regional reference locations of 1960 ug/L (BERA

Table 4-5). These data indicate that the incremental risk of exposure of aquatic life to manganese in surface water is higher than reference water bodies.

Silver. Silver was above detection limits in slightly more than 5% (7 of 133) of the filtered metals samples. Silver was not detected in any baseflow samples, however, the detection limits generally ranged from 0.5 µg/L to 1.0 µg/L, which are above the Tier II screening value of 0.12 µg/L. The detected values were from six storm event samples at SW-08 and one at SW-10. These detected concentrations ranged from 0.25 to 0.55 µg/L.

Acute toxicity values for freshwater invertebrates range from 0.25 µg/L for the water flea, *D. magna,* to 4,500 µg/L for the amphipod, *Gammarus pseudolimnaeus* (USEPA, 1985). Chronic toxicity values ranging from 2.6 µg/L to 29 µg/L have been reported for *D. magna* (USEPA, 1985). The observed concentrations in the study area of dissolved silver were at the levels associated with toxicity to the most sensitive organisms.

The observed concentrations of silver on site are at the site-specific detection limits, and are generally lower than those associated with harm to aquatic species. Consequently the risk from exposure to silver in surface water in the study area is low, and associated with moderate uncertainty.

Risk conclusions. Among the nine inorganics identified as surface water COPCs in the BERA, seven were detected at concentrations above screening values in the supplemental data set, including: barium, cadmium, copper, iron, lead, mercury, and silver. Three of the metals with NAWQC criteria available (cadmium, iron, and lead) were above the NAWQC values in only one of over 100 samples, with the cadmium and lead values occurring during storm events. Copper exceeded the NAWQC in four of the 133 samples, three of which occurred during a storm event. Based on the magnitude and frequency of these exceedences, the risk to aquatic organisms in the study area from exposure to metals in surface water is low.

TABLE E.4-1
SURFACE WATER ANALYTICAL RESULTS - MC-13
WELLS G&H SUPERFUND SITE (OU3)

Parameter	MC-13 6/17/1999
VOCs (ug/L)	
1,1,1-Trichloroethane	2 U
1,1,2,2-Tetrachloroethane	2 U
1,1,2-Trichloroethane	2 U
1,1-Dichloroethane	2 U
1,1-Dichloroethene	2 U
1,2-Dichloroethane	2 U
1,2-Dichloropropane	2 U
2-Butanone	2 U
2-Hexanone	2 U
4-Methyl-2-Pentanone	2 U
Acetone	5 U
Benzene	2 U
Bromodichloromethane	2 U
Bromoform	2 U
Bromomethane	2 UJ
Carbon Disulfide	2 U
Carbon Tetrachloride	2 U
Chlorobenzene	2 U
Chloroethane	2 U
Chloroform	2 U
Chloromethane	2 UJ
cis-1,2-Dichloroethene	2 U
cis-1,3-Dichloropropene	2 U
Dibromochloromethane	2 U
Ethylbenzene	2 U
Methylene Chloride	5 UJ
Styrene	2 U
Tetrachloroethene	2 U
Toluene	2 U
trans-1,2-Dichloroethene	2 U
trans-1,3-Dichloropropene	2 U
Trichloroethene	2 U
Vinyl Chloride	2 U
Xylene, m/p-	4 U
Xylene, o-	2 U
SVOCs (ug/L)	
1,2,4-Trichlorobenzene	5 U
1,2-Dichlorobenzene	5 U
1,3-Dichlorobenzene	5 U
1,4-Dichlorobenzene	5 U
2,4,5-Trichlorophenol	12 U
2,4,6-Trichlorophenol	5 U
2,4-Dichlorophenol	5 U
2,4-Dimethylphenol	5 U
2,4-Dinitrophenol	12 UJ
2,4-Dinitrotoluene	5 U
2,6-Dinitrotoluene	5 U
2-Chloronaphthalene	5 U
2-Chlorophenol	5 U
2-Methylnaphthalene	5 U
2-Methylphenol	5 U
2-Nitroaniline	12 U
2-Nitrophenol	5 U
3,3'-Dichlorobenzidine	5 U
3-Nitroaniline	5 U
4,6-Dinitro-2-methylphenol	12 UJ
4-Bromophenyl-phenylether	5 U
4-Chloro-3-methylphenol	5 U
4-Chloroaniline	5 U
4-Chlorophenyl-phenylether	5 U
4-Methylphenol	5 U
4-Nitroaniline	12 U
4-Nitrophenol	12 U
Acenaphthene	5 U
Acenaphthylene	5 U
Anthracene	5 U
Benzo(a)anthracene	5 U
Benzo(a)pyrene	5 U
Benzo(b)fluoranthene	5 U
Benzo(g,h,i)perylene	5 U
Benzo(k)fluoranthene	5 U

TABLE E.4-1
SURFACE WATER ANALYTICAL RESULTS - MC-13
WELLS G&H SUPERFUND SITE (OU3)

Parameter	MC-13 6/17/1999
Bis(2-Chloroethoxy)methane	5 U
Bis(2-Chloroethyl)ether	5 U
bis-(2-chloroisopropyl)ether	5 U
bis(2-Ethylhexyl)phthalate	5 U
Butylbenzylphthalate	5 U
Carbazole	5 U
Chrysene	5 U
Dibenz(a,h)anthracene	5 U
Dibenzofuran	5 U
Diethylphthalate	5 U
Dimethylphthalate	5 U
Di-n-Butylphthalate	5 U
Di-n-octylphthalate	5 U
Fluoranthene	5 U
Fluorene	5 U
Hexachlorobenzene	5 U
Hexachlorobutadiene	5 UJ
Hexachlorocyclopentadiene	12 UJ
Hexachloroethane	5 U
Indeno(1,2,3-cd)pyrene	5 U
Isophorone	5 U
Naphthalene	5 U
Nitrobenzene	5 U
N-Nitroso-di-n-propylamine	5 U
N-Nitrosodiphenylamine	5 U
Pentachlorophenol	12 U
Phenanthrene	5 U
Phenol	5 U
Pyrene	5 U
PCB/Pesticides (ug/L)	
4,4'-DDD	0.0089 U
4,4'-DDE	0.0089 U
4,4'-DDT	0.0089 U
Aldrin	0.0089 U
alpha-BHC	0.0089 U
alpha-Chlordane	0.0089 U
Aroclor-1016	0.044 U
Aroclor-1221	0.044 U
Aroclor-1232	0.044 U
Aroclor-1242	0.044 U
Aroclor-1248	0.044 U
Aroclor-1254	0.044 U
Aroclor-1260	0.044 U
beta-BHC	0.0089 U
delta-BHC	0.0089 U
Dieldrin	0.0089 U
Endosulfan I	0.0089 U
Endosulfan II	0.0089 U
Endosulfan Sulfate	0.0089 U
Endrin	0.0089 U
Endrin Aldehyde	0.0089 U
Endrin Ketone	0.0089 U
gamma-BHC	0.0089 U
gamma-Chlordane	0.0089 U
Heptachlor	0.0089 U
Heptachlor Epoxide	0.0089 U
Methoxychlor	0.044 U
Toxaphene	0.089 U

TABLE E.4-1
SURFACE WATER ANALYTICAL RESULTS - MC-13
WELLS G&H SUPERFUND SITE (OU3)

Parameter	MC-13 6/17/1999
Total Metals (ug/L)	
Aluminum	62.2 J
Antimony	18.3 UJ
Arsenic	26.7 J
Barium	43.4
Beryllium	0.22 U
Cadmium	0.78 U
Calcium	52400
Chromium	10.6 J
Cobalt	3 U
Copper	2.8 J
Iron	2710
Lead	1.4 J
Magnesium	8600
Manganese	749
Mercury	0.04 U
Nickel	2.7 J
Potassium	NA
Selenium	1.1 U
Silver	0.78 U
Sodium	NA
Thallium	1.2 U
Vanadium	5.4 J
Zinc	38.5 J
Dissolved Metals (ug/L)	
Aluminum	50 U
Antimony	100 U
Arsenic	5
Barium	38
Beryllium	4 U
Cadmium	1 U
Calcium	54000
Chromium	10 U
Cobalt	3 U
Copper	2 U
Iron	230
Lead	1 U
Magnesium	8800
Manganese	770
Mercury	0.2 U
Nickel	2 U
Potassium	NA
Selenium	2 U
Silver	2 U
Sodium	NA
Thallium	2 U
Vanadium	10 U
Zinc	21
Total Organic Carbon (mg/L)	7.94
Hardness (mg/L)	166

TABLE E.4-2
SURFACE WATER DATA SUMMARY - GAUGING STATION 05 - BASEFLOW
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Average Concentration
Dissolved Metals - ug/L								
Aluminum						0 / 17	30.8 - 77.7	26
Antimony						0 / 17	1.2 - 100	4.1
Arsenic	3.8		11.4	J	IPSW-05-071401FT	13 / 17	5.2 - 13	5.6
Barium	27.7		44.4		IPSW-05-091002FT	17 / 17	N/A	35
Beryllium						0 / 17	0.2 - 4	0.28
Cadmium						0 / 17	0.2 - 1	0.21
Calcium	38000		58100		IPSW-05-111901FT	17 / 17	N/A	47800
Chromium	0.93	J	2.2		IPSW-05-091801FT	10 / 17	0.6 - 10	1.6
Cobalt	0.8	J	2.1		IPSW-05-102502FT	8 / 17	0.7 - 3	1.0
Copper	2.4	J	4		IPSW-05-102201FT	4 / 17	0.6 - 6	1.7
Iron	134		1480		IPSW-05-071401FT	14 / 17	8.7 - 23.8	507
Lead	1.6	J	1.6	J	IPSW-05-041702FT	1 / 17	0.7 - 2.7	0.82
Magnesium	6250		9280		IPSW-05-111901FT	17 / 17	N/A	7866
Manganese	308		770		SW-MC-13-0	17 / 17	N/A	553
Mercury						0 / 17	0.1 - 0.2	0.055
Nickel	1.3	J	2.3	J	IPSW-05-102201FT	11 / 17	0.9 - 3.5	1.5
Potassium	4840	J	7690	J	IPSW-05-021502FT	16 / 16	N/A	6369
Selenium	2.7	J	2.7	J	IPSW-05-062002FT	1 / 17	1.9 - 4.8	1.7
Silver						0 / 17	0.5 - 2	0.39
Sodium	55000		123000	J	IPSW-05-021502FT	16 / 16	N/A	77131
Thallium						0 / 17	2 - 6	1.8
Vanadium						0 / 17	0.4 - 10	0.63
Zinc	3.9	J	121		IPSW-05-121701FT	16 / 17	25.1	41

N/A = Not Applicable or Not Available
J = Estimated Value

TABLE E.4-3
SURFACE WATER DATA SUMMARY - GAUGING STATION 06 - BASEFLOW
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Average Concentration
Dissolved Metals - ug/L								
Aluminum						0 / 16	22 - 86.4	25
Antimony						0 / 16	1.2 - 4	1.2
Arsenic	2.1	J	7.1	J	IPSW-06-071401FT	8 / 16	1.3 - 8	2.7
Barium	29	J	42.2	J	IPSW-06-010402FT	16 / 16	N/A	36
Beryllium						0 / 16	0.2 - 0.75	0.16
Cadmium						0 / 16	0.2 - 1	0.19
Calcium	37000		52200		IPSW-06-071602FT	16 / 16	N/A	45988
Chromium	1	J	2		IPSW-06-071401FT	10 / 16	0.6 - 3.3	1.2
Cobalt	0.75	J	1.3	J	IPSW-06-021502FT	6 / 16	0.7 - 2.5	0.77
Copper	0.68	J	3.5	J	IPSW-06-050802FT	7 / 16	2 - 5.6	2.1
Iron	110		961		IPSW-06-071401FT	11 / 16	8.7 - 254	293
Lead						0 / 16	0.7 - 2.6	0.77
Magnesium	6210		8980		IPSW-06-071602FT	16 / 16	N/A	7859
Manganese	277		749		IPSW-06-071602FT	16 / 16	N/A	454
Mercury	0.13	J	0.17	J	IPSW-06-080602FT	3 / 16	0.1 - 0.14	0.072
Nickel	1	J	2.2	J	IPSW-06-071401FT	10 / 16	0.9 - 3.4	1.4
Potassium	4430	J	7660		IPSW-06-021502FT	16 / 16	N/A	5929
Selenium	1.9	J	1.9	J	IPSW-06-031202FT	1 / 16	2.1 - 4.8	1.7
Silver						0 / 16	0.5 - 1	0.35
Sodium	58800		144000	J	IPSW-06-021502FT	16 / 16	N/A	81856
Thallium	3.6		3.6		IPSW-06-102502FT	1 / 16	2.2 - 6	2.0
Vanadium	0.64	J	0.64	J	IPSW-06-071401FT	1 / 16	0.4 - 1.7	0.38
Zinc	19.7	J	102		IPSW-06-121701FT	16 / 16	N/A	45

N/A = Not Applicable or Not Available
J = Estimated Value

TABLE E.4-4
SURFACE WATER DATA SUMMARY - GAUGING STATION 07 - BASEFLOW
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Average Concentration
Dissolved Metals - ug/L								
Aluminum						0 / 16	19.6 - 74.4	25
Antimony						0 / 16	1.5 - 4	1.2
Arsenic	1.5	J	4.5	J	IPSW-07-071401FT	6 / 16	1.3 - 4.7	2.0
Barium	31.5	J	41.8	J	IPSW-07-010402FT	16 / 16	N/A	37
Beryllium						0 / 16	0.2 - 0.75	0.17
Cadmium						0 / 16	0.2 - 0.8	0.19
Calcium	36100		49600		IPSW-07-010402FT	16 / 16	N/A	43256
Chromium	0.66	J	2		IPSW-07-091801FT	9 / 16	0.6 - 2.5	0.90
Cobalt	0.7	J	0.82	J	IPSW-07-021502FT	2 / 16	0.44 - 2	0.49
Copper	0.93	J	4.9		IPSW-07-102201FT	8 / 16	2.6 - 6.4	2.5
Iron	143		699		IPSW-07-071401FT	11 / 16	15.6 - 163	247
Lead						0 / 16	0.7 - 2.5	0.77
Magnesium	6030		8720		IPSW-07-010402FT	16 / 16	N/A	7222
Manganese	188		531		IPSW-07-071602FT	16 / 16	N/A	313
Mercury						0 / 16	0.1 - 0.15	0.053
Nickel	1.2	J	2.2	J	IPSW-07-102201FT	12 / 16	1 - 3	1.4
Potassium	4420	J	7150		IPSW-07-021502FT	16 / 16	N/A	5709
Selenium						0 / 16	1.9 - 4.8	1.6
Silver						0 / 16	0.5 - 1	0.35
Sodium	58400		142000	J	IPSW-07-021502FT	16 / 16	N/A	82675
Thallium						0 / 16	2.2 - 6	1.9
Vanadium	0.57	J	0.57	J	IPSW-07-050802FT	1 / 16	0.4 - 1.7	0.39
Zinc	14.7	J	76.8		IPSW-07-121701FT	16 / 16	N/A	43

N/A = Not Applicable or Not Available
J = Estimated Value

TABLE E.4-5
SURFACE WATER DATA SUMMARY - GAUGING STATION 08 - BASEFLOW
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Average Concentration
Dissolved Metals - ug/L								
Aluminum						0 / 16	19.6 - 74.2	24
Antimony						0 / 16	1.2 - 4	1.2
Arsenic	1.6	J	3.25		IPSW-08-041702FT	6 / 16	1.3 - 5	1.7
Barium	36.75		63.05		IPSW-08-091002FT	16 / 16	N/A	47
Beryllium						0 / 16	0.2 - 0.74	0.17
Cadmium						0 / 16	0.2 - 0.77	0.18
Calcium	30100		47950		IPSW-08-111901FT	16 / 16	N/A	39753
Chromium	0.46	J	1.65	J	IPSW-08-102201FT	6 / 16	0.5 - 2.1	0.66
Cobalt	0.645	J	1.475	J	IPSW-08-021502FT	3 / 16	0.4 - 2	0.53
Copper	2.25	J	12.4		IPSW-08-062002FT	7 / 16	0.6 - 7.1	3.0
Iron	186.5		568		IPSW-08-071401FT	12 / 16	8.7 - 104	219
Lead						0 / 16	0.7 - 2.2	0.76
Magnesium	5050		8260		IPSW-08-111901FT	16 / 16	N/A	6730
Manganese	113.5	J	407		IPSW-08-071602FT	16 / 16	N/A	230
Mercury	0.1	J	0.1	J	IPSW-08-102201FT	1 / 16	0.1 - 0.15	0.056
Nickel	0.545	J	2	J	IPSW-08-102201FT	9 / 16	0.9 - 2.6	1.1
Potassium	3810	J	7160		IPSW-08-021502FT	16 / 16	N/A	5256
Selenium						0 / 16	1.9 - 4.8	1.6
Silver						0 / 16	0.5 - 1	0.35
Sodium	59550		140000	J	IPSW-08-021502FT	16 / 16	N/A	79463
Thallium						0 / 16	2.2 - 6	1.8
Vanadium	0.46	J	0.46	J	IPSW-08-091801FT	1 / 16	0.4 - 1.7	0.37
Zinc	4.95	J	58.35	J	IPSW-08-021502FT	15 / 16	13	27

N/A = Not Applicable or Not Available
J = Estimated Value

TABLE E.4-6
SURFACE WATER DATA SUMMARY - GAUGING STATION 09 - BASEFLOW
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Average Concentration
Dissolved Metals - ug/L								
Aluminum						0 / 16	19.6 - 82.2	25
Antimony	1.8	J	1.8	J	IPSW-09-071602FT	1 / 16	1.5 - 4	1.3
Arsenic	1.8	J	4.9		IPSW-09-080602FT	4 / 16	1.7 - 5.2	1.7
Barium	28.5		39.7		IPSW-09-121701FT	15 / 16	35.6	33
Beryllium						0 / 16	0.2 - 0.75	0.17
Cadmium						0 / 16	0.2 - 0.47	0.17
Calcium	23000		35200		IPSW-09-041702FT	16 / 16	N/A	29031
Chromium	0.98	J	1.2	J	IPSW-09-071401FT	2 / 16	0.5 - 1.5	0.49
Cobalt	1.3	J	1.6		IPSW-09-021502FT	2 / 16	0.4 - 2	0.54
Copper	2	J	5.9		IPSW-09-062002FT	7 / 16	2 - 5.2	2.5
Iron						0 / 16	9.5 - 205	17
Lead						0 / 16	0.7 - 2.2	0.76
Magnesium	3810		5790		IPSW-09-041702FT	16 / 16	N/A	4945
Manganese	1.3		78.8		IPSW-09-031202FT	10 / 16	1.2 - 4.7	19
Mercury						0 / 16	0.1 - 0.43	0.062
Nickel	0.94	J	2.7	J	IPSW-09-071401FT	3 / 16	0.7 - 1.9	0.83
Potassium	3290	J	6300		IPSW-09-021502FT	16 / 16	N/A	4251
Selenium						0 / 16	1.9 - 4.8	1.6
Silver						0 / 16	0.5 - 1	0.35
Sodium	49800		122000	J	IPSW-09-021502FT	16 / 16	N/A	74931
Thallium						0 / 16	2.2 - 6	1.8
Vanadium	0.48	J	2		IPSW-09-071401FT	2 / 16	0.4 - 1.7	0.50
Zinc	1.6	J	29.8	J	IPSW-09-021502FT	11 / 16	0.7 - 10.3	8.5

N/A = Not Applicable or Not Available
J = Estimated Value

TABLE E.4-7
SURFACE WATER DATA SUMMARY - GAUGING STATION 10 - BASEFLOW
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Average Concentration
Dissolved Metals - ug/L								
Aluminum						0 / 16	19.6 - 91.2	26
Antimony						0 / 16	1.2 - 4	1.2
Arsenic	1.5	J	3.9	J	IPSW-10-121701FT	3 / 16	1.2 - 4.2	1.4
Barium	30.6		43.6	J	IPSW-10-010402FT	16 / 16	N/A	38
Beryllium						0 / 16	0.2 - 0.61	0.16
Cadmium						0 / 16	0.2 - 0.68	0.18
Calcium	24100		33400		IPSW-10-050802FT	16 / 16	N/A	29431
Chromium	0.5	J	1.4	J	IPSW-10-071401FT	6 / 16	0.5 - 2	0.66
Cobalt						0 / 16	0.4 - 2	0.40
Copper	1.1	J	8.6		IPSW-10-102201FT	6 / 16	1.5 - 5	2.4
Iron	20.1	J	20.1	J	IPSW-10-082301FT	1 / 16	8.7 - 143	16
Lead						0 / 16	0.7 - 2.2	0.77
Magnesium	4490		7130		IPSW-10-121701FT	16 / 16	N/A	5926
Manganese	1.5		164		IPSW-10-021502FT	14 / 16	1.1 - 2.3	40
Mercury						0 / 16	0.1 - 0.16	0.053
Nickel	0.93	J	1.7	J	IPSW-10-071401FT	3 / 16	0.7 - 2.2	0.75
Potassium	3280	J	6020		IPSW-10-021502FT	16 / 16	N/A	4373
Selenium						0 / 16	1.9 - 4.8	1.6
Silver						0 / 16	0.5 - 1	0.35
Sodium	51000		118000	J	IPSW-10-021502FT	16 / 16	N/A	79044
Thallium						0 / 16	2.2 - 6	1.8
Vanadium						0 / 16	0.4 - 1.7	0.39
Zinc	1.2	J	71.4		IPSW-10-091801FT	7 / 16	0.7 - 10.5	7.9

N/A = Not Applicable or Not Available
J = Estimated Value

TABLE E.4-8
SURFACE WATER DATA SUMMARY - GAUGING STATION 05 - STORM EVENT
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Average Concentration
Dissolved Metals - ug/L								
Aluminum						0 / 6	7.6 - 95.1	21
Antimony	2.8	J	2.8	J	IPSW-05-051502FT	1 / 6	1.9 - 3.7	1.6
Arsenic	2.2	J	12.6		IPSW-05-051502FT	3 / 6	2.5 - 3	3.5
Barium	18.2		31.4		IPSW-05-092502FT	6 / 6	N/A	25
Beryllium						0 / 6	0.1 - 1	0.16
Cadmium						0 / 6	0.2 - 0.47	0.18
Calcium	18600		34700		IPSW-05-092502FT	6 / 6	N/A	26150
Chromium	1.35		1.9		IPSW-05-101802FT	3 / 6	1.3 - 1.8	1.2
Cobalt	1.8		1.8		IPSW-05-101802FT	1 / 6	0.44 - 0.7	0.56
Copper	4.5		4.5		IPSW-05-092502FT	1 / 6	2.3 - 4.3	2.2
Iron	60.7		968		IPSW-05-051502FT	5 / 6	88.4	300
Lead						0 / 6	0.7 - 2.3	0.75
Magnesium	2820		5240		IPSW-05-101802FT	6 / 6	N/A	3959
Manganese	70.3		498		IPSW-05-101802FT	6 / 6	N/A	192
Mercury						0 / 6	0.1	0.050
Nickel	1.4	J	2.2		IPSW-05-101802FT	4 / 6	1.3 - 1.4	1.4
Potassium	2740		5660		IPSW-05-092502FT	6 / 6	N/A	4022
Selenium						0 / 6	1.7 - 3.2	1.3
Silver						0 / 6	0.5 - 0.8	0.31
Sodium	23600		43650		IPSW-05-042602FT	6 / 6	N/A	34708
Thallium						0 / 6	2.2 - 5.1	1.6
Vanadium	1.1	J	1.1	J	IPSW-05-101802FT	1 / 6	0.3 - 0.89	0.41
Zinc	42.6	J	78.8		IPSW-05-083102FT	5 / 6	42.3	51

N/A = Not Applicable or Not Available
J = Estimated Value

TABLE E.4-9
SURFACE WATER DATA SUMMARY - GAUGING STATION 06 - STORM EVENT
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Average Concentration
Dissolved Metals - ug/l.								
Aluminum						0 / 6	7.6 - 57.7	18
Antimony	1.7	J	1.7	J	IPSW-06-072502FT	1 / 6	1.2 - 4.9	1.6
Arsenic	2.5	J	11.8		IPSW-06-051502FT	5 / 6	2.5	4.2
Barium	22		34.3		IPSW-06-092502FT	6 / 6	N/A	27
Beryllium						0 / 6	0.1 - 0.5	0.12
Cadmium						0 / 6	0.2 - 0.4	0.18
Calcium	21200		36100		IPSW-06-092502FT	6 / 6	N/A	27592
Chromium	1.9		2.9		IPSW-06-042602FT	4 / 6	1.2 - 1.7	1.7
Cobalt						0 / 6	0.4 - 0.93	0.34
Copper	4.2		51.7		IPSW-06-042602FT	4 / 6	4.7 - 6.1	12
Iron	211		790		IPSW-06-051502FT	4 / 6	91.9 - 116	346
Lead						0 / 6	0.7 - 2.3	0.76
Magnesium	3090		5330		IPSW-06-092502FT	6 / 6	N/A	4331
Manganese	97.9		255		IPSW-06-101802FT	6 / 6	N/A	153
Mercury						0 / 6	0.1 - 0.11	0.051
Nickel	1.2	J	2.1		IPSW-06-092502FT	3 / 6	0.9 - 2.1	1.2
Potassium	3280		6190		IPSW-06-092502FT	6 / 6	N/A	4268
Selenium						0 / 6	1.7 - 3.2	1.3
Silver						0 / 6	0.5 - 0.8	0.31
Sodium	30100		60200		IPSW-06-042602FT	6 / 6	N/A	43350
Thallium						0 / 6	2.4 - 5.1	1.7
Vanadium						0 / 6	0.3 - 0.81	0.29
Zinc	33	J	60.5		IPSW-06-083102FT	6 / 6	N/A	47

N/A = Not Applicable or Not Available
J = Estimated Value

TABLE E.4-10
SURFACE WATER DATA SUMMARY - GAUGING STATION 07 - STORM EVENT
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Average Concentration
Dissolved Metals - ug/L								
Aluminum						0 / 6	7.6 - 57.7	20
Antimony						0 / 6	1.6 - 2.2	0.92
Arsenic	1.375	J	7.7		IPSW-07-051502FT	4 / 6	2 - 2.5	3.0
Barium	17.9		28.75		IPSW-07-072502FT	6 / 6	N/A	24
Beryllium						0 / 6	0.2	0.10
Cadmium						0 / 6	0.2 - 0.4	0.16
Calcium	19300		25500		IPSW-07-072502FT	6 / 6	N/A	22917
Chromium	1.5	J	2.2		IPSW-07-042602FT	3 / 6	0.82 - 1.7	1.2
Cobalt	0.74	J	0.74	J	IPSW-07-101802FT	1 / 6	0.4 - 0.7	0.34
Copper	4.6		20.3		IPSW-07-042602FT	3 / 6	4.5 - 5.5	6.4
Iron	74.225	J	722		IPSW-07-051502FT	5 / 6	49.5	236
Lead	2.5		2.5		IPSW-07-051502FT	1 / 6	0.7 - 2	0.93
Magnesium	3150		4230		IPSW-07-101802FT	6 / 6	N/A	3621
Manganese	27.5		164		IPSW-07-042602FT	6 / 6	N/A	98
Mercury						0 / 6	0.1	0.050
Nickel	1.03	J	1.3	J	IPSW-07-051502FT	3 / 6	1 - 1.6	0.89
Potassium	3140		3885		IPSW-07-092502FT	6 / 6	N/A	3521
Selenium						0 / 6	1.7 - 3	1.2
Silver						0 / 6	0.5 - 0.8	0.31
Sodium	29000		44300		IPSW-07-042602FT	6 / 6	N/A	38017
Thallium						0 / 6	2.2 - 5.3	1.6
Vanadium	0.88	J	0.88	J	IPSW-07-101802FT	1 / 6	0.4 - 0.84	0.36
Zinc	20.85	J	43.6		IPSW-07-083102FT	6 / 6	N/A	36

N/A = Not Applicable or Not Available
J = Estimated Value

TABLE E.4-11
SURFACE WATER DATA SUMMARY - GAUGING STATION 08 - STORM EVENT
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Average Concentration
Dissolved Metals - ug/l.								
Aluminum	9.919237		37.42364		IPSW-08-00-051602FT	6 / 6	N/A	24
Antimony	0.790265		1.947827		IPSW-08-00-083102FT	6 / 6	N/A	1.3
Arsenic	1.284979		3.447913		IPSW-08-00-051602FT	6 / 6	N/A	2.0
Barium	20.92433		30.87228		IPSW-08-00-072502FT	6 / 6	N/A	24
Beryllium	8.527594		0.248879		IPSW-08-00-072502FT	6 / 6	N/A	0.13
Cadmium	0.106465		0.2		IPSW-08-00-042602FT	6 / 6	N/A	0.16
Calcium	18014.16		23546.61		IPSW-08-00-072502FT	6 / 6	N/A	20674
Chromium	0.53157		1.857312		IPSW-08-00-042602FT	6 / 6	N/A	1.0
Cobalt	0.214466		0.402026		IPSW-08-00-051602FT	6 / 6	N/A	0.30
Copper	1.997159		14.31572		IPSW-08-00-042602FT	6 / 6	N/A	4.8
Iron	21.9226		315.4828		IPSW-08-00-051602FT	6 / 6	N/A	157
Lead	0.683201		3.835089		IPSW-08-00-083102FT	6 / 6	N/A	1.5
Magnesium	2823.025		3854.093		IPSW-08-00-072502FT	6 / 6	N/A	3318
Manganese	21.50218		158.9092		IPSW-08-00-042602FT	6 / 6	N/A	85
Mercury	0.05		5.928234		IPSW-08-00-092502FT	6 / 6	N/A	0.052
Nickel	0.541668		0.997435		IPSW-08-00-072502FT	6 / 6	N/A	0.73
Potassium	2899.858		3643.029		IPSW-08-00-042602FT	6 / 6	N/A	3251
Selenium	1.053069		1.5		IPSW-08-00-101802FT	6 / 6	N/A	1.3
Silver	0.25		0.4		IPSW-08-00-101802FT	6 / 6	N/A	0.32
Sodium	28558.86		51989.28		IPSW-08-00-042602FT	6 / 6	N/A	36931
Thallium	1.124162		2.1		IPSW-08-00-083102FT	6 / 6	N/A	1.5
Vanadium	0.239593		0.451874		IPSW-08-00-101802FT	6 / 6	N/A	0.33
Zinc	11.26868		34.05547		IPSW-08-00-042602FT	6 / 6	N/A	22

N/A = Not Applicable or Not Available
J = Estimated Value

TABLE E.4-12
SURFACE WATER DATA SUMMARY - GAUGING STATION 09 - STORM EVENT
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Average Concentration
Dissolved Metals - ug/l								
Aluminum						0 / 6	19.6 - 69.5	23
Antimony	4	J	4	J	IPSW-09-051502FT	1 / 6	1.2 - 4.8	1.6
Arsenic	1.025	J	3.55		IPSW-09-092502FT	4 / 6	2 - 3	1.9
Barium	29.9		34.1		IPSW-09-042602FT	6 / 6	N/A	33
Beryllium						0 / 6	0.2	0.10
Cadmium	0.305	J	0.305	J	IPSW-09-042602FT	1 / 6	0.2 - 0.4	0.18
Calcium	30000		34300		IPSW-09-042602FT	6 / 6	N/A	30992
Chromium						0 / 6	0.4 - 0.8	0.28
Cobalt						0 / 6	0.4 - 0.7	0.28
Copper	2.6		2.6		IPSW-09-083102FT	1 / 6	2.6 - 3.8	1.8
Iron						0 / 6	8.6 - 24.5	6.9
Lead						0 / 6	0.7 - 1.3	0.51
Magnesium	4950		5640		IPSW-09-042602FT	6 / 6	N/A	5223
Manganese	1.1		34.5		IPSW-09-051502FT	3 / 6	0.47 - 0.5	7.5
Mercury						0 / 6	0.1	0.050
Nickel	0.665	J	0.665	J	IPSW-09-072502FT	1 / 6	0.6 - 1.7	0.53
Potassium	3585		5600		IPSW-09-042602FT	6 / 6	N/A	4366
Selenium						0 / 6	2.1 - 3	1.3
Silver						0 / 6	0.5 - 0.8	0.31
Sodium	60100		108500		IPSW-09-042602FT	6 / 6	N/A	74692
Thallium						0 / 6	2.2 - 4.2	1.4
Vanadium	0.375	J	0.375	J	IPSW-09-072502FT	1 / 6	0.4 - 1.1	0.32
Zinc	2.975	J	2.975	J	IPSW-09-072502FT	1 / 6	0.7 - 16.4	3.2

N/A = Not Applicable or Not Available
J = Estimated Value

TABLE E.4-13
SURFACE WATER DATA SUMMARY - GAUGING STATION 10 - STORM EVENT
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Minimum Detected Concentration	Minimum Qualifier	Maximum Detected Concentration	Maximum Qualifier	Location of Maximum Concentration	Detection Frequency	Range of Detection Limits	Average Concentration
Dissolved Metals - ug/L								
Aluminum						0 / 6	7.6 - 69.4	17
Antimony						0 / 6	1.2 - 4	1.2
Arsenic	2.175	J	2.175	J	IPSW-10-083102FT	1 / 6	1.3 - 3	1.3
Barium	35.6		42.75		IPSW-10-101802FT	6 / 6	N/A	38
Beryllium						0 / 6	0.1 - 0.66	0.13
Cadmium						0 / 6	0.2 - 0.4	0.18
Calcium	28900		34200		IPSW-10-042602FT	6 / 6	N/A	31267
Chromium	0.56	J	1		IPSW-10-051502FT	3 / 6	0.4 - 1.2	0.60
Cobalt						0 / 6	0.4 - 0.7	0.29
Copper	1.1	J	1.7	J	IPSW-10-092502FT	2 / 6	1.8 - 3.7	1.4
Iron						0 / 6	8.6 - 15.3	5.8
Lead						0 / 6	0.7 - 2.3	0.64
Magnesium	5730		6995		IPSW-10-101802FT	6 / 6	N/A	6079
Manganese	0.32	J	7.8		IPSW-10-042602FT	2 / 6	0.33 - 1.7	1.6
Mercury						0 / 6	0.1	0.050
Nickel	0.515	J	0.81	J	IPSW-10-072502FT	2 / 6	0.9 - 1.6	0.60
Potassium	4090		5810		IPSW-10-042602FT	6 / 6	N/A	4648
Selenium						0 / 6	1.7 - 3.2	1.3
Silver	0.55	J	0.55	J	IPSW-10-051502FT	1 / 6	0.5 - 0.8	0.36
Sodium	55500	J	116000		IPSW-10-042602FT	6 / 6	N/A	77942
Thallium						0 / 6	2.4 - 5.1	1.8
Vanadium						0 / 6	0.3 - 0.7	0.27
Zinc						0 / 6	0.7 - 14.4	2.1

N/A = Not Applicable or Not Available
J = Estimated Value

TABLE E.4-14
COMPARISON OF SURFACE WATER DATA TO SCREENING CRITERIA

Parameter	Maximum Detected Conc.[1] (u g/L)	Location of Maximum Concentration	Detection Frequency	Screening Criterion (u g/L)	Type	COPC? [2]	Reason for Exclusion
Aluminum	37	IPSW-08-00-051602FT	6 / 133	87	Freshwater Chronic NAWQC	No	DF, BSV
Antimony	4	IPSW-09-051502FT	10 / 133	30	SCV	No	BSV
Arsenic	13	IPSW-05-051502FT	63 / 133	150	Freshwater Chronic NAWQC[3]	No	BSV
Barium	**63**	IPSW-08-091002FT	132 / 133	4	Tier II	Yes	
Beryllium	0.25	IPSW-08-00-072502FT	6 / 133	5.3	Tier II	No	DF, BSV
Cadmium	**0.31**	IPSW-09-042602FT	7 / 133	0.27	Freshwater Chronic NAWQC[4]	Yes	
Calcium	58,100	IPSW-05-111901FT	133 / 133	NA	NA	No	Nutrient
Chromium	2.9	IPSW-06-042602FT	62 / 133	83.7	Freshwater Chronic NAWQC[4,5]	No	BSV
Cobalt	2.1	IPSW-05-102502FT	29 / 133	3	Tier II	No	BSV
Copper	**52**	IPSW-06-042602FT	56 / 133	10.2	Freshwater Chronic NAWQC[4]	Yes	
Iron	**1,480**	IPSW-05-071401FT	69 / 133	1,000	Freshwater Chronic NAWQC	Yes	
Lead	**3.8**	IPSW-08-00-083102FT	8 / 133	3.0	Freshwater Chronic NAWQC[4]	Yes	
Magnesium	9,280	IPSW-05-111901FT	133 / 133	NA	NA	No	Nutrient
Manganese	**770**	SW-MC-13-0	118 / 133	80	Tier II	Yes	
Mercury	0.17	IPSW-06-080602FT	10 / 133	0.77	Freshwater Chronic NAWQC	No	BSV
Nickel	2.7	IPSW-09-071401FT	67 / 133	59	Freshwater Chronic NAWQC[4]	No	BSV
Potassium	7,690	IPSW-05-021502FT	132 / 132	NA	NA	No	Nutrient
Selenium	2.7	IPSW-05-062002FT	8 / 133	4.61	Freshwater Chronic NAWQC	No	BSV
Silver	**0.55**	IPSW-10-051502FT	7 / 133	0.12	Tier II	Yes	
Sodium	144,000	IPSW-06-021502FT	132 / 132	NA	NA	No	Nutrient
Thallium	3.6	IPSW-06-102502FT	7 / 133	12	SCV	No	BSV
Vanadium	2.0	IPSW-09-071401FT	14 / 133	19	Tier II	No	BSV
Zinc	121	IPSW-05-121701FT	105 / 133	134	Freshwater Chronic NAWQC[4]	No	BSV

[1] Dissolved (filtered) concentrations.

[2] Analytes with maximum detected concentrations exceeding screening criteria were included as Chemicals of Potential Concern (COPCs).

[3] Value reported for arsenic $^{3+}$.

[4] Metals criteria were adjusted to a site-specific hardness value 116 mg/L as $CaCO_3$ using equations provided in USEPA, 2002.

[5] Value reported for chromium $^{3+}$, it is assumed that chromium in surface water is present in reduced form.

COPC - Chemical of Potential Concern
NAWQC - National Ambient Water Quality Criterion (USEPA 1986a,b; 1987; 1992a, 1998, 2002).
SCV - Secondary Chronic Value as presented in Suter and Tsao (1996).
Tier II - Ecotox Thresholds Great Lakes Water Quality Initiative Tier II Methodology (USEPA, 1996).
NA - Screening criterion not available
BSV - Below Screening Value
DF - Detection Frequency < 5%
A bolded value indicates that a maximum detected concentration exceedes screening benchmakrs.

APPENDIX E.5

BASELINE ECOLOGICAL RISK ASSESSMENT
SUPPLEMENTAL DATA - SEDIMENT

Appendix E.5

Evaluation of Additional Sediment Data

After completion of the Baseline Ecological Risk Assessment (BERA), two sets of additional sediment data were collected to fill data gaps in response to comments on the Draft document. The first set of data were collected in March and April 2004 to further evaluate the potential ecological exposure of receptors to the depositional area of the Aberjona River in the lower portion of reach 5. Prior to these data being collected, the only data evaluated in the BERA in reach 5 were four samples collected at station SD-05. To more comprehensively characterize this area, 15 sediment samples were collected from station AJRW, in Winchester, south of Bacon Street. Six samples were collected in the center of the channel and nine more were collected along the edge of the river.

The second set of data included nine sediment cores collected in February 2003 throughout the study area to primarily provide a limited understanding of the vertical distribution of contaminants to assist in the assessment of future cleanup alternative considerations (e.g., dredging). These data were also used to evaluate the ecological risk associated with the additional samples collected through the study area in comparison to the data used in the BERA calculations.

The assessment in this section consists of evaluating the potential risk of ecological communities to metals in the sediments. The concentration of the metals are compared to sediment screening benchmarks used in the BERA, and to concentrations of metals observed in samples collected in earlier sampling rounds which were evaluated in the BERA. As applicable, the concentrations in the additional samples are compared to levels of contaminants determined to be associated with potential risk to one or more ecological receptor in the study area.

Maximum detected levels of chemicals were compared to sediment benchmarks. The sets of criteria were the same as those used in the BERA screening, in order of selection, these consisted of:

- USEPA Office of Solid Waste and Emergency Response Ecotox Thresholds (ETs) - Sediment Quality Criteria (SQCs), Sediment Quality Benchmarks (SQBs), or NOAA- Effects Range Low (ERLs) were used preferentially (USEPA, 1996);

- Ontario Ministry of Environment and Energy (OMEE) Lowest Effect Levels (LELs) (Persaud *et al.,* 1993), were used when a screening value from above was not available;

- Oak Ridge National Laboratory (ORNL) Sediment Secondary Chronic Values (SCVs) (Jones *et al.,* 1997); were used when a screening value from above was not available; and

- National Oceanic and Atmospheric Administration (NOAA) Threshold Effects Level (TEL) (Buchman, 1999) were used when a screening value was not available in any of the above.

Ecological sediment screening criteria were unavailable for several chemicals. As with surface water data, potassium, sodium, calcium, and magnesium were exclude from the screening process because they are nutrients and occur naturally at high concentrations. In addition COCs exceeding screening criteria are compared to sitewide sediment concentrations, reference locations, and ecological threshhold effects levels (TELs) established in the BERA. These comparisons allow an assessment of the potential risk of exposure to sediment contaminants, relative to ecological risks determined for the site in the BERA.

Each of the two data sets, the AJRW samples and the sediment core samples, are discussed in separate sections below.

AJRW Samples

Sediment samples were collected for metals and TOC at station AJRW, located in reach 5, upstream of the Mystic Lakes. Six deep sediment samples (SD-AJRW-01 through AJRW-06) were collected in March 2004, and nine shallow sediment samples (SD-AJRW-07, -09, -11, -13, -15, -17, -19, -21, and -23) were collected in April of 2004. All of these 15 samples were combined to compare to sediment screening criteria (Table E.5-1).

Among the metals in sediment, maximum concentrations of nine were measured above ecological benchmarks, including arsenic, cadmium, chromium, copper, iron, lead, mercury,

nickel, and zinc. Each of these compounds were identified as COPCs in sediment in the BERA. Among the remaining metals, aluminum, cobalt, and manganese were below screening values. Barium, beryllium, and vanadium were detected but lacked screening values. Selenium and thallium had no screening values, but were not detected. Silver and antimony were also below detection limits in all samples, however, the detection limits exceeded the screening values.

A comparison of data collected at AJRW to sitewide data from the BERA (Tables 4-16, 4-17, and 4-18 of the BERA) indicates that the concentrations of metals were generally lower in sediments from AJRW than those observed in samples collected throughout the Aberjona River study area (Table E.5-2). Average concentrations of aluminum, barium, beryllium, iron, manganese, nickel, and vanadium at AJRW were all below the average concentrations at reference locations. The only compounds with average concentrations at AJRW higher than average sitewide concentrations were compounds that were all below detection limits at AJRW, and whose average values were estimated as a mean of one-half the detection limits (selenium, silver, and thallium). None of the maximum detected COPC concentrations at AJRW were higher than maximums observed sitewide, and only a few of the maximum concentrations at AJRW (aluminum, barium, beryllium, cobalt, lead, nickel, above vanadium) were above sitewide averages (Table E.5-2).

The metals associated with ecological risk to one or more receptors in the Aberjona River Study area were arsenic, chromium, lead, and mercury, as identified in the BERA. The average concentrations of each of these COPCs at AJRW were below both sitewide average concentrations and the threshold effects levels (TELs) for all of the receptors identified as having adverse effects from exposure in the BERA (Table E.5-3). Comparison to shrew TEL was not applied, as these sediment locations were not considered to be shrew habitat. Based on these results, it can be concluded that there is no significant ecological risk associated with exposure of receptors at AJRW that exceeds thresholds established in the BERA. If these data had been incorporated into the BERA calculations, there would have been no changes in the conclusions for sitewide risks calculated for heron or mallard, nor would there have been risk associated with exposure to receptors at this station for semi-aquatic mammals (muskrat) or benthic

invertebrates.

Sediment Cores

Sediment core samples were collected at each of nine locations (SC05 through SC13) throughout the study area and analyzed for metals, hexavalent chromium, and TOC in February 2003. SC05 through SC08 were collected from the Wells G&H 38-acre wetland, SC09 and SC10 from the former Cranberry Bog, SC11 from Davidson Park, SC12 from Judkins Pond, and SC13 from the outlet of the river as it flows into the upper forebay of Upper Mystic Lake (Figure 2-35). The samples collected at each location included one sample from each of the following depth intervals: 0 - 1 foot, 1 - 2 foot, 2 - 3 foot, and 3 - 4 foot. Metals concentrations from the surface sample (0-1 ft interval) were compared to sediment screening criteria (Tables E.5-4).

Among the metals in the sediment core samples, maximum concentrations of 13 were measured above ecological benchmarks, including antimony, arsenic, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, silver, and zinc. Each of these compounds were identified as COPCs in sediment in the BERA. Among the remaining metals, aluminum was below screening values in all of the cores. There were no screening values for barium, beryllium, selenium, thallium, and vanadium. Beryllium and thallium were not detected in most samples, and did not have a screening benchmark. Silver and antimony were also generally below detection limits in all samples, however, the detection limits usually exceeded the screening values.

With the exception of sediment core SC05 (located in reach 1 near SD-TT28) and SC12 (Judkins Pond), concentrations of metals of concern generally decreased with depth in the core (Figure 2-35). This indicates that the surface samples from 0-6 inch depth interval used to characterize risk in the BERA represented a higher exposure case than sediment at deeper depths.

The metals concentrations in the upper foot of the cores were within the range of concentrations observed in previous samples in the reach for each of the metals of ecological concern (arsenic, chromium, lead, and mercury), with the exception of lead in reach 4 (Tables E.5-5 to E.5-9). The

observed concentration of lead of 520 mg/kg in core SC12 from Judkins Pond (reach 4) exceeded the average and maximum lead concentrations for reach 4 of 345 mg/kg and 455 mg/kg, respectively. Although the concentration of lead at SC12 slightly exceeded the sitewide average of 478 mg/kg, the lead concentration in SC12 was below the threshold effects levels (TELs) for muskrat and mallard, and consequently consistent with the conclusion of negligible risk to receptors in reach 4.

Concentrations of arsenic were below the TELs for each of the ecological receptors (invertebrates, mallard, and muskrat) in all sediment core samples outside of reach 1. In reach 1, surface core samples (0-1 feet), arsenic concentrations ranged from 210 mg/kg in SC05 to 1,300 mg/kg in SC06. The maximum concentration of arsenic within each of the four cores collected in reach 1 was higher than both the average sediment concentration for the reach (439 mg/kg) and the 95% UCL for reach 1 (757 mg/kg), but did not exceed the maximum observed arsenic concentration in reach 1 of 4,550 mg/kg (Table E.5-5).

In conclusion, the metals concentrations in the sediment core data are consistent with sediment data previously collected in the Aberjona River Study Area in support of the BERA. The BERA conclusions regarding risk to ecological receptors was based on surface sediment samples (0 - 6 inches), as these represent the expected exposure point concentrations for ecological receptors. The surface core data for metals (0 - 1 foot) collected in the supplemental data set were consistent with risk conclusions in the BERA.

Risk conclusions. Among the inorganics identified as COPCs in sediment in the BERA, nine were detected at concentrations above screening values in the supplemental data set at station AJRW, including: arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel, and zinc. Based on the magnitude and frequency of these exceedences, the risk to aquatic organisms in the study area from exposure to metals in sediment is low. Based on the data collected at station AJRW, there is no significant ecological risk associated with exposure of receptors exceeding thresholds established in the BERA. If these data had been incorporated into the BERA calculations, there would have been no changes in the conclusions for sitewide risks calculated

for heron or mallard, nor would there have been risk associated with exposure to receptors at this station for semi-aquatic mammals (muskrat) or benthic invertebrates.

Sediment core data collected throughout the study area indicated that sediment metals concentrations generally decreased with depth. The metals concentrations in the sediment core data were consistent with sediment data previously collected in the Aberjona River Study area in support of the BERA.

TABLE E.5-1
SEDIMENT DATA SUMMARY - AJRW
WELLS G&H SUPERFUND SITE (OU3)

Parameter	Maximum Detected Concentration[1]	Location of Maximum Concentration	Range of Detection Limits	Average Concentration	Detection Frequency	Screening Criterion Level	Screening Screening Type	Hazard Quotient
Metals - mg/kg								
Aluminum	14,000	SD-AJRW03	N/A	8,407	15 / 15	25,500	TEL	0.55
Antimony			9.4 - 11	4.9	0 / 15	2	ERL	N/A
Arsenic	**57.5**	SD-AJRW02	9.4 - 20	22	7 / 14	8.2	ERL	7.0
Barium	89.5	SD-AJRW02	N/A	52	15 / 15	N/A	N/A	N/A
Beryllium	0.98	SD-AJRW03	0.94 - 1.1	0.53	1 / 15	N/A	N/A	N/A
Cadmium	**3.8**	SD-AJRW05	2.8 - 3.3	1.9	3 / 15	1.2	ERL	3.2
Chromium	**235**	SD-AJRW09	N/A	89	15 / 15	81	ERL	2.9
Cobalt	17	SD-AJRW03	N/A	8.7	15 / 15	50	LEL*	0.34
Copper	**190**	SD-AJRW09	N/A	92	15 / 15	34	ERL	5.6
Iron	**25,000**	SD-AJRW02	N/A	14,553	15 / 15	20000	LEL	1.3
Lead	**1,000**	SD-AJRW04	N/A	259	15 / 15	47	ERL	21
Manganese	445	SD-AJRW02	N/A	221	15 / 15	460	LEL	0.97
Mercury	**1.0**	SD-AJRW09	0.025	0.51	14 / 15	0.15	ERL	7.0
Nickel	**24**	SD-AJRW02	N/A	14	15 / 15	21	ERL	1.1
Selenium			9.4 - 20	6.9	0 / 15	N/A	N/A	N/A
Silver			2.8 - 3.3	1.5	0 / 15	0.5	LEL*	N/A
Thallium			47 - 55	25	0 / 9	N/A	N/A	N/A
Vanadium	53	SD-AJRW03	N/A	30	15 / 15	N/A	N/A	N/A
Zinc	**820**	SD-AJRW03	N/A	334	15 / 15	120	LEL	6.8
Total Organic Carbon (mg/kg)	74,300	SD-AJRW02	6,410	39,924	14 / 15	N/A	N/A	

Notes:

[1] Bold values indicate maximum concentrations exceeding screening criteria

ERL - NOAA Effects Range-Low (Long *et al*., 1995; Long and Morgan, 1990)
LEL - Ontario Ministry of Environment and Energy Lowest Effect Level (Persaud *et al*., 1993)
LEL*- Ontario Ministry of Environment and Energy Lowest Effect Level (OME, 1996)
TEL - Threshold Effects Level (Buchman, 1999)
N/A = Not Applicable or Not Available
A blank cell indicates that the COC was not detected.

TABLE E.5-2
SEDIMENT DATA COMPARISON - AJRW, SITEWIDE AND REFERENCE
WELLS G&H SUPERFUND SITE (OU3)

Parameter	AJRW Maximum Concentration[1]	Sitewide Maximum Concentration[2]	Reference Maximum Concentration[3]	AJRW Average Concentration[1]	Sitewide Average Concentration[2]	Reference Average Concentration[3]
Metals - mg/kg						
Aluminum	14,000	34,400	20,200	8,407	10,109	8,581
Antimony		329	5.6	4.9	6.4	1.0
Arsenic	58	4,550	44.5	22	229	17
Barium	90	3420	173	52	84	57
Beryllium	0.98	2.9	1.3	0.53	0.64	0.56
Cadmium	3.8	38	6.1	1.9	5.8	1.3
Chromium	235	24,600	512	89	945	89
Cobalt	17	130	22	8.7	15	8.5
Copper	190	3,760	344	92	340	63
Iron	25,000	258,000	51,600	14,553	25,435	16,345
Lead	1,000	41,000	755	259	478	194
Manganese	445	3,060	1,980	221	468	368
Mercury	1.0	89	0.71	0.51	2.0	0.19
Nickel	24	177	32	14	21	15
Selenium		30	3.2	6.9	2.8	0.81
Silver		12	2.9	1.5	0.53	0.50
Thallium		18	2.2	25	1.20	0.50
Vanadium	53	180	148	30	43	35
Zinc	820	8,750	645	334	1,165	195
Total Organic Carbon (mg/kg)	74,300	912,000	427,000	39,924	195,505	109,001

Notes:
[1] AJRW maximum detected concentrations and ARJW average concentrations from Table E.5-1.
[2] Sitewide maximum detected concentrations and sitewide average concentrations from BERA Table 4-17.
[3] Reference maximum detected concentrations and reference average concentrations from BERA Table 4-18.

A blank cell indicates that a contaminant of concern was not detected.
N/A = Not Applicable or Not Available

TABLE E.5-3
THRESHOLD EFFECTS LEVELS FOR RECEPTORS
WELLS G&H SUPERFUND SITE (OU3)

Parameter	AJRW Average Concentration[1]	Invertebrate TEL	Muskrat TEL	Mallard TEL
Metals - mg/kg				
Arsenic	22	220	150	N/A
Chromium	89	110	2,800	2,200
Lead	259	N/A	1,340	750
Mercury	0.51	2.0	6.5	17

Notes:
[1] AJRW average concentrations from Table E.5-1.

TEL - Threshold Effects Level - Corresponds to the concentration of the COPC in the sediment associated with adverse effects on the receptor
N/A = Not Applicable

TABLE E.5-4
SEDIMENT CORE DATA SUMMARY
WELLS G&H SUPERFUND SITE (OU3)

Parameter	SC0501	SC0601	SC0701	SC0801	SC0901	SC1001	SC1101	SC1201	SC1301	Screening Criterion Level	Screening Type
Metals (mg/Kg)											
Aluminum	15,000	18,000	NA	21,500	7,100	5,300	12,000	17,000	22,000	25,500	TEL
Antimony	12 U	50 U	34 U	50 U	10 U	11 U	8.5 U	7.6 U	6.4 U	2	ERL
Arsenic	**210**	**1,300**	**440**	**1,250**	**89**	**67**	**100**	**130**	**120**	8.2	ERL
Barium	66	150	95	93.5	19	19	100	140	120	na	na
Beryllium	1.2 U	5 U	3.4 U	5 U	1 U	1.1 U	0.85 U	1.1	1.5	na	na
Cadmium	**4.2**	**19**	**25**	**22.4**	1.5 U	1.6 U	**4.2**	**10**	**12**	1.2	ERL
Chromium	**1,200**	**750**	**2,700**	**1,430**	**190**	**130**	**390**	**400**	**600**	81	ERL
Cobalt	13	**52**	**68**	31.1	4.9	3.6	19	23	28	50	LEL*
Copper	**510**	**770**	**910**	**1,410**	**160**	**47**	**230**	**370**	**460**	34	ERL
Iron	**24,000**	**120,000**	**59,000**	**58,200**	13,000	11,000	**30,000**	**37,000**	**32,000**	20,000	LEL
Lead	**390**	**590**	**570**	**676**	**69**	28	**260**	**520**	**810**	47	ERL
Manganese	390	**1,800**	**2,600**	**591**	140	110	**520**	**960**	370	460	LEL
Mercury	**3.5** J	**8.2** J	**3.7** J	**14**	**1.2**	**0.18**	**1.7**	**2.6**	**2.1** J	0.15	ERL
Nickel	20	**39**	**49**	30 U	7.1	6.6 U	**31**	**39**	**37**	21	ERL
Selenium	24 U	100 U	68 U	50 U	10 U	11 U	8.5 U	7.6 U	13 U	na	na
Silver	1.8 U	7.5 U	NA	NA	1.5 U	1.6 U	1.3 U	1.2 U	**1.8**	0.5	LEL*
Thallium	24 U	100 U	68 U	100 U	20 U	22 U	17 U	15 U	13 U	na	na
Vanadium	43	64	72	66.9	19	11	50	64	87	na	na
Zinc	**790**	**2,000**	**4,800**	**2,650**	**260**	**150**	**1,000**	**1,800**	**2,500**	120	LEL
Wet Chemistry (mg/Kg)											
Chromium VI	13	8.0	29	15	2.0	1.4	4.2	4.3	6.4		
Total Organic Carbon	65,200	179,000	234,000	NA	39,800	23,000	119,000	112,000	115,000		

[1] Bold values indicate maximum detected concentrations exceeding screening criteria

ERL - NOAA Effects Range-Low (Long *et al*., 1995; Long and Morgan, 1990)
LEL - Ontario Ministry of Environment and Energy Lowest Effect Level (Persaud *et al*., 1993)
LEL*- Ontario Ministry of Environment and Energy Lowest Effect Level (OME, 1996)
TEL - Threshold Effects Level (Buchman, 1999)
N/A = Not Applicable or Not Available
A blank cell indicates that the COC was not detected.

TABLE E.5-5
SEDIMENT CORE DATA COMPARISON - REACH 1 SAMPLES
WELLS G&H SUPERFUND SITE (OU3)

Parameter	SC0501 Concentration[1]	SC0601 Concentration[1]	SC0701 Concentration[1]	SC0801 Concentration[1]	Sitewide Average Concentration[2]	Sitewide Maxium Concentration[2]	Reach 1 Average Concentration[3]	Reach 1 Maximum Concentration[3]
Metals - mg/kg								
Arsenic	210	1300	440	1250	229	4550	439	4550
Chromium	1200	750	2700	1430	945	24600	2040	24600
Lead	390	590	570	676	478	41000	879	41000
Mercury	3.50	8.20	3.70	14.00	2.02	89.20	3.10	45.00

Parameter	SC0501 Concentration[1]	SC0601 Concentration[1]	SC0701 Concentration[1]	SC0801 Concentration[1]	Invertebrate TEL	Muskrat TEL	Mallard TEL
Metals - mg/kg							
Arsenic	210	1300	440	1250	220	150	N/A
Chromium	1200	750	2700	1430	110	2,800	2,200
Lead	390	590	570	676	N/A	1,340	750
Mercury	3.50	8.20	3.70	14.00	2.0	6.5	17

Notes:
[1] Sediment core 0 to 1 foot sample concentration
[2] Sitewide maximum detected concentrations and sitewide average concentrations from BERA Table 4-17
[3] Reach 1 maximum detected concentrations and average concentrations from BERA Table 4-252

TEL - Threshold Effects Level - Corresponds to the concentration of the COPC in the sediment associated with adverse effects on the receptor
N/A = Not Applicable

TABLE E.5-6
SEDIMENT CORE DATA COMPARISON - REACH 2 SAMPLES
WELLS G&H SUPERFUND SITE (OU3)

Parameter	SC0901 Concentration[1]	SC1001 Concentration[1]	Sitewide Average Concentration[2]	Sitewide Maxium Concentration[2]	Reach 2 Average Concentration[3]	Reach 2 Maximum Concentration[3]
Metals - mg/kg						
Arsenic	89	67	229	4550	120	1410
Chromium	190	130	945	24600	329	5310
Lead	69	28	478	41000	170	664
Mercury	1.2	0.2	2.0	89.2	1.9	89.0

Parameter	SC0901 Concentration[1]	SC1001 Concentration[1]	Invertebrate TEL	Muskrat TEL	Mallard TEL
Metals - mg/kg					
Arsenic	89	67	220	150	N/A
Chromium	190	130	110	2,800	2,200
Lead	69	28	N/A	1,340	750
Mercury	1.2	0.2	2.0	6.5	17

Notes:
[1] Sediment core 0 to 1 foot sample concentration
[2] Sitewide maximum detected concentrations and sitewide average concentrations from BERA Table 4-17
[3] Reach 2 maximum detected concentrations and average concentrations from BERA Table 4-253

TEL - Threshold Effects Level - Corresponds to the concentration of the COPC in the sediment associated with adverse effects on the receptor
N/A = Not Applicable

TABLE E.5-7
SEDIMENT CORE DATA COMPARISON - REACH 3 SAMPLES
WELLS G&H SUPERFUND SITE (OU3)

Parameter	SC1101 Concentration[1]	Sitewide Average Concentration[2]	Sitewide Maxium Concentration[2]	Reach 3 Average Concentration[3]	Reach 3 Maximum Concentration[3]
Metals - mg/kg					
Arsenic	100	229	4550	69	485
Chromium	390	945	24600	156	918
Lead	260	478	41000	195	661
Mercury	1.70	2.02	89.20	1.10	5.70

Parameter	SC1101 Concentration[1]	Invertebrate TEL	Muskrat TEL	Mallard TEL
Metals - mg/kg				
Arsenic	100	220	150	N/A
Chromium	390	110	2,800	2,200
Lead	260	N/A	1,340	750
Mercury	1.70	2.0	6.5	17

Notes:
[1] Sediment core 0 to 1 foot sample concentration
[2] Sitewide maximum detected concentrations and sitewide average concentrations from BERA Table 4-17
[3] Reach 3 maximum detected concentrations and average concentrations from BERA Table 4-254

TEL - Threshold Effects Level - Corresponds to the concentration of the COPC in the sediment associated with adverse effects on the receptor
N/A = Not Applicable

TABLE E.5-8
SEDIMENT CORE DATA COMPARISON - REACH 4 SAMPLES
WELLS G&H SUPERFUND SITE (OU3)

Parameter	SC1201 Concentration[1]	Sitewide Average Concentration[2]	Sitewide Maxium Concentration[2]	Reach 4 Average Concentration[3]	Reach 4 Maximum Concentration[3]
Metals - mg/kg					
Arsenic	130	229	4550	69	135
Chromium	400	945	24600	266	442
Lead	520	478	41000	345	455
Mercury	2.6	2.0	89.2	1.2	3.2

Parameter	SC1201 Concentration[1]	Invertebrate TEL	Muskrat TEL	Mallard TEL
Metals - mg/kg				
Arsenic	130	220	150	N/A
Chromium	400	110	2,800	2,200
Lead	520	N/A	1,340	750
Mercury	2.6	2.0	6.5	17

Notes:
[1] Sediment core 0 to 1 foot sample concentration
[2] Sitewide maximum detected concentrations and sitewide average concentrations from BERA Table 4-17
[3] Reach 4 maximum detected concentrations and average concentrations from BERA Table 4-255

TEL - Threshold Effects Level - Corresponds to the concentration of the COPC in the sediment associated with adverse effects on the receptor
N/A = Not Applicable

TABLE E.5-9
SEDIMENT CORE DATA COMPARISON - REACH 6 SAMPLES
WELLS G&H SUPERFUND SITE (OU3)

Parameter	SC1301 Concentration[1]	Sitewide Average Concentration[2]	Sitewide Maxium Concentration[2]	Reach 6 Average Concentration[3]	Reach 6 Maximum Concentration[3]
Metals - mg/kg					
Arsenic	120	229	4550	117	1570
Chromium	600	945	24600	272	3000
Lead	810	478	41000	429	1290
Mercury	2.1	2.0	89.2	1.0	14.0

Parameter	SC1301 Concentration[1]	Invertebrate TEL	Muskrat TEL	Mallard TEL
Metals - mg/kg				
Arsenic	120	220	150	N/A
Chromium	600	110	2,800	2,200
Lead	810	N/A	1,340	750
Mercury	2.1	2.0	6.5	17

Notes:
[1] Sediment core 0 to 1 foot sample concentration
[2] Sitewide maximum detected concentrations and sitewide average concentrations from BERA Table 4-17
[3] Reach 6 maximum detected concentrations and average concentrations from BERA Table 4-257

TEL - Threshold Effects Level - Corresponds to the concentration of the COPC in the sediment associated with adverse effects on the receptor
N/A = Not Applicable

APPENDIX F

APPENDIX F

EPA RESPONSES TO COMMENTS
MAY 2003 WELLS G&H SUPERFUND SITE
OU-3 ABERJONA RIVER STUDY
BASELINE HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT REPORT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

June 28, 2004

See attached address list

Re: EPA responses to comments on the May 2003 Wells G&H Superfund Site OU-3 Aberjona River Study Baseline Human Health and Ecological Risk Assessment

Dear addressees:

Thank you for preparing and submitting comments on EPA's Wells G&H Superfund Site OU-3 Aberjona River Study Baseline Human Health and Ecological Risk Assessment (BRA), dated May 2003, which focused on potential risks from surface water, sediments and soils along the Aberjona River from Route 128 to the Mystic Lakes. EPA initially released the baseline human health risk assessment in March 2003 and then followed up with the combined human health and ecological risk assessment in May 2003. During the Spring and Summer 2003 time period, EPA held numerous public meetings explaining the BRA results.

By November 2, 2003, EPA received approximately 128 pages of comments on the BRA from the following parties:

A. Gradient Corporation (contractor to Solutia, Inc., and Stauffer Management Company, LLC who act on behalf of the primary settlers to the Industri-Plex Superfund Site 1989 Consent Decree);
B. S.R. Hansen & Associates (contractor to Solutia, Inc., and Stauffer Management Company);
C. Solutia, Inc., Stauffer Management Company, LLC, and their legal councels Hush & Eppenberger, LLC, and Ropes & Gray, LLP, respectively;
D. Aberjona Study Coalition (prepared by Cambridge Associates, Inc., Tufts University, and Eco-Solutions, Inc.);
E. City of Woburn (prepared by University of Connecticut, Technical Outreach Services to Communities Program);
F. Town of Winchester; and
G. Other Comments

Please find attached, EPA's responses to each of the parties' comments in the order presented above (e.g., A. Gradient Corporation, B. S.R. Hansen & Associates, etc.,). EPA's responses pertaining to the Massachusetts Department of Environmental Protection (DEP) were prepared in consultation with the DEP. The responses are inserted immediately after every comment in the text of each party's original comment letter. The responses are denoted in bold italic text and begin with "***EPA Response.***"

Based upon EPA's responses to comments, EPA will revise the BRA. Notable aspects of the revision will include:

- Recalculation of exposure point concentrations based on the use of EPA's updated software program ProUCL (version 3.0);
- Evaluation of recent sediment and floodplain soil samples collected along the Aberjona River in Winchester, south of Beacon Street (station AJRW);
- Evaluation of recent sediment core data collected from nine locations along the Aberjona River between Route 128 and the Mystic Lakes (SC05 through SC13); and
- Evaluation of recent surface water baseflow and storm event data collected from 5 surface water gauging stations along the Aberjona River between Route 128 and the Mystic Lakes (SW05 through SW10).

EPA expects to release the revised document this summer. The revised BRA will be incorporated into a Comprehensive Remedial Investigation (RI) Report that will provide a detailed discussion on the fate and transport of contamination along the entire Aberjona River from the Industri-Plex Superfund Site (North of Route 128) in Woburn to the Mystic Lakes in Winchester and Medford. The RI will further explain potential human health and ecological risks along the river. EPA's next public meetings on the Aberjona River will take place after the release of the Comprehensive RI Report.

If you have further questions on the EPA's responses to comments, please contact Angela Bonarrigo at (617) 918-1034, or me at (617) 918-1323.

Sincerely,

Joseph F. LeMay, P.E.
Remedial Project Manager
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A. GRADIENT CORPORATION

Comments on Baseline Human Health Risk Assessment Report, Wells G&H Superfund Site, Aberjona River Study, Operable Unit 3, Woburn, MA, USEPA Region 1, March, 2003

Prepared for

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October 13, 2003

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1 Overview

This report presents Gradient's comments on EPA's "Baseline Human Health Risk Assessment Report, Wells G&H Superfund Site, Aberjona River Study, Operable Unit 3, Woburn, MA", dated March 2003. In general, we believe that EPA's risk assessment overestimates risk due to the use of several overly conservative and unrealistic exposure assumptions. The end result is that the calculated risks significantly overestimate the actual risks likely to be experienced by the local population. In this report we discuss the overly conservative nature of some exposure assumptions, and also show that the use of more realistic (yet still conservative) exposure assumptions leads to risks that are within EPA's range of acceptable risk levels.

EPA Response: See responses to specific comments below.

Chapter 2 presents our specific comments on the text and appendices. The most problematic exposure parameters that have been overestimated include the exposure frequency, the sediment ingestion rate, and the exposure point concentrations, as discussed below.

- The exposure frequencies used by EPA were based solely on professional judgment. However, it is important to note that the frequency with which a receptor might contact sediment would be far less than the frequency with which he or she might visit an area to take a walk. The exposure frequencies have been overestimated because they do not reflect the fact that the Wells G&H wetland and the Cranberry Bog are unattractive and undesirable areas for wading. These areas are overgrown with 10-ft high reeds, have soft sediment, and have mosquitoes during the summer months. It is difficult to access the sediment at stations WH and CB-03 due to the presence of dense vegetation, including vines and brambles. At some of the sample locations in CB-03, it is necessary to descend a steep embankment covered in dense vegetation to access the sediment in the bog, which itself is densely filled with tall reeds. To access these points, we found that a 6-ft tall adult was waist-deep in brush. The three southernmost points at CB-03 appear to be located in an undesirable channel of stagnant water that is choked with decaying leaves, and to access these sample points, it is necessary to walk through a dense tangle of vines and brambles. For these reasons, it is highly implausible that a young child, ages 1 to 7 years old, would contact the sample locations at WH or CB-03 at all, let alone at the frequencies assumed by EPA. Even for a more plausible adolescent receptor, EPA's assumption that wading would occur 4 days/week for 6 months/year (104 days/year) at the Cranberry Bog, and 3 days/week for 6 months/year (78 days/year) in the Wells G&H wetland is a significant overestimate, due to the lack of accessibility and desirability of these areas. Even if a boardwalk were constructed at the Wells G&H wetland in the future, it is highly unlikely that a young child would leave the boardwalk to contact sediment with a frequency of 78 days/year. Moreover, it should be noted that a recent article in the Woburn Daily Times Chronicle (8/26/03) indicated that it is possible that no nature trail will be built in this area. EPA's overestimated exposure frequencies overestimate risk in these areas.

EPA Response: Exposure frequencies for the exposure stations are based on current land use as well as future land use assumptions and do factor in professional judgment. However, the intent of the selected exposure frequencies is to adequately protect human health without being unrealistically conservative. All the samples applied to the human health risk assessment were thoroughly investigated by the Agency and risk assessors and considered reasonably accessible. The Cranberry Bog and Wells G&H wetland are well utilized areas by the neighborhood and

community. Future plans by the City of Woburn include development of the Wells G&H wetland into a passive recreational area. The Cranberry Bog is surrounded by residences, making it plausible that young children living in these residences may contact sediments and soils in areas adjacent to their yards. No fencing is in place to prevent a child from wandering from their yard into the wetland, which in some locations is a distance of as little as 5 to 10 feet. Therefore, for the Cranberry Bog, it is not unreasonable to assume an exposure frequency approaching one used in a residential setting. The Wells G&H wetland has periodically been used by community groups as a paint ball range. During each visit to these areas, adults and children were observed utilizing these areas (e.g., walking dogs, playing in groups, sliding down the embankments). It is plausible that a child engaged in a game of capture the flag or while participating in a paint ball activity would slide down a steep embankment or run through an area of stagnant water filled with decaying leaves. In addition, children and adults are naturally attracted to the edge of wetlands and surface water to observe the environment. Samples located in areas overgrown with reeds, vines, brambles or with excessively soft sediments, and considered not accessible, were not quantitatively evaluated for human exposures. For some samples, it was found that access may be more difficult via one path, but easier if approached from a different direction. For example, some of the CB-03 sampling locations may be more difficult to access by simply descending the bank, but could be easily accessed after entering the wetland in a less steep and drier area, and then traveling through the wetland to these sampling locations. Should the City of Woburn elect not to construct a boardwalk (station BW) into the Wells G&H wetland, then such future exposure assumptions used for station BW may over estimate risk.

- EPA's assumption that a child obtains 50% of his daily soil/sediment ingestion from the site is based solely on professional judgment. Since soil ingestion is believed to occur sporadically throughout the day as a consequence of hand-to-mouth activity, the assumption that a child obtains 50% of his daily soil/sediment ingestion from the site implies that the child is ingesting sediment for a significant portion of the day. Since sediment in the Cranberry Bog and the Wells G&H wetland is difficult to access due to the dense vegetation, and the areas are undesirable as wading or play areas, the duration of any sediment exposure event is likely to be very brief. Thus the assumption that a child obtains 50% of his daily soil/sediment ingestion from the site overestimates risk.

EPA Response: Since sediments adhere to body surfaces, it is not unrealistic to assume that 50% of a receptor's intake would occur from the study area. This assumption acknowledges that human receptors would not spend 100% of their recreational time in impacted areas.

- Recent soil ingestion rate studies suggest that the average and high-end soil ingestion rates for children are lower than the values used by EPA (200 mg/day for a child and 100 mg/day for an adult) based on 1994 Region I Guidance. EPA's 1997 Exposure Factors Handbook recommends soil ingestion rates of 100 mg/day for a child and 50 mg/day for an adult (USEPA, 1997). Use of these soil ingestion rates would decrease risks by a factor of two.

EPA Response: The child and adult soil ingestion values recommended in the 1997 Exposure Factors Handbook represent central estimate values and are appropriate for use in a central tendency evaluation. The Exposure Factors Handbook does not recommend upper percentile values for use with a reasonable maximum scenario. Therefore, EPA Region I values, recommended for use in a

reasonable maximum scenario, were selected for use. These values are consistent with ingestion rates recommended by MADEP and, as stated in the Exposure Factors Handbook, are within the range of ingestion estimates from published studies. The central tendency ingestion rates utilized are the same as those recommended in the Exposure Factors Handbook for use in a central tendency evaluation.

- At several stations, EPA has based risks on a highly uncertain estimate of the average arsenic concentration that people might be exposed to, resulting in an overestimate of risk. The exposure point concentrations (EPCs) for several exposure areas (WH, CB-03, 13/TT-27) are highly uncertain and based on skewed data sets. This is especially problematic in that these datasets, as analyzed by EPA, yielded risks of potential concern. These stations are discussed below.

EPA Response: See overall response provided below for these three data sets.

- At station WH, the dataset is highly skewed due to the inclusion of one sample with a high arsenic concentration. This sample (SD-12-01-ME with 3230 mg/kg) is the southernmost sample that EPA included in the WH area (Figure 1). The skewed dataset strongly suggests that this exposure area is not well delineated, and thus that this dataset may be inappropriate for use in risk management decisions. In addition, it is an unexpected observation that two samples with the same ID, taken by different contractors (SD-12-01-ME and SD-12-01-FW), appear to have been collected from two different locations (Figure 1).

EPA Response: SD-12-01-FW was collected in 1995 while SD-12-01-ME was collected in 1997. The samples were originally intended to be co-located. However, when the area was returned to in 1997, the sampling location was moved slightly to include a depositional area that had not been previously characterized. These sample locations are illustrated on Figure 2-3.

- At station CB-03, on the western side of the Cranberry Bog, EPA used an arsenic EPC equal to the maximum concentration (1410 mg/kg) detected in this exposure area, because the 95%UCL exceeds the maximum concentration. EPA's use of the maximum concentration as the EPC indicates that the dataset for CB-03 is skewed, with the maximum concentration located at the southernmost sample (Figure 2). The sediment concentrations in 11 of the 12 samples at CB-03, ranging from 9.1 to 510 mg/kg, are much lower than the maximum concentration, and the average concentration of all 12 samples is only 272 mg/kg. Based on this dataset, if a person visited each sample location with equal frequency, then, on average, that individual would be exposed to an average concentration much lower than 1410 mg/kg. Therefore, using an EPC of 1410 mg/kg in all likelihood overestimates the risks for CB-03. In addition, the sediment in the CB-03 exposure area is not very accessible because these sample locations are located in areas with dense vegetation, including vines, brambles, and tall reeds.

- At station 13/TT-27, on the west side of the Wells G&H wetland, the dataset is highly skewed due to two samples with high concentrations. EPA used an arsenic EPC that is equal to the maximum concentration (4210 mg/kg) because the calculated 95%UCL exceeded the maximum. EPA's use of the maximum concentration as the EPC indicates that the 13/TT-27 area has too few samples to be well characterized. The skewed dataset strongly suggests that this exposure area is not well delineated, and thus that this dataset may be inappropriate for use in risk management decisions. The average concentration of all samples is 840 mg/kg. Based on this dataset, if a person visited each sample location with equal frequency, then, on average, that individual would be exposed to an

average concentration that is much lower than 4210 mg/kg. Therefore, using an EPC equal to the maximum concentration of 4210 mg/kg likely overestimates risks for 13/TT-27.

EPA Response: According to EPA guidance, the arithmetic average concentration is not to be used as the reasonable maximum exposure point concentration (EPC). The reasonable maximum EPC in the report were calculated appropriately in accordance with EPA guidance. EPA acknowledges that the reasonable maximum EPC used at a small number of stations maybe uncertain due to one or a small number of elevated arsenic detects compared to the remainder of the data set. This uncertainty is specifically applicable to stations WH (sample SD-12-01-ME; 3230 mg/kg), CB-03 (sample CB-03-11; 1410 mg/kg), and 13/TT-27(samples SD-13-01-FW and SD-13-02-FW; 4210 mg/kg and 2480 mg/kg, respectively). During public presentations, this uncertainty was acknowledged, and the public was informed that the risk estimated for these stations was largely attributable to elevated arsenic levels in one or a small number of samples. This information will be added to the text of the risk assessment, with the locations of the highest arsenic levels identified. The highest concentatrions of arsenic found in sediments can be extracted from Figure 2-24. In addition, EPA has recently released version 3.0 of the ProUCL calculation software (version 2.1 was used for the draft report). ProUCL version 3.0 is being used in revisions to the draft report. Its use may result in a more accurate estimate of exposure point concentrations for these stations.

EPA's uncertainty analysis should be expanded to more clearly articulate how many of the assumptions are biased towards overestimating rather than underestimating potential health risks. The impact of these conservative assumptions on the uncertainty in the calculated risks should be explained. In addition, as noted below in Appendix B, EPA's cancer slope factor for arsenic is very conservative, especially as applied to U.S. populations experiencing relatively low levels of exposure, and thus will further tend to overestimate the cancer risk from exposure to arsenic in sediment.

EPA Response: The uncertainty section will be expanded to include additional notations as to those assumptions that tend to overestimate or underestimate risk. In addition, the discussion in the uncertainty section relative to the arsenic toxicity factor will be expanded.

Chapter 3 presents the results of Gradient's deterministic risk calculations to demonstrate the implications of alternate (and more realistic) exposure assumptions for the risk estimates at Stations WH, NT-1, NT-2, NT-3, 13/TT-27, and CB-03. The exposure frequencies were reduced to 6 days/year, to reflect the fact that the Wells G&H wetland and the Cranberry Bog are very undesirable areas for wading, because they are covered in dense vegetation, including vines and brambles, and are difficult to access. In addition, the soil ingestion rates were reduced to the more recent values in EPA's 1997 Exposure Factors Handbook. The use of more realistic, yet still conservative, exposure assumptions results in deterministic RME cancer risks that are at or below $2x10^{-5}$ at all six of these stations. Noncancer risks are also at or below 0.4 at all six stations. These risks do not exceed EPA's permissible risk limits.

EPA Response: Exposure frequencies used in Gradient's deterministic risk calculations are not sufficiently protective of reasonable maximum exposures that are occurring or may occur in the future at these stations. These areas are currently utilized by the community at a higher frequency than would be accounted for by an exposure frequency of 4 to 6 days/year. Future plans to develop these areas into more attractive and more highly utilized recreational spaces would only serve to increase the frequency with which individuals visit the site and contact impacted media. The deterministic calculations performed by Gradient and provided in Chapter 3 of these comments have not been reviewed for accuracy since the exposure assumptions (i.e., exposure frequencies and soil ingestion rates) used are not sufficiently protective of current or potential future reasonable maximum exposures

in these areas. In addition, the reference dose for arsenic used in these calculations is not appropriate for childhood exposures, even if occurring for less than 7 years in duration.

Chapter 3 also presents the results of Gradient's probabilistic (Monte Carlo) analyses. In order to assess the uncertainty associated with EPA's deterministic risk calculations, Gradient performed probabilistic risk calculations for the ingestion of arsenic in sediment, for current risk at CB-03, and future risk at stations WH, NT-1, NT-2, NT-3, and 13/TT-27. for both cancer and noncancer risks. Ingestion of arsenic in sediment is the major contribution to EPA's cancer and noncancer risks. The probabilistic risk calculations are presented to help put EPA's risks into perspective, and because USEPA Region I "considers Monte Carlo analysis to be an acceptable approach for analyzing uncertainty in the risk assessment" (USEPA, 1994).

The results of the probabilistic risk calculations indicate that all of the 95th percentile cancer risks are at or below $3x10^{-5}$. The 95th percentile risk is $1x10^{-5}$ at both WH and CB-03, $2x10^{-5}$ at NT-1, $6x10^{-6}$ at NT-2, $4x10^{-6}$ at NT-3, and $3x10^{-5}$ at 13/TT-27. The 95th percentile noncancer hazards range from 0.07 to 0.95 and are all less than EPA's acceptable hazard of 1.0. The 95th percentile risk means that there is a 95% probability that the risks to any one individual will be below this value.

The probabilistic risks are substantially lower than EPA's individual risk estimates for the ingestion of arsenic in sediment (Table 1). Although the probabilistic risks are only for the ingestion of arsenic in sediment, this pathway represents a major portion (about 75%) of EPA's total cancer risks for these stations. This analysis indicates that EPA's RME risks are very high-end values and hence are not representative of RME values. Use of a more plausible range of exposure inputs results in cancer risks falling within EPA's acceptable risk range of 10^{-6} to 10^{-4}, and noncancer hazards falling below 1.0.

EPA Response: The probabilistic calculations performed by Gradient and contained in Chapter 3 have not been reviewed for accuracy. Specific assumptions used in Gradient's probabilistic assessment are not sufficiently protective of current or potential future site conditions. Should it be determined that probabilistic information would be useful during the risk management process, an evaluation will be conducted at that time by EPA.

Appendix A presents the results of recent soil ingestion rate studies to demonstrate that the sediment ingestion rates used by EPA overestimate likely sediment ingestion rates. EPA used RME sediment ingestion rates of 200 mg/day for a child and 100 mg/day for an adult, based on 1994 EPA Region I Guidance. EPA's 1997 Exposure Factors Handbook recommends soil ingestion rates of 100 mg/day for a child and 50 mg/day for an adult (USEPA, 1997). Use of these sediment ingestion rates would decrease predicted risks by approximately a factor of two.

EPA Response: As stated previously, the child and adult soil ingestion values recommended in the 1997 Exposure Factors Handbook represent central estimate values and are appropriate for use in a central tendency evaluation. Since the Exposure Factors Handbook does not recommend upper percentile values for use with a reasonable maximum scenario, EPA Region I values, recommended for use in a reasonable maximum scenario, were selected for use. These values are consistent with ingestion rates recommended by MADEP and, as stated in the Exposure Factors Handbook, are within the range of ingestion estimates from published studies. The central tendency ingestion rates utilized are the same as those recommended in the Exposure Factors Handbook for use in a central tendency evaluation.

Appendix B presents a discussion of arsenic toxicity to illustrate the very conservative nature of the arsenic toxicity factor, especially as applied to US populations, and provides evidence that the use of

this factor will tend to overestimate the cancer risk from exposure to arsenic in sediment. Appendix B discusses U.S. epidemiological studies of arsenic carcinogenicity, demonstrating that the estimated arsenic exposures to sediment in the Aberjona River are well below the exposures experienced by U.S. populations where epidemiological studies have not found elevated cancer risks. In addition, the estimated arsenic exposures to sediment in the Aberjona River are well below the exposures found in studies of non-U.S. populations that show an increased risk of cancer due to exposure to high concentrations of arsenic in drinking water. Appendix B also discusses the implications of the non-linearity of the dose-response relationship for arsenic carcinogenicity, and the fact that exposure to arsenic in soil has not been shown to cause adverse health effects.

EPA Response: The discussion in the uncertainty section relative to the arsenic toxicity factor will be expanded.

2 Specific Comments on Text and Appendices

Gradient's specific comments on the risk assessment report are presented below by report section and page number.

3.1.2 Identification of Exposure Stations

p. 3-8, 1st ¶. The exposure assumptions at NT-1, NT-2, and NT-3 are implausible. The NT-3 exposure area is a proposed nature trail on the eastern side of the wetland, near Well H, without access into the wetland. NT-2 includes the proposed NT-3 nature trail area, *plus* a pier extending west into the wetland. NT-1 includes the proposed NT-3 nature trail area, *plus* an elevated walkway located farther west in the wetland. The future RME cancer risks at NT-3, NT-2, and NT-1 are calculated by EPA as 1E-04, 2E-04, and 5E-04, respectively. Area NT-3 has an acceptable cancer risk of 1E-04. The cancer risks increase to what EPA concludes to be unacceptable levels (greater than 1E-04) with the addition of the pier (NT-2) and the elevated walkway (NT-1) that extend farther west into the wetland. Both the pier and the elevated walkway (boardwalk) would need to be elevated a few feet off the ground in order not to be subject to flooding. Thus, in order for a child (1 to 6 years old) to be exposed to sediment, he or she would have to leave the boardwalk and engage in activity bringing him or her in contact with sediments on each visit to the boardwalk. This is an implausible assumption given the young age of the children, and the fact that children of this age would be under supervision. It is unlikely that children would be allowed to leave the boardwalk, especially on each visit, and particularly if the area adjacent to and below the boardwalk is filled with dense vegetation.

EPA Response: It is acknowledged that children and adults would be unlikely to leave a hypothetical boardwalk each time the study area is visited. However, without the boardwalk being fenced and the exact construction details not available, it would be remiss to assume a lesser degree of exposure. This evaluation is intended to evaluate future uses proposed by the City of Woburn as described in the report. If the City of Woburn elected not to construct a pier or boardwalk, or design a pier or boardwalk to minimize exposures to sediments, then EPA may need to re-evaluate the future risks associated with NT-2 or NT-3. If the City of Woburn decided to construct a boardwalk or pier into the wetlands and unacceptable risks remained under the NT-2 or NT-3 exposure scenarios, then cleanup alternatives would need to be considered for the area to reduce those risks.

For the exposure stations on the east side of the Wells G&H wetland, EPA used an exposure frequency of 78 days/year, based solely on professional judgment. However, an exposure frequency of 78 days/year (3 days/week for 6 months/year) is unrealistically high given the fact that this portion of the wetland is located immediately adjacent to the shooting range of the rod and gun club, the wetland is filled with reeds, the sediment is soft, and the area has mosquitoes during the summer months. These attributes would render the area unattractive as a wildlife viewing or recreational area. We also note that exposures to sediment do not occur unless the person leaves the path or boardwalk. EPA has blurred the distinction between how often someone visits the area to take a walk, and how often he or she might actually contact sediments by wading. Because the wetland lacks desirability as a play area, a person is unlikely to contact sediment each time he or she visits the area to take a walk. EPA's scenario implies that a child would ingest sediment during each of his or her 78 visits per year. This assumption is unrealistic, even for a reasonable maximum exposure scenario.

EPA Response: The Wells G&H wetland has been reported by residents as an area that is used daily by nearby residents for nature walks, and recently, has been utilized periodically as a paint ball range by community children. Activities reported and observed as occurring include fishing, catching frogs

and insects and playing games. These activities may all result in contact with the wetland media. The 78 day/year-exposure frequency for the Wells G&H wetland area is for future exposures. It is likely that children and adults would visit this area more frequently than 78 days per year. In fact, residents have stated to EPA that they currently go to this area nearly every day. The 78 days/year exposure frequency is intended to provide a reasonable maximum estimate of the number of days of sediment and surface water contact per year for future site use in the Wells G&H wetland area. The total number of visits per year, which may include visits without sediment and surface water contact, is acknowledged as likely to exceed 78 days per year.

3.2.2.5 Data Evaluation

p. 3-16. Data Evaluation. The Aberjona River floods periodically. EPA should explain the basis for its implied assumption that samples collected in 1995 are still representative of current conditions, *i.e.*, whether EPA has evaluated co-located samples to show that 1995 and 2001 samples have similar concentrations, or whether EPA has studied the temporal variation in arsenic sediment concentration over time.

EPA Response: The 2001 sampling was conducted to fill data gaps and considered new locations. Co-located sampling was conducted in 1997, when some of the 1995 sediment sampling locations were re-sampled. The results for those co-located samples were similar and indicate that concentrations are remaining relatively stable over time. Appendix A.2 (M&E Supplemental Data Compendium) contains a comparison of the co-located 1995 and 1997 data.

p. 3-17, 2nd ¶, 1st sentence. Cr(VI) was not detected in a sample with total chromium of 930 mg/kg, but was detected in a sample with total chromium of 13,400 mg/kg. On this basis, EPA assumes Cr(VI) is not present at sediment concentrations equal to or less than 930 mg/kg, and that Cr(VI) is present at 0.13% of the total chromium concentration at sediment concentrations greater than 930 mg/kg. This sentence should make it clear that the estimate of 0.13% of Cr(VI) is based on only one sample with a total chromium concentration of 13,400 mg/kg. This is a very conservative assumption, since the sample with Cr(VI) detected (13,400 mg/kg) has a concentration two orders of magnitude higher than the next highest concentration sample where Cr(VI) was not detected (930 mg/kg). Based on the observation that Cr(VI) was only detected in a sample with total chromium concentration of 13,400 mg/kg, EPA should apply the Cr(VI) assumption only to samples that have concentrations of total chromium greater than 10,000 mg/kg, as there is no justification for a broader application of this assumption.

EPA Response: The uncertainty section will be modified to explain that the 0.13% value is based on the results of a single detected concentration of Cr(VI) in those samples analyzed in 2002 via ion chromatography. Due to the lack of Cr(VI) ion chromatography data in samples with total chromium levels between 930 mg/kg and 13,400 mg/kg, 930 mg/kg was selected as the threshold above which Cr(VI) may be present. Cr(VI) data collected by an alternate colorimetric method were not used in this site-wide extrapolation due to interferences with the method that resulted in some data rejection. However, those colorimetric data that were not rejected were used on a station-by-station basis.

p. 3-17, 3rd ¶, 2nd sentence. EPA states that "stations NT-2, NT-3 and WG have *station-specific* results demonstrating that Cr(VI) was non-detect at the location of the *maximum* detected total chromium value". The maximum concentration of total chromium at all three of these stations was 2570 mg/kg, in sample SD-WG-10. However, the report does not present Cr(VI) results for a sample with a total chromium concentration of 2570 mg/kg. EPA also implies (in the first paragraph on page 3-17) that there are no Cr(VI) results for total chromium concentrations between 930 and 13,400 mg/kg. Moreover, Appendix C.4 does not contain Cr(VI) results for any samples with total chromium concentrations between 930 and 13,400 mg/kg. Therefore the basis for the statement regarding station-specific Cr(VI) results for samples

at stations NT-2, NT-3, and WG is unclear. If EPA has Cr(VI) data for samples with total Cr concentrations between 930 and 13,400 mg/kg, then these data should be presented.

EPA Response: Cr(VI) was analyzed using a colorimetric method and by ion chromatograph. Since some of the colorimetric results were rejected, the ion chromatography results were deemed as the most reliable and used to develop site-specific assumptions concerning the relative presence of Cr(VI). However, those colorimetric Cr(VI) results that were not rejected (e.g.., at SD-WG-10) were used as station-specific results for those stations that included that data point (NT-2, NT-3 and WG). Therefore, station NT-2, NT-3 and WG are stated as having station-specific results that demonstrate non-detect levels of Cr(VI) above 930 mg/kg total chromium.

p. 3-17, last ¶. The assumption that all chromium in surface water, surface soil, and fish exists as Cr(VI) has no scientific basis and is unrealistically conservative. It is not reasonable to assume that chromium in surface water exists entirely as Cr(VI) when EPA's data show that most of the chromium in these sediments exists as Cr(III).

EPA Response: In the absence of medium-specific Cr(VI) results for surface water, surface soil and fish, total chromium results were assumed to be Cr(VI). This assumption is protective and reflects the lack of site-specific chromium speciation data for these media.

3.2.3 Identification of COPCs

p. 3-19. It should be noted that the use of residential soil PRGs as a COPC screening criterion for surface soil along the streambank is very conservative. The level of exposure in residential scenarios is well above what is contemplated for recreational exposures. Similarly, using drinking water PRGs as a COPC screening tool for evaluating surface water in the Aberjona River, which is not used as a source of drinking water, is overly conservative.

EPA Response: It will be noted in the uncertainty section that conservative screening values (i.e., PRGs) are used when selecting COPCs so as not to omit a compound that might contribute significantly to risk.

p. 3-19. The AWQC for arsenic should not be used as an ARAR. The AWQC was derived using a toxicity value for inorganic arsenic. The majority of arsenic in fish exists as arseno-sugars (*e.g.*, arsenobetaine, arsenocholine). The fraction of inorganic arsenic in freshwater fish has been reported to be less than 10% (Schoof *et al.*, 1999). The arseno-sugars are essentially non-toxic because they are excreted unmetabolized in a relatively short time. EPA is currently revising the AWQC for arsenic based on this information (*Fed. Reg.* Oct. 12, 2000). In addition, the arsenic AWQC is more than 500 times lower than the maximum contaminant level (MCL), the regulatory limit for arsenic in drinking water that is based on a lifetime of daily exposure.

EPA Response: The BRA is not intended to identify ARARs. ARAR identification will ocurr in the Feasibility Study. The uncertainty section will discuss that the arsenic AWQC is currently under review by EPA. Regardless of the use of this value, arsenic would continue to be selected as a surface water COPC.

p. 3-20. EPA notes that the background fish tissue lead level is 0.34 mg/kg but then delays use of this value until the risk characterization. Lead should be eliminated as a COPC for fish tissue at this stage by comparison to background.

EPA Response: According to EPA Region I guidance, contaminants are not typically eliminated as COPCs based on a comparison to background. Therefore, lead has been retained as a fish COPC until the risk characterization section.

3.2.4 Determination of Exposure Point Concentrations

p. 3-22. Exposure Point Concentrations.

Gradient is unable to reproduce the EPC calculations for stations NT-1 and 13/TT-27 because the database provided by EPA[1] does not include some of the samples that EPA used in their exposure areas (according to Table C.1-1). At NT-1, seven samples are missing, and at 13/TT-27, one sample is missing.

EPA Response: All data utilized in the EPC calculations are provided in Appendix B.

EPA states (p.3-22, 2nd ¶) that "USEPA requires the use of the 95%UCL on the arithmetic mean concentration for the estimation of both the CT and RME risk", and notes that wherever possible, the 95%UCL has been used as the EPC. This discussion is misleading and should be modified for clarification and consistency with current guidance. EPA should cite their current guidance on calculating EPCs (USEPA, 2002).[2] The 2002 guidance recommends the use of the 99% Chebyshev UCL for certain datasets, and in fact EPA has used the 99% Chebyshev UCL as the EPC for certain datasets. Therefore discussing the use of only the 95% UCL in this discussion is incorrect. In addition, Table 3-3.2, which lists the statistic used for the EPC in each exposure area, is incorrect, because for stations where the EPC is the 99% Chebyshev UCL (for example, at WH), the table states that the 95%UCL was used. Table 3-3.2 should be corrected.

EPA Response: The 99% Chebyshev UCL was used as the EPC for certain datasets. This information is presented in the ProUCL documentation provided in Appendix B.

The EPC (and hence the risk) in the WH exposure area is heavily influenced by the samples that EPA chose to include in this exposure area. EPA selected the boundary of the WH exposure area, presumably based on professional judgment. However, EPA has not demonstrated that all of the sample locations they included in the WH exposure area are uniformly accessible. The arsenic EPC of 1900 mg/kg for the WH exposure area is heavily influenced by EPA's inclusion of one sample with a very high arsenic concentration (SD-12-01-ME). The WH samples (WH-01 to WH-10) included in the WH exposure area range from 4.7 to 424 mg/kg, and have an average arsenic concentration of 123 mg/kg. However, the last sample included in the WH exposure area, SD-12-01-ME, has a concentration of 3230 mg/kg, which is an order of magnitude higher in concentration than the next highest WH sample. This sample is the southernmost sample within this exposure area (Figure 1). Including this sample yields an EPC for station WH that is potentially biased high. If EPA did not include sample SD-12-01-ME in the WH exposure area, the EPC at WH would be 663 mg/kg[3], and risks at WH would decrease by a factor of 3. Thus, the inclusion of this one sample tends to overestimate the risk for the entire WH exposure area.

At station WH, the EPC of 1900 mg/kg is the 99% Chebyshev minimum variance unbiased estimate (MVUE) UCL. Table 3-3.2 should note that the EPC for WH is the 99%UCL, not the 95%UCL, and EPA should provide the statistical rationale for using the 99% Chebyshev UCL as the EPC, as described

[1] Metcalf & Eddy (Wakefield, MA). 2002. "Analytical data for baseline risk assessment, Wells G&H Superfund Site, Aberjona River study, Operable Unit 3, Woburn, Massachusetts." February.

[2] USEPA, 2002. Office of Emergency and Remedial Response (Washington, DC). "Calculating upper confidence limits for exposure point concentrations at hazardous waste sites. Supplemental guidance to RAGS." OSWER Directive 9285.6-10. December. Downloaded from: http://www.epa.gov/superfund/programs/risk/ragsa/ucl.pdf.

[3] The EPC of 663 mg/kg was obtained from the ProUCL program, and is the 99% Chebyshev (MVUE) UCL.

in their 2002 guidance. EPA's use of the 99% Chebyshev UCL indicates that this dataset is highly skewed due to the inclusion of sample SD-12-01-ME. The skewed dataset strongly suggests that this exposure area is not well delineated, and thus that this dataset may be inappropriate for use in risk management decisions.

EPA Response: As stated above, all samples applied to the human health risk assessment were thoroughly investigated by the Agency and risk assessors and considered reasonably accessible. Appendix B documents the use of the 99% Chebyshev UCL for certain data sets. It is acknowledged that the EPC used at this station is uncertain due to one arsenic result (SD-12-01-ME; 3230 mg/kg) that was elevated in comparison to the remainder of the data set. This uncertainty will be added to the text of the risk assessment, with the locations of the highest arsenic levels identified. EPA is currently evaluating the use of ProUCL version 3.0 for revisions to the draft report. Its use may result in a more accurate estimate of exposure point concentrations for this station.

EPA has not provided sufficient information in their UCL guidance (USEPA, 2002) or ProUCL manual (USEPA, 2003) to assess the validity of their choice of the 99% Chebyshev UCL as better than other possible methods. EPA should provide its underlying analyses that led to the UCL recommendations so that experts in the community can review and refine if appropriate. For example, Saranko and Tolson (2003) (provided in Appendix C) show that the UCL of data sets with statistical characteristics similar to the WH dataset may be better estimated with alternative methods that give rise to lower UCL values. Their analysis suggests that EPA's method may have overestimated the EPC, and therefore the risk, for the WH dataset.

EPA Response: Use of the methods provided by the ProUCL software package and associated guidance provided consistent decision-making with respect to calculating UCLs for the various data sets. EPA is currently evaluating the use of ProUCL version 3.0 for revisions to the draft report. Its use may result in a more accurate estimate of exposure point concentrations.

At Station CB-03, on the western side of the Cranberry Bog, EPA used an exposure point concentration (EPC) that is equal to the maximum concentration (1410 mg/kg) detected in this exposure area, because the calculated 95%UCL exceeded the maximum. EPA's use of the maximum concentration as the EPC indicates that the CB-03 area has too few samples to be well characterized. The sediment concentrations in 11 of the 12 CB-03 samples are much lower, ranging from 9.1 to 510 mg/kg, and the average concentration of all 12 CB-03 samples is only 272 mg/kg. Based on this dataset, if a person visited each sample location with equal frequency, then on average, he or she would be exposed to an average concentration that is much lower than the EPC of 1410 mg/kg. Therefore, using an EPC equal to the maximum concentration of 1410 mg/kg likely overestimates the risks for CB-03.

At station 13/TT-27, on the west side of the Wells G&H wetland, EPA used an EPC that is equal to the maximum concentration (4210 mg/kg) detected in this exposure area, because the calculated 95%UCL exceeded the maximum. EPA's use of the maximum concentration as the EPC indicates that the 13/TT-27 area has too few samples to be well characterized. Seven of the nine samples used to characterize this area have arsenic concentrations ranging from 12 to 356 mg/kg, but the last two samples have concentrations of 2480 and 4210 mg/kg, respectively. The average concentration of all samples is 840 mg/kg. Based on this dataset, if a person visited each sample location with equal frequency, then, on average, he or she would be exposed to an average concentration that is much lower than 4210 mg/kg. Therefore, using an EPC equal to the maximum concentration of 4210 mg/kg in all likelihood overestimates the risks for 13/TT-27.

EPA Response: According to EPA guidance, the arithmetic average concentration is not to be used as the reasonable maximum exposure point concentration (EPC). It is acknowledged that the reasonable

maximum EPCs used at a small number of stations are uncertain due to one or a small number of elevated arsenic detects compared to the remainder of the data set. This uncertainty is specifically applicable to stations WH, CB-03 and 13/TT-27. During public presentations, this uncertainty was acknowledged, and the public was informed that the risk estimated for these stations was largely attributable to elevated arsenic levels in one or a small number of samples. This information will be added to the text of the risk assessment, with the locations of the highest arsenic levels identified. As previously stated, EPA will be using ProUCL version 3.0 for revisions to the draft report. Its use may result in a more accurate estimate of exposure point concentrations for these stations.

p. 3-22. Two stations were evaluated that had only one sample to represent the exposure area, stations AM and TT-30. It is not clear why these areas were evaluated as separate exposure areas with only one sample. The risks from these areas are highly uncertain.

EPA Response: It is acknowledged that the estimated risks for these stations are uncertain. However, these samples were not in the vicinity of other samples applicable to the human health risk assessment.

p. 3-22, 3rd ¶. The following statement is incorrect and should be corrected: "In cases where the arithmetic mean value exceeded the maximum detected value, the maximum detected value was used as the EPC for both the RME and CT cases". It is not mathematically possible for the mean to exceed the maximum detected value (because the mean is an average of the maximum and at least one lower value). The sentence would be correct if "95%UCL" were substituted for "arithmetic mean value".

EPA Response: It is possible for the arithmetic mean to exceed the maximum detected concentration. If the maximum detected concentration is an estimated value (i.e., close to the detection limit) and the non-detect values were slightly elevated due to sample dilution or interferences. In this case, it is possible that use of half the slightly elevated detection limit would increase the mean value to slightly greater than the maximum detected value. No change to the text is required.

3.3 Exposure Assessment

p. 3-26, 1st ¶. The age of the child receptor is 1 to 6 years of age (p. 3-26). It is highly implausible that a child this young would have exposure to sediment with the frequency noted by EPA for the various scenarios, due to the fact that the wetlands are undesirable areas for wading, and are difficult to access by a small child due to the presence of dense vegetation both in and around the wetland. It is also implausible that a child would be exposed to sediment over his face, forearms, hands, lower legs, and feet on each and every exposure event, as EPA has assumed (p. 3-34).

EPA Response: This assumption is reasonable given the proximity of residential and future recreational properties. The evaluation estimated risks associated with childhood and adult exposures for a combined duration of 30 years, as prescribed by EPA guidance. For this evaluation, it is assumed that 6 of those years are during childhood and 24 years are during adulthood. Since childhood exposures may in fact occur for longer than 6 years, a young child (age 1 to 6) was selected for evaluation to capture the reasonable maximum childhood risk that may occur during a 6 year childhood exposure duration. Since exposures are assumed to occur during the warmest months of the year, body surface area equivalent to the face, forearms, hands, lower legs and feet may reasonably be exposed. This assumes that individuals, during the warmest six months of the year, wear short-sleeve shirts, shorts and sandals.

p. 3-28, 2nd ¶. It could be better described that NT-3 is a subset of both NT-1 and NT-2, so that it is clear that these exposure areas overlap.

EPA Response: The Executive Summary and Section 5 clearly describe the relationship of NT-1, NT-2, and NT-3 as follows: "Stations NT-1, NT-2, and NT-3 were also evaluated under a future land use scenario due to potential development plans of the City of Woburn within the Wells G&H wetland that may include the construction of a nature trail (station NT-3) with a possible boardwalk (station NT-1) or pier (station NT-2) extending out into the wetland". Further clarification can be found in Appendix C.1 which shows a listing of sediment samples comprising each of these stations. The overlap is clearly shown with this information.

p. 3-28. The frequency with which an individual might go wading and contact sediment is much less than the frequency with which a receptor might *visit* a given exposure area, because the Wells G&H wetland and the Cranberry Bog are undesirable areas for wading. Both the Wells G&H wetland and the Cranberry Bog have very low desirability for wading because to access the wetland, one must walk through dense vegetation including vines and brambles, and the wetland itself is densely filled with reeds, the sediment is soft, and the area is filled with mosquitoes during the summer months. Although a person might walk along the path on the west side of the Cranberry Bog a few times per week, that individual might never contact sediment. Due to the lack of desirability of the Wells G&H wetland for wading, it is highly unlikely that a child who walks along a boardwalk in the future Nature Trail area would leave the boardwalk and contact sediment with a frequency of 78 days/year. Moreover, it should be noted that a recent article in the Woburn Daily Times Chronicle (8/26/03) indicated that it is possible that no nature trail will be built in this area. EPA should provide a basis for their assumptions and should support their exposure frequencies by providing information regarding observations of adults or children wading in sediment during any of their site visits.

EPA Response: All the samples applied to the human health risk assessment were thoroughly investigated by the Agency and risk assessors and considered reasonably accessible. The Wells G&H wetland and Cranberry Bog are areas that are utilized by the surrounding neighborhoods and the community as a whole. The Wells G&H wetland has been reported by residents as an area that is used daily by nearby residents for nature walks, and recently, has been periodically utilized as a paint ball range by community children. The Cranberry Bog wetland is used as a play area by local children. Activities reported and observed as occurring include fishing, catching frogs and insects and playing games (such as capture the flag or hide-and-go-seek). A bridge has been built to connect the eastern and western sides of the wetland to allow greater access by individuals utilizing this area recreationally. The community performs cleanup of these areas on a regular basis, which includes trash removal in the interior wetland areas. These activities may all result in contact with the wetland media. The 78 day/year-exposure frequency for the Wells G&H wetland area is for future exposures. It is likely that children and adults would visit this area more frequently than 78 days per year. In fact, residents have stated to EPA that they currently go to this area nearly every day. The 78 days/year-exposure frequency is intended to provide a reasonable maximum estimate of the number of days of sediment and surface water contact per year for future site use in the Wells G&H wetland area. The total number of visits per year, which may include visits without sediment and surface water contact, is acknowledged as likely to exceed 78 days per year.

p. 3-30 2nd ¶. The RME sediment ingestion rate of 100 mg/day for an adult and 200 mg/day for a child is particularly conservative. These values are based on 1994 Region I Guidance. However, EPA's 1997 Exposure Factors Handbook recommends soil ingestion rates of 100 mg/day for a child and 50 mg/day for an adult (USEPA, 1997). Use of these soil ingestion rates would decrease risks by a factor of two.

EPA Response: The child and adult soil ingestion values recommended in the 1997 Exposure Factors Handbook represent reasonable central estimate values and are appropriate for use in a central tendency evaluation. The Exposure Factors Handbook does not recommend upper percentile values for use with a reasonable maximum scenario. Therefore, EPA Region I values, recommended for use

in a reasonable maximum scenario, were selected for use. These values are consistent with ingestion rates recommended by MADEP and, as stated in the Exposure Factors Handbook, are within the range of ingestion estimates from published studies. The central tendency ingestion rates utilized are the same as those recommended in the Exposure Factor's Handbook for use in a central tendency evaluation.

p. 3-30 3rd ¶. The adult exposure frequency ranges from 26 to 104 days/year, depending on the station. EPA states that due to the presence of shallow surface waters, wading is likely to be the primary recreational activity at stations along the river (p. 3-25). However, the frequency with which a receptor might go *wading* and contact and ingest sediment is much less than the frequency with which a receptor might *visit* an exposure area like the Cranberry Bog, to walk their dog, for example. We believe that the exposure frequencies used by EPA are too high, because they reflect a high-end estimate of the number of potential *visits* per year, rather than the potential number of *wading and ingestion events* per year. The Wells G&H wetland and the Cranberry Bog are unattractive areas for wading because access to the sediment is through dense vegetation including vines and brambles, the wetlands are filled with tall reeds, the sediment is soft, and these areas have mosquitoes during the summer months. At the Cranberry Bog, a 6-ft tall adult was waist-deep in brush to access the sediment; and once in the sediment, he stood in 10-ft tall reeds. Thus it is unreasonable to assume that a 1-7 year old child would contact sediment in the bog on a regular basis. It is also unreasonable to assume that wading and sediment contact activity would occur with a frequency as high as 4 days/week for 6 months/year at the Cranberry Bog, or 3 days/week for 6 months/year at the proposed future nature trail areas (NT-1, NT-2, NT-3).

EPA Response: As stated previously, the Wells G&H wetland and Cranberry Bog are areas that are utilized by the surrounding neighborhoods and the community as a whole. The Wells G&H wetland may become more highly utilized in the future should the City of Woburn decide to develop this area as recreational space. Activities reported or observed as occurring (e.g., fishing, game playing, and frog catching) result in contact with the wetland media. Sampling locations determined as inaccessible to humans (e.g., in areas of soft sediment, dense vegetation, water greater than 2 feet) were not quantitatively evaluated. The exposure frequencies utilized in the human health risk assessment are sufficiently protective of current and potential future land use without being unrealistically conservative. The number of visits per year, including those without sediment and surface water contact, is acknowledged as likely exceeding the current and future exposure frequencies used in the risk calculations.

3.3.2.2 Exposure Parameters

p. 3-32. EPA used an arsenic dermal absorption fraction of 3%, the default value recommended by EPA (USEPA, 2001a). This value is based on a study by Wester *et al.* (1993), where estimates of arsenic absorption ranged from 3.2 to 4.5 percent *in vivo* in monkeys. Various factors affect the efficiency of dermal absorption, and thus there is considerable uncertainty associated with this value. However, the 3% value is likely to overestimate arsenic absorption and thus overestimate risks for the following reasons:

- Wester *et al.* used a soluble form of arsenic (sodium arsenate) mixed with soil. However, the forms of arsenic found in sediment are likely to be relatively insoluble, since the arsenic has been present for decades, and the sediment is in contact with surface water.
- Wester *et al.* added sodium arsenate to moist soil, and applied the mixture to the skin; thus the arsenic was not "aged." However, in the environment, metals tend to transform to less soluble forms in soil over time, and can also become sequestered in the pores of soil particles (Loehr, 1996).

- Wester *et al.* applied soil to the abdominal skin of the animals for 24 hours, whereas a child receptor along the river might only be exposed to sediment *via* wading for a short period of time. Specifically, "...studies with 24-hour (or longer) exposure periods are likely to overestimate the degree of dermal absorption that would occur under typical human exposure conditions" (NEPI, 2000). The absorption of any material is time-dependent. To the extent that an individual washes his skin more often than once every 24 hours, the uptake will be reduced. Washing may remove any soil residues adhering to the skin before absorption can occur to the same extent as in the animal study.
- In the Wester study, no urinary arsenic measurements were collected within the first 24 hours; therefore, it is not possible to estimate the amount of arsenic absorbed in periods less than 24 hours. After 7 days, a total of 3.2% of the arsenic was absorbed from the soil high dose. After one day (*i.e.*, in the first 24 hours), a total of 1.2% of the arsenic was absorbed from the soil high dose. Thus, about 40% (1.2% ÷ 3.2%) of the total absorption from soil occurred in the first 24 hours. A child playing in sediment would be exposed to arsenic in sediment for less than 24 hours. Thus it is reasonable to assume that the child's dermal absorption of arsenic from sediment, even assuming an extremely conservative exposure period on the order of 2 hours, would be no more than 1.2%. For this reason, use of a dermal absorption value of 3% is conservative and would overestimate the amount absorbed and thus overestimate risk *via* the dermal contact pathway.

EPA should point out in the uncertainty section that use of a dermal absorption value of 3% overestimates the amount absorbed, possibly by a factor of two or more, and thus overestimates risk *via* the dermal contact pathway.

EPA Response: The uncertainty section will be modified to include information related to the dermal absorption of arsenic, specifically that the dermal risk may be overestimated for this compound. Without site-specific information, it is impossible to quantify the degree of overestimation.

p. 3-32. EPA's assumption is that 50% of the fish consumed is obtained from the study area. EPA should support this assumption by providing data on the productivity of this river, types of food fish in the river, and whether the fish populations can support this rate of consumption. Support for the consumption rate is cited from EPA's Exposure Factors Handbook which states that approximately half of the total fish consumed in fishing households is obtained from recreational activities (USEPA, 1997). The implication is that 50% of the fish consumed comes from recreational activities, and that 100% of the recreational fishing occurs in the study area. The assumption that 100% of the recreational fishing for 24 years occurs in the same river is highly implausible. In reality, individuals are likely to fish in different locations over the span of 24 years as conditions in this and other fishing locations change over time.

EPA Response: The fish ingestion rates utilized (5 g/day and 13 g/day) are applicable to adults engaging in recreational fishing in the New England area. The additional information from the Exposure Factors Handbook provides data with which to adjust the adult ingestion rates so as to be appropriate for a younger age group (Table 10-61). This table also provides information on the relative ingestion of store-bought and recreationally-caught fish. However, since the ingestion rates utilized are for recreationally-caught fish, the information on store-bought vs. recreationally-caught fish ingestion rate was not used. Instead, the 50% value was selected to account for the fact that it is unlikely that 100% of the recreational fish consumed by a receptor would be caught in the same river.

3.4 Toxicity Assessment

p. 3-37. EPA's adjustments to the surface water RfD for manganese to account for dietary intake of manganese are overly conservative. Manganese presents a unique problem in that the level required for physiologic functioning is only slightly lower than the level where neurological effects are seen. Therefore, IRIS recommends taking into consideration dietary contributions of manganese when "using the reference dose to determine acceptable concentrations of manganese in water and soils" and suggests using a modifying factor of 3 for drinking water (IRIS, 1996). The IRIS modifying factor of 3 for drinking water also considers neonatal exposures. The IRIS RfD, without modification, is 0.14 mg/kg-day.

USEPA Region I guidance differs from the IRIS guidance. For drinking water exposures, USEPA Region I guidance advises adjusting the IRIS RfD to account for dietary intake (a 2-fold-reduction) and to account for neonatal exposures (a 3-fold reduction) (USEPA, 1996). This 6-fold reduction of the IRIS RfD results in a Region I RfD for drinking water of 0.024 mg/kg-day.

In this risk assessment, EPA has adjusted the manganese RfD for surface water according to the Region I guidance for drinking water. This is overly conservative, because surface water from the Aberjona river is not used as a drinking water source. Furthermore, neonatal exposures are not expected under the recreational exposure scenarios that EPA evaluated. For surface water, the IRIS recommendation of a 3-fold reduction of the RfD is more appropriate and still takes into account dietary intake and neonate exposures.

EPA Response: For the revised Wells G&H OU-3 Risk Assessment and the risk assessment to be conducted for the Aberjona River north of Route 128, the manganese RfD for the surface water pathway will be changed from 0.024 mg/kg-day to 0.07 mg/kg-day, which will reflect the removal of the 3-fold adjustment to the IRIS RfD.

p. 3-38. It is unreasonable to assume that chromium in surface water exists entirely as Cr(VI) when EPA's data show that most of the chromium in these sediments (where the chromium in surface water originates) exists as Cr(III).

EPA Response: Chromium may be present in surface water as a result of overland transport. The assumption that chromium in surface water exists as Cr(IV) accounts for the lack of medium-specific speciation data.

3.4.4 Toxicity Information for Arsenic in Sediment

p. 3-40. 1st ¶, last sentence. Oral bioavailability information is provided in Appendix C.8, but Table C.8-1 should be referenced to allow the reader to easily find the information.

EPA Response: As stated, the oral bioavailability values can be found on Tables 3-5.1 and 3-6.1.

p. 3-41. EPA describes the two bioavailability values derived from the swine study as a range of best estimate bioavailability values. EPA should state that these values represent the mean bioavailability values for two different sediment types.

EPA Response: The text of the uncertainty section will be modified to clarify this point.

p. 3-41. For the equation, the second RfD term should have the subscript "IRIS", not "IRIA".

EPA Response: It is acknowledged that this subscript should correctly read "IRIS".

3.4.5 Toxicity of Lead

p. 3-42, 1st ¶, 6th sentence. Blood lead levels are reported in units of micrograms per deciliter (μg/dL). Change 10 mg/dL [milligrams per deciliter] to 10 μg/dL. This sentence does not make sense in this context. The model was used to calculate a blood lead level, not a soil lead concentration.

EPA Response: The unit will be corrected. It is acknowledged that the model is used to determine whether or not exposures to a soil lead concentration will result in the exceedance of a childhood blood lead level goal.

p. 3-42, 2nd ¶, 3rd sentence. Change 10 mg/dL to 10 μg/dL. This sentence does not make sense in this context. The model was used to calculate a blood lead level, not a soil lead concentration.

EPA Response: The unit will be corrected. It is acknowledged that the model is used to determine whether or not exposures to a soil lead concentration will result in the exceedance of a 95th percentile fetal blood lead level goal.

p. 3-42, 4th and 5th sentence. Change mg/dL to μg/dL.

EPA Response: The unit will be corrected.

3.5.2.2 Description of ILCR Estimates

p. 3-48. It should be noted that the risk and hazard index estimates would decrease if a lower, more reasonable exposure frequency were used, particularly for stations in the Wells G&H wetland, which is an undesirable area for wading. Chapter 3 of this report presents revised risk calculations that show the effect of using a lower and more realistic exposure frequency.

EPA Response: The exposure frequencies are adequately protective and represent reasonable maximum and central tendency estimates, based on known information on current land use and anticipated future land use.

p. 3-50, 5th and 6th sentence. Change mg/dL to μg/dL.

EPA Response: The unit will be corrected.

3.5.3 Description of Uncertainties

p. 3-51. The uncertainty analysis states that uncertainty exists for certain parameters, but does not note the steps that were taken to address the uncertainties in the risk assessment. In a conservative risk assessment such as this, many of the assumptions are biased towards overestimating potential health risks. The impact of these conservative assumptions on the uncertainty in the calculated risks should be explained.

EPA Response: The uncertainty section will be expanded to include additional notations as to those assumptions that tend to overestimate or underestimate risk.

p. 3-52, 2nd ¶. EPA states: "Conversely, the biodegradation of chemicals to more toxic chemicals was also not considered." The discussion of the biodegradation of chemicals should be clarified. There are two types of biodegradation that could be the subject matter here. Metabolism or biodegradation within the human body (and potential conversion of chemicals to more toxic metabolites) is accounted for in the studies that support the RfDs and CSFs. Biodegradation in the environment, prior to human exposure, is not accounted for in the toxicity values. However, most environmental processes transform chemicals towards less reactive, less toxic forms (*e.g.*, oxidation of double bonds, dechlorination, binding in complexes, *etc.*). Thus, although biodegradation of COPCs in the environment is not factored into the risk assessment, it is not likely to result in an underestimate of potential health risks.

EPA Response: This section will be clarified to state that environmental biodegredation was not considered. Since some compounds can be converted to more toxic forms as a result of environmental conditions (for example, inorganic mercury into organic forms of mercury), this uncertainty may result in either an underestimation or overestimation of risk.

p. 3-52, 3rd ¶, last sentence. EPA states that "...it is not expected that actual risks will be significantly greater than estimated risks". In fact, due to the extremely conservative screening approach employed (comparing maximum detected concentrations to screening values based on residential exposures), the added contribution of chemicals that were eliminated as COPCs would be negligible. The word "significantly" should be deleted.

EPA Response: This section discusses the impact of eliminating chemicals from further quantitative evaluation (i.e., COPC selection). Since the elimination of some chemicals from further quantitative evaluation will result in an underestimate of risk, the word "significantly" should remain to provide information to the reader that the underestimation is not expected to be very great.

p. 3-53. Section 3.5.3.3, Toxicological Data. This section should provide greater detail on the uncertainty and conservatism in the toxicity factor for arsenic, because arsenic is the major risk driver at this site. Appendix B to this report presents a discussion of arsenic toxicity.

EPA Response: The discussion in the uncertainty section relative to the arsenic toxicity factor will be expanded.

p. 3-53., 2nd sentence. This sentence: "For the study area, there is a probability of overestimating health risks or hazards for a number of reasons..." does not appear to belong in the section on "Toxicological Data". This sentence should be moved to the first paragraph on p. 3-51.

EPA Response: The sentence will be moved as suggested.

p. 3-53. 2nd ¶. EPA states that "one of the major contributors to uncertainty is the accuracy of the toxicity values used." EPA gives several assumptions used in the dose-response model for carcinogens, and states that "to the extent that any of these assumptions are incorrect, the extrapolated risks may be over- or under-estimates." However, EPA should note that, in the derivation of toxicity values, conservative assumptions are made to account for these uncertainties, and thus the values tend to be biased towards overestimating risk. For example, humans are considered to be as sensitive as the most sensitive test species. In the case of arsenic, the major risk driver in this- assessment, the toxicity factor is, as discussed in Appendix B, very conservative as applied to U.S. populations.

EPA Response: This section of the uncertainty section will be expanded as suggested.

p. 3-53, 3rd ¶. The toxicity factors are conservative and contain uncertainty factors. Appendix B to this report discusses toxicological uncertainties for arsenic.

EPA Response: The discussion in the uncertainty section relative to the arsenic toxicity factor will be expanded.

p. 3-54, 3rd ¶. The sixth sentence should be revised to: "The assumption that RME receptors obtain 100% of their self-caught dietary fish intake from the Aberjona River was also conservative."

EPA Response: The sixth sentence will be removed since it does not accurately reflect the approach utilized in the HHRA.

p. 3-54. The EPC uncertainty section should make the following points:

The EPC (and hence the risk) in the WH exposure area is heavily influenced by the samples that EPA chose to include in this exposure area. EPA selected the boundary of the WH exposure area, presumably based on professional judgment. However, EPA has not demonstrated that all of the sample locations they included in the WH exposure area are uniformly accessible. The arsenic EPC of 1900 mg/kg for the WH exposure area is heavily influenced by EPA's inclusion of one sample with a very high arsenic concentration (SD-12-01-ME). The WH samples (WH-01 to WH-10) included in the WH exposure area range from 4.7 to 424 mg/kg, and have an average arsenic concentration of 114 mg/kg. However, the last sample included in the WH exposure area, SD-12-01-ME, has a concentration of 3230 mg/kg, which is an order of magnitude higher in concentration than the next highest WH sample. This sample is the southernmost sample within this exposure area (Figure 1). Including this sample yields an EPC for station WH that is potentially biased high. If EPA did not include sample SD-12-01-ME in the WH exposure area, the EPC at WH would be 663 mg/kg[4], and risks at WH would decrease by a factor of 3. Thus, the inclusion of this one sample tends to overestimate the risk for the entire WH exposure area.

At station WH, the EPC of 1900 mg/kg is the 99% Chebyshev minimum variance unbiased estimate (MVUE) UCL. Table 3-3.2 should note that the EPC for WH is the 99%UCL, not the 95%UCL, and EPA should provide the statistical rationale for using the 99% Chebyshev UCL as the EPC, as described in their 2002 guidance. EPA's use of the 99% Chebyshev UCL indicates that this dataset is highly skewed due to the inclusion of sample SD-12-01-ME. The skewed dataset strongly suggests that this exposure area is not well delineated, and thus that this dataset may be inappropriate for use in risk management decisions.

EPA has not provided sufficient information in their UCL guidance (USEPA, 2002) or ProUCL manual (USEPA, 2003) to assess the validity of their choice of the 99% Chebyshev UCL as better than other possible methods. EPA should provide its underlying analyses that led to the UCL recommendations so that experts in the community can review and refine if appropriate. For example, Saranko and Tolson (2003) (provided in Appendix C) show that the UCL of data sets with statistical characteristics similar to the WH dataset may be better estimated with alternative methods that give rise to lower UCL values. Their analysis suggests that EPA's method may have overestimated the EPC, and therefore the risk, for the WH dataset.

At Station CB-03, on the western side of the Cranberry Bog, EPA used an exposure point concentration (EPC) that is equal to the maximum concentration (1410 mg/kg) detected in this exposure area, because the calculated 95%UCL exceeded the maximum. EPA's use of the maximum concentration as the EPC indicates that the CB-03 area has too few samples to be well characterized. The sediment concentrations

[4] The EPC of 663 mg/kg was obtained from the ProUCL program, and is the 99% Chebyshev (MVUE) UCL.

in 11 of the 12 CB-03 samples are much lower, ranging from 9.1 to 510 mg/kg, and the average concentration of all 12 CB-03 samples is only 272 mg/kg. Based on this dataset, if a person visited each sample location with equal frequency, then on average, he or she would be exposed to an average concentration that is much lower than the EPC of 1410 mg/kg. Therefore, using an EPC equal to the maximum concentration of 1410 mg/kg in all likelihood overestimates the risks for CB-03.

At station 13/TT-27, on the west side of the Wells G&H wetland, EPA used an EPC that is equal to the maximum concentration (4210 mg/kg) detected in this exposure area, because the calculated 95%UCL exceeded the maximum. EPA's use of the maximum concentration as the EPC indicates that the 13/TT-27 area has too few samples to be well characterized. Seven of the nine samples used to characterize this area have arsenic concentrations ranging from 12 to 356 mg/kg, but the last two samples have concentrations of 2480 and 4210 mg/kg, respectively. The average concentration of all samples is 840 mg/kg. Based on this dataset, if a person visited each sample location with equal frequency, then, on average, he or she would be exposed to an average concentration that is much lower than 4210 mg/kg. Therefore, using an EPC equal to the maximum concentration of 4210 mg/kg likely overestimates the risks for 13/TT-27.

EPA Response: The discussion of uncertainties associated with the EPCs will be expanded as appropriate. As previously discussed, it is acknowledged that the arsenic EPC used at a small number of stations are uncertain due to one or a small number of arsenic results that were elevated in comparison to the remainder of the data set. This uncertainty will be added to the risk assessment, with the locations of the highest arsenic levels identified.

5.1.6 Baseline Human Health Risk Assessment

p. 5-9, 2nd ¶. The EPC is the 95% upper confidence limit on the mean concentration.

EPA Response: The clarification will be added.

p. 5-10, last sentence. Change "are:" to "are arsenic and benzo(a)pyrene."

EPA Response: The text will remain unchanged so as to provide information on the locations where arsenic and benzo(a)pyrene are driving risk.

APPENDIX C-3 Human Health Reference Calculations

Table C.3-2.1. The AWQC for arsenic should not be considered for COPC screening. The AWQC was derived using a toxicity value for inorganic arsenic. However, the majority of arsenic in fish exists as arseno-sugars (*e.g.*, arsenobetaine, arsenocholine). The fraction of inorganic arsenic in freshwater fish has been reported to be less than 10% (Schoof *et al.*, 1999). The arseno-sugars are essentially non-toxic because they are excreted unmetabolized in a relatively short time. EPA is currently revising the AWQC for arsenic based on this information (*Fed. Reg.* Oct. 12, 2000).

EPA Response: As stated above, the BRA is not intended to identify ARARs. ARAR identification will ocurr in the Feasibility Study. The uncertainty section will discuss that the arsenic AWQC is currently under review by EPA.

Tables C.3-3.1, C.3-3.2, C.3-3.3. Arsenic, lead and mercury concentrations in wetland surface water are below their respective MCLs, meaning this water meets drinking water standards.

EPA Response: These compounds have been selected as surface water COPCs based on a comparison of maximum detected concentrations in all background surface water samples combined to risk-based preliminary remediation goals and AWQCs. Average or 95% UCL concentrations may not exceed these screening criteria. However, the compounds selected as COPCs are carried forward for quantitative risk evaluation.

Table C.3-5. Regarding the primary target organ column, bis-2-ethylhexyl-phthalate is also a reproductive toxin in animals (only the liver is mentioned) and inorganic mercury is better known as a nephrotoxin than an immunotoxin. The primary target organ should not be listed as "NOAEL" for chromium (VI) and vanadium. The kidney is the primary target organ for chromium *via* oral exposure. The target organ for vanadium by oral exposure could be listed as "not known".

EPA Response: The target organ for bis(2-ethylhexyl)phthalate will remain as liver, since treated offspring also displayed liver effects. Since the RfD for inorganic mercury is based on autoimmune effects, the target organ for this compound will also remain unchanged. After additional research, the target organs for chromium (VI) and vanadium will be listed as GI system and kidney, respectively. This information will be used in the revised Wells G&H OU-3 Risk Assessment and the risk assessment for the Aberjona River north of Route 128.

Table C.3-6. It should be stated in the notes that cadmium and chromium (VI) are recognized as carcinogens by the inhalation route of exposure but do not appear to be oral or dermal route carcinogens (IRIS, 2003).

EPA Response: Since Table C.3-6 lists information related to the toxicity of compounds via the oral route of exposure, it is not necessary to add information on the inhalation route of exposure.

APPENDIX C-5 Derivation of Allowable Daily Intake

General. Several calculations of allowable daily intake result in improbable values; either soil concentrations greater than 1 million mg/kg (*i.e.*, more than 100%) or fish tissue concentrations that are biologically implausible (*e.g.*, a fish composed of 10% magnesium). EPA should not use solutions that are not possible in real life. One million mg/kg should be used as the maximum soil concentration. A nominal cutoff value (*e.g.*, 1% or 10,000 mg/kg) should be used as the value in edible fish tissue when very high risk-based values are calculated.

EPA Response: Comment noted. These calculations have been presented to demonstrate that essential nutrients may be removed from further quantitative risk evaluation. The calculations will be reviewed further and changed, if necessary.

p. C.5-1. The FDA Daily Recommended Value (DRV) for sodium is 2,400 mg/day. The soil value of 1,000,000 mg/kg equates to a block of pure salt.

EPA Response: See response to general comment above.

p. C.5-2. The FDA Recommended Daily Intake (RDI) for calcium is 1,000 mg/day. EPA should indicate why a 10-fold reduction was not applied as was the case for sodium (presumably because excessive sodium intake is more of a health hazard than excessive calcium intake). The soil value of 4,000,000 mg/kg is greater than 100%. The fish value of 50,000 mg/kg would require that the edible fish tissue (*i.e.*, excluding bones and viscera) be 5 percent calcium, which is not possible.

EPA Response: See response to general comment above.

p. C.5-3. The FDA RDI for magnesium is 400 mg/day. The soil value of 8,050,000 mg/kg is greater than 100%. The fish value of 100,630 mg/kg would require that 10% of the edible fish tissue be pure magnesium, which is not possible.

EPA Response: See response to general comment above.

p. C.5-4. The FDA DRV for potassium is 3500 mg/day. The soil value of 1,000,000 mg/kg is equal to 100% potassium, which is not possible.

EPA Response: See response to general comment above.

APPENDIX C-8 Toxicity Profiles for COPCs

General.

- Although the inhalation route of exposure is not being evaluated in this risk assessment, this section contains information on the toxicity of compounds *via* the inhalation route. This should be eliminated as confusing to the reader.
- The discussion and citation of RfDs and CSFs is inconsistent between chemicals, *i.e.*, for some chemicals these values are provided and for others they are not.
- Because inhalation exposures are not being evaluated, discussion of RfCs should be eliminated.
- Bis-2-ethylhexyl-phthalate is a COPC in the risk calculation tables, but there is no discussion of this compound in Appendix C-8.

EPA Response: Information related to the inhalation route of exposure will be retained in Appendix C.8. This information is important in characterizing the overall toxicity of a COPC. The toxicity profiles will be updated and appended to the revised Wells G&H OU-3 Risk Assessment. Discussion and citations of RfDs and CSFs will be removed from the toxicity profiles since the toxicity values as well as information relative to them are provided in Tables 3-5.1 and 3-6.1. This information does not need to be repeated in the toxicity profiles. At that time, a toxicity profile will be added for bis(2-ethylhexyl)phthalate.

p. C.8-2. The term q1* is outdated terminology. The term CSF (cancer slope factor) is currently in use.

EPA Response: The toxicity profiles will be updated and appended to the revised Wells G&H OU-3 Risk Assessment.

p. C.8-5. IRIS lists the animal dose as 20 but the human equivalent concentration (HEC) as 14. These terms should be clarified.

EPA Response: This information, since it relates to the toxicity values and information provided in Tables 3-5.1 and 3-6.1, will be removed when the toxicity profiles are updated.

p. C.8-10. It should be explained that there is no RfD for the carcinogenic PAHs because either RfDs are given for individual compounds, or there is an explanation for why the RfD is lacking. Change "factor" to "factors".

EPA Response: This information will be added to the uncertainty section of the report since it contributes to the underestimation of risk.

p. C.8-24. EPA should provide the absorption of PCBs through the skin and GI tract in a more quantitative manner. EPA should note that chloracne (like non-chemical acne) is only disfiguring if it is severe.

EPA Response: No additional discussion of absorption is required. The dermal absorption of PCBs is quantitatively discussed in Section 3.3.2.2 (Exposure Parameters). Since the oral absorption efficiency of PCBs exceeds 50%, no further quantification is necessary (see Section 3.4.3 Adjustment of Toxicity Factors).

p. C.8-29. The statement in the toxicity profile that states that dermal absorption of arsenic is "not significant" contradicts the results in this risk assessment, in which dermal exposure to arsenic contributes 20-30% of the risk. In addition, arsenic is embryotoxic, fetotoxic and teratogenic only at doses and in some cases *via* routes which are inconsistent with plausible human exposures. See DeSesso in Teratology 2001 64(3):170-3.

EPA Response: This information will be added to the discussion on arsenic toxicity, to be incorporated into the uncertainty section.

p. C.8-31. The acutely toxic dose noted for barium should be put in units of mg (800 mg not 0.8 g) to make it more easily comparable to the other doses and the RfD which are expressed in mg.

EPA Response: Comment noted.

p. C.8-32. The RfC for barium is not relevant to this assessment as inhalation route exposures are not being evaluated.

EPA Response: As noted above, information related to the inhalation route of exposure will be retained in the profiles.

p. C.8-34. According to IRIS, the chronic oral RfD for chromium (VI) is 3E-3 mg/kg-day not 5E-3 mg/kg-day as stated in the text. According to IRIS, the chronic oral RfD for chromium (III) is 1.5 mg/kg-day not 1 mg/kg-day as stated in the text. The correct IRIS RfD for chromium (VI) was used in the calculations so this correction only affects the text, not the risk estimates.

EPA Response: As noted above, when the toxicity profiles are updated, discussion and citations of RfDs and CSFs will be removed. The toxicity values as well as information relative to them are provided in Tables 3-5.1 and 3-6.1.

p. C.8-34. EPA should state explicitly that chromium (VI) has not been shown to be a carcinogen by the oral route of exposure. While it is true, as stated, that ingested chromium VI is listed by USEPA as not classifiable as to carcinogenicity, the available data indicate a lack of tumorigenicity after oral chromium (VI) exposure. For example, a recent expert review panel report commissioned by the State of California indicated that chromium (VI) was not likely to be carcinogenic by the oral route of exposure (California Chromate Toxicity Review Committee, 2001). See also Proctor *et al.* (2002), and Zhang and Li (1997).

EPA Response: The language from IRIS will continue to be used in the profile ("Carcinogenicity by the oral route of exposure can not be determined and is classified as Group D").

p. C.8-36. The discussion of copper hydroxyquinoline should be deleted because an organic copper compound like copper hydroxyquinoline is not relevant to an environmental copper exposure.

EPA Response: The discussion of copper hydroxyquinoline will remain in the profile. Little data are available to assess the carcinogenic potency of copper compounds. The data from the organic copper compound is stated as uncertain with unknown relevance. However, it represents the body of information that was examined in order to arrive at "inadequate" classification.

p. C.8-37. No RfD is identified for copper in this section although a value of 4E-2 mg/kg-day is used in the risk calculations. There is currently no RfD for copper listed on IRIS, although an MCL exists which is often used to derive an RfD. EPA should document the basis for the 4E-2 mg/kg-day value in the text.

EPA Response: The provisional RfD, provided by NCEA, is back-calculated from the MCLG of 1.3 mg/L.

p. C.8-39. The RfD for cyanide (2E-2 mg/kg-day) should not be included in this section, as cyanide is not a COPC for this risk assessment.

EPA Response: The cyanide toxicity profile will be removed when the toxicity profiles are updated.

p. C.8-42. Although EPA has classified lead and lead compounds as a Group B2 probable human carcinogen, EPA has stated that the carcinogenic potency of lead appears weak and that risk management decisions based on lead's neurodevelopmental effects should be adequate to address possible carcinogenic effects. The statement should be made that it is EPA policy to evaluate lead for neurodevelopmental effects and not carcinogenicity. As written, it implies that carcinogenicity is not evaluated simply because a value is not available.

EPA Response: When the toxicity profiles are updated, this point will be clarified as noted.

p. C.8-49. The discussion of the toxicity of nickel carbonyl should be deleted. This compound has a toxicity quite different from inorganic nickel, is an occupational chemical, and is not found at the site. The same applies to nickel subsulfide.

EPA Response: Since these nickel compounds give an indication of the overall potential toxicity of nickel, this information will be retained in the toxicity profile.

p. C.8-51. The first two sentences of the selenium discussion are out of place and add no significant information to the discussion. They should be deleted and the section should start with the next paragraph.

EPA Response: The profile will be modified when the toxicity profiles are updated.

p. C.8-58. Some explanatory text should accompany Table C.8-1 because toxicity, not oral bioavailability, is the primary topic of the preceding 57 pages. The reason why other compounds (*e.g.*, PCBs, lead, organic mercury, *etc.*) are not listed should also be noted. Finally, the special case of the site-specific oral bioavailability of arsenic in sediment should be discussed.

EPA Response: The purpose of this table is presented in Section 3.4.3 and on Tables 3-5.1 and 3-6.1.

APPENDIX C-9 Relative Bioavailability of Arsenic in Sediments from the Aberjona River

p. 3. EPA should provide more information on where the sediment samples were collected. For example, the location in the streambed and the depth of the overlying water column should be provided.

EPA Response: This information will be provided in the Comprehensive Remedial Investigation Report being prepared by TetraTech NUS in support of the Aberjona River Study Area north and south of Route 128. All samples were collected along the edge of the stream or wetland, in areas considered accessible to humans (e.g., below less than 2 feet of standing water). The following correlates the bioavailability sampling locations to historical sampling locations:

Bioavailability Sample	*Historical Location*
1	*HB01-08*
2	*HB02-04*
3	*HB03-08*
4	*SD12-01-ME*
5	*WG-07*
6	*WS-08*
7	*CB03-06*
8	*CB03-11*
9	*CB03-09*
10	*SD07-10-FW*
11	*SD07-04-FW*
12	*SD07-05-ME*

p. 17. This section should note whether any data were excluded from the analysis.

EPA Response: Test Material (TM) 3 was excluded from the in vivo portion of the study because the arsenic levels were judged not to be high enough to yield measurable results in swine. However, TM3 was used in the in vitro portion of the study.

Figure 4-2. The data suggest two groups of results at high arsenic doses, one following linear dose-elimination pattern and one following a sublinear pattern. EPA should state whether the data following the apparent sublinear pattern represent a subgroup of animals, or if this is simply random variability in the data.

EPA Response: Figure 4-2 presents results for all animals receiving TM1, followed over time from 6 to 11 days after the beginning of dosing. Random variability in the data is shown.

Figure 5-1. The RBA values in this figure appear to be approximately 54% and 43%. What do these values represent? Their arsenic concentrations seem to match sediment samples TM1 and TM2. However the RBA estimates provided for TM1 and TM2 on page 17 are 37% and 51%. EPA should add error bars to this figure so that the apparent dose-effect on RBA can be more clearly evaluated by the reader.

EPA Response: The values plotted for RBA represent the upperbound of the 90% confidence interval. Since this figure is simply provided to show the inverse correlation between RBA and sediment concentration, no further clarification is necessary.

Table B-3. The footnotes indicate that some pigs ate only part of their dose. An estimate of the amount of the dose consumed is noted. However, if the soil is not homogeneous within the doughball but rather located in the center, EPA should explain whether it is possible to accurately estimate the amount of soil not consumed from the amount of dough not eaten.

EPA Response: Since the amount of dough not consumed tended to be minimal (typically between 5% and 10%), it is unlikely that this type of estimation will have a significant impact on the determination of RBA.

3 Revised Risk Calculations

3.1 Revised Deterministic Risk Calculations

EPA's risk analysis overestimates risks due to a number of overly conservative exposure assumptions, including high-end estimates for exposure frequency and soil ingestion rate. EPA's assumptions for exposure frequencies, which are based on professional judgment, are especially troubling. For example, it is highly implausible that any individual, starting at age 1, would wade in the maximum concentration sediment at CB-03 for 4 days/week, 6 months/year, and 30 years. This section presents recalculated cancer and noncancer risks for WH, NT-1, NT-2, CB-03, and 13/TT-27, to show the impact of more plausible (yet still conservative) estimates for exposure frequency and soil ingestion rate. The changes to exposure frequency and ingestion rate are still conservative, but yield a more realistic estimation of risk.

Exposure frequencies were modified in the following manner:

- For current and future risks from exposure to sediment at the west side of the Cranberry Bog (CB-03), we assumed a sediment exposure frequency of 1 day/month for 6 months/year (6 days/year). The cranberry bog has little desirability as a wading area, because it is densely filled with reeds, it is accessible only by walking through dense vegetation that includes vines and brambles, it has mosquitoes present during the summer, and it shows little evidence that humans use this area on a frequent basis.
- For current risks from exposure to sediment at WH, we used an exposure frequency of 4 days/year. Like the Cranberry Bog, the Wells G&H wetland has little desirability as a wading area, because it is densely filled with reeds, it is surrounded by dense vegetation including vines and brambles, and it has mosquitoes present during the summer. For current exposures at WH, we used a lower exposure frequency than for the Cranberry Bog, because this wetland is currently even harder to access than the Cranberry Bog.
- For future risks from exposure to sediment at the stations in the Wells G&H wetland (WH, NT-1, NT-2, NT-3, and 13/TT-27), we used an exposure frequency of 1 day/month for 6 months/year (6 days/year), the same as that used for the Cranberry Bog. Future redevelopment may make accessibility to this wetland approximately equal to that of the Cranberry Bog, and this wetland is considered as undesirable for wading as the Cranberry Bog.

The soil ingestion rate was decreased to 100 mg/day for a child and 50 mg/day for an adult, using the recommended soil ingestion rates in EPA's Exposure Factors Handbook (USEPA, 1997). All other parameters were kept the same, including the EPCs, the 50% fraction from site, and the exposure duration.

Table 1 presents revised risks to illustrate the impact of two modest changes in exposure parameters. All revised risks are within EPA's acceptable levels for both cancer and noncancer risks. The current RME cancer risks at WH and CB-03 decrease to $8x10^{-6}$ and $9x10^{-6}$, respectively. The current RME noncancer risks at WH and CB-03 both decrease to 0.2. The future RME cancer risks at WH, NT-1, NT-2, and NT-3 decrease to between $4x10^{-6}$ and $2x10^{-5}$. The future cancer risk decreases to $9x10^{-6}$ at CB-03, and to $3x10^{-5}$ at 13/TT-27. The future RME noncancer risks decrease to 0.3 at WH and NT-1, 0.1 at NT-2 and NT-3, 0.2 at CB-03, and 0.4 at 13/TT-27. All risks are within EPA's acceptable exposure limits. Note that

although we used an exposure frequency of 4 days/year for current risk, and 6 days/year for future risk, at stations in the Wells G&H wetland (WH, NT-1, NT-2, NT-3, and 13/TT-27), the exposure frequency could be as high as 15 days/year and risks would still fall within EPA's acceptable risk limits. The exposure frequency at CB-03 in the Cranberry Bog could be as high as 35 days/year and risks would still fall within EPA's acceptable risk limits.

Only two exposure parameters were modified for the revised risks presented in Table 1. However, other parameters could be modified that would reduce risks even further, such as use of a lower dermal absorption for arsenic, or use of a subchronic RfD for arsenic. Dermal contact accounts for 20-30% of the total risk for both cancer and non-cancer and is thus a significant contribution to risk. EPA used a dermal absorption of 3%. Using the results of the Wester study (see Section 3.3.2.2) it is reasonable to assume that a child's dermal absorption of arsenic from sediment, even assuming an extremely conservative exposure period on the order of 2 hours, would be no more than 1.2%. Thus the dermal absorption value of 3% is conservative and tends to overestimate the amount absorbed and overestimate risk *via* the dermal contact pathway. We note, in addition, that there is no literature to indicate that dermal contact with arsenic in sediment or soil causes cancer or any other health effects.

A subchronic RfD is appropriate for evaluation of exposures that are less than 10% of a lifetime. Therefore, it is appropriate to use a subchronic RfD to evaluate noncancer risks for the 1-6 year old child. USEPA Region 8 has derived an oral RfD for arsenic of 0.015 mg/kg-day that addresses both acute and subchronic exposures (USEPA, Region 8, 2001). This value is 50 times higher than the chronic RfD that EPA used for arsenic (0.0003 mg/kg-day). According to Region 8, the subchronic RfD is appropriate to quantify non-cancer health risks from subchronic exposures to inorganic arsenic lasting 15 days to 7 years (USEPA, Region 8, 2001). If the Region 8 subchronic arsenic RfD is used, the noncancer risks would be about 50 times lower than those presented in Table 1, since arsenic contributes more than 99% of the noncancer risks for these stations.

EPA Response: Exposure frequencies used in Gradient's deterministic risk calculations are not sufficiently protective of reasonable maximum exposures that are occurring or may occur in the future at these stations. These areas are currently utilized by the community at a higher frequency than would be accounted for by an exposure frequency of 4 to 6 days/year. Future plans to develop these areas into more attractive and more highly utilized recreational spaces would only serve to increase the frequency with which individuals visit the site and contact impacted media. The deterministic calculations performed by Gradient and provided in Chapter 3 of these comments have not been reviewed for accuracy since the exposure assumptions (i.e., exposure frequencies and soil ingestion rates) used are not sufficiently protective of current or potential future reasonable maximum exposures in these areas. In addition, the reference dose for arsenic used in these calculations is not appropriate for childhood exposures, even if occurring for less than 7 years in duration.

Table 1
EPA and Revised Risk Calculations

Current Cancer Risk
Exposure Factors Revised: Exposure Frequency, Soil Ingestion Rate

	EPA Current RME Risks		Revised Current RME Risks	
Station	Exp Freq (d/yr)	Cancer Risk	Exp Freq (d/yr)	Cancer Risk
WH	26	1E-04	4	8E-06
CB-03	104	**3E-04**	6	9E-06

Current Noncancer Risk
Exposure Factors Revised: Exposure Frequency, Soil Ingestion Rate

	EPA Current RME Risks		Revised Current RME Risks	
Station	Exp Freq (d/yr)	Noncancer Risk	Exp Freq (d/yr)	Noncancer Risk
WH	26	**2**	4	0.2
CB-03	104	**6**	6	0.2

Notes:
1. Values in bold exceed 1E-04 for cancer risks or 1 for noncancer risks.
2. Revised soil ingestion rates taken from USEPA Exposure Factors Handbook (1997), Table 4-25: Child: 100 mg/day, Adult: 50 mg/day.

(Continued)

Table 1
EPA and Revised Risk Calculations (cont'd)

Future Cancer Risk
Exposure Factors Revised: Exposure Frequency, Soil Ingestion Rate

	EPA Future RME Risks		Revised Future RME Risks	
Station	Exp Freq (d/yr)	Cancer Risk	Exp Freq (d/yr)	Cancer Risk
WH	78	**4E-04**	6	2E-05
NT-1	78	**5E-04**	6	2E-05
NT-2	78	**2E-04**	6	8E-06
NT-3	78	1E-04	6	4E-06
CB-03	104	**3E-04**	6	9E-06
13/TT-27	78	**8E-04**	6	3E-05

Future Noncancer Risk
Exposure Factors Revised: Exposure Frequency, Soil Ingestion Rate

	EPA Future RME Risks		Revised Future RME Risks	
Station	Exp Freq (d/yr)	Noncancer Risk	Exp Freq (d/yr)	Noncancer Risk
WH	78	**7**	6	0.3
NT-1	78	**8**	6	0.3
NT-2	78	**3**	6	0.1
NT-3	78	**2**	6	0.1
CB-03	104	**6**	6	0.2
13/TT-27	78	**10**	6	0.4

Notes:
1. Values in bold exceed 1E-04 for cancer risks or 1 for noncancer risks.
2. Revised soil ingestion rates taken from USEPA Exposure Factors Handbook (1997), Table 4-25: Child: 100 mg/day, Adult: 50 mg/day.

3.2 Probabilistic Risk Calculations

In order to assess the uncertainty associated with EPA's deterministic risk calculations, Gradient performed probabilistic risk calculations for the ingestion of arsenic in sediment at stations WH, NT-1, NT-2, NT-3, 13/TT-27, and CB-03. The probabilistic risk calculations are presented to help put EPA's risks into perspective, and because USEPA Region I "considers Monte Carlo analysis to be an acceptable approach for analyzing uncertainty in the risk assessment" (USEPA, 1994).

Probabilistic risk calculations use distributions for the input parameters instead of point estimates, to express the fact that a given exposure parameter may have a range of plausible values for different individuals. We used distribution inputs for five exposure parameters: exposure frequency, sediment ingestion rate, body weight, bioavailability, and fraction from site. For the purpose of this calculation, we used EPA's point estimates for the exposure point concentration (EPC), exposure duration, averaging time, and cancer slope factor. EPA guidance (USEPA, 2001b) states that the EPC should be a point estimate rather than an input distribution, and distributions are not available for the cancer slope factor.

The input distributions used for each exposure parameter are described in Table 2. We used a uniform distribution for bioavailability because we have a range for this parameter, but it is difficult, at this time, to identify any particular value as more likely than any other. Inputs for other distributions are based on literature values or professional judgment.

Table 3 presents the results of the probabilistic risk calculations. All of the 90th percentile cancer risks are at or below $2x10^{-5}$, and all of the 95th percentile cancer risks are at or below $3x10^{-5}$. The 95th percentile risk is $1x10^{-5}$ at both WH and CB-03, $2x10^{-5}$ at NT-1, $6x10^{-6}$ at NT-2, $4x10^{-6}$ at NT-3, and $3x10^{-5}$ at 13/TT-27. The 95th percentile risk is used here as an estimate of the RME, because EPA's Guidance for Probabilistic Risk Assessment states that "In human health PRA, a recommended starting point for risk management decisions regarding the RME is the 95th percentile of the risk distribution." (EPA, 2002; p. 7-4). The 95th percentile risk means that there is a 95% probability that the risk to any one individual will be below this value. The probabilistic noncancer hazard quotients are presented in Table 3. The 95th percentile noncancer hazards range from 0.07 to 0.95 and are all less than EPA's acceptable hazard of 1.0.

The probabilistic risks are substantially lower than EPA's individual risk estimates for the ingestion of arsenic in sediment (Table 1). Although the probabilistic risks are only for the ingestion of arsenic in sediment, this pathway represents a major portion (about 75%) of EPA's total cancer risks for these stations. This analysis indicates that EPA's RME risk, derived by using point estimates for all inputs, is a very high end value and hence is not representative of an RME value. Use of a more plausible range of exposure inputs results in risks falling within EPA's acceptable risk range of 10^{-6} to 10^{-4}. The probabilistic risks corroborate the revised deterministic risks (Table 1), in that both sets of risks do not exceed EPA's acceptable risk levels when more realistic inputs are used.

A sensitivity analysis was also performed as part of the probabilistic risk calculations. The results of the sensitivity analysis indicate that the calculated cancer risk is most sensitive to the Child exposure frequency, the Child fraction from site, and the Child sediment ingestion rate. These three parameters together account for 69% of the variability in the calculated cancer risk. This means that variation in the values used for these parameters has a large influence on the calculated risk. Thus, the sensitivity analysis highlights the fact that use of accurate and reasonable values for these parameters is critical to the overall confidence in the predicted risks.

EPA Response: The probabilistic calculations performed by Gradient and contained in Chapter 3 have not been reviewed for accuracy. Specific assumptions used in Gradient's probabilistic assessment are not sufficiently protective of current or potential future site conditions. Should it be determined that probabilistic information would be useful during the risk management process, an evaluation will be conducted at that time by EPA.

Table 2
Distributions for Exposure Parameters

Parameter	Assumed Distribution	Distribution Parameters: WH (Current)	Distribution Parameters: CB-03 (Current and Future)	Distribution Parameters: WH, NT-1, NT-2, NT-3, 13/TT-27 (Future)	Source
Exposure frequency	Lognormal	Range = 1-20 50th% = 4 95th% = 12	Range = 1-20 50th% = 6 95th% = 12	Range = 1-20 50th% = 6 95th% = 12	Professional judgment based on site visits.
Sediment ingestion rate	Lognormal	Child: Range = 1-300 50th% = 45 95th% = 124 Adult: Range = 1-300 50th% = 23 95th% = 100	Child: Range = 1-300 50th% = 45 95th% = 124 Adult: Range = 1-300 50th% = 23 95th% = 100	Child: Range = 1-300 50th% = 45 95th% = 124 Adult: Range = 1-300 50th% = 23 95th% = 100	Literature values, see Appendix A. Used half the child value for 50th percentile, and EPA value for 95th percentile.
Body weight	Normal	Child: Range = 11-19 Mean = 15 Stdev = 2 Adult: Range = 34-216 Mean = 70 Std Dev = 4	Child: Range = 11-19 Mean = 15 Stdev = 2 Adult: Range = 34-216 Mean = 70 Std Dev = 4	Child: Range = 11-19 Mean = 15 Stdev = 2 Adult: Range = 34-216 Mean = 70 Std Dev = 4	EPA Exposure Factors Handbook
Bioavailability of Arsenic in Sediment	Uniform	Min = 37% Max = 51%	Min = 37% Max = 51%	Min = 37% Max = 51%	EPA swine study
Fraction from site	Triangular	Min = 0% Max = 100% Most likely = 50%	Min = 0% Max = 100% Most likely = 50%	Min = 0% Max = 100% Most likely = 50%	Professional judgment.

Table 3
Probabilistic Cancer Risks
Current Risks from Ingestion of Arsenic in Sediment

Station	Arsenic EPC (mg/kg)	Probabilistic Cancer Risk 90th Percentile	Probabilistic Cancer Risk 95th Percentile	EPA Point Estimate Current RME Risk from Ingestion of Arsenic in Sediment
WH	1900	8.0E-06	1.1E-05	8.6E-05
CB-03	1400	7.6E-06	1.0E-05	2.6E-04

Probabilistic Noncancer Hazards
Current Risks from Ingestion of Arsenic in Sediment

Station	Arsenic EPC (mg/kg)	Probabilistic Noncancer Hazard 90th Percentile	Probabilistic Noncancer Hazard 95th Percentile	EPA Point Estimate Current RME Hazard from Ingestion of Arsenic in Sediment
WH	1900	0.15	0.21	1.5
CB-03	1400	0.14	0.19	4.5

(Continued)

Table 3 (continued)
Probabilistic Cancer Risks
Future Risks from Ingestion of Arsenic in Sediment

Station	Arsenic EPC (mg/kg)	Probabilistic Cancer Risk 90th Percentile	Probabilistic Cancer Risk 95th Percentile	EPA Point Estimate Future RME Risk from Ingestion of Arsenic in Sediment
WH	1900	1.0E-05	1.3E-05	2.6E-04
NT-1	2500	1.4E-05	1.8E-05	3.3E-04
NT-2	820	4.5E-06	5.9E-06	1.1E-04
NT-3	500	2.7E-06	3.5E-06	6.7E-05
13/TT-27	4200	2.3E-05	2.9E-05	5.7E-04
CB-03	1400	7.6E-06	1.0E-05	2.6E-04

Probabilistic Noncancer Hazards
Future Risks from Ingestion of Arsenic in Sediment

Station	Arsenic EPC (mg/kg)	Probabilistic Noncancer Hazard 90th Percentile	Probabilistic Noncancer Hazard 95th Percentile	EPA Point Estimate Future RME Hazard from Ingestion of Arsenic in Sediment
WH	1900	0.19	0.25	4.6
NT-1	2500	0.24	0.32	6.0
NT-2	820	0.08	0.11	2.0
NT-3	500	0.05	0.07	1.2
13/TT-27	4200	0.41	0.95	10
CB-03	1400	0.14	0.19	4.5

Appendix A

Recent Studies of Soil Ingestion Rate

Appendix A Recent Studies of Soil Ingestion Rate

EPA's use of RME sediment ingestion rates of 200 mg/day for a child and 100 mg/day for an adult is overly conservative. These values are based on 1994 Region I Guidance. EPA's 1997 Exposure Factors Handbook recommends soil ingestion rates of 100 mg/day for a child and 50 mg/day for an adult (USEPA, 1997). These values were used in our deterministic risk calculations presented in Section 3.1. In addition, more recent studies indicate that the average and high-end soil ingestion rates are lower than the 1994 values used by EPA. Recent studies of soil ingestion rates are discussed below. The results of these studies indicate that child soil ingestion rates would be better described by a mean rate of 45 mg/day, and a 95th percentile rate of 124 mg/day. This distribution was used in our probabilistic risk calculations described in Section 3.2.

Stanek and Calabrese (1995a) performed a re-analysis of a previous soil ingestion study of 64 children (ages 1-4) in Amherst, Massachusetts (Calabrese *et al.*, 1989). The Amherst study is one of the most comprehensive and detailed studies of children's incidental soil ingestion to date (Calabrese *et al.*, 1989). In this study, incidental soil ingestion rates were estimated using a mass balance approach. In the re-analysis, the Amherst data were used to develop distributions of potential daily soil ingestion rates, including estimates for various percentiles of the study population. Using this approach, the authors estimated a mean soil ingestion rate for the 50^{th} percentile child (ages 1-4 years) of 45 mg/day (Stanek and Calabrese, 1995a). This re-analysis differs from earlier interpretations of the Amherst study (including evaluations conducted by the study researchers) and reflects a more robust approach that takes into account a greater degree of the information reflected in the study data.

Stanek and Calabrese (1995b) re-analyzed a combined data set (n=168) based on the Amherst study mentioned above, and another soil ingestion study by Davis *et al.* (1990) that involved 104 children (ages 2-7) in the state of Washington. Based on their re-analysis of the combined dataset, the authors estimated a mean soil ingestion rate for the 50^{th} percentile child of 37 mg/day.

Stanek and Calabrese (2000) performed a soil ingestion study of 64 children (ages 1-4 years) living on a Superfund site in Anaconda, Montana. Stanek and Calabrese derived a seven-day average soil ingestion rate for the 50^{th} percentile child of 17 mg/day. (The comparable value based on the 1989 Amherst population was 45 mg/day.) The seven-day average soil ingestion rate for the 95^{th} percentile child was 141 mg/day (compared to 208 mg/day for the Amherst population.) Stanek and Calabrese (2000) also estimate average soil ingestion rates over longer time periods, based on the seven-day study period. They estimate that the 95^{th} percentile child will have a 365 day average soil ingestion rate of 106 mg/day for the Anaconda population and 124 mg/day for the Amherst population. These estimates are based on an analysis of uncertainty in the daily soil ingestion estimates, using standard statistical techniques.

EPA Response: The child and adult soil ingestion values recommended in the 1997 Exposure Factors Handbook represent central estimate values and are appropriate for use in a central tendency evaluation. The Exposure Factors Handbook does not recommend upper percentile values for use with a reasonable maximum scenario. Therefore, EPA Region I values, recommended for use in a reasonable maximum scenario, were selected for use. These values are consistent with ingestion rates recommended by MADEP and, as stated in the Exposure Factors Handbook, are within the range of ingestion estimates from published studies. The central tendency ingestion rates utilized are the same as those recommended in the Exposure Factors Handbook for use in a central tendency evaluation.

Appendix B

Arsenic Toxicity

Appendix B Arsenic Toxicity

The current arsenic Cancer Slope Factor (CSF) for arsenic of 1.5 $(mg/kg\text{-}day)^{-1}$ is based on skin cancer observed in a study of over 40,000 people in Taiwan who were exposed for a significant portion of their lifetime to high concentrations of arsenic in groundwater used for drinking water (Chen *et al.*, 1985; Tseng *et al.*, 1968). The CSF derived from this study is generally believed to be conservative – see for example, Morales *et al.*, 2000; SEGH, 2002; Brown *et al.* 2000; and Buchet and Lison, 2000. This section discusses the toxicity of arsenic, providing evidence of the conservatism in the current USEPA CSF for arsenic. Although we do not necessarily suggest that EPA use an alternative value for the CSF, this Appendix provides a perspective on the conservatism in the calculated risks. Several studies conducted in the U.S. have shown that people exposed to arsenic in drinking water, at doses higher than those estimated in this risk assessment, do not have an increased risk of cancer. In addition, the estimated doses of arsenic for individuals exposed to this site are much lower than those in studies of overseas populations that do show evidence of an increased risk of cancer from exposure to arsenic.

B.1 U.S. Epidemiological Studies of Arsenic Carcinogenicity

B.1.1 Overview of U.S. Epidemiological Studies of Arsenic Exposure

Several well-designed epidemiological studies have been conducted in U.S. populations with highly elevated arsenic exposures. The U.S. epidemiological studies consistently show a lack of association between arsenic exposure and cancer outcomes. Table B-1 summarizes findings from the best available epidemiological studies of U.S. populations with elevated arsenic exposures, including two with high childhood exposures. These studies are summarized below:

- The Lewis *et al.* (1999) study, conducted by USEPA scientists, was designed to investigate the health effects of chronic consumption of arsenic-contaminated drinking water in a cohort of 4,058 residents of Millard County, Utah. For the seven communities included in the study, average drinking water concentrations ranged from 18 to 191 μg/L, and maximum detected concentrations ranging as high as 620 μg/L. Together with information on the residence history of the cohort members, the median drinking water concentrations were used to establish three arsenic exposure indices: low (<1,000 ppb-years), medium (1,000-4,999 ppb-years), and high (≥5,000 ppb-years).

- Despite highly elevated exposures to arsenic in drinking water, Lewis *et al.* (1999) reported the lack of a relationship between bladder and lung cancer and exposure to drinking water arsenic in the Utah cohort. A small, but statistically significant increase in prostate cancer was noted, but it was not dose dependent, and thus does not confirm a relationship between arsenic and prostate cancer.

- Based on their findings, the authors concluded "Whereas the studies in Taiwan and Argentina reported high exposures to drinking water arsenic, this study population was exposed to much lower levels, perhaps indicating that bladder cancer occurs in response to higher arsenic."

- A case-control study in Utah failed to find a relationship between bladder cancer and arsenic exposure from drinking water. The drinking water concentrations of arsenic in this study averaged 5μg/L (the total range was 0.5-160 μg/L). While this case-control study suggested that smoking might potentiate the effects of arsenic-induced bladder cancer, this observation was not consistent with respect to latency period (Bates *et al.*, 1995).

- A large ecological study, conducted by Morton *et al.* (1976), examined skin cancer incidence in a large study population of 190,871 exposed to arsenic drinking water concentrations averaging 16.5 μg/L and 4.8 μg/L in rural and urban regions respectively. No relationship between skin cancer and arsenic was found. Based on results, the authors stated that "it seems safe to conclude that our data showed no evidence of water arsenic influence on skin cancer incidence in Lane County over this 14-year period."

- In Churchill County, Nevada, Moore *et al.* (2002) investigated the relationship between childhood cancer incidence and arsenic exposure in drinking water from 1979 to 1989. Over 327,000 Nevada children were grouped into low, medium, and high exposure categories (*i.e.*, >10 μg/L, 10-25 μg/L and 35-90 μg/L, respectively). No statistically significant association between arsenic and any type of childhood cancer was found in any of the exposure groups.

- Tollestrup *et al.* (2002) used a cohort of over 3,000 children (aged 2 to 14) who had lived in close vicinity to the ASARCO Ruston copper smelter between the years 1910 and 1932 to examine to association between arsenic exposure and cause of death, which occurred 30 to 80 years after exposure. The authors used the number of years lived in a one-mile radius (*i.e.,* designed categories of 0- < 1.0 year, 1.0-3.9 years, 4.0 –9.9 years, and >10 years) of the smelter stack as a surrogate for arsenic exposure. The study found no evidence of increased bladder or lung cancer mortality rates, even in the three highest arsenic exposure categories.

- Lamm and coworkers (2002) conducted an extensive analysis of the relationship between arsenic in drinking water and cancer incidence using data from 133 US counties and over 75 million person-years of observations. Bladder cancer mortality data were collected for the years 1950 to 1979 along with Unites States Geological Survey (USGS)-derived data on arsenic levels in US groundwater supplies. Bladder cancer standard mortality ratios (SMRs) from individual counties dependent on groundwater as a drinking source, having median levels ranging from 3-60 μg/L, were compared to county-specific arsenic groundwater concentrations. Linear regression analysis of these data indicated that the slope estimate of this relationship was indistinguishable from zero, *i.e.* there was no evidence of a dose response relationship between arsenic intake and bladder cancer.

In summary, despite some highly elevated arsenic exposures (higher than those for the Aberjona River), these studies do not show evidence of increased excess bladder, lung, or skin cancer risk in the United States. These studies indicate that ingestion of arsenic in drinking water, at the levels found in the U.S., do not cause cancer. It should be noted that what are considered to be elevated arsenic exposures among U.S. populations are still substantially lower than those of the Taiwanese and South American populations where large excess lifetime bladder, lung, and skin cancer risks have been observed. Consequently, these U.S. epidemiological studies are suggestive of a possible threshold for arsenic carcinogenicity. Findings from these studies thus indicate that the use of a cancer slope factor (CSF)

based on studies of cancer occurrence (bladder, lung, and skin) in highly exposed Taiwanese populations may result in overestimates of arsenic-related cancer risk in the United States.

B.1.2 Interpretation of U.S. Studies

Prevalence of Skin Cancer In Populations With Elevated Arsenic Exposures

As noted above, there is a lack of observed skin cancer cases in U.S. epidemiological studies of populations with elevated arsenic exposures. Valberg *et al.* (1998) examined whether this observation was more likely due to an absence of risk in U.S. populations or random variability from a predicted risk. This was done using a likelihood ratio approach that evaluated which of two hypotheses was the more likely explanation for the lack of observed skin cancer cases in the studies of U.S. populations. This analysis showed that no effect of arsenic on skin cancer prevalence was about 2.2 times more likely than an effect of arsenic exposure on skin cancer prevalence as predicted by EPA's current arsenic cancer potency factor of 1.5 $(mg/kg/day)^{-1}$. This study thus indicates that using a cancer potency factor based on a study of elevated arsenic exposures in the Taiwanese population may result in overestimates of skin cancer prevalence in the U.S. population.

Power of U.S. Epidemiological Studies To Detect Arsenic-Related Health Risks

A recent sample size calculation published in *Environmental Health Perspectives* supports the point that epidemiological studies of U.S. populations, such as the Lewis *et al.* (1999) study of Millard County, Utah, have sufficient power to detect the postulated arsenic-health risks if the risks are indeed as high as those estimated for Taiwanese populations (Frost *et al.*, 2002). Specifically, Frost *et al.* (2002) estimated the sample size required to test the arsenic risk predicted by Morales *et al.* (2000) for the United States.[5] In order to detect these large predicted excess risks, Frost *et al.* concluded that a sample size of approximately 1,400 would be needed for an arsenic drinking water exposure level of 100 µg/L. This sample size requirement was more than satisfied by the Lewis *et al.* (1999) study of a cohort of 4,058 individuals in Millard County, Utah, described in Section B.1.1. Frost *et al.* concluded that their findings were inconsistent with the "postulated excess risk for lung and bladder cancers", and did not "support the concerns that epidemiologic studies in the United States are not sufficiently powerful to detect the postulated arsenic-related health risks."

B.2 Non-U.S. Epidemiological Studies of Arsenic Carcinogenicity

Several studies conducted outside the United States have established arsenic as a skin, bladder, and lung carcinogen in humans. However, many of these studies have found an increased risk of cancer only at relatively high doses of arsenic, *i.e.*, arsenic concentrations in drinking water greater than 100 µg/L (for review see Brown and Ross, 2002). Several key studies are summarized below:

- The relative risk for urinary cancer and transitional cell carcinoma in a northeastern Taiwanese study population (based on a National Taiwan comparison group) was statistically significant only at arsenic concentrations in drinking water greater than 100 µg/L (Chiou *et al.*, 2001).

[5] The Morales *et al.* (2000) re-analysis of internal cancer risks in the arsenic-endemic region of southwestern Taiwan was used by U.S. EPA to calculate cancer risks at various MCL options in revising the arsenic drinking water regulations.

- Morales *et al.* (2000) re-analyzed the original data from Southwestern Taiwan. Using a the Taiwanese population as a comparison group, a recalculation of the relative risks for lung and bladder cancer showed a statistically significant dose-response relationship only at arsenic concentrations in drinking water that were greater than 400 μg/L.
- Lamm (2003) also re-analyzed data from southwestern Taiwan, considering differences in arsenic exposure from artesian (pressurized deep water) *vs.* non-artesian (shallow water) wells. Lamm concluded that bladder cancer incidence was independent of arsenic levels in villages that did not rely on the artesian wells as a water source. In contrast, when a village relied exclusively on water from artesian wells, a relationship was found. This indicates that contaminants in artesian wells (*i.e.*, humic acids, fluorescent substances, and fungal toxins), other than arsenic, may have contributed to increased bladder cancer risk.
- Guo and Tseng (2000) re-collected and re-analyzed data from Southwestern Taiwan. The study examined both bladder cancer incidence and death in the arsenic-contaminated region. While the study demonstrated a relationship between arsenic concentration and bladder cancer (incidence and death), this relationship was observed only at drinking water arsenic concentrations greater than 640 μg/L.
- In a cross-sectional study from Inner Mongolia (Tucker *et al.*, 2001; as cited in NRC, 2001), skin cancer was observed only in individuals exposed to peak concentrations of 150 μg/L or greater.

B.3 Non-linearity of Dose-response Relationship for Arsenic Carcinogenicity

The use of a cancer slope factor to quantify cancer risks associated with arsenic ingestion includes the default assumption that the dose-response relationship is linear at low doses. This assumption implies that even a very low dose of arsenic confers some excess cancer risk, and that, as the dose increases, risk increases in a directly proportional fashion. Careful examination of the biological principles that govern arsenic toxicity indicate that this assumption is incorrect for arsenic and that the true dose-response relationship is likely to be sub-linear or non-linear. Thus, from a toxicological perspective, low doses of arsenic would be relatively less harmful than higher doses, and may, in fact, be associated with zero risk.

A key fact that supports non-linearity for the arsenic dose-response relationship is associated with the way in which arsenic alters gene expression (Rudel *et al.*, 1996; Kitchin *et al.*, 2001). Specifically, arsenic does not interact directly with DNA to produce point mutations, but instead may modify gene transcription through one or more indirect mechanisms, including chromosome alterations, changes in DNA-methylation patterns, and perturbation of key regulatory enzymes.

A description of possible mechanisms of arsenic-induced carcinogenesis is provided below. These mechanisms are not mutually exclusive and all are consistent with a non-linear dose-response relationship.

- Arsenic has conclusively been shown to induce chromosome damage without interacting with DNA in cell culture systems as well as in animals. (Noda *et al.*, 2002; Wang *et al.* 1994; Vega *et al.*, 1995; NRC 1999).

- Arsenic affects DNA methylation status, which can affect the transcriptional regulation of genes critical to cell growth and cell death (Zhao *et al.*, 1997; Mass and Wang, 1997).
- Arsenic may inhibit aspects of DNA repair including inhibition of p53 (Mass and Wang, 1997) and components of the nucleotide excision repair system (Hu *et al.*, 1998; Andrew *et al.*, 2003)
- Arsenic may modulate cell signaling pathways responsible the regulation of cell proliferation. Specifically, exposure to arsenic can activate the c-Src dependent Epidermal Growth Factor Receptor (EFGR) and the mitogen-activated protein kinase (MAPK) cell signaling pathways (Simeonova and Luster, 2002; Bode and Dong, 2001)
- Metabolism of arsenic to its trivalent methylated metabolites (MMA^{III} and DMA^{III}) can generate reactive free oxygen radicals that can cause DNA damage (Kitchin *et al.*, 2003; Mass *et al.*, 2001).
- Treatment of human cells with micromolar concentrations of arsenic can induce protective cellular mechanisms such as the enhanced transcription of glutathione-related genes and induction of heat shock proteins (Del Razo *et al.*, 2001; Schuliga *et al.*, 2002).
- Luster (2003) suggests that arsenic acts through multiple mechanisms and suggests that the dose-response for arsenic is likely to be non-linear in the low dose region.

Based on available data, including the above proposed modes of action, arsenic does not appear to be an initiating carcinogen (*i.e.*, the type of carcinogen for which a linear dose-response relationship is plausible).

Despite the strong evidence that arsenic does not exert its toxicity in a linear fashion, both the EPA and the NRC have used linear models to estimate human risks at low arsenic exposures. This decision was made based on a 1996 EPA guidance document which states that, in the absence of definitive mode of action, a linear default assumption will be utilized. Thus, the decision to reject a non-linear or threshold model for arsenic carcinogenesis was a decision based on policy and not the most biologically plausible model. Because the EPA cancer slope factor in IRIS is based on a linear dose-response relationship, and the true dose-response is likely to be non-linear, use of the cancer slope factor is likely to overestimate cancer risks at exposure levels lower than those experienced in the Taiwanese study upon which the CSF is based.

Evidence of arsenic's non-linearity is further supported by evidence from epidemiological studies. As discussed previously, U.S.-based studies indicate that elevated of levels of arsenic in drinking water are not associated with increased bladder and lung cancer risk. In addition, studies from Taiwan and Inner Mongolia demonstrate that arsenic does not pose a significant cancer risk until drinking water levels are greater than 100 µg/L. Collectively, these studies indicate that increased risk of cancer is not associated with low doses of arsenic.

B.4 Evaluation of Exposure to Arsenic in Soil

By comparison with food and water, incidental ingestion of arsenic from contaminated soil or sediment does not contribute significantly to total arsenic intake and resulting arsenic body burden. The modest impact of arsenic on body burden is evidenced by studies that show low increases in urinary arsenic levels after soil exposure. Although elevated urinary arsenic levels were reported to be associated

with very high soil arsenic levels near copper smelters (Baker *et al.*, 1977; Binder *et al.*, 1987), studies of populations of children residing in communities with concentrations of arsenic in soil at or below 200 mg/kg indicate very little, if any, effect of arsenic in soil on body burden of arsenic, as reflected in urine arsenic levels (Valberg *et al.*, 1997; Hewitt *et al.*, 1995). In addition, the Anaconda, MT study demonstrated that urinary arsenic levels were unaffected by soil arsenic levels as high as 500 mg/kg (Hwang *et al.*, 1997). This observation is likely due to the small impact of soil arsenic relative to the impact of background levels of arsenic in food and water. Although there is no literature specifically on arsenic exposures to sediment, we would expect that exposure to sediment would be similar to that in soil, and that it would have a similarly small impact.

Studies of arsenic contamination in the area adjacent to the former ASARCO copper smelter in Ruston, Washington indicate that childhood exposures to arsenic in soil and air do not result in increased rates of bladder or lung cancer during adulthood. The study followed a cohort of children residing in the area during smelter operation during 1907-1932. The authors used the number of years lived within a one-mile radius of the smelter stack as a surrogate for total ambient arsenic exposure *via* soil and air. Exposure was evaluated as a function of duration of residence (categories of 0-<1.0 year, 1.0-3.9 years, 4.0-9.9 years, and >10 years). Arsenic soil concentrations ranged from 100 to 1600 mg/kg when measured in 1974 (Harter *et al.* 1993), and thus were at least that high during the exposure period of 1907-1932. The study found no evidence of increased bladder or lung cancer mortality rates, even in the three highest arsenic exposure categories (Tollestrup *et al.*, 2002; Harter *et al.*, 1993; Frost, 2003). While the cohort in this study was exposed to arsenic *via* both soil and air, another study conducted at this site in the mid 1980's demonstrated that exposure to arsenic *via* incidental ingestion of soil had a strong correlation to urinary arsenic levels indicating that soil exposure is an important determinant of total arsenic dose in children (Polissar *et al.*, 1990).

Adverse health effects from exposure to arsenic in soil are not addressed in any of the above studies. ATSDR's Toxicity Profile for Arsenic (ATSDR, 2000) does recognize arsenic-contaminated soil as a potential source of adverse health effects. However, ATSDR acknowledges that arsenic-bound soil has low bioavailability, through both the oral and dermal route, that will limit toxicity. Additionally, the profile does not present any studies in which exposure to arsenic-contaminated soil resulted in adverse health effects.

B.5 Conclusions

Several U.S.-based studies provide evidence that even relatively high levels of arsenic in drinking water do not result in increased cancer risk. By estimating water consumption in these exposed populations, we can calculate total arsenic intake and compare these values to estimated exposures to arsenic in sediment along in the Aberjona River. It is also useful to compare site-specific exposures of arsenic to levels ingested at the MCL for arsenic in drinking water. In all cases, we find that exposures to arsenic in sediment along the Aberjona River are well below levels at which no cancer increase was observed in U.S. studies, and are also less than permissible exposures to arsenic in drinking water at the MCL of 10 μg/L.

EPA has estimated site-related lifetime daily average arsenic intakes up to 0.3 μg/kg-day for a child, and 0.13 μg/kg-day for an adult, (for future RME exposures at NT-1). In contrast, estimated arsenic intakes as high as 5.7 μg/kg-day have been experienced by U.S. populations without evidence of increased cancer risks (see Table B-1). Specifically, for the Lewis *et al.* (1999) study, which is among the largest and best-conducted of the epidemiological studies of U.S. populations with elevated arsenic

exposures, average intakes of arsenic in drinking water ranged from 0.26 to 2.7 μg/kg-day (based on average drinking water consumption of 1L/day (Jacobs *et al.* 2000)). Over 1,200 members of the Millard County, Utah, cohort resided in the two communities with the highest intake level (average 2.5 μg/kg-day), many for their entire lifetimes. Despite these elevated intakes, no elevated death rates from bladder or lung cancers were observed for those who died through November 1996 (2,203 cohort members), and death rates were not elevated among the cohort members with the highest levels of drinking water arsenic. The observed bladder and cancer mortality risks in the Lewis *et al.* study are lower than the baseline health risks predicted for the general population of Utah, even with arsenic drinking water concentrations that on average were as high as 191 μg/L, and at times exceeded 600 μg/L.

In the non-U.S. studies cited in Section B.2, populations had exposure to arsenic in drinking water at concentrations of 100 μg/L or greater. In order to calculate arsenic intakes, certain assumptions must be made about the exposed populations. For example, using estimates of water consumption patterns in Taiwanese males developed by the National Research Council (NRC, 1999; NRC, 2001), calculated arsenic intakes at 100 μg/L are 5.5 μg/kg-day. This assumes an average Taiwanese male weighs 55 kg and drinks 3L/day of contaminated water. Moreover, if one assumes, based on the work of Lamm and Kruse (2003) and the re-analysis of the Taiwan data by Morales *et al.* (2000), that cancer is not increased until levels of 400 μg/L, then the estimated carcinogenic intake in Taiwan would be 22 μg/kg-day. In contrast, site-related exposures are considerably less than the drinking water exposures in these studies. For example, EPA's estimated arsenic intakes for an adult at CB-03 are 0.12 μg/kg-day, which is 45 times lower than doses received at 100 μg/L in the Taiwanese studies. Thus, modest intakes of arsenic from exposure to sediment along the river are unlikely to present a significant toxicological concern.

Estimated arsenic exposures along the Aberjona River are less than arsenic exposures permitted in drinking water at the MCL of 10 μg/L, which is a level designed to be health protective (USEPA, 2001a). As an example, EPA's RME estimates of arsenic intake at CB-03 are 0.27 μg/kg-day for children and 0.12 μg/kg-day for adults. By comparison, exposure to arsenic in drinking water at the current MCL of 10 μg/L would yield an estimated intake of 0.7 μg/kg-day for a 15 kg child and 0.3 μg/kg-day for a 70 kg adult, based on drinking water intakes of 1L/day for children and 2L for adults. Thus, site-related arsenic exposures are less than those considered by EPA to be health protective in drinking water.

EPA Response: The discussion in the uncertainty section relative to the arsenic toxicity factor will be expanded.

Table B-1
Summary of Epidemiological Studies of Cancer Risks in U.S. Populations with Elevated Arsenic Exposures

Study Type	Study Location	Study Population(s)	As Drinking Water Levels (µg/L)	Average Daily As Intakes (µg/kg-day)	Key Findings on Cancer Health Effects	Reference
Lifetime/Adult Exposures						
Retrospective Cohort	Millard County, UT	4,058 Adults	Averages ranging from 18 to 191	0.26 to 2.7 (based on average water levels, 1 L/day ingestion rate, and 70 kg body weight)	No elevated death rates from bladder or lung cancers have been observed for those who died through November 1996, and death rates show no association with exposure level. For bladder and lung cancers together, the authors observed 39 deaths when 63.5 were expected ($p<0.05$).	Lewis *et al.*, 1999
Retrospective Cohort	Nationwide (133 US counties)	75 million person-years of observations	Median concentrations ranging from 3 to 60 µg/L	SMR: 0.73 (0.41 to 1.27) for bladder cancer at highest exposure level	After reviewing groundwater arsenic levels in 133 counties in the US dependent on groundwater as a drinking source, the authors found no relationship between arsenic exposure and bladder cancer mortality.	Lamm *et al.* 2002
Meta-analysis	Utilized studies of Fallon, NV (Vig *et al.*, 1984), Fairbanks, AK (Harrington *et al.*, 1978), and Millard County, UT (Southwick *et al.*, 1983)	105 for Fallon, 79 for Fairbanks, and 145 for Millard County	100 for Fallon, 76-401 for Fairbanks, and 208 for Millard County	1.4 for Fallon, 1.1-5.7 for Fairbanks, and 2.9 for Millard County (based on average water levels, 1 L/day ingestion rate, and 70 kg body weight)	No skin cancers were found in the exposed populations in each study location. This study further examined whether an absence of risk in U.S. populations or random variability from a predicted risk was the more likely explanation for the study findings. Likelihood ratio analysis showed that no effect of arsenic on skin cancer prevalence is about 2.2 times more likely than an effect of arsenic exposure on skin cancer prevalence as predicted by EPA's current arsenic cancer potency factor of 1.5 $(mg/kg/day)^{-1}$.	Valberg *et al.*, 1998
Case-control	88 towns in Utah	117 cases, 266 population-based controls	Range of 0.5 to 160, with a mean of 5 (81 out of 88 towns <10 µg/L; 1 town >50 µg/L)	0.001 to 2.3 (based on range of water levels, 1 L/day ingestion rate, and 70 kg body weight)	No association found between bladder cancer risk and arsenic exposure for two exposure metrics-total cumulative exposure (<19 up to >53 mg) and intake concentration. Analyses indicated increased bladder cancer risks for smokers, although authors could not rule out possible bias in data.	Bates *et al.*, 1995

Study Type	Study Location	Study Population(s)	As Drinking Water Levels (µg/L)	Average Daily As Intakes (µg/kg-day)	Key Findings on Cancer Health Effects	Reference
Ecological	Lane County, Oregon	190,871 total study population	Averages of 16.5 and 4.8 in all rural and urban regions, respectively, with a maximum recorded conc. of 33	Averages of 0.23 and 0.07 for rural and urban regions, respectively (based on average water levels, 1L/day ingestion rate, and 70 kg body weight)	Did not detect any excess risk of skin cancer associated with arsenic exposures up to 33 µg/L (note 19,063 people were exposed at this maximum concentration). Among the 3,237 skin-cancer cases identified in the study, only three had evidence of arsenic keratosis. "	Morton *et al.*, 1976
Childhood Exposures						
Ecologic Study	Entire State of Nevada, including Churchill County and Fallon, Nevada.,	327,947 children between 0-19 years of age	0-7.8 in low-exposure group, 10-24.6 in medium-exposure group, 35.9-91.5 in high-exposure group	0.57 to 1.4 in high-exposure group (based on average 0.6 L/day ingestion rate, and 38 kg body weight)	No statistically significant association between arsenic and any type of childhood cancer was found in any of the exposure groups.	Moore *et al.*, 2002
Retrospective Cohort	Ruston, Washington in vicinity of American Smelting and Refining Company (ASARCO) copper smelter	3,132 children residing near smelter between 1907-1932	Not reported in study (note that ambient air exposures are considered to be the primary exposure source)	Not known during 1907-1932 exposure period, although elevated urine As levels observed in 1970s following improvements in smelter processes	Despite elevated childhood As exposures, no elevated incidence of bladder or lung cancer mortality observed in 1,075 deceased members of cohort as of 12/31/90.	Tollestrup *et al.*, 2002

B.6 References

Agency for Toxic Substances and Disease Registry (ATSDR). 1997. "Toxicological Profile for Vinyl Chloride Update (Update)." Sciences International, Inc. Prepared for US Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR). September.

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. "Toxicological Profile for Arsenic (Update)." Syracuse Research Corp. National Technical Information Service (NTIS), Springfield, VA. Prepared for US Public Health Service, Agency for Toxic Substances and Disease Registry (ATSDR). NTIS PB2000-108021. 446p. September.

Andrew, A.S., M.R. Karagas, and J.W. Hamilton. 2003. Decreased DNA repair gene expression among individuals exposed to arsenic in United States drinking water. *Int. J. Cancer* 104(3):263-268.

Baker, Jr., E.L., C.G. Hayes, P.J. Landrigan, J.L. Handke, R.T. Leger, W.J. Housworth, and J.M. Harrington. 1977. A nationwide survey of heavy metal absorption in children living near primary copper, lead, and zinc smelters. *Am. J. Epidemiol.* 106(4):261-273.

Bates M.N., A.H. Smith, and K.P. Cantor. 1995. Case-control study of bladder cancer and arsenic in drinking water. *Am. J. Epidemiol.* 141:523-530.

Binder, S., D. Forney, W. Kaye, and D. Paschal. 1987. Arsenic exposure in children living near a former copper smelter. *Bull. Environ. Contam. Toxicol.* 39:114(8).

Bode, A.M. and Z. Dong. 2002. The paradox of arsenic: Molecular mechanisms of cell transformation and chemotherapeutic effects. *Crit. Rev. Oncol. Hematol.* 42(1):5-24.

Brown, K.G., T.L. Kuo, H.R. Guo, L.M. Ryan, and C.O. Abernathy. 2000. Sensitivity analysis of U.S. EPA's estimates of skin cancer risk from inorganic arsenic in drinking water. *Hum. Ecol. Risk Assess.* 6:1055-1074.

Brown, K.G. and G.L. Ross. 2002. Arsenic, drinking water, and health: A position paper of the American Council on Science and Health. *Regul. Toxicol. Pharmacol.* 36(2):162-174.

Buchet, J.P. and D. Lison. 2000. Clues and uncertainties in the risk assessment of arsenic in drinking water. *Food Chem. Toxicol.* 38 (Suppl. 1):S81-85.

Calabrese, E.J., R. Barnes, E.J. Stanek, H. Pastides, C.E. Gilbert, P. Veneman, X. Wang, A. Lasztity, and P.T. Kostecki. 1989. How much soil do young children ingest: An epidemiologic study. *Regul. Toxicol. Pharmacol.* 10:123-137.

California Chromate Toxicity Review Committee. 2001. "Scientific Review of Toxicological and Human Health Issues Related to the Development of a Public Health Goal For Chromium(VI)." Downloaded from: http://www.dhs.cahwnet.gov/ps/ddwem/chemicals/Chromium6/reviewpanelreport.pdf. August 31.

Chen, C.J., Y.C. Chuang, T.M. Lin, and H.Y. Wu. 1985. Malignant neoplasms among residents of a blackfoot disease-endemic area in Taiwan: High-arsenic artesian well water and cancers. *Cancer Res.* 45:5895-5899.

Chiou, H.Y., S.T. Chiou, Y.H. Hsu, Y.L. Chou, C.H. Tseng, M.L. Wei, and C.J. Chen. 2001. Incidence of transitional cell carcinoma and arsenic in drinking water: A follow-up study of 8102 residents in an arseniasis-endemic area in Northeastern Taiwan. *Am. J. Epidemiol.* 153(5):411-418.

Davis, S., P. Waller, R. Buschbom, J. Ballou, and P. White. 1990. Quantitative estimates of soil ingestion in normal children between the ages of 2 and 7 years: Population-based estimates using aluminum, silicon, and titanium as soil tracer elements. *Arch. Environ. Health* 45(2):112-122.

Del Razo, L.M., B. Quintanilla-Vega, E. Brambila-Colombres, E.S. Calderón-Aranda, M. Manno, and A. Albores. 2001. Stress proteins induced by arsenic. *Toxicol. Appl. Pharmacol.* 177:132-148.

DeSesso, J.M. 2001. Teratogen update: Inorganic arsenic. *Teratology* 64(3):170-173.

Federal Register. 2000. Notice of Intent To Develop Ambient Water Quality Criteria for Protection of Human Health--Arsenic, Methylmercury, and Carbofuran; Notice of Data Availability; Request for Data and Information. 65(198). October 12. Downloaded from http://www.gpoaccess.gov/fr/advanced.html

Ferreccio, C., C. Gonzalez, V. Milosavjlevic, G. Marshall, A.M. Sancha, and A.H. Smith. 2000. Lung cancer and arsenic concentrations in drinking water in Chile. *Epidemiology* 11(6):673-679.

Frost, F. 2003. "An Epidemiological Perspective on Arsenic Exposure and Risk Assessment." Presented at Lovelace Respiratory Research Institute, Albuquerque, NM. 8 pp.

Frost, F., G. Craun, and K.G. Brown. 2002. Detection of excess arsenic-related cancer risks. *Environ. Health Perspect.* 110(1):A12-A13.

Germolec, D.R., J. Spalding, G.A. Boorman, J.L. Wilmer, T. Yoshida, P.P. Simeonova, A. Bruccoleri, F. Kayama, K. Gaido, R. Tennant, F. Burleson, W. Dong, R.W. Lang, and M.I. Luster. 1997. Arsenic can mediate skin neoplasia by chronic stimulation of keratinocyte-derived growth factors. *Mutat. Res.* 396(3):209-218.

Guo, H.R. and Y.C. Tseng. 2000. Arsenic in drinking water and bladder cancer: Comparison between studies based on cancer registry and death certificates. *Environ. Geochem. Health* 22(2):83-91.

Harter, L., F. Frost, K. Tollestrup, and F. Westrum. 1993. "Mortality Study of Children Residing Near ASARCO Copper Smelter in Ruston, Washington (Draft)." Washington Dept. of Health. December 3.

Hewitt, D.J., G.C. Millner, A.C. Nye, M. Webb, and R.G. Huss. 1995. Evaluation of residential exposure to arsenic in soil near a Superfund site. *Hum. Ecol. Risk Assess.* 1(3):323-335.

Hu, Y., L. Su, and E.T. Snow. 1998. Arsenic toxicity is enzyme specific and its affects on ligation are not caused by the direct inhibition of DNA repair enzymes. *Mutat. Res.* 408(3):203-218.

Hwang, Y.H., R.L. Bornschein, J. Grote, W. Menrath, and S. Roda. 1997. Environmental arsenic exposure of children around a former copper smelter site. *Environ. Res.* 72:72-81.

Integrated Risk Information System (IRIS). 1996. Manganese. U.S. Environmental Protection Agency. Downloaded from http://www.epa.gov/iris/subst/0373.htm.

Jacobs, H.L., J.T. Du, H.D. Kahn and K.A. Stralka. 2000. "Estimated Per Capita Water Ingestion in the United States." Prepared for US EPA, Office of Water, Washington, DC. EPA 815-R-00-008. April. Downloaded from http://www.epa.gov/waterscience/drinking/percapita/text.pdf on 8/7/01.

Kitchin, K.T. 2001. Recent advances in arsenic carcinogenesis: Modes of action, animal model systems, and methylated arsenic metabolites. *Toxicol. Appl. Pharmacol.* 172:249-261.

Kitchin, K.T. and S. Ahmad. 2003. Oxidative stress as a possible mode of action for arsenic carcinogenesis. *Toxicol. Lett.* 137(1-2):3-13.

Lamm, SH; Engel, A; Wilson, R; Feinleib, M. 2002. "Examination of the NRC Bladder Cancer Risk from Arsenic in Drinking Water Estimate, Using US Data with 75 Million Person-Years of Observation." Abstract presented at Fifth International Conference on Arsenic Exposure and Health Effect, Society of Environmental Geochemistry and Health. July 12-18, San Diego, CA.

Lamm, S.H. and M. Kruse. 2003. "Comments in Response the CPSC Report and Hearings on the Risk of Human Cancer from Arsenic Exposure." Consultants in Epidemiology & Occupational Health, Inc., Washington, DC. Submitted to US Consumer Product Safety Commission (CPSC), CCA Docket, 26 pp., March 28.

Lee, T., N. Tanaka, P.W. Lamb, T.M. Gilmer, and J.C. Barrett. 1988. Induction of gene amplification by arsenic. *Science* 241:79-81.

Lewis, D.R., J.W. Southwick, R. Ouellet-Hellstrom, J. Rench, and R.L. Calderon. 1999. Drinking water arsenic in Utah: A cohort mortality study. *Environ. Health Perspect.* 107(5):359-365.

Loehr, R.C. 1996. "The Environmental Impact of Soil Contamination: Bioavailability, Risk Assessment, and Policy Implications." Prepared for National Environmental Policy Institute, Bioavailability Policy Project, Reason Foundation, Policy Study No. 211, 21 pp. August.

Luster, M.I. 2003. "Proposed Mechanisms for Arsenic Carcinogenicity: Implications for the Shape of the Dose-Response Curve." Abstract presented at 2003 Society of Toxicology Conference.

Mass, M.J. and L. Wang. 1977. Arsenic alters cytosine methylation patterns of the promoter of the tumor suppressor gene p53 in human lung cells: A model for a mechanism of carcinogenesis. *Mutat. Res.* 396(3):263-277.

Mass, M.J., A. Tennant, B.C. Roop, W.R. Cullen, M. Styblo, D.J. Thomas, and A.D. Kligerman. 2001. Methylated trivalent arsenic species are genotoxic. *Chem. Res. Toxicol.* 14:355-361.

Moore, L.E., M. Lu, and A.H. Smith. 2002. Childhood cancer incidence and arsenic exposure in drinking water in Nevada. *Arch. Environ. Health* 57:201-206.

Morales, K.H., L. Ryan, T-L. Kuo, M-M. Wu, and C-J. Chen. 2000. Risk of internal cancers from arsenic in drinking water. *Environ. Health Perspectives* 108(7):655-661.

Morton, W., G. Starr, D. Pohl, J. Stoner, S. Wagner, and P. Weswig. 1976. Skin cancer and water arsenic in Lane County, Oregon. *Cancer* 37:2523-2532.

National Environmental Policy Institute (NEPI). 2000. "Assessing the Bioavailability of Metals in Soil for Use in Human Health Risk Assessments." Bioavailability Policy Project Phase II, Metals Task Force Report. Summer. Downloaded from http://www.nepi.org/pubs/metals-bio%20final.pdf on June 27, 2001.

National Research Council (NRC). 1999. "Arsenic in Drinking Water." Subcommittee on Arsenic in Drinking Water. National Academy Press, Washington, DC.

National Research Council (NRC). 2001. "Arsenic in Drinking Water: 2001 Update." National Academy Press, Washington, DC.

Noda, Y., T. Suzuki, A. Kohara, A. Hasegawa, T. Yotsuyanagi, M. Hayashi, T. Sofuni, K. Yamanaka, and S. Okada. 2002. *In vivo* genotoxicity evaluation of dimethylarsinic acid in Muta(TM)Mouse. *Mutat. Res.* 513(1-2):205-212.

Polissar, L., K. Lowry-Coble, D.A. Kalman, J.P. Hughes, G. van Belle, D.S. Covert, T.M. Burbacher, D. Bolgiano, and N.K. Motte. 1990. Pathways of Human Exposure to Arsenic in a Community Surrounding a Copper Smelter. *Environmental Research* 53:29-47.

Proctor, D.M., J.M. Otani, B.L. Finley, D.J. Paustenbach, J.A. Bland, N. Speizer, and E.V. Sargent. 2002. Is hexavalent chromium carcinogenic *via* ingestion? A weight-of-evidence review. *J. Toxicol. Environ. Health A* 65:701-746.

Rudel, R., T.M. Slayton, B.D. Beck. 1996. Implications of arsenic genotoxicity for dose-response of carcinogenic effects. *Regul. Toxicol. Pharmacol.* 23: 87-105.

Schoof, R.A., L.J. Yost, J. Eickhoff, E.A. Crecelius, D.W. Cragin, D.M. Meacher, and D.B. Menzel. 1999. A market basket survey of inorganic arsenic in food. *Food Chem. Toxicol.* 37: 839-846.

Schuliga M., S. Chouchane, and E.T. Snow. 2002. Upregulation of glutathione-related genes and enzyme activities in cultured human cells by sublethal concentrations of inorganic arsenic. *Toxicol. Sci.* 70(2):183-192.

Simeonova P.P. and M.I. Luster. 2002. Arsenic carcinogenicity: relevance of c-Src activation. *Mol. Cell Biochem.* 234-235(1-2):277-82.

Society for Environmental Geochemistry and Health. 2002. *SEGH Fifth International Conference on Arsenic Exposure and Health Effects, Book of Abstracts, San Diego, CA*, July 14-18, 251 pp.

Stanek, E.J. and E.J. Calabrese. 1995a. Soil ingestion estimates for use in site evaluations based on the best tracer method. *Human Ecol. Risk Assess.* 1(2):133-156.

Stanek, E.J. and E.J. Calabrese. 1995b. Daily estimates of soil ingestion in children. *Environ. Health Perspect.* 103(3):276-285.

Stanek, E.J. and E.J. Calabrese. 2000. Daily soil ingestion estimates for children at a Superfund site. *Risk Analysis* 20(5):627-635.

Stokinger, H.E. 1955. Standards for safeguarding the health of the industrial worker. *Public Health Rep.* 70(1):1(11).

Tollestrup, K., F.J. Frost, L.C. Harter, and G. McMillan. 2002. Mortality in children residing near the ASARCO copper smelter in Ruston, Washington. *Am. J. Epidemiol.* 155(11): SER Abstract #154. Society for Epidemiologic Research. Abstracts of the 35th Annual Meeting, Palm Desert, CA, June 18-21.

Tucker, S.B., S.H. Lamm, F.X. Li, and R. Wilson. 2001. "Relationship Between Consumption of Arsenic-Contaminated Well-Water and Skin Disorder in Huhhot, Inner Mongolia." 33 pp. July 15.

United States Environmental Protection Agency (USEPA). 1992. "Dermal Exposure Assessment: Principles and Applications." Office of Health and Environmental Assessment, Washington DC. EPA/600/8-91/011B. January.

U.S. Environmental Protection Agency (USEPA). 1994. "EPA Region 1 Waste Management Division: Risk Updates (Number 2)." 24 pp. August.

U.S. Environmental Protection Agency (USEPA). 1996. "EPA Region 1 New England: Risk Updates (Number 4)." 10 pp. November.

U.S. Environmental Protection Agency (USEPA). 1997. "Exposure Factors Handbook. Volume I: General Factors and Volume III: Activity Factors." Office of Research and Development, Washington, D.C. EPA/600/P-95/002Fa, EPA/600/P-95/002Fc. August.

U.S. Environmental Protection Agency (USEPA). 2000. "Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health (2000) (Final Report)." Prepared for US EPA, Office of Water US EPA, Office of Science and Technology, Washington, DC. EPA-822-B-00-004. October.

U.S. Environmental Protection Agency (USEPA). 2001a. Arsenic in drinking water. Final Rule. *Federal Register* 66(14)7000-7010. January 22.

U.S. Environmental Protection Agency (USEPA). 2001b. "Risk Assessment Guidance for Superfund (RAGS). Volume III: Part A, Process for Conducting Probabilistic Risk Assessment." Office of Emergency and Remedial Response, Washington, DC. EPA 540-R-02-002; Publication 9285.7-45; PB2002-963302. 385 pp. December.

U.S. Environmental Protection Agency (USEPA). 2002. Office of Emergency and Remedial Response (Washington, DC). "Calculating upper confidence limits for exposure point concentrations at hazardous waste sites. Supplemental guidance to RAGS." OSWER Directive 9285.6-10. December. Downloaded from: http://www.epa.gov/superfund/programs/risk/ragsa/ucl.pdf.

U.S. Environmental Protection Agency (USEPA). 2003. Office of Research and Development, National Exposure Research Laboratory (Las Vegas, NV). "ProUCL statistical software and user's guide (Version 2.1)." February.

U.S. Environmental Protection Agency Region 8 (Denver, CO); Benson, R. 2001. "Derivation of acute and subchronic oral reference doses for inorganic arsenic." February.

Valberg, P.A., B.D. Beck, P.D. Boardman, and J.T. Cohen. 1998. Likelihood ratio analysis of skin cancer prevalence associated with arsenic in drinking water in the USA. *Environ. Geochem. and Health* 20:61-66.

Valberg, P.A., B.D. Beck, T.S. Bowers, J.L. Keating, P.D. Bergstrom, and P.D. Boardman. 1997. Issues in setting health-based cleanup levels for arsenic in soil. *Regul. Toxicol. Pharmacol.* 26:219-229.

Vega, L., M.E. Gonsebatt, P. Ostrosky-Wegman. 1995. Aneugenic effect of sodium arsenite on human lymphocytes in vitro: An individual susceptibility effect detected. *Mutat. Res.* 334:365-373.

Wang, T.S. and H. Huang. 1994. Active oxygen species are involved in the induction of micronuclei by arsenite in XRS-5 cells. *Mutagenesis* 9(3):253-257.

Wester, R.C., H.I. Maibach, L. Sedik, J. Melendres, and M. Wade. 1993. *In vivo* and *in vitro* percutaneous absorption and skin decontamination of arsenic from water and soil. *Fundam. Appl. Toxicol.* 20:336-340.

Zhang, J. and S. Li. 1997. Cancer mortality in a Chinese population exposed to hexavalent chromium in water. *J. Occup. Environ. Med.* 39(4):315-319.

Zhao, C.Q., M.R. Young, B.A. Diwan, T.P. Coogan, and M.P. Waalkes. 1997. Association of arsenic-induced malignant transformation with DNA hypomethylation and aberrant gene expression. *Proc. Natl. Acad. Sci.* 94:10907-10912.

Appendix C

Evaluation of the EPA's UCL Recommendations for Skewed Data Sets

Evaluation of the EPA's UCL Recommendations for Skewed Data Sets

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10 October 2003

Exposure point concentrations (EPCs) used in risk assessments should reflect the average contaminant concentrations encountered by a receptor at a site. This parameter is typically represented by the upper 95% confidence limit on the mean (95% UCL). The 95% UCL of the concentration mean is a measure of the precision to which the average concentration can be measured. Statistically, the 95% UCL estimates the 95th percentile of the sampling distribution of the sample average. That is, if one were to create 100 sets of measurements each set selected at random from the same population having a known mean, then 95 of the computed UCL values would be expected to be above the true mean and 5 would be expected to be below the true mean. Any method for calculating the 95% UCL should have this property; while at the same time, it is preferable to use methods that do not substantially overestimate the true mean.

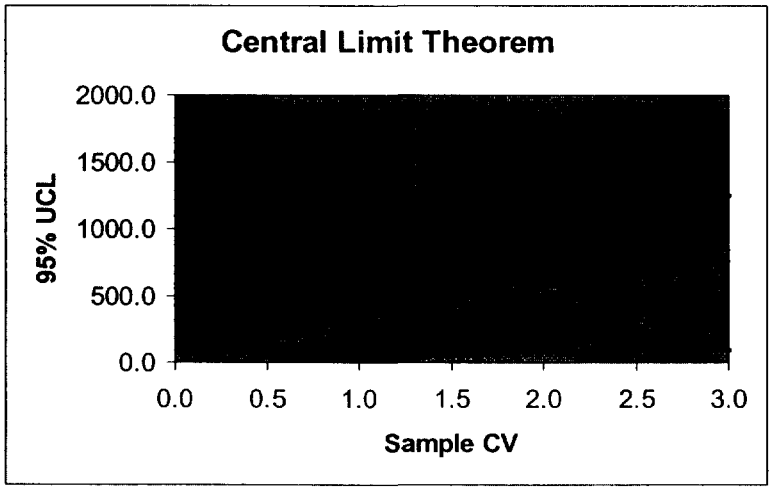
Numerous statistical methods are available for the calculation of 95% UCLs, however, they often yield disparate results. The U.S. Environmental Protection Agency (EPA) has recently provided guidance and companion software (EPA, 2002) for the calculation of EPCs at contaminated sites. These efforts extend previous EPA guidance (1992) by incorporating a variety of statistical methods and are generally considered an improvement of the earlier guidance. However, based on the results of an analysis we presented at the 2003 annual meeting of the Society of Toxicology (Mills et al., 2003), the EPA UCL recommendations may either underestimate or overestimate the true mean depending on site-specific data characteristics.

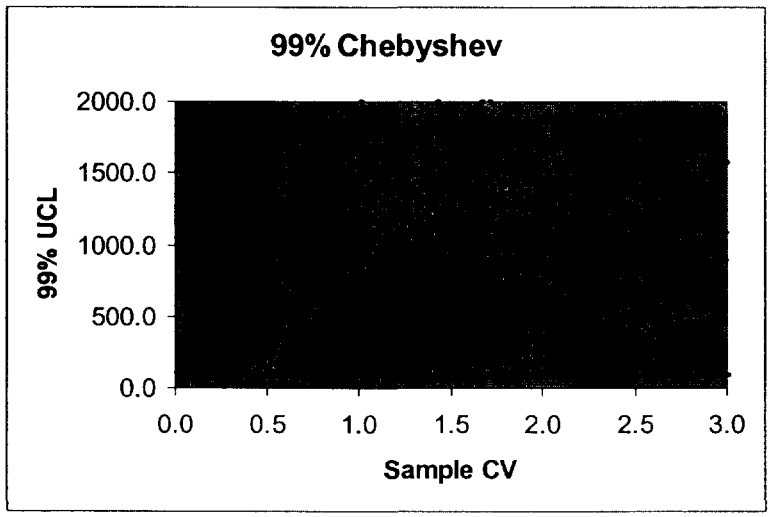
Our original analysis has significant implications for the UCLs selected by EPA to represent the EPCs in the human health risk assessment for the Wells G&H Superfund Site Operable Unit 3 - Aberjona River Study. An additional analysis was conducted to specifically evaluate the UCL selected by EPA to represent the EPC for the WH arsenic data set, a small, relatively skewed sample population with a sample size (n) of 12 and a Coefficient of Variation (CV) of 2.4. To evaluate the EPA methodology with this data set, we expanded our analysis on the performance of UCL methods to increase the sample observations in the 2.2 to 2.6 CV range, similar to the WH arsenic data set.

Although the true population parameters are never known for chemical concentrations at a site, a reasonable inference is that sample data with CV 2.4 were drawn from a population with CV 2.4. To evaluate this type of case, 10,000 synthetic lognormal data sets (n=12) were generated using Crystal Ball (Mean 100; Std 240; CV 2.4). For each sample data set, UCLs were calculated with the 95% CLT, 95% Bootstrap, 95% Chebyshev (MVUE), and the 99% Chebyshev (MVUE) methods. Table 1 below provides a summary of the UCL results for all the sample data sets. The Min and Max are the lowest and highest 95% UCL observed out of the data sets. Mean and Median UCLs are also shown. The 'Coverage' refers to the percent of the UCLs from the sample data sets that were larger than the true population mean of 100. For example, for 68% of the samples, the Central Limit Theorem (CLT) produced 95% UCLs greater than 100. By definition, a 95% UCL method providing nominal coverage would have a coverage of 95%.

Table 1. UCL results from 10,000 samples drawn from Ln(100, 240)					
	Min	Max	Median	Mean	Coverage
95% CLT	22.5	2383.1	131.9	169.7	68%
95% Bootstrap	21.6	2379.5	129.4	166.9	67%
95% H-Stat	29.9	93672.5	413.2	951.5	95%
95% Cheby (MVUE)	29.7	2871.8	236.3	294.2	93%
99% Cheby (MVUE)	51.1	5676.4	430.7	544.8	99%

These results suggest that the 95% H-statistic or the 99% Chebyshev (MVUE) would be the UCL method of choice since these two methods are the only ones to deliver at least the desired 95% coverage. We believe that EPA used a similar approach in the development of their UCL recommendations in ProUCL. If this is the case, EPA has neglected an important detail. The range of UCL results produced by each method is highly dependent on the sample CV. To illustrate this point, scatter plots of the UCL results (y-axis) versus the sample CV (x-axis) for the 95% CLT and 99% Chebyshev methods are shown in the two graphs below.





As the CVs of the sample data sets increase, the 99% Chebyshev (MVUE) method significantly over predicts the true mean with increasing frequency. The same is true of the CLT, but the extent of the "overage" is much more limited.

Given this observed relationship, we evaluated the coverage of the methods for the data sets with CVs in the range of 2.2 to 2.6, bracketing the WH arsenic data set (CV=2.4). Within the 10,000 sample data sets, 491 were identified with CVs in the range of 2.2 to 2.6. The performance of the CLT and Chebyshev (MVUE) UCL methods for this portion of the sample data is shown in Table 2 below.

Table 2. UCL results for 491 of 10000 samples drawn from Ln(100, 240) with sample CV of 2.2 to 2.6

	Min	Max	Median	Mean	Coverage
95% CLT	71.4	1374.8	329.3	375.9	99.4%
95% Cheby (MVUE)	72.3	2657.7	367.6	451.3	99.2%
99% Cheby (MVUE)	131.7	5176.4	683.6	856.8	100%

In this case, the coverage properties of these three methods are all adequate, in that all three provide at least 95% coverage. However, the 95% CLT produces the lowest mean and median UCLs indicating that the frequency of overestimation of the true mean (i.e., overage) is reduced. If the sample CV is a reasonable estimate of the population CV, this analysis indicates that the 95% CLT estimate provides 99% coverage and is a more appropriate (yet still conservative) estimate of the 95% UCL. When applied to the arsenic data set from the WH station, the 95% CLT yields a substantially lower UCL estimate (806 mg/kg) than the estimate based on the 99% Chebyshev (MVUE) method applied by EPA (1910 mg/kg).

An important uncertainty associated with this analysis is that the true population distribution that gives rise to site sampling data is never known. If the population is considerably more highly skewed than the sample would indicate, the coverage properties of these methods might be less than optimal. In fact, as the CV of the underlying population rises, eventually even the 99% Chebyshev method will fail to provide nominal coverage. Thus, if the population is considerably more skewed than the sample would indicate, then there is a higher probability that the UCL will under predict the true population mean. Alternatively, if the sample population was biased so as to produce sample data with more variability than the underlying population, then the UCL often greatly exceeds the true population mean.

The methodology used by EPA to develop recommendations for their ProUCL program is not available for review. It is unclear how the EPA distinguished between sample and population parameters in the development of the ProUCL recommendations. Use of sample parameters to estimate population parameters and underlying distribution types are particularly problematic when dealing with small sample sizes and highly skewed data sets. There is usually only weak evidence that the underlying population even follows a specified distribution. Formal Goodness-of-

Fit tests only provide for the exclusion of a specified distribution. In addition, point source contamination areas that fit highly skewed lognormal distributions would have very significant hot spots. For example, at sites with a population CV of greater than 5, we would expect to see more than four orders of magnitude difference between the lowest and highest sample concentrations, with the data set being heavily weighted at the low end. Distributions of this sort are certainly possible, but are probably the result of a mixture of populations resulting from different sources or activities rather than a true multiplicative (dilution) process as would be the assumption for a lognormal distribution. The use of lognormal theory to develop statistical confidence intervals for such nonparametric samples is highly suspect. In such cases, the only practical method of evaluating UCL performance is through simulation. This is the approach we used in the analysis presented at the 2003 annual meeting of the Society of Toxicology (cited above). We believe that recommendations developed using this type of approach are superior to those provided by EPA's ProUCL program.

References

Mills CE, CJ Saranko, JK Tolson, SM Roberts, and KM Portier. (2003). Comparison of techniques for calculating 95% upper confidence limits (95% UCLs) on the mean. *Toxicol. Sci.* 72(S-1): 395.

USEPA (1992). *Calculating the Concentration Term: Supplemental Guidance to RAGS.* Publication EPA 9285.7-081, May 1992

USEPA (2002). *Calculating upper confidence limits for exposure point concentrations at hazardous waste sites. Supplemental guidance to RAGS,* Office of Emergency and Remedial Response, OSWER Directive 9285.6-10. December, 2002. Download at http://www.epa.gov/superfund/programs/risk/ragsa/ucl.pdf.

SDTT-22-01
87.3

SDTT-22-02
5.2

WH-10
15

WH-09
19.2

WH-06
22.6

WH-08
4.7

WH-07
12.5

WH-05
370

WH-04
210

WH-03
123

WH-02
424

WH-01
30

SD-12-01ME
3230

SD-12-03ME
4550

SD-12-03FW
1540

SD-12-01FW
101

SD-13-03
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156

SDTT-27-02

15-03

SD-20-02
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SD-20-01
303
226
236

SD-20-02
321

SDTT-29-01
647

SDTT-29-02

SDTT-29-03
1650

WG-02
63.4

SD-18-01
5516
182
207

WW-12
44.2

WW-11
37.4

WW-10
52.8

WW-09
54.6

WW-07
42.6

SD-18-02
1180
273

WH Sample Area

Legend

Arsenic Concentration (mg/kg)

- 5 - 10
- 11 - 100
- 101 - 500
- 501 - 1000
- 1001 - 3230
- Not Used in WH Area
- BOG or MARSH
- OPEN WATER
- WOODED SWAMP

0 75 150 300 Feet

Original includes color coding.

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GeoSyntec Consultants
BOXBORO, MASSACHUSETTS

DATE: 9/10/03	1 inch equals 150 feet
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9.1
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15.9
CB-03-05
111
CB-03-06
CB-03-12
188
CB-03-07
117
CB-03-08
233
CB-03-09
483
CB-03-10
131
CB-03-11
1410
CB-03 Sample Area
Legend
Arsenic Concentration (mg/kg)
5 - 10
11 - 100
101 - 500
501 - 1000
1001 - 3230
Not Used in CB-03 Area
BOG or MARSH
OPEN WATER
WOODED SWAMP
Original includes color coding.
N
W
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75
150
300
Feet
GeoSyntec Consultants
BOXBORO, MASSACHUSETTS
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Comments on the Ecological Risk Component of EPA's "Baseline Human Health and Ecological Risk Assessment Report, Wells G&H Superfund Site, Aberjona River Study, Operable Unit 3, Woburn, MA" dated June 2003

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Appendix A – CV for Dr. S.R. Hansen	

1. OVERVIEW

This report presents S.R. Hansen & Associates'[1] comments on the ecological risk component of EPA's "Baseline Human Health and Ecological Risk Assessment Report, Wells G&H Superfund Site, Aberjona River Study, Operable Unit 3, Woburn MA", dated June 2003. In summary, we believe that EPA's ecological risk assessment (the BERA) contains certain errors and, consequently, overestimates risk due to reliance on hypothetical impacts (based on mathematical calculations) when actual observations fail to detect such impacts. The end result is that the calculated risks overestimate the severity and areal extent of the actual risks likely to be experienced by the ecological community inhabiting the Aberjona River watershed. In this report, we identify the overestimates that are made in the BERA and provide alternative assessments of the ecological risk based on a more realistic interpretation of the available data.

It should be emphasized that, based on the criteria specified in the BERA, the only substantive ecological risk in the Aberjona River watershed is associated with the potential impact of sediment-bound arsenic on benthic invertebrates and aquatic mammals and this risk is limited to a relatively small area of the watershed (i.e., the Wells G&H site in Reach 1 and the cranberry bog in Reach 2). The risks presented by all other COPCs (i.e., both organic compounds and other metals) to all other potential biological receptors (i.e., predatory fish, bottom-feeding fish, small foraging fish, waterfowl, semi-aquatic avian species, and small terrestrial mammals) are deemed to be either negligible or low in all reaches of the watershed. We concur with this conclusion that these six receptors are at negligible or low risk throughout the watershed and, consequently, our comments are primarily directed to issues related to the BERA's estimate of the risk that arsenic poses to benthic invertebrates and aquatic mammals (as represented by muskrats).

In this document, comments are provided in the following four sections. First, the conclusion that six of the eight biological receptors which were evaluated in the BERA have negligible or low risk throughout the study area is discussed. Second, the purported risk that arsenic in Reaches 1 and 2 poses to aquatic mammals (i.e., muskrats) is reviewed and critiqued. Third, the purported risk that arsenic in Reaches 1 and 2 poses to benthic invertebrates is reviewed and critiqued. Fourth, the overall risk that COPCs pose to the ecological community inhabiting the Aberjona River watershed is evaluated and summarized.

[1] CV for Dr. S.R. Hansen is attached as an appendix to this report

2. SIX OF EIGHT BIOLOGICAL RECEPTORS HAVE NEGLIGIBLE OR LOW RISK TO ALL COPCS

Using the criteria established by EPA in the BERA, it is clear that six of the eight classes of biological receptors considered in the reported assessment face negligible to low risk from all COPCs, throughout the study area. Inclusion of these receptors in summary figures (e.g., Figure E-3) incorrectly suggests a significant risk to their populations.

In EPA's risk assessment report, the criteria used in establishing a risk level for a COPC to a biological receptor is clearly explained on page 4-121 as follows:

> *"The magnitude of risk incorporates both the degree to which the endpoint is exceeded and also the proportion of the habitat affected. Since the endpoints were based on effects on populations, a reasonable probability of risk was determined to be present only when a risk was present through the majority of the organism's habitat. If the NOAEL TRV (lower effects threshold) was exceeded across most of the site, the contaminant was concluded to pose a low risk to populations. The highest risk was associated with contaminants that exceeded upper threshold effects levels based on LOAEL TRVs, and was present throughout a majority of the indicator species' habitat within the study area. If high HQs were present in only a small proportion of the habitat for the selected indicator species, the magnitude of the overall risk to the population from exposure to the COPC was considered low."*

Using these criteria, each of these COPCs was evaluated for its potential to impact each of eight classes of biological receptors – predatory fish species (represented by largemouth bass), epibenthic fish species (represented by white sucker), small foraging fish species (represented by pumpkinseed), semi-aquatic avian species (represented by green herons), aquatic mammal species (represented by muskrats), waterfowl species (represented by mallards), small mammal species using drier wetland areas (represented by short-tailed shrews), and benthic invertebrate species (considered as a group).

Based on these evaluations, EPA concluded that the only COPCs that have a potential to pose significant risk to any of the biological receptors are arsenic, chromium, copper, lead, and mercury. More detailed evaluations of the potential impacts of these metals on the biological receptors lead to the conclusion that six classes of biological receptors (i.e., predatory fish, epibenthic fish, small foraging fish, piscivorous birds, waterfowl, and small terrestrial mammals) were at negligible or low risk. This conclusion, with which we strongly concur, is made at several points in the BERA and the underlying rationale is summarized below:

> **Predatory Fish** (represented by largemouth bass) – The risk to this group of species is deemed **negligible** throughout the study area because COPC concentrations in fish collected from all reaches of the study area were lower than benchmarks which are considered indicative of impairment. The only exception was mercury. However, since the concentrations of mercury in reference fish tissues also exceeded tissue residue benchmarks, no site-related risk was deemed warranted. The BERA discussion on the risk to predatory fish can be found on pages 4-95 to 4-97 and 4-122.

Epibenthic or Bottom-Feeding Fish (represented by white sucker) – The risk to this group of species is **negligible** throughout the study area because COPC concentrations in fish collected from all reaches of the study area were lower than benchmarks which are considered indicative of impairment. The BERA discussion on the risk to epibenthic fish can be found on pages 4-95 to 4-97 and 4-122.

Small Foraging Fish (represented by pumpkin seed) – The risk to this group of species is deemed **negligible** throughout the study area because COPC concentrations in fish collected from all reaches of the study area were lower than benchmarks which are considered indicative of impairment. The BERA discussion the risk to small foraging fish can be found on pages 4-95 to 4-97 and 4-122.

Piscivorous Birds (represented by green herons) – The risk to this group of species is deemed **negligible** throughout the study area because none of the HQs (i.e., hazard quotients) for any of the COPCs were greater than the target HQ of 1 using the lower effects threshold. The BERA discussion of the risk to piscivorous birds can be found on pages 4-90 to 4-91 and 4-122.

Waterfowl (represented by mallards) – The risk to this group of species is deemed **low** throughout the study area because none of the HQs (calculated on a site-wide basis) for any of the COPCs were greater than the target HQ of 1 using the upper effects threshold. (Evaluation on a site-wide basis is considered appropriate because these species are expected to forage over wide areas.) The lower effects threshold was exceeded on a site-wide basis for chromium, mercury, and lead. However, for these metals, the upper effects level threshold was exceeded at only a few stations and, therefore, the site-wide HQ based on the upper effects thresholds for each of these metals was less than 1. This is stated clearly in the BERA on page 4-124: "The assessment of the waterfowl endpoint indicates a low risk to populations, site-wide from exposure to chromium, lead, and mercury." The BERA discussion of the risk to waterfowl can be found on pages 4-91 to 4-93 and 4-123 to 4-124.

Small Terrestrial Mammals (presented by short-tailed shrew) – The risk to this group of species is deemed between **negligible** and **low** throughout the study area. The negligible risk level applies to all COPCs except arsenic because very few (i.e., much less than a majority of stations) of the HQs for these COPCs exceed the target HQ of 1 using the lower effects threshold and no HQs exceed the upper effects threshold target. For arsenic, a **low** risk level applies because the majority of stations have HQs exceeding the HQ target of 1 using the lower effects threshold, but only a small number of stations have HQs exceeding the upper effects threshold target. This is clearly stated in the BERA on page 4-124: "Since the number of stations exceeding the upper TEL is small, the risk to small mammal populations, due to exposure to sediment arsenic is low." The BERA discussion of the risk to small terrestrial mammals can be found on pages 4-93 to 4-95 and 4-124.

<u>EPA Response to Comment Section 2</u>: Using the criteria established by EPA in the BERA, EPA concludes that six of the eight classes of biological receptors considered in the reported

assessment face negligible to low risk from all COPCs, throughout the study area. These are summarized in Table 4-25. The same identified risks are displayed on Figure E-3, even in cases where the overall risk to the receptor was determined to be low. The inclusion of these results on Figure E-3 was not intended to imply a significant risk to these receptors. Otherwise, the reviewers have correctly summarized EPA's analysis.

3. PURPORTED IMPACTS TO AQUATIC MAMMALS

It is concluded in the BERA that aquatic mammals (represented by muskrats) are at significant risk from arsenic in Reaches 1 and 2 of the study area. It is important to note that based on the criteria established in the BERA, aquatic mammal populations are at negligible or low risk from all other COPCs throughout the entire study area. Our evaluation indicates that the risk associated with arsenic is overstated and should be ranked as low in all reaches of the study area, including Reaches 1 and 2. The fact that muskrat populations are found in all reaches of the study area, including Reach 1, demonstrates that the predicted risk is not supported by actual observations. These conclusions are discussed below.

3.1 Based on EPA's Criteria, Aquatic Mammals Face Low Risk from Other COPCs – In total, 58 COPCs were evaluated for the risk that they might pose to aquatic mammal populations in the study area. Of these, 52 chemicals (i.e., all those evaluated except for arsenic, chromium, copper, lead, mercury, and zinc) were deemed to pose negligible risk to aquatic mammal populations. The six aforementioned metals are identified as posing significant risks to aquatic mammals at various stations in Reaches 1 and 2. However, due to the relatively few stations so affected, based on the criteria established in the BERA, five of these metals (chromium, copper, lead, mercury, and zinc) are deemed to present low risk to the aquatic mammal populations inhabiting these reaches. Inclusion of any COPCs except arsenic in summary figures (e.g., Figure E-3) incorrectly suggests that they pose a significant risk to aquatic mammal populations.

3.2 Based on EPA's Criteria, Arsenic Poses Low Risk to Aquatic Mammals in Reach 2 – In the summary and conclusions of the BERA, it is stated that muskrats face a high risk from arsenic in Reaches 1 and 2. However, based on criteria established in the BERA, this conclusion is not correct for Reach 2. The upper effects threshold for arsenic is only exceeded in 4 out of the 14 stations in Reach 2 (i.e., Stations TT-30, TT-32, TT-33, and CB-03). As stated earlier, the criterion for assigning risk, as described on page 4-121 of the BERA, specifies that risk is considered "low" for a COPC if fewer than a majority of stations exceed the upper effects threshold. Therefore, since far less than a majority of stations exceed the upper threshold, arsenic should be classified as posing a low risk to aquatic mammal populations in Reach 2.

3.3 Ingestion Rates of Arsenic are Overestimated – The purported significant risk that arsenic poses to muskrats at stations in Reaches 1 and 2 is based on a food consumption model, in which consumption of plants is the principal avenue of exposure. The estimated HQ for a COPC is directly related to the value assigned as the concentration of that COPC in plant tissue. However, in the BERA, plant concentrations are not measured at each station, but rather are estimated from sediment concentrations. Assumptions used in this estimation process can lead to large errors and, consequently, lead to the designation of "significant" risk where it does not exist. A validation of the estimation process is possible by comparing actual plant tissue concentrations measured at a station with the concentrations estimated from sediment concentrations. This validation exercise is provided in Table 4-276 of the BERA and clearly demonstrates that the model overestimates the amount of arsenic in plant tissue consumed by muskrats by up to 2.76 times. For the three site stations for which data exist (i.e., Stations 18, 20, and 21), the average overestimation of plant arsenic tissue levels is 2.03 times, leading to an overestimation of the HQs by a similar amount. If the plant tissue values used in the HQ calculations are divided by a

factor of 2.03 (to compensate for the over-estimate of plant concentrations), the level of risk, as illustrated in Table 1, drops to "low" in both Reaches 1 and 2. Based on the corrected HQs, only 8 out of the 20 stations in Reach 1 have HQs which are greater than 1 when the upper effects threshold for arsenic of 150 mg/kg in the sediment is used as the benchmark. In Reach 2, the risk posed by arsenic to aquatic mammals is low regardless of this correction because the number of stations exceeding the upper effects threshold was only 4 out of 14 without the correction and 1 out of 14 with the correction.

3.4 Muskrat Populations Present in all Reaches of Watershed – It is well established that muskrat populations currently inhabit all reaches of the study area. On page 4-42 of the BERA, the author states "Muskrats have been observed in the Wells G&H 38-acre wetland at the northern end of the study area (north of Salem Street), and likely occur in all of the open water habitats within the study area". No evidence is presented that these muskrat populations are suffering from arsenic poisoning and no suggestion is made in that regard. Therefore, the purported impact is, at this point, a mathematically-derived hypothesis which is not supported by actual observations on the ground or in the water.

The inconsistency between the predicted risk and the observed populations is noted in the BERA (pg 4-90). It is suggested that effects on the population may be occurring which are not observable from qualitative data and that "muskrat populations may be present on the site whether or not the conditions at a portion of the sampled stations present a risk to survival or reproduction of individuals". This position is not consistent with the stated objective of the BERA to assess risk to populations, not to individuals. Unless otherwise demonstrated, the presence of a robust population of muskrats throughout the study area indicates that risk to populations of aquatic mammals is negligible or, at worst, low.

EPA Response to Comment Section 3: ***The BERA identifies a series of metals that may pose a risk to aquatic mammals. These metals present a low risk to aquatic mammal populations. This low risk determination takes into consideration the limited habitat area and number of sampling stations with calculated exposure exceeding lowest observed effects level for the representative mammal species. These risks are displayed on Figure E-3 and were not intended to imply significant risk to the mammal populations.***

According to the criteria set out in the document, the reviewers are correct that Reach 2 should have been omitted from being considered "high" since just 4 of 14 stations exceeded the TEL. However, this conclusion is also an artifact of the way the reaches were divided. If the Cranberry Bog had been considered part of Reach 1, then 19 out of 29 stations would have had exceedences of TEL for muskrat, and the inclusion of the stations in the Cranberry Bog with those contributing to risk for muskrat would be consistent with the criteria set in the document.

EPA does not concur that the selected model for estimating exposure of mammals to ingestion of arsenic in Reaches 1 and 2 over-estimates the exposure to muskrats. EPA acknowledges the uncertainty of estimating plant tissue concentrations from sediment concentrations using uptake factors, and provided an evaluation of the magnitude of the error in Table 4-276. However, other assumptions in the model also likely contributed to uncertainty, and likely

underestimate exposure to an equal or greater degree. In particular, as noted by other reviewers, the plant tissue samples used in the model were collected from above-ground portion of the plants. Muskrats' preferred food includes the root portions of plants like cattails. Other data sets have shown that the roots typically have significantly higher concentrations of metals. In data collected just north of the study area, for cattails, the difference between roots and stem/leafs was a factor of 6. If this factor is applied in the same way as the calculation presented in Table 1 of the comments, the majority of the stations in both reaches 1 and 2 would exceed the TEL for muskrat. These arguments emphasize the uncertainty involved in the estimates of risk. However, EPA feels that reasonable assumptions have been used in calculating risk with the data available, and the evidence indicates a risk to herbivorous mammals in the upper portion of the study area associated with the ingestion of plant material.

The final point made in the comments is that the BERA acknowledges the presence of muskrat in the study area. It is standard practice in ecological risk assessment as well as in human health assessment to base conclusions of risk on reasonable models of exposure for receptors, without corresponding documentation of mortality of individuals or reduction in populations that result from these risks. The comments contend that the population of muskrat in the study area is "robust." The presence of muskrat in the watershed does not mean that the populations are unaffected. Rather, the presence of individuals in the study area indicates that either portions of the study area are not harmful to muskrat survival or may be a result of immigration from other areas supplementing reproductive rates in the study area. Either of these results would be consistent with observation of individuals in the study area, and do not result in the dismissal of the potential risk to aquatic mammals.

Table 1. Muskrat HQs for Arsenic Based on Upper Effects Threshold TEL of 150 mg/kg in Sediment

Station	Reach	BERA HQ (Plant [As] estimated from Sediment [As])	Corrected HQ (Estimated Plant [As] corrected by dividing by 2.03)
NRSE	1	1.2	<1
14	1	<1	<1
TT-22	1	<1	<1
21	1	1.2	<1
12	1	9.9	4.9
13	1	9.1	4.5
TT-28	1	5.2	2.6
WH	1	<1	<1
BW	1	8.9	4.4
15	1	1.2	<1
20	1	2	<1
WG	1	<1	<1
TT-29	1	5.2	2.6
19	1	17.4	8.6
11	1	2	<1
WW	1	<1	<1
JY	1	1	<1
18	1	5	2.5
WS	1	1.2	<1
10	1	6	3
HQ >1	**1**	**15 of 20**	**8 of 20**
TT-30	2	4.1	2
TT-31	2	<1	<1
TT-32	2	1.8	<1
CB-01	2	<1	<1
CB-04	2	<1	<1
CB-03	2	1.9	<1
CB-02	2	<1	<1
CB-06	2	<1	<1
TT-33	2	1.7	<1
16	2	<1	<1
9	2	<1	<1
AM	2	<1	<1
KF	2	<1	<1
8	2	<1	<1
HQ >1	**2**	**4 of 14**	**1 of 14**

4. PURPORTED IMPACTS TO BENTHIC INVERTEBRATES

It is concluded in the BERA that arsenic is the only COPC that poses a significant risk to benthic invertebrate communities in the study area and that this risk occurs in Reach 1, Reach 2, and portions of the Mystic Lakes. However, an evaluation of the underlying data and the decision criteria established in the BERA indicates that the risk associated with arsenic is overstated and should be ranked as "low" in all reaches of the study area, including Reach 1, Reach 2, and the Mystic Lakes. The BERA also concludes that all other COPCs pose a "negligible" to "low" risk to benthic invertebrates throughout the study site and our evaluation indicates that this conclusion is strongly supported by the available data. The rationale underlying these conclusions is discussed below.

4.1 Based on EPA's Criteria, Arsenic Poses a Low Risk to Benthic Invertebrates Throughout Study Area – In the summary and conclusions of the BERA, it is stated that benthic invertebrates face a high risk from arsenic in Reaches 1 and 2 and to some extent in the Mystic Lakes. However, based on the criteria established in the BERA, this conclusion is incorrect for all three of these locations.

> **Mystic Lakes** – For the Mystic Lakes, the upper effects threshold for arsenic is only minimally exceeded in 2 out of the 8 lake stations and, therefore, according to the decision criteria, the risk that arsenic poses to benthic invertebrates in the lakes is low. This conclusion is stated on page 5-16 of the BERA: "Based on the limited number of stations in reach 6 (2 of 8 stations) above the upper TEL, the risk to benthic invertebrates is low in this reach".
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> **Reach 2** - The upper effects threshold for arsenic is only exceeded in 4 out of the 14 stations in Reach 2. Since clearly less than a majority of stations exceed the upper effects threshold, arsenic should be deemed to pose a low risk to benthic invertebrate communities in Reach 2.
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> **Reach 1** - The upper effects threshold for arsenic is exceeded in 10 out of the 20 stations in Reach 1. The criterion for substantive risk requires that a majority of the stations in a reach exceed the upper effects threshold and this criterion is not met in Reach 1.

4.2 Based on EPA's Criteria, Benthic Invertebrates Face Low Risk from All Other COPCs In total, 58 COPCs were evaluated for the risk that they might pose to benthic invertebrate communities in the study area. Of these, 52 chemicals (i.e., all those evaluated except for arsenic, chromium, copper, lead, mercury, and zinc) were deemed to pose negligible risk to benthic invertebrates. The six aforementioned metals are identified as posing significant risks to aquatic mammals at various stations in Reach 1, Reach 2, and the Mystic Lakes. However, due to the relatively few stations so affected, based on the criteria established in the BERA, five of these metals (i.e., chromium, copper, lead, mercury, and zinc) are deemed to present low risk to the benthic invertebrates inhabiting these reaches. Inclusion of any COPCs except arsenic in summary figures (e.g., Figure E-3) incorrectly suggests that they pose a significant risk to the benthic invertebrate community.

4.3 Triad Bioassay Test Results do not Support Impacts Predicted by Exceedence of the Arsenic Sediment TEL – Stations in Reaches 1 and 2 of the study area were identified in the BERA as posing a significant risk to benthic invertebrates because sediment at those stations exceeds the arsenic upper effects threshold of 220 mg/kg. In an attempt to confirm the accuracy of these predictions, bioassay tests were performed by EPA on sediment samples collected from a number of stations in Reaches 1 and 2. The accuracy of the predicted impacts would be supported if (1) the bioassay tests demonstrated that sediments containing more than 220 mg/kg of arsenic or more were toxic to the test organisms and (2) the level of toxicity increased as the concentration of arsenic in the sediments increased above the TEL. The BERA claims that the bioassay testing provides such confirmation. However, a careful evaluation of the bioassay test results indicates that the interpretation of these results in the BERA is incorrect and that, in fact, no significant toxicity is observed in any of the site samples in Reaches 1 and 2, even those with sediment arsenic concentrations greatly in excess of the purported 220 mg/kg upper effects threshold. The rationale underlying these conclusions is summarized below.

Reference Site Results Used Incorrectly - A major problem with the BERA interpretation of the toxicity test data is the manner in which the reference site results were used. Comparison against reference site results without consideration of laboratory control results is inappropriate because it tends to produce false positives. For example, in this data set, when compared to a reference site, sediments collected from four stream stations (i.e., Stations 10, 12 TT-29, and TT-30) and four wetland stations (i.e., Stations 13, 19, TT-32, and TT-33) are identified as causing reduced growth in the *C. tentans* and/or *H. azteca* tests. However, as illustrated in Table 2, only 2 of these 8 impacts (i.e., Stations 12 and 13) were identified as exhibiting reduced growth when the results from site samples were compared against the laboratory control. The purported impacts on growth for the other six sites (i.e., those detected by comparison to reference site results but not by comparison to laboratory control results) are more likely due to exceptionally high growth in the reference samples (perhaps due to high nutrient levels or favorable grain size) than to any sub-par performance in the study area samples. Interestingly, as illustrated in Table 2, Stations 12 and 13 did not have the highest arsenic concentrations of the twelve stations sampled.

Results from reference site sediment testing are more appropriately used as a means to confirm the conclusions drawn from comparisons with laboratory control sediment results, not to replace the use of the laboratory control sediment results. The results from laboratory control sediment and reference site sediment are intended to be used in a two step evaluation. In the first step, the results from site samples are compared against the results of the laboratory control to determine if any impacts may be occurring. If any impacts are identified based on this comparison with laboratory control sediments, then the second step is performed in which the results from study area samples are compared against the results from one or more reference site sediments. If no impacts are observed in this second comparison, then it is assumed that the differences observed in the first step comparison (i.e., against the laboratory control) do not indicate significant toxicity, but are rather an artifact of "natural" conditions in the study area. When this approach is taken, only two of the study area stations (i.e., Stations 12 and 13) still have reported impacts (i.e., reduced growth).

Table 2. Predicted Impacts on Test Organism Growth based on Comparison with Laboratory Control and Reference Site Results

Station	Habitat Type	[As]	Step 1 Growth Impact vs Lab Control?	Step 2 Growth Impact vs Ref Site?	Overall Assessment Growth Impact vs Lab Control + Ref Site
13	wetland	353	Y	Y	Y**
19	wetland	4250	N	Y*	N
22	wetland	13	N	N	N
TT-32	wetland	313	N	Y*	N
TT-33	wetland	221	N	Y*	N
WH	wetland	24	N	N	N
WW	wetland	4	N	N	N
10	stream	2180	N	Y*	N
12	stream	958	Y	Y	Y**
18	stream	1490	N	N	N
TT-29	stream	747	N	Y*	N
TT-30	stream	541	N	Y*	N

* Comparison with reference site results produced a false positive because no reduced growth was detected when compared with laboratory control results

** Comparison with reference site results confirms the findings made based on comparison laboratory control results

Reference Stations and Site Stations were Tested on Different Days and Results Cannot be Statistically Compared – A second and perhaps more damaging problem with the BERA interpretation of the bioassay results is the fact that the reference sites and the study area sites were tested on different days, using different cohorts of test organisms. This major failure in experimental design, which is explained below, leads to an overestimate of the number of site samples that had statistically significantly lower growth than the reference samples.

For all four of the tests which were performed on the sediment samples in the triad evaluation (i.e., the *C. tentans* acute test, the *C. tentans* chronic test, the *H. azteca* acute test, and the *H. azteca* chronic test), the samples were divided into two groups and bioassay tests were performed on each group at different times using different cohorts of test organisms. For all tests, the groups were configured as follows:

- Group 1 included all of the stream and wetland site samples plus a laboratory control
- Group 2 included all of the reference site samples, Mystic Lake samples, and a laboratory control

The results from these tests clearly demonstrate that at the end of the test period, the Group 2 control organisms weighed more than the Group 1 control organisms. This implies that the cohort of organisms used in the Group 2 tests either grew faster or started out at a larger size than the cohort of organisms used in the Group 1 tests. Therefore, the weight of the organisms from the reference sites, which were part of Group 2, would be expected to be higher than the weight of the organisms from the site samples (in Group 1) even if the quality of the sediment in the site samples and the reference samples was exactly the same. If a correction is made for this "control weight differential", the statistically significant differences in growth between reference stations and study area sites greatly diminish, if not disappear.

This point is illustrated in Table 3 for the growth results from the *C. tentans* acute bioassay tests. In the first group of sediments tested, which included all of the stream and wetland site samples, the mean control weight was 0.92 mg/individual. In the second group of sediments tested, which included the four reference sites for these habitat types, the mean control weight was 1.13 mg/individual. Based on these control values, the test organisms in the second test group were 1.23 times heavier than those in the first test group. Based on the uncorrected data, it is reported in the BERA that four wetland stations (i.e., Stations 13, 19, TT-32, and TT-33) and three stream stations (i.e., Stations 10, 12, and TT-30) had statistically significantly reduced growth when compared to the reference stations. However, when the "control weight differential" is corrected, only two of these stations (i.e., Stations 12 and 13) have statistically significantly lower growth than the designated reference stations.

This "control growth differential" was also observed in the *C. tentans* chronic test and the *H. azteca* acute tests, with values of 1.45 and 1.1, respectively.

It should be emphasized that statistically comparing the results obtained from one set of tests against those obtained from another set of tests is routinely avoided in environmental

Table 3. Growth Results for the 10-day *C. tentans* Acute Bioassay Tests Comparisons between Site Stations and Reference Stations

Sample	Habitat Type	Sample Weight (mg)	Weight of Applicable Lab Control (mg)	Control Weight Differential	Corrected Sample Weight (mg)
SA	Ref - wetland	1.40	1.13	1.23	1.14
HB	Ref - wetland	1.73	1.13	1.23	1.41
WW	wetland	1.16	0.92	1	1.16
WH	wetland	1.06	0.92	1	1.06
TT-33	wetland	**0.99***	0.92	1	0.99
TT-32	wetland	**0.89***	0.92	1	0.89
22	wetland	1.01	0.92	1	1.01
19	wetland	**0.97***	0.92	1	0.97
13	wetland	**0.55***	0.92	1	**0.55****
04-IP	Ref - stream	1.14	1.13	1.23	0.93
01-IP	Ref - stream	1.35	1.13	1.23	1.10
TT-30	stream	**0.85***	0.92	1	0.85
TT-29	stream	0.95	0.92	1	0.95
18	stream	0.90	0.92	1	0.90
12	stream	**0.67***	0.92	1	**0.67****
10	stream	**0.81***	0.92	1	0.81

* denotes site station which had statistically significantly lower weight than both applicable reference sites based on uncorrected reference weight data

** denotes site station which had statistically significantly lower weight than both applicable reference sites based on corrected reference weight data

toxicology. Different cohorts of test organisms are likely to come from different genetic stocks and be in different states of health. Consequently, it is normal to observe differences in growth and reproduction between cohorts and these differences prevent meaningful comparisons between test results obtained with these different test cohorts. Not surprisingly, this phenomenon occurred in the triad study and, therefore, the results from the stream and wetland sites cannot be meaningfully compared against the reference site results. This situation makes the information in almost all of the Figures in Chapter 4 of the BERA meaningless.

Bioassay Test Results are not Consistent – Four bioassay tests were performed on each of the sediment samples collected during the 2001 triad evaluation. Two tests examined the response of *C. tentans* (a 10-day survival and growth test and a chronic life-cycle survival, growth and reproduction study) and two tests examined the response of *H. azteca* (a 10-day survival and growth test and a 42-day chronic survival, growth, and reproduction test). For each species, the results of the acute and chronic tests were not consistent and, therefore, serious doubts are raised as to the significance of the purported impacts. These inconsistencies are apparent regardless of whether the laboratory control or a reference site is used as the standard against which impacts are assessed.

For example, based on the laboratory control (see Table 4-267), the results of the 10-day *C. tentans* test identifies statistically significantly reduced growth in two samples (i.e., Stations 13 and 12) after 10-days of exposure. However, the chronic life-cycle tests show no such impact after 20-days of exposure. To conclude that the sediments from these two stations cause an impairment in organism growth in each of these samples is obviously not supported by the combined data. If growth was slightly retarded in these two samples during the first 10 days of exposure (as indicated in the 10-day test), these impacts disappeared by day 20.

This same inconsistency is even more pronounced when the results were based on comparison with reference site data (see Table 4-268). For *C. tentans*, the results of the 10-day test identify statistically significant reduced growth after 10 days of exposure in sediments from 7 stations. However, for 3 of these (i.e., Stations 10, 12 and TT-30), there is no such impact after 20-days of exposure. For H. *azteca*, the situation is even worse. The results of the 10-day test identify statistically significant reduced growth after 10 days of exposure in sediments from 4 stations (i.e., Stations 13, 19, TT-32, and TT-33), but after 28 days and 42 days of exposure there is no such impact in any of these sediments.

As illustrated in Table 4, if these inconsistencies are removed from the list of purported "hits" in Table 4-268, the calculated Toxicity Index values would decrease significantly. The highest value would be 1 and this would be assigned to only 4 of the 14 study area sites tested (i.e., Stations 13, 19, TT-33, and TT-32). It should be noted that in Table 4, these stations were assigned a TI of 1 and not 2 because the same endpoint is being detected in both the acute and the chronic tests and, therefore, should not be double counted. It should also be noted that none of these four stations exhibited consistent reduced growth when compared to the laboratory controls (see Table 4-267). In fact, only one station (i.e. Station 13) exhibited a growth impact at all and this impact was observed in the acute test but not the chronic test.

Table 4. Revision of BERA Table 4-268

Summary of Toxicity Testing Results as Compared to Corresponding Reference Samples, Wells G&H Superfund Site OU3

Station	Habitat	*C. tentans*, 10-day Acute		*C. tentans*, Life Cycle Chronic				*H. azteca*, 10-day Acute		*H. azteca*, 42-day Chronic			Toxicity Index
		survival	growth	survival	growth	% emerged	% hatched	survival	growth	suvival	growth	reproduction	
SA	wetland-R												0
HB	wetland-R												0
WW	wetland												0
WH	wetland												0
TT-33	wetland		p<0.05		p<0.05								1
TT-32	wetland		p<0.05		p<0.05								1
22	wetland												0
19	wetland		p<0.05		p<0.05								1
13	wetland		p<0.05		p<0.05								1
04-IP	stream-R												0
01-IP	stream-R												0
TT-30	stream												0
TT-29	stream												0
18	stream												0
12	stream												0
10	stream												0
03-IP	pond-R												0
UF	pond												0
6	pond												0
4	pond												0

shaded box indicates an acute endpoint that is not confirmed in the chronic test and should not be included in calculation of Toxic Index

patterned box indicates acute endpoints that are confirmed in chronic test, but since they reflect the same endpoint, should not be double counted in calculation of Toxic Index

Impacts Based on Comparison with Lab Control are Minor – When compared against the results of the laboratory controls (as summarized in Table 4-267) and confirmed by reference site results, few impacts were observed in the bioassay tests and those that were observed were minor. These test results lead to the prediction that benthic invertebrate communities at these stations would not be significantly impacted by exposure to the sediments and that chemical constituents of these sediments are not biologically available in toxic quantities. These conclusions are based on the following interpretation of the bioassay results and associated analytical chemistry data:

- No mortality was observed for any of the 12 study area sites from Reaches 1 and 2, even at the highest arsenic concentrations (up to 4,250 mg/kg).

- There were no consistent statistically significant reductions in growth of either test species for any of the study area sites. For *C. tentans*, sediments from two stations (i.e., Stations 12 and 13) exhibited reduced growth in test organisms after 10 days of exposure. However, exposure to these same sediments for 20 days did not produce any such effects.

- There was no demonstrated reduction in the percentage of emerging adults in the *C. tentans* chronic test in any of the samples collected from stations in Reaches 1 and 2.

- There was no demonstrated reduction in the mean number of days to adult mortality in the *C. tentans* chronic test in any of the samples collected from stations in Reaches 1 and 2. In fact, the adults exposed to sediments from these stations appeared to live longer than the adults exposed to either laboratory control sediments or reference station sediments.

- There was no demonstrated reduction in the number of eggs produced per adult in the *C. tentans* chronic test in any of the samples collected from stations in Reaches 1 and 2. In fact, the adults exposed to sediments from these stations appeared to produce more eggs than the adults exposed to laboratory control sediments.

- There was no demonstrated reduction in the number of eggs that hatched per adult in the *C. tentans* chronic test in any of the samples collected from stations in Reaches 1 and 2. In fact, the adults exposed to sediments from these stations appeared to have more eggs hatching than the adults exposed to laboratory control sediments.

- When compared to the laboratory control, samples from only 4 of the 12 stations in Reaches 1 and 2 (i.e., Stations 19, TT-32, TT-33, WH) exhibited statistically significant reductions in the percentage of successfully hatched eggs in the *C. tentans* chronic test. However, test organisms exposed to sediments from these stations had better hatching success than test organisms exposed to sediment from the designated reference station.

- When compared to the laboratory control, only one sample of the 12 collected from Reaches 1 and 2 (i.e., Station 12) exhibited a statistically significant reduction in

growth in the *H. azteca* chronic test after 42 days of exposure. However, test organisms exposed to sediment from this station grew better than test organisms exposed to sediment from the designated reference station.

- When compared to the laboratory control, only one sample of the 12 collected from Reaches 1 and 2 (i.e., Station 18) exhibited a statistically significant impairment in reproduction in the *H. azteca* chronic test after 42 days of exposure. However, test organisms exposed to sediment from this station had better reproduction than test organisms exposed to the sediment from the designated reference station.

4.4 Bioassays Performed in 1995 and 1997 do not Support the Hypothesis that Exceedence of the Arsenic Sediment TEL Causes Toxicity to Benthic Invertebrates – Bioassay tests were also performed in 1995 and 1997. If interpreted correctly, the results of these tests indicate that sediments in Reaches 1 and 2 are generally not toxic, even when the arsenic concentration greatly exceeds the purported upper effects threshold for arsenic of 220 mg/kg.

In 1995, six study area samples and two reference site samples were evaluated for toxicity. The bioassay tests performed on these samples were a 10-day survival and growth test with *C. tentans* and a 10-day survival test with *H. azteca*. The *H. azteca* test did not meet control survival and was deemed a failed test. Therefore, the results from this test are not useful in evaluating impacts. The results of the *C. tentans* test are summarized in Appendix A1 of the BERA and are said to indicate growth impairments in one stream station (i.e., Station SD-16) and 2 wetland stations (i.e., Stations SD-18 and SD-19) when compared to reference site results. What is not stated in the BERA, however, is that the bioassay report in Appendix A1 concludes that the reduced growth in the stream sample "may be due to physical characteristics of the sediment rather than from contaminants". What also is not stated in the BERA is that the results from the wetland reference site are not appropriate for comparison purposes and, therefore, there is no way to determine if the wetland study area sites have reduced growth. The problem is that the very low survival (i.e., 36%) in this reference sample makes the weight data unusable. It is often seen in bioassay tests that in samples with high mortality, the surviving individuals often demonstrate higher growth rates; perhaps because the surviving individuals have less competition for food. Table 5 summarizes the results of the 1995 *C. tentans* tests along with associated sediment arsenic concentrations. It is interesting to note that the sediment arsenic concentration in a stream sample which was deemed non-toxic in the BERA comes from a station with an average arsenic concentration in the sediment of 560 mg/l as measured in 1995 and 1,437 mg/kg based on a long-term average. This value is obviously greater than the purported upper effects threshold of 220 mg/kg.

In 1997, six study area samples and two reference site samples were evaluated for toxicity. The bioassay tests performed on these samples were a 10-day survival and growth test with *C. tentans* and a 10-day survival test with *H. azteca*. The *H. azteca* test did not meet control survival and was deemed a failed test. Therefore, the results from this test are not useful in evaluating impacts. The results of the *C. tentans* test are not summarized in the BERA, but are said to indicate growth impairments in 3 of the 6 samples when compared to reference site results. What is not stated in the BERA, however, is that reduced growth is not seen in any of these samples when compared to the laboratory control. In fact, all study area samples grew faster than the

Table 5. Results for 1995 *C. tentans* Bioassay Tests and Associated Chemistry Data

	Stream 8/21/1995 SD-07	Stream 8/31/1995 SD-12	Stream 8/23/1995 SD-16	Wetland 9/7/1995 SD-18	Wetland 8/31/1995 SD-19-1	Wetland 8/21/1995 SD-19-2	Stream Ref 8/30/1995 SD-23	Wetland Ref 8/21/1995 SD-24	Lab Control
% Survival	82.5	86.2	68.6	70	70	81.1	81.2	36	70
Avg weight (mg)	0.0014*	0.0012*	0.0008*	0.0013*	0.0010*	0.0009*	0.0017*	0.0021	0.0033
1995 mean [As]	52	560	10.9	222	1940	1940	12.6	16.4	
Data set mean [As]		1437	11	721	2518		12.6	20	
1995 Growth hit									
vs Lab Cont	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**		
vs Stream Ref	**No**	**No**	**Yes**						
vs Wetland ref				**NA**	**NA**	**NA**			

NA = Cannot compare wetland stations against wetland reference site because of excessive mortality in wetland reference sample

* = Average weight of test organisms are statistically significantly less than those in the laboraotry control

laboratory control. This is illustrated in Table 6, in which the results of the 1997 *C. tentans* tests are summarized along with associated sediment arsenic concentrations. As explained above, it is inappropriate to identify any of these stations as impacted. Also of interest is the fact that the sediment arsenic concentrations in these non-toxic samples range from 62 to 2,518 mg/kg, with 4 non-toxic samples greatly exceeding the purported upper effects threshold for arsenic of 220 mg/kg.

4.5 Lack of Toxicity in Sediments Probably due to High Concentrations of Iron – As demonstrated in a series of papers written by researchers at MIT (Hemond 1995, Aurillo et al. 1994, and Senn & Hemond 2002), arsenic in the sediments of the Aberjona River watershed are primarily in the +5 oxidation state and bound to hydrous ferric oxides (HFOs). In this form, arsenic is less toxic to benthic invertebrates because (1) arsenic in the +5 oxidation state is less toxic than arsenic in the +3 oxidation state and (2) arsenic bound to HFOs is less biologically available (i.e., tightly bound to the iron complex and unlikely to either dissolve into the pore water or be liberated in the guts of those invertebrates that ingest the sediment).

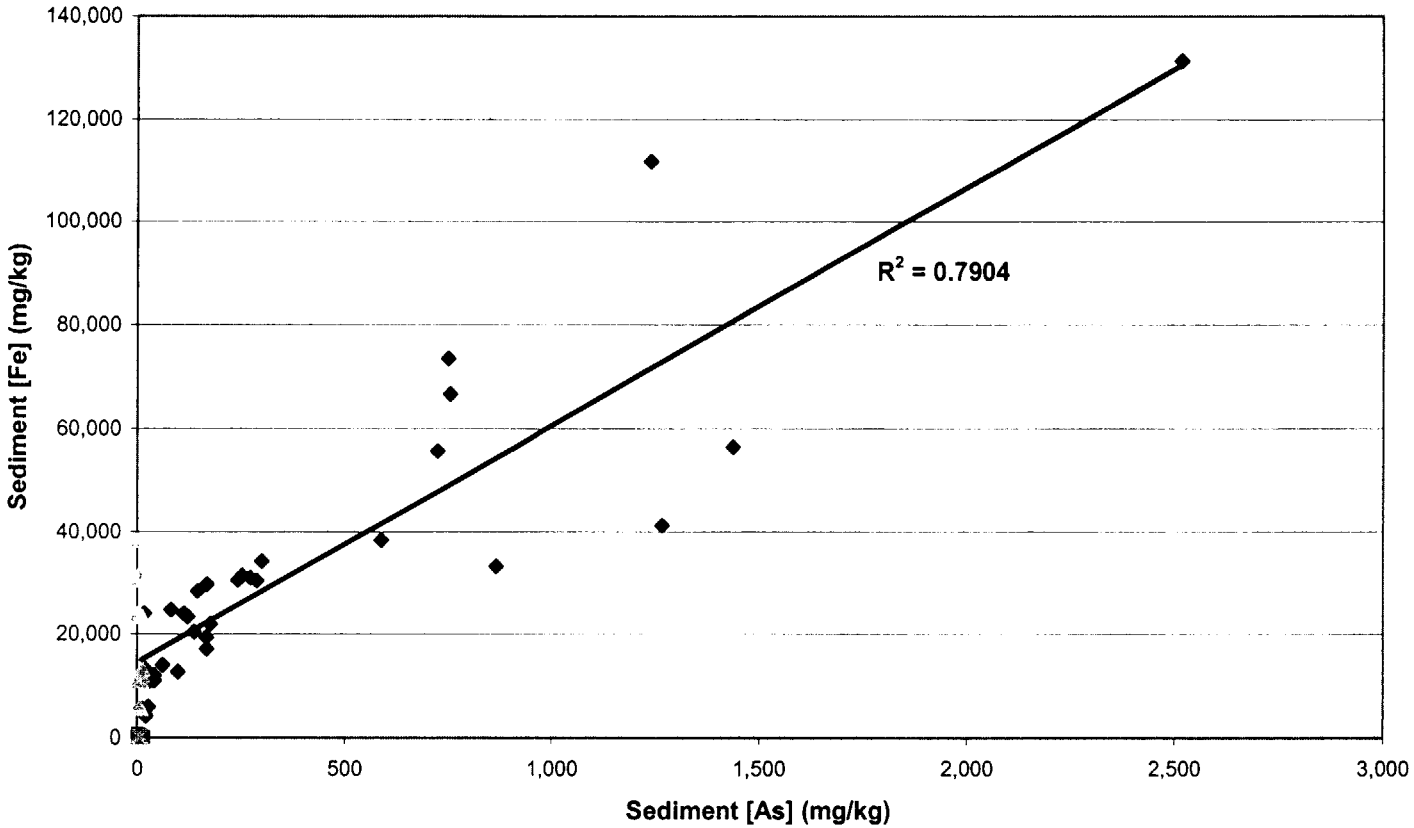
Evidence that arsenic in the sediments in Reaches 1 and 2 of the Aberjona River watershed is bound to HFOs is provided by the strong positive correlation that exists between the concentrations of arsenic and iron in sediment samples collected from these reaches over the past decade. As can be seen in Figure 1, when a linear regression is performed between the arsenic and iron sediment concentrations, there is a strong statistically significant positive correlation ($p = 0.0000$), with a correlation coefficient of 0.89 and a coefficient of determination (i.e., r^2) of 79.04%. Apparently, arsenic which entered the Aberjona River watershed was oxidized to As(V) and then became tightly bound to co-occuring hydrous ferric oxides. In depositional areas in the watershed, the HFOs settled along with the bound arsenic. Consequently, those sites that have higher sediment iron concentrations also have higher sediment arsenic concentrations. The lack of toxicity in the high iron/arsenic samples is due to the fact that the arsenic is unavailable in this iron complex to benthic invertebrates and other aquatic life.

4.6 Community Metrics do not Support Impacts Predicted by Exceedence of the Arsenic Sediment TEL - To examine the accuracy of predictions of impact based on exceedence of sediment TEL values for arsenic, an evaluation was made by EPA of the "health" of the benthic invertebrate community at each of the stations in Reaches 1 and 2 for which sediment chemistry analyses and sediment bioassay tests were performed. The accuracy of the predicted impacts based on sediment chemistry would be supported if (1) community metrics demonstrated that the benthic community was degraded at those stations which exceeded the 220 mg/kg arsenic threshold and (2) the level of degradation to the benthic community increased as the concentration of arsenic in the sediments increased. The BERA claims that the evaluation of community structure provides such confirmation. However, a careful evaluation of the community metric results indicates that the interpretation in the BERA is incorrect and that, in fact, few stations show impairment in community structure in Reaches 1 and 2, even those with sediment arsenic concentrations greatly in excess of the purported 220 mg/kg upper effects threshold. For the few stations that exhibit low diversity when compared to reference sites, there is no significant correlation with sediment arsenic concentrations. These conclusions are explained below.

Table 6. Results for 1997 *C. tentans* Bioassay Tests and Associated Chemistry Data

Sample	Habitat Type	[As] (mg/kg)	% Survival	Weight (mg/individual)	Reduced Growth vs Lab Control	Reduced Growth vs Ref Site
Lab Control			93.8	0.494		
SD-07	River	62	92.5	0.818	N	
SD-10	River	863	90	0.61	N	Y
SD-12	River	1437	83.8	0.738	N	
SD-06	Pond	74	95	0.634	N	Y
SD-18	Wetland	721	85	0.825	N	
SD-19	Wetland	2518	87.5	0.654	N	Y
FB	River Ref		63.8	1.059		
SD-25	Wetland Ref		95	1.048		

Figure 1. Arsenic as a Function of Iron in Site Sediments in Reaches 1 and 2



Community "Health" Should be Determined by Evaluating Standard Metrics – In the BERA, the health of the benthic invertebrate community at each station is summarized into a categorical metric called the "Community Index" or CI. This index includes both standard metrics of community health (i.e., # taxa, # individuals, Shannon-Weiner Index, and Pielou Index) and non-standard metrics (i.e., Community Loss Index, % Chironomids, % Oligochaetes, % Chironomids + Oligochaetes, % Dominant, and Tolerance Value of Dominant Species). How these diverse values can be summed into an overall Community Index is not explained and, therefore, the meaning of the CI is left undefined. The usual technique for assessing community "health" is to rely on the standard metrics which have been used by community ecologists for several decades and determine if, based on these metrics, any sites show lower diversity or abundance than representative reference sites.

Non-standard metrics used in the BERA to assess the "health" of the benthic invertebrate community are subjective and/or not suitable for statistical analysis and, therefore, should not be used to identify impairments. Metrics based on the percentage of chironomids and/or oligochaetes (in fact three metrics of this type are used in the BERA) are a prime example of subjectivity. The assumption is made that high levels of either of these two groups of organisms is indicative of a degraded benthic community. However, what percentage of these organisms equals impairment is never stated and, in fact, cannot be known. High percentages of these groups are to be expected in the samples collected because the selected sample locations were prime habitat for these organisms. This is acknowledged on page 4-79: "Since all of the stations sampled were selected to represent depositional areas, high abundances of Oligochaetes and Chironomids are not unexpected, since these taxa are frequently found in fine sediments". The uselessness of these metrics in evaluating impact is quickly confirmed when one of the wetland reference sites (i.e., Station SA) is shown to have a higher percentage of chironomids (i.e., 83%) than any of the 15 site stations evaluated. In fact the percent chironomids found at this reference station was more than twice that observed at any of the 15 site stations.

In addition to being subjective, three of the non-standard metrics (i.e., community loss index, percent dominance, and tolerance value of dominant species) are not suitable for statistical analysis because there is no replication within a station. For each of these metrics, the value that is indicative of impairment is not defined and differences from reference sites cannot be statistically evaluated because of the lack of replication.

The calculation of the community loss index (CLI) is another prime example of subjectivity. The CLI values for each station were determined by the comparison of the list of species observed at each site station with the list of species observed at a single reference station. For wetland and stream habitats, there were actually two reference stations and the number of species found at each of these reference stations was different. Interestingly, the reference stations selected for the CLI calculations were those with the highest number of species; thus maximizing the CLI for the site stations. Use of the other reference stations, which had fewer species, would have produced lower CLI values for the site stations. Whether these lower CLI values would have made a difference in the interpretation of the results cannot be known because the definition of a problematic CLI value is not stated.

None of the Wetland Stations in Reaches 1 or 2 Exhibited Degraded Community Structure when Compared to Reference Stations– Considering the four most commonly used metrics of community health (i.e., # taxa, # individuals, Shannon-Weiner Index, and Pielou Index), none of the seven wetland stations in Reaches 1 and 2 (i.e., Stations 13, 19, 22, TT-32, TT-33, WH, and WW) show impairment when compared against the two wetland reference sites (HB and SA). In fact, for both Shannon-Weiner Index and Pielou Index, two of the wetland sites (i.e., Stations 22 and WH) were statistically significantly more diverse than either of the reference sites.

For each metric, our conclusions were reached based on a statistical evaluation which consisted of an analysis of variance followed, if warranted, by a multiple-range test. The input data and the results of the statistical analyses are summarized in Table 7. For the "# of taxa" and the "# of individuals", the ANOVA could not detect any statistically significant differences between sites and, therefore, multiple-range tests were not deemed appropriate. For both Shannon-Weiner Index and Pielou Index, the ANOVA indicated that statistically significant differences between stations might be present. Multiple-range tests indicated that, based on these indices, two wetland sites (i.e., Station 22 and WH) were statistically significantly different from one or both reference sites. However, the results indicated that these two wetland sites were actually more diverse than the reference sites and, therefore, the community structure of these sites was not impaired.

Several of the Stream Stations in Reaches 1 or 2 Exhibited Reduced Diversity when Compared to Reference Stations, but these Reductions are not Correlated with Sediment Arsenic– Considering the four most commonly used metrics of community robustness (i.e., # taxa, # individuals, Shannon-Weiner Index, and Pielou Index), all of the five stream stations in Reaches 1 and 2 (i.e., Stations 10, 12, 18, TT-39, and TT-30) exhibit impairment when compared against the two stream reference sites (i.e., Stations 01-IP and 04-IP). In fact, for 3 of the 4 metrics (i.e., # of taxa, Shannon-Weiner Index, and Pielou Index) several of the stream sites were statistically significantly less diverse than either of the reference sites, but not because of arsenic.

For each metric, our conclusions were reached based on a statistical evaluation which consisted of an analysis of variance followed, if warranted, by a multiple-range test. The input data and the results of the statistical analyses are summarized in Table 8. For all four of the community metrics, the ANOVA indicated that statistically significant differences between stations might be present.

Multiple-range tests indicated that for the "# of organisms", there was no impairment in any of the stream stations when compared to the reference sites. One of the stream stations (i.e., Station 18) was statistically significantly different from both reference sites. However, the results indicated that this stream site had more organisms than the reference sites and, therefore, there was no impairment to community structure.

On the other hand, multiple-range tests indicated that based on the other three community metrics, each of the stream stations was less diverse than the reference sites. For "# of taxa", 3 of the 5 stream stations (i.e., Stations 10, 12, and TT-29) exhibited lower diversity that both

Table 7. Statistical Analysis of Community Metrics for Wetland Stations in Reaches 1 and 2

Station	Reach	Habitat Type	Avg # Taxa	Avg # Organisms	Shannon's Index	Pielou's Index
HB	Ref	wetland ref	18.7	439	1.33	0.400
SA	Ref	wetland ref	18.0	366	1.4	0.483
13	1	wetland	22.3	647	1.73	0.557
19	1	wetland	17.0	169	1.77	0.637
22	1	wetland	26.7	369	2.4	0.737
TT-32	2	wetland	23.7	646	1.15	0.367
TT-33	2	wetland	11.7	374	0.88	0.340
WH	1	wetland	20.0	162	2.29	0.767
WW	1	wetland	20.7	185	1.76	0.580
ANOVA p value			**0.299**	**0.289**	**0.037**	**0.033**
Pairwise Significant Differences					22 > HB	22 > HB
					22 > SA	WH > HB
					WH > HB	WH > SA

Table 8. Statistical Analysis of Community Metrics for Stream Stations in Reaches 1 and 2

Station	Reach	Habitat Type	Avg # Taxa	Avg # Organisms	Shannon's Index	Pielou's Index
01-IP	Ref	stream ref	19.7	449	1.64	0.550
04-IP	Ref	stream ref	24.3	393	2.06	0.643
10	1	stream	4.3	22.7	0.86	0.610
12	1	stream	11.0	608	0.47	0.203
18	1	stream	17.3	1583	1.01	0.353
TT-29	1	stream	11.7	1022	0.72	0.297
TT-30	2	stream	20.3	327	1.30	0.441
ANOVA p value			**0.0000**	**0.0026**	**0.0002**	**0.002**
Pairwise Significant Differences			01-IP > 10	18 > 01-IP	01-IP > 10	01-IP > 12
			01-IP > 12		01-IP > 12	01-IP > TT-29
			01-IP > TT-29		01-IP > 18	
					01-IP > TT-29	
			04-IP > 10	18 > 04-IP	04-IP > 10	04-IP > 12
			04-IP > 12		04-IP > 12	04-IP > 18
			04-IP > 18		04-IP > 18	04-IP > TT-29
			04-IP > TT-29		04-IP > TT-29	04-IP > TT-30
					04-IP > TT-30	

of the reference stations. For Shannon-Weiner Index, 4 of the 5 stream stations (i.e., Stations 10, 12, 18, and TT-29) exhibited lower diversity than both reference stations. For Pielou Index, 2 of the 5 stream stations (i.e., Stations 12 and TT-29) exhibited lower diversity than both reference stations.

For the four community metrics considered, the lower diversity observed in the stream stations is not significantly correlated with sediment arsenic concentrations. For each of the four metrics, linear regressions were performed in which the metric values for the stream stations were compared to the concentrations of arsenic measured in the sediments at these stations. The input data and the results of these regression analyses are summarized in Table 9. For three of the metrics (i.e., # of taxa, # organisms, and Pielou Index), the p-values associated with the linear regressions range from 0.377 to 0.456 and, consequently, there is very little relationship between concentrations of arsenic in the sediment and these measures of community diversity. The regression between Shannon-Weiner Index values and sediment arsenic concentrations indicated a stronger relationship ($p=0.068$), but were only marginally statistically significant since the p value exceeded the routine cut off of statistical significance of 0.05.

4.7 Crayfish do not Show Impairment – Crayfish were collected from several reaches of the study area (i.e., Reaches 1, 2, 3, 5 and a reference area) and their tissues were analyzed for COPCs. These measured concentrations were then compared to benchmarks to determine if these organisms were impaired due to harmful body burdens. As stated on page 4-71 of the BERA, the results indicated "that COPC body burdens in site crayfish are lower than those which would be associated with adverse effects" (page 4-71). This conclusion does not support the contention that benthic invertebrates are being adversely impacted in Reaches 1 and 2 of the study area.

Table 9. Correlation of Metric Results with Sediment Arsenic Concentrations for Stream Stations in Reaches 1 and 2

Station	Sediment [As] (mg/kg)	# Taxa	# Organisms	Shannon Index	Pielou Index
10	863	4.3	23	0.86	0.61
12	1437	11.0	608	0.47	0.20
18	721	17.3	1583	1.01	0.35
TT-29	747	11.7	1022	0.72	0.30
TT-30	587	20.3	327	1.30	0.44

Metric	p-Value	Correlation Coefficient r	Coefficient of Determination r^2
# Taxa	0.4559	-0.4422	19.60%
# Organisms	0.8225	-0.1399	1.96%
Shannon Index	0.0682	-0.85	72.20%
Pielou Index	0.3771	-0.5127	26.30%

EPA Response to Comment Section 4: ***The criterion set in the BERA for a majority of the stations within a reach was applied to wildlife receptors, and not to benthic invertebrates. This distinction is appropriate because modeled risk for wildlife receptors are based on forage areas. The endpoints selected addressed population effects, not effects on individuals. Consequently it is reasonable to set the assumption that if more than half of the stations within a reach (shrew, muskrat) exceed an exposure that is indicative of risk, that there may be sufficient habitat area affected to impact the population of animals in that portion of the study area. However, the same logic does not apply to estimating risk to benthic invertebrate populations. With benthic invertebrates, each station is equivalent to a sample community. EPA did not intend that the criteria of over 50% of the stations within the reach should be applied to benthic invertebrates.***

The risks identified by EPA's criteria were displayed on Figure E-3, even in the cases where the overall risk to the receptor was determined to be low. The inclusion of these results on Figure E-3 was not intended to imply a significant risk to these receptors. The stations identified showed evidence of impairment of benthic invertebrates through toxicity testing results, and community composition statistics. These stations also corresponded to those with the highest metals concentrations, especially arsenic.

Use of the reference sites for comparison of toxicity tests is appropriate. EPA's "Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with

Freshwater Invertebrates" (Second Edition, EPA, 2000), Section 16.2, (Data Analysis) states: "In most sediment toxicity and bioaccumulation tests, test organisms are exposed to chemicals in sediment to estimate the response of the population of laboratory organisms. The organism response to these sediments is usually compared with the response to a control or reference sediment..." EPA guidance does not require the observation of an impact compared to laboratory controls, as a prerequisite for determining if there were impacts compared to reference locations. A major purpose of the laboratory controls are to establish that laboratory conditions (organism health, temperature, dissolved oxygen, ammonia concentrations), are maintained at acceptable growth levels during the test. Since the laboratory controls are based on artificial sediments, it is not uncommon to observe reduced growth of organisms in the laboratory controls, as compared to field reference. In reality, for chronic effects, the better measure of comparison for possible chronic effects is natural reference sediment.

However, the reviewers have pointed out that the experimental design was weakened by the way the samples were grouped in the lab on two different days. EPA acknowledges that the growth data of C. tentans *may have been influenced by the size of the organisms used on the two different beginning test days. Consequently, the EPA accepts the only stations with significant difference in* C. tentans *growth, as compared to laboratory controls, are stations 12 and 13, for the ten-day growth experiments. However, for stream and wetland samples, stations TT-32, 13, TT-30, 12, 18, 10 had lower growth of* C. tentans *as compared to laboratory controls. The three stream stations with highest arsenic concentrations (Stations 12, 18 and 10) did demonstrate the lowest growth rate of* C. tentans, *and similarly, the four wetland stations with the highest arsenic concentrations had the lowest growth rates for* C. tentans, *although the growth at all but 12 and 13 were not significantly different from the controls.*

Using these growth data for the 10-day C. tentans *tests, a consistent trend for lower growth rates on sediments with higher arsenic concentrations was observed. A plot of sediment arsenic concentration (log-transformed) versus the 10-day growth of* C. tentans *indicates the decreasing growth as compared with increasing arsenic concentration. This is a statistically significant relationship (r^2 = -0.70, p = 0.004, n=15) for wetland and stream samples alone or for all 20 samples, including the 5 lake/pond locations (r^2 = -0.65, p=0.002, n=20).*

This statistically significant relationship of arsenic concentration with growth of C. tentans *is not the sole basis of EPA's conclusion of evidence of impairment of benthic invertebrate communities associated with high concentrations of metals, including arsenic. These results were supported by other lines of evidence, discussed below and presented in the text of the BERA. The growth of* H. azteca *was also significantly reduced as compared to reference at stations TT-33, TT-32, 19 and 13. Growth of* H. azteca *was correlated to arsenic concentration in the sediment. As stated in the BERA, EPA believes these separate lines of evidence, cumulatively, indicate that there is impairment of the benthic invertebrate communities at the stations with higher metals concentrations, which is most closely associated with the concentration of arsenic.*

With regard to the 1995, and 1997 toxicity test data, EPA acknowledges that there were problems with interpreting the data for both of these rounds. This is, in part, why EPA chose to do a third and more comprehensive toxicity testing round in 2001. Due to the problems noted in interpreting the data from the earlier rounds, EPA has not put any significant weight on these test results.

EPA agrees that the predicted impacts on benthic communities associated with sediment chemistry would be supported if community metrics demonstrated that the benthic community was degraded at those stations which exceeded the 220 mg/kg arsenic threshold. However, EPA does not assume that the level of degradation to the benthic community would necessarily increase in a linear fashion as the concentration of arsenic in the sediments increased. Depending on the nature of the toxicity and resulting community response, there is no reason to assume that the response to sediment arsenic concentration of any individual community metric would necessarily be linear. As has been pointed out, there are other habitat characteristics and sediment chemistry conditions at each station (and in each sample) that could add to or ameliorate the potential toxicity of arsenic. As noted by the reviewers, the iron concentration in sediments may act to reduce, to some extent, the toxicity of arsenic to benthic invertebrates. EPA acknowledges that the toxicity of metals, including arsenic, is confounded by many variables. This contributes to the explanation of why the results of toxicity testing are as the reviewers have noted, "inconsistent." The observed variability in the response of organisms, both in the field, as shown by the benthic community analysis, and in the laboratory, reflect the variability of the response of individual organisms, and the resulting response of the community, to various levels of contaminant concentration in the sediments. As noted by the reviewers, iron concentrations in the sediment are likely a major variable in affecting the toxicity of arsenic in sediment. The correlation of iron concentration to arsenic concentrations, however, does not prove this point. As documented in the BERA, a number of metals co-vary in the sediment samples.

Community metrics used by EPA were appropriate. Many of the "standard" indices are most suitable for stream communities in riffle/run habitats. In the slow-moving, depositional environments characteristic of the samples in the river and wetlands, some of the "normal" stream metrics are not applicable. However, all of the metrics used are listed in Barbour, et. al, 1999 or Plafkin, et al. 1989 as acceptable community metrics, and most have been used in other studies of metal toxicity to evaluate similar data sets (e.g. Canfield, 1994). The only modification of these metrics was to use the tolerance of the dominant species as a simplified metric rather than Hisenhoff's Biotic Index. The metrics selected for analysis by the reviewer as "standard" are some of those least sensitive to moderate pollution or disturbance of a community. For example, number of organisms may not be sensitive to toxicity. If only the more sensitive species are impacted by sediment toxicity, this may lead to an increase in pollution-tolerant species, and no reduction in the total number of organisms present. Due to the depositional nature of the sediments, it is not surprising that high abundances of oligochaetes and chironomids are found. It has been noted in other studies that high proportions of these groups, with the relative low proportions of other taxa, are usually considered indicative of contaminated sediments (Canfield, et al., 1994). Based on these characteristics, evaluation of percent dominant and percent oligochaetes and chironomids

were reasonable, as was the use of the community loss index. The formula for the community loss index is provided in Appendix D.9.

There are numerous ways to analyze and present benthic invertebrate community data. The current study was not designed to test for statistically significant differences between stations (with a replicate number of 3), but was intended to identify stations with several community characteristics (indicative of impairment) lower than reference, and to evaluate relationships along a gradient of contaminant concentrations. The analysis presented in the comments is selective, and the validity of the statistical approach is not supported. The statistical tests performed on the individual metrics (ANOVA followed by multiple range tests) assume normal distributions of the data, which is a condition that is not met for all of the variables (abundance and number of taxa are not normally distributed variables). However, the conclusion that stations 22 and WH are more diverse than the reference locations (Table 7) is consistent with EPA's results indicating minimal evidence of impairment or toxicity at these stations. Similarly, in the analysis of stream stations presented, although not consistent with EPA's planned analyses (and assumptions of normality not verified), the conclusions support EPA's conclusions that stations 10, 12, 18 and TT-29 show evidence of community impairment. However, EPA would disagree that the lower diversity is not correlated to sediment arsenic concentrations. Average Shannon-Wiener diversity calculated for each station is significantly correlated to log-transformed sediment concentrations for the 15 stream and wetland stations combined ($r^2 = -0.74$, $p = 0.002$, $n=15$). However, with only 7 or 8 stations, respectively, the relationship was still significant among wetland stations ($r^2 = -0.84$, $p = 0.019$, $n=7$), but was not significant for stream stations alone ($r^2 = -0.51$, $p = 0.199$, $n=8$). Output from statistical tests is included as Attachment 1 to the response to comments and will be included in the revised Wells G&H OU-3 Risk Assessment.

As EPA presented in Table 4-270, combining the results from wetland and stream sampling locations, a decrease in diversity is significantly correlated to increased sediment arsenic concentration, as were percent dominance (an acceptable measure of tolerance/intolerance, Barbour, 1999) and percent oligochaetes and chironomids (a modified, but reasonable measure of composition, Barbour, 1999) and Pielou's evenness (see results, attachment 1) . There was no significant correlation of arsenic concentration to total number of organisms or number of taxa. The lack of effect on total number of organisms is not unexpected, due to the apparent chronic effects observed in the toxicity of the sediment samples, and insensitivity of this metric to moderate toxicity or disturbance.

EPA concludes that the metrics used were standard, reasonable, and appropriate. In an attempt to simplify the presentation of multiple metrics, EPA used the calculation of a summary statistic, the CI or Community Index. With or without reliance on this metric, EPA believes that the benthic invertebrate community data consistently show lower scores for stations with higher arsenic concentrations and correlation of several metrics to increased sediment concentrations of arsenic.

EPA agrees that the benthic invertebrate data are variable. However, there are consistent trends, as documented in the BERA, and these trends in diversity, evenness, and percent dominant taxa, correlated to arsenic concentrations provide consistent, statistically significant

evidence of impairment of benthic invertebrate communities at higher concentrations of arsenic in sediment. Considering how variable the natural communities are, and how variable bioavailablity of arsenic in sediments can be, showing a statistically significant trend of several endpoints to a single contaminant is sound evidence of a relationship between community impairment and sediment arsenic concentration measured along a gradient in the field.

EPA concurs that the BERA indicates that crayfish tissue results do not allow a conclusion of adverse effects, as a tissue residue value for crayfish was not available. However, the concentration of arsenic in tissue of crayfish on site was 11.5 times greater than at reference locations. This represented a significantly higher concentration in crayfish in reaches 1 and 2 than at reference locations (ANOVA, post-hoc comparisons, $p < 0.05$). Based on these results, EPA cannot conclude adverse effects on crayfish, however the results do not in themselves contradict the conclusion the benthic invertebrate communities are being adversely affected in Reaches 1 and 2.

Summary of benthic invertebrate endpoints:

1) *Sediment concentrations of several metals consistently exceed Severe Effect Level (SEL) values, particularly in reaches 1 & 2 for arsenic, chromium, copper, lead, mercury, and zinc, indicating potential impacts on benthic invertebrates.*
2) *Growth of* **C. tentans** *was lower than laboratory controls at stations 10, 12, 13, 18, TT-30, and TT-32. However, the impacts were statistically significant at only stations 12 and 13. No other toxicity endpoints indicated acute or chronic effects of sediment toxicity on benthic invertebrates.*
3) *EPA acknowledges that there was high variability in the results of the laboratory tests in 1995, 1997, and 2001. These apparently "inconsistent" results are not uncommon in laboratory toxicity testing when there are no acute toxic effects associated with exposure to sediments. No acute toxicity to sediment invertebrates was observed from samples collected in the study area. However, a consistent (and statistically significant) trend for lower growth rates on sediments with higher arsenic concentrations was observed.*
4) *Community metrics of benthic invertebrate populations indicated lower diversity in on-site wetland and river stations, and a significant correlation of reduced diversity with increased arsenic concentration. Other metrics, including Pielou's Evenness and percent dominant taxa also indicated lower values with higher arsenic concentrations in sediment. There was no decrease in the number of taxa or the total abundance of organisms comparing on-site stations to reference stations and no relationship of COPC concentrations to these metrics.*
5) *Crayfish tissue results do not indicate adverse effects. Concentrations of arsenic in tissue samples of crayfish from reaches 1 and 2 were higher (statistically significant), but these values were not associated with adverse effects.*

Based on these various results, EPA concludes that there is evidence that high sediment metals concentrations, particularly arsenic, may be associated with chronic impacts on benthic invertebrate communities. EPA's risk management decision will take into account the

strength of evidence of these results, as well as the severity and extent of the impacts on the ecosystem.

5. SUMMARY AND CONCLUSIONS

A thorough evaluation of the available data indicates that the BERA overestimates the risk posed by COPCs to biological receptors in the Aberjona River watershed. The available data strongly support the conclusion in the BERA that all COPCs, in all reaches of the watershed, pose negligible to low risk to predatory fish, bottom-feeding fish, small foraging fish, piscivorous birds, waterfowl, and small terrestrial mammals. On the other hand, the available data do not support the higher level of risk that the BERA assigns to aquatic mammals and benthic invertebrates. Specifically, the BERA concludes that arsenic in Reaches 1 and 2 poses a significant risk to these two groups of organisms. However, as explained in this report, risk to these two receptors is overestimated due to faulty extrapolations and misinterpretation of the available data. When these errors are corrected, the conclusion reached concerning aquatic mammal populations and benthic invertebrate communities is that they face low risk from arsenic in all reaches of the watershed (including Reaches 1 and 2) due to the fact that arsenic is bound to hydrous ferric oxides and, consequently has extremely low biological availability. These conclusions are further discussed below.

1. **BERA Concludes that all COPCs Except Arsenic Pose Negligible to Low Risk** - In the BERA, a large number of COPCs were evaluated as to the risk that they might pose to the biological community in the Aberjona River watershed. The evaluation considered the potential for impacts associated with surface water exposure and sediment exposure. In total, nine COPCs in surface water (all inorganics) and 58 COPCs in sediment (including VOCs, SVOCs, pesticides/PCBs, and inorganics) were evaluated. These evaluations considered potential impacts to a wide variety of animals represented by eight receptor classes. Of this long list of chemicals and receptor classes, it was concluded that all but six metals in sediments (i.e., arsenic, chromium, copper, lead, mercury, and zinc) posed negligible risk to all components of the biological community. In addition, of these six metals, only arsenic was identified as posing substantive risk to the biological community and this risk was limited in areal extent (i.e., to Reaches 1 and 2 of the study area) and ecological magnitude (i.e., potentially impact only two of eight receptor classes evaluated). However, careful analysis of the data, as provided in this report and summarized below, indicates that the risk associated with arsenic is overestimated in the BERA and should also be assigned a low risk to all eight receptor classes in all reaches of the study area.

2. **Risk Posed by Arsenic to Aquatic Mammals is Low** – The BERA concludes that arsenic poses a substantive risk to aquatic mammals in Reaches 1 and 2 of the study area. This risk is estimated based on a food consumption model which overestimates the concentration of arsenic in plants which are assumed to be the major food source of these species. When this overestimation is corrected, the level of risk that arsenic poses to aquatic mammals falls to "low" because less than a majority of stations in each reach

have HQs greater than 1. In addition, aquatic mammal populations are prevalent in the study area and show no signs of stress at the population level.

3. **Risk Posed by Arsenic to Benthic Invertebrates is Low** – The BERA concludes that arsenic poses a substantive risk to benthic invertebrates in Reaches 1 and 2 of the study area as well as in portions of Mystic Lakes. The primary basis for this estimated risk is a comparison of sediment arsenic concentrations with an "upper effects threshold" benchmark. The results of bioassay tests and community structure analyses are used in an attempt to confirm the benchmark-derived risk estimates. Several errors were made in the BERA in the interpretation of the data and in the design of the testing and, consequently, the risk to benthic invertebrates was overestimated. First, the criterion established for assigning risk levels was not adhered to. When properly applied, this criterion assigns low risk from arsenic to all reaches of the study area. Second, the bioassay test results indicate very minor impacts, if any, to benthic invertebrates in all of the sediment samples tested; even those sediments with arsenic concentrations greatly in excess of the purported "upper effects threshold" of 220 mg/kg. Third, the results of community structure analyses indicate that, based on standard metrics, there is no evidence that any of the wetland stations in Reaches 1 and 2 have reduced diversity or abundance. For several stream stations in these reaches, diversity is lower than that observed in reference areas, but there is no evidence that this is due to sediment arsenic concentrations. Overall, the bioassay test results and the community structure results do not confirm the level of risk predicted by the benchmark comparisons. This lack of confirmation coupled with the proper application of the criterion established in the BERA for assigning risk leads to the conclusion that arsenic in sediments in Reaches 1 and 2 poses a low risk to benthic invertebrate communities.

EPA response: EPA has responded to specific comments on the risk posed to aquatic mammals and benthic invertebrates. EPA believes that reasonable assumptions have been used in calculating risk based on sound assumptions and interpretation of the data. EPA does not believe that the BERA over-estimated the risk to aquatic mammals. Based on the dietary exposure calculations, the evidence indicates a risk to herbivorous mammals in the upper portion of the study area associated with the ingestion of plant material. EPA does not concur that the presence of muskrats in the study area is sufficient evidence to conclude that there is a lack of impairment of aquatic mammal populations.

Based on several lines of evidence in the evaluation of impacts on benthic invertebrates, EPA concludes that there is evidence that high sediment metals concentrations, particularly arsenic, may be associated with chronic impacts on benthic invertebrate communities. EPA's risk management decision will take into account the strength of evidence of these results, as well as the severity and extent of the impacts on the ecosystem.

This document has been prepared for Solutia, Inc. and Stauffer Management Company, LLC by

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Literature Cited:

Aurillo, A.C., Mason, R.P., and Hemond, H.F. 1994. Speciation and Fate of Arsenic in Three Lakes of the Aberjona Watershed. Environ. Sci & Technol. 28: 577-585.

Grapentine, L. Anderson, J., Boyd, D., Burton, G.A., DeBarros, C., Johnson, G., Marvin, C., Milani, D., Painter, S., Pascoe, T., Reynoldson, T., Richman, L., Solomon, K., and Chapman, P.M. 2002. A Decision Making Framework for Sediment Assessment Developed for the Great Lakes. Human and Ecological Risk Assessment 8:1641-1655.

Hemond, H.F. 1995. Movement and Distribution of Arsenic in the Aberjona Watershed. Environ. Health Perspect 103(Suppl 1): 35-40.

MacDonald, D.D. and Ingersoll, C.G. 2002. A Guidance Manual to Support the Assessment of Contaminated Sediments in Freshwater Ecosystems. United States Environmental Protection Agency, Great Lakes National Program Office, Chicago, Illinois. EPA-905-B02-001-C.

Senn, D.B. and Hemond, H.F. 2002. Nitrate Controls on Iron and Arsenic in an Urban Lake. Science 296: 2373-2376.

S. R. HANSEN & Associates — Environmental Consulting

STEPHEN R. HANSEN, Ph.D.
Principal

Over the past twenty-five years, Dr. Hansen has been directing research and monitoring in the areas of environmental toxicology, environmental chemistry, and community ecology. Of particular interest have been projects dealing with the prediction and mitigation of adverse impacts on natural ecosystems resulting from chemical discharge and/or physical perturbation. Performance of these projects involved the use of risk assessment techniques, toxicity identification/reduction evaluations, single and multi-species (microcosm) bioassays, field evaluations, and computer analyses.

EDUCATION:

Ph.D. (interdisciplinary ecology), University of Michigan, Ann Arbor	1974
M.S. (organic chemistry), University of Michigan, Ann Arbor	1970
B.A. (chemistry), Hunter College, New York	1964

PROFESSIONAL HISTORY:

S.R. Hansen & Associates, Occidental, CA, Principal	1987 - Present
EA Engineering, Science, and Technology, Inc. Lafayette, CA, Senior Scientist, Environmental Toxicology & Chemistry	1981-1987
United States Environmental Protection Agency Corvallis Environmental Research Laboratory, Corvallis, Oregon Research Scientist, Chemical Ecologist	1978-1981
University of Iowa, Iowa City Assistant Professor, Instructor of Zoology	1975-1980

EXPERIENCE SUMMARY:

ENVIRONMENTAL TOXICOLOGY: Designed and performed hundreds of bioassay tests to evaluate the toxicity of ambient samples of water (including surface water, stormwater runoff, and effluents) and sediment to both resident and surrogate species of fish, invertebrates, and algae. Assessed the ability of national water quality criteria, generated from a standard set of single species toxicity tests, to predict community level responses to toxic substances. Developed a mechanistic test to screen for the effects of toxicants on interspecies interactions.

Designed aquatic ecology monitoring systems to detect toxic discharges into aquatic systems. Evaluated the role played by toxic chemicals in the decline of natural populations (e.g., striped bass and salmon in the Sacramento River basin) and alterations in community structure.

TOXICITY IDENTIFICATION/REDUCTION EVALUATIONS (TI/REs): Designed and performed effluent toxicity characterization evaluations to determine if effluent limits and/or water quality objectives were being met and, therefore, if a TI/RE was necessary. These evaluations included multi-species bioassay testing, dilution modeling, and dye dispersion studies. Performed and successfully completed TI/REs on major industrial plant effluents, municipal plant effluents, sediments, and stormwater runoff samples resulting in the identification of the causative toxicants, the location of probable sources, and the evaluation of potential reduction methodologies. Participated in the development of a national-level protocol for the performance of TI/REs in industrial plants. Developed and implemented protocols for the performance of TIEs on estuarine sediments and stormwater runoff.

IMPACT & RISK ASSESSMENTS: Performed major studies to assess the impact of chemicals on the structure and functioning of natural communities. Assessed the risk associated with discharging hyper-saline water from salt ponds in and around San Francisco Bay to facilitate the conversion of these ponds to wetlands. Evaluated the impact of acid mine drainage and its constituents on salmonids in the Sacramento River System. Investigated the effects of DDTs and PCBs on marine organisms in the Southern California Bight. Determined the toxicity of bittern produced in salt pond evaporators and evaluated the potential for disposal in Northern California and in Baja Sur, Mexico. Evaluated the effects of pesticides and heavy metals on complex stream and estuarine communities. Assessed the risk to Native American populations associated with the use of wastewater treatment chemicals in North Slope, Alaska oil production facilities and their discharge into traditional fishing areas. Assessed the effects of antibiotics on nutrient uptake, competitive abilities, and population dynamics in microbial communities. Developed population and community level microcosms to simulate natural systems and to predict the impact of toxic and hazardous substances. Assessed the impact of hazardous wastes on sewage treatment processes. Determined whether wastes must be classified as hazardous, and evaluated disposal options. Evaluated the role played by toxic substances in the decline of the striped bass population in the San Francisco Bay-Delta system. Assessed the role played by selenium in producing the impacts observed in avian and aquatic populations at Kesterson Reservoir. Screened agricultural drainage waters from the San Joaquin Valley, CA for potential constituents of concern.

WATER QUALITY REGULATORY COMPLIANCE: Performed studies in support of site-specific criteria for copper, zinc, and cadmium in the Upper Sacramento River. Performed technical studies which formed the basis for the development of a site-specific water quality objective for copper in San Francisco Bay. Developed proposals for site-specific water quality-based cyanide effluent limits for two petroleum refineries in the San Francisco Bay Area. Developed a protocol for setting water quality criteria, standards, and effluent limits for the discharge of sub-surface agricultural drainage waters into receiving water bodies of California. Applied this protocol to define the research needed to set accurate effluent limits for selenium present in these agricultural waste waters. Recommended cyanide water quality standards for streams impacted by leaching processes associated with gold extraction. Developed and

reviewed aquatic monitoring programs for industrial and mining clients. Evaluated wastewater treatment processes to identify the causes of TSS and toxicity problems and to determine the effectiveness of bacterial degradation.

ENVIRONMENTAL CHEMISTRY: Utilized electrochemical methods to identify the biologically available fraction of copper, zinc, cadmium, and nickel in ambient waters and effluents for use in setting site-specific water quality objectives. Developed methods to reduce the detection limit for the measurement of cyanide in ambient estuarine waters and in complex effluents. Identified diazinon as the cause of toxicity in stormwater runoff. Examined the potential of a organic chemicals to bioconcentrate in aquatic organisms. Measured the fate and effects of the insecticide Diflubenzuron in a stream community. Analyzed the role of secondary plant compounds in herbivore deterrence. Analyzed the role of insect cuticular lipids in desiccation resistance (examined the use of cuticular lipids as a key to insect species identification and systematics). Evaluated the fate and effects of selenium and cyanide in natural aquatic systems.

LITIGATION SUPPORT - Served as an expert in litigations for the following clients: (1) Stauffer Management Company concerning the impact of acid mine drainage from the Iron Mountain Mine on aquatic life in the Upper Sacramento River, (2) Ropes and Gray, Latham and Watkins, and Scadden Arps concerning the effect of DDTs and PCBs on marine life in the Southern California Bight, (3) Covington and Burling concerning when the adverse impacts of heavy metals discharged from mining operations on aquatic organisms were established in the scientific literature (4) Cargill Salt concerning the impact of a refinery waste pond on aquatic life and wildlife in the San Francisco Bay estuary, (5) City of Vallejo concerning the impact on aquatic life of exceeding effluent limits in the discharge from a wastewater treatment plant, (6) Westlands Water District concerning the discharge of subsurface agricultural drainage water to S.F. Bay and/or the Pacific Ocean, (7) Western States Petroleum Association concerning setting water quality objectives and effluent limits for selenium, (8) Unocal Oil Company concerning setting water quality objectives and effluent limits for cyanide, (9) Beveridge and Diamond concerning groundwater contamination, (10) Cargill Salt concerning the discharge of saturated brine solutions into San Francisco Bay and adjacent ponds, (11) Unocal Oil Company concerning exceedences of NPDES effluent limits for selenium, and (12) Pima County concerning setting water quality standards for effluent-dominated waterbodies.

COMMUNITY ECOLOGY: Designed and performed studies to determine the community structure of streams and lakes and to evaluate the impact of chemicals on the structure and functioning of the constituent species and functional groups. Studied the impact of mercury on clapper rails in a salt marsh community. Studied an Upper Sonoran grassland community of searching predators to determine how desiccation resistance, competition, predation, and foraging strategies influence resource utilization. Experienced in the analysis of size, age structure, spatial distribution, and resource availability for plant and animal populations. Experienced in population censusing, water chemistry measurements, habitat evaluations, and statistical analyses of multivariate data.

HYDROELECTRIC POWER: Developed input-output model for predicting effects on Sacramento River salmon population resulting from the addition of hydroelectric generation capability to Red Bluff Diversion Dam; designed and managed fisheries and hydrology field

studies associated with the project. Experience in discussions and negotiations with agencies and regulatory groups. Designed and performed in-stream flow studies to assess the impacts on fisheries resources associated with water diversions from streams.

PROFESSIONAL ACTIVITIES:

Society of Environmental Toxicology and Chemistry
Water Pollution Control Federation
American Society of Testing & Materials
American Chemical Society
San Francisco Bay and Estuarine Association

PUBLICATIONS:

Love, M.S. and S.R. Hansen. 2001. Two surveys of the recreational fishery for white croaker (*Genyonemus lineatus*) on the Palos Verdes Shelf and data on DDT and PCB concentrations in white croaker from inshore waters off Palos Verdes. Submitted and accepted by CalCOFI Reports.

Hansen, S.R. and R.R. Garton. 1982. The ability of standard toxicity tests to predict the effects of the insecticide Diflubenzuron on laboratory stream communities. Can. J. Fish. Aquat. Sci. 39(9):1273-1288.

Hansen, S.R. and R.R. Garton. 1982. The effects of Diflubenzuron on a complex laboratory stream community. Arch. Environ. Contam. Toxicol. 11(1):1-10.

Hansen, S.R. 1981. Screening for toxic effects on interspecies interactions: A mechanistic or an empirical approach. Arch. Environ. Contam. Toxicol. 10(5):599-605.

Hansen, S.R. and S.P. Hubbell. 1980. Single-nutrient microbial competition: agreement between experimental and theoretically forecast outcomes. Science 207:1491-1493.

Hansen, S.R. 1978. Resource utilization and coexistence of three species of Pogonomyrmex ants in an Upper Sonoran grassland community. Oecologia 35:109-117

TECHNICAL PAPERS:

Determination of Heavy Metal Concentrations in the Water Column of Alviso and Baumberg Ponds. Prepared for Cargill Salt, U.S. Fish & Wildlife Service, and California Department of Fish and Game. 2003.

Evaluation of the Potential for Reductions in Dissolved Oxygen Associated with Circulation of Saline Pond Water During the Initial Stewardship Period of Wetland Restoration. Prepared for Cargill Salt, U.S. Fish & Wildlife Service, and California Department of Fish and Game. 2003.

Evaluation of the Potential for Salinity Impacts on Bay Shrimp Associated with Circulation of Saline Pond Water During the Initial Stewardship Period of Wetland Restoration. Prepared for Cargill Salt, U.S. Fish & Wildlife Service, and California Department of Fish and Game. 2003.

Evaluation of the Potential for Impacts on Salmonid Migration Associated with Circulation of Saline Pond Water During the Initial Stewardship Period of Wetland Restoration. Prepared for Cargill Salt, U.S. Fish & Wildlife Service, and California Department of Fish and Game. 2003.

Evaluation of the Potential for Impacts to Aquatic Life due to the Presence of Heavy Metals in the Saline Pond Water Circulated During the Initial Stewardship Period of Wetland Restoration. Prepared for Cargill Salt, U.S. Fish & Wildlife Service, and California Department of Fish and Game. 2003.

Evaluation of the Potential for Impacts to Aquatic Life due to the Elevated Salinity of Pond Water During the Initial Stewardship Period of Wetland Restoration. Prepared for Cargill Salt, U.S. Fish & Wildlife Service, and California Department of Fish and Game. 2003.

Review of USEPA's Cobalt Toxicity Reference Value Position Paper. Prepared for the Blackbird Mine Site Group. 2002.

Evaluation of the USEPA Ambient Water Quality Criterion for Iron: Relevance and Appropriateness to the Blackbird Mine Site. Prepared for the Blackbird Mine Site Group. 2002.

Recreational Vessel Fishery for White Croaker on the Palos Verdes Shelf. Prepared for Montrose Chemical Corporation of California, Aventis CropScience, and Chris-Craft. 2000.

Evaluation of Agricultural Runoff as a Source of DDT to Predatory Animals on the Channel Islands. Prepared for Montrose Chemical Corporation of California, Aventis CropScience, and Chris-Craft. 2000.

Temporal Trends in the Concentrations of DDT and Its Metabolites in the Tissues of White Croaker Collected from the Palos Verdes Shelf. Prepared for Montrose Chemical Corporation of California, Aventis CropScience, and Chris-Craft. 2000.

Evaluation of the Sale of White Croaker in Retail Fish Markets in Southern California. Prepared for Montrose Chemical Corporation of California, Aventis CropScience, and Chris-Craft. 2000.

Evaluation of Whether Cargill Salt's Dredging Operations Increase the Bioavailability of Mercury and, Consequently, Adversely Impact California Clapper Rails. Prepared for Cargill Salt Company, Newark, California. 1999.

Evaluation of the Toxicological Significance of Exceedences of Permit Effluent Limits for Residual Chlorine and Heavy Metals. Prepared for the City of Vallejo, Vallejo, California. 1998.

Comments on an Ecological Risk Evaluation Report for the Palos Verdes Shelf. Prepared for Montrose Chemical Corporation of California. 1998.

Evaluation of the Environmental Impact of Brine Discharged to a Surface Impoundment. Prepared for Cargill Salt Company, Newark, California.

Evaluation of the Fate and Effects of Copper in the Haiwee Reservoir. Prepared for the City of Los Angeles, Department of Water and Power. 1997

Toxicity Identification Evaluation for the Marley Cooling Tower Stockton Facility. Prepared for Marley Cooling Tower Company. 1997.

Development and Application of Estuarine Sediment Toxicity Identification Evaluations. Prepared for the San Francisco Bay Regional Water Quality Control Board. 1996.

Development of Marine Toxicity Identification Evaluation Procedures for the West Coast Species, *Haliotis rufescens, Macrocystis pyrifera,* and *Atherinops affinis*. Prepared for Bay Area Dischargers Association. 1996.

Effects of Dredge Lock Access on Mercury Concentrations in Potential Prey of Clapper Rails. Prepared for Cargill Salt. 1996.

Effluent Characterization Study for the Chevron Richmond Facility. Prepared for Chevron U.S.A., Inc. 1996.

Effluent Characterization Study for the Rhone Poulenc Martinez Facility. Prepared for Rhonc Poulenc, Inc. 1996.

Stormwater Monitoring Program, Toxicity Identification Evaluation Study. Prepared for City and County of Sacramento. 1995.

San Francisco Estuary Regional Monitoring Program for Trace Substances - Aquatic Toxicity Studies. Prepared for the San Francisco Estuary Institute. 1995.

San Francisco Estuary Regional Monitoring Program for Trace Substances - Aquatic Toxicity Studies. Prepared for the San Francisco Estuary Institute. 1994.

Identification and Control of Toxicity in Storm Water Discharges to Urban Creeks. Prepared for Alameda County Urban Runoff Clean Water Program. 1994.

Evaluation of the Discharge of Bittern to the San Francisco Bay Estuary. Prepared for Cargill Salt. 1994.

Evaluation of the Effect of Nitrification on the Toxicity of the Haskell Street Wastewater Treatment Plant Effluent. Prepared for the City of El Paso. 1993.

Toxicity Identification Evaluation for the San Jose/Santa Clara Wastewater Treatment Plant. Prepared for City of San Jose, California. 1993.

Toxicity Identification Evaluation for the Unocal San Francisco Refinery. Prepared for Unocal Corporation, Rodeo, California. 1993.

Critical Review and Evaluation of the Mass Emissions Reduction Strategy for Selenium. Prepared for Western States Petroleum Association, Glendale, California. 1993

Toxicity Identification Evaluation for the Sunnyvale Wastewater Treatment Plant. Prepared for City of Sunnyvale, California. 1992.

Toxicity Identification Evaluation for the Palo Alto Wastewater Treatment Plant. Prepared for the City of Palo Alto, California. 1992.

Development of Site-Specific Criteria for Copper in San Francisco Bay. Prepared for the Regional Water Quality Control Board, San Francisco Bay Region, Oakland, California. 1992.

Development of Site-Specific Criteria for Nickel in San Francisco Bay. Prepared for the Regional Water Quality Control Board, San Francisco Bay Region, Oakland, California. 1992.

An Investigation into the Use of Granulated Activated Carbon to Reduce or Remove "Organic" Toxicity from Effluent Produced by the Tosco Avon Refinery. Prepared for the Tosco Refining Company, Martinez, California. 1992.

Toxicity Identification/Reduction Evaluation for the Frontier Refinery. Prepared for Frontier Refining Company, Cheyenne, Wyoming. 1992.

An Investigation into the Use of Granulated Activated Carbon to Reduce or Remove "Organic" Toxicity from Effluent Produced by the Frontier Refinery. Prepared for the Frontier Refining Company, Martinez, California. 1992.

Results of Sediment Bioassays on Material Dredged from Southwest Marine Shipyards. Prepared for Southwest Marine, San Francisco, California. 1992.

Toxicity Identification Evaluation for Rainbow Trout Toxicity in the Tosco Avon Refinery Effluent. Prepared for the Tosco Refining Company, Martinez, California. 1992.

Toxicity Identification/Reduction Evaluation for the Haskell Street Treatment Plant. Prepared for the City of El Paso, El Paso, Texas. 1991.

Evaluation of the Discharge of Cargill Salt Bittern into the EBDA Discharge Line. Prepared for Cargill Salt Company, Newark, California. 1991.

Microcosm Testing to Evaluate the Fate of Dissolved and Adsorbed Hydrocarbons in Groundwater. Prepared for Chevron El Paso Refinery, El Paso, Texas. 1991.

Evaluation of tht Toxicity of Urban Stormwater Runoff from the Lower American River Watershed. Prepared for the City and County of Sacramento, Sacramento, California. 1991.

Evaluation of tht Toxicity of Urban Stormwater Runoff from the Sacramento River Watershed. Prepared for the City and County of Sacramento, Sacramento, California. 1991.

Studies in Support of Alternate Cyanide Effluent Limits for Four San Francisco Bay Area Refineries. Prepared for the Joint Refinery Cyanide Study Group (Tosco Avon, Shell Martinez, Exxon Benicia, and Unocal San Francisco Refineries), Martinez, CA. 1990.

Proposal for an Alternate Cyanide Effluent Limit for the Unocal San Francisco Refinery. Prepared for Unocal Corporation, Rodeo, CA. 1990.

Proposal for an Alternate Cyanide Effluent Limit for the Tosco Avon Refinery. Prepared for Tosco Corporation, Martinez, CA. 1990.

Evaluation of the TI/RE Performed at the Sacramento Regional Wastewater Treatment Plant in Response to a Toxicity Episode in February - March 1990. Prepared for the Sacramento Regional Wastewater Treatment Plant, Elk Grove, CA. 1990.

Ambient and Effluent Toxicity Testing for the Tosco Avon Refinery as Part of the Effluent Toxicity Characterization Program. Prepared for the Tosco Avon Refinery, Martinez, California. 1990.

Metal Concentrations and Nature of Suspended Solids in Leslie Salt Bittern. Prepared for Leslie Salt Company, Newark, CA. 1990.

Odor Treatability Studies at the Tosco Avon Refinery. Prepared for the Tosco Refining Company, Martinez, California. 1990.

Risk Assessment: Coagulant Use at the Kuparuk Seawater Treatment Plant. Prepared for ARCO Alaska, Inc., Anchorage, Alaska. 1989.

Comments on U.S. EPA's Proposal to Short-List Suisun Bay, Carquinez Strait, and San Pablo Bay as Selenium Impaired, and Source-List Six Petroleum Refineries as Point Source Contributors. Prepared for the Western States Petroleum Association, Los Angeles, CA. 1989.

Toxicity Investigation Report. Prepared for the Encina Water Pollution Control Facility, Carlsbad, Calif. 1989.

Final Water Quality Impact Evaluation for Land Disposal of Dredged Sediments from the Oakland Inner Harbor, Alameda County, California. Prepared for the Port of Oakland, Oakland, Calif. 1989.

Evaluation of the Options for the Discharge of Bittern - Regulatory and Economic Considerations. Prepared for the Leslie Salt Company, Newark, Calif. 1989.

Evaluation of the Use of Reclaimed Water at the Tosco Avon Refinery. Prepared for the Tosco Corporation, Martinez, Calif. 1989.

Evaluation of a Toxicity Episode in the Wastewater from the Tosco Avon Refinery. Prepared for Tosco Corporation, Martinez, Calif. 1988.

Toxicity Concentration Evaluation. Prepared in association with Entrix, Inc. for Unocal Refining & Marketing Division, Unocal Corporation, Arroyo Grande, Calif. 1988.

Alternate Cyanide Effluent Limits: Identification of Issues and Development of Study Plans. Prepared for San Francisco Bay Area Joint Refinery Group (Tosco Avon, Shell Martinez, Exxon Benicia, and Unocal Rodeo). 1988.

Protocol for Conducting Industrial Toxicity Reduction Evaluations (TREs). Prepared for Battelle Memorial Institute, Columbus Division, under contract fromU.S. Environmental Protection Agency. 1987.

Identification of Potential Substances-of-Concern in Agricultural Drainage Waters from the San Joaquin Valley: A Screening Level Analysis. Prepared for the San Joaquin Valley Drainage Program, Sacramento, Calif. 1987.

Supplemental Environmental Impact Report for the Sacramento Regional Wastewater Plant Expansion. Prepared in association with Brown and Caldwell Consulting Engineers for the Sacramento Regional County Sanitation District, Sacramento, Calif. 1987.

Evaluation of Bittern Discharge Options and Recommended Study Plans. Prepared for the Leslie Salt Company, Newark, Calif. 1987.

Review of the San Joaquin Valley Drainage Program: Adequacy for Setting Effluent Limits? Prepared for the San Joaquin Valley Drainage Program, Sacramento, Calif. 1987.

Toxicity Reduction Evaluation at the Tosco Corporation Avon Refinery, Martinez, Calif.: A Case Study. Prepared for the U.S. Environmental Protection Agency, Washington, D.C. 1987.

Bioassay Testing of Dredged Sediment. Prepared for Bendix Environmental Research, Inc., San Francisco, Calif. 1987.

Effluent Toxicity Evaluation. Prepared for the VictorValley Waste Water Reclamation Authority. Victorville, Calif. 1987.

Derivation of Water Quality-Based Toxicity Effluent Limits for the Shell Oil Martinez Manufacturing Complex. Prepared for Shell Oil Company, Martinez, Calif. 1986.

Risk Assessment for the Discharge of Effluent from the Sacramento Regional Wastewater Treatment Plant with Particular Emphasis on Temperature, pH, TRC, Copper, and Zinc. Prepared for the Sacramento Regional County Sanitation District, Sacramento, Calif. 1986.

Toxicity Reduction Evaluation and Treatment Feasibility Study for Avon Refinery. Prepared for Tosco Corporation, Martinez, Calif. 1986.

Evaluation of the Existing Total Residual Chlorine Effluent Limits for the Sacramento Regional Wastewater Treatment Plant. Prepared for the Sacramento Regional County Sanitation District, Sacramento, Calif., 1985.

Study Plan for Deriving a Water-Quality Based Effluent Toxicity Limit for the Shell Oil Martinez Manufacturing Complex. Prepared for Shell Oil Co., Martinez, Calif., 1985.

Plan for the Closure of Oily Waste Surface Impoundments. Prepared for Tosco Corp., Martinez, Calif., 1985.

Interim Report on Toxicity Reduction Evaluation for the Tosco Refinery Effluent. Prepared for Tosco Corp., Martinez, Calif., 1985.

Report of the Selenium Expert Panel: Recommended Research Directions and Priorities. Prepared for the U.S. Bureau of Reclamation, Sacra-mento, Calif. 1984.

Preliminary Evaluation of Effluent Quality Problems at the Avon Refinery, Martinez, California. Prepared for the Tosco Company, Los Angeles, Calif. 1984.

Protocol for Setting Effluent Limits for the Discharge of Subsurface Agricultural Drainage Water. Prepared for the U.S. Bureau of Reclamation, Sacramento, Calif., 1984.

Proposed Cyanide Water Quality Standard for Monitor Creek, Alpine County, California. Prepared for California Silver, Inc., Marklee- ville, Calif. 1984.

Instream Flow Incremental Methodology for the Proposed Nelson Creek Hydroelectric Project, Lassen County, Calif. Prepared for Henwood and Associates, Sacramento, Calif. 1984.

Research Issues Associated with Toxicity Problems at Kesterson Reservoir. Proceedings of a Research Meeting in Sacramento, 5-7 December 1983. Prepared for the U.S. Bureau of Reclamation, Sacramento, Calif., 1984.

Review of the Aquatic Ecology Environmental Monitoring Plan - McLaughlin Project (Homestake Gold Mine). Prepared for Yolo County, Calif., 1984.

Rapid Biomonitoring Techniques for Identifying Toxic Effluents in the San Luis Drain. Prepared for U.S. Bureau of Reclamation, Sacramento, Calif., 1983.

Problems with the Reproductive Success of Bird Populations Resident at Kesterson Reservoir: Magnitude, Cause, Source, and Ramifications. Prepared for U.S. Bureau of Reclamation, Sacramento, Calif., 1983.

The Use of Biomonitoring as a Substitute for Extensive Routine Chemical Analyses. Prepared for the U.S. Bureau of Reclamation, Sacramento, Calif., 1983.

Predischarge and Postdischarge Monitoring Plans Appropriate for the San Luis Drain. Prepared for the U.S. Bureau of Reclamation, Sacramento, Calif., 1983.

A Method for the Selection of Compounds for Inclusion in the Chemical Monitoring Plan for Agricultural Runoff. Prepared for the U.S. Bureau of Reclamation, Sacramento, Calif., 1983.

Suggested Toxicology Study Plan Appropriate for the San Luis Drain NPDES Permit Application. Prepared for U.S. Bureau of Reclamation, Sacramento, Calif., 1983.

Aquatic Ecology Monitoring Report for the Zaca Mine. Prepared for California Silver Company, Markleeville, Calif., 1983.

Fisheries and Water Quality Studies for the Lake Red Bluff Hydro- electric Project. Prepared for City of Redding, 1982.

Evaluation of the Role Played by Toxic Substances in the Decline of the Striped Bass Population in the San Francisco Bay - Delta System. Prepared for the Striped Bass Task Force, California State Water Resources Control Board, 1982.

Conceptual Model: Factors Affecting the Striped Bass Population in the San Francisco Bay - Delta System. Prepared for the Striped Bass Task Force, California State Water Resources Control Board, 1982.

Evaluation of Nophenol 922 as a hazardous material. Prepared for EKC Technology, Hayward, Calif., 1982.

Hazardous Waste Evaluation and Disposal Options. Prepared for Dennison-Eastman Corporation, Richmond, Calif., 1982.

Screening for Bioaccumulation Potential of Organic Compounds: The Use and Possible Modification of Octanol/Water Partition Coefficients as Tier One Tests. Prepared for the United States Environmental Protection Agency, Corvallis, Oregon, 1981.

PRESENTATIONS:

Evaluation of Options for the Disposal of Agricultural Drainage Water from the San Joaquin Valley. American Society of Chemical Engineers. 1996.

Development of Marine Sediment Toxicity Identification Evaluations. Society of Environmental Toxicology and Chemistry, Cincinnati, Ohio. 1994.

Ammonia and Sediment Toxicity. Society of Environmental Toxicology and Chemistry, Cincinnati, Ohio. 1994.

Use of Freshwater Species in Biomonitoring and TIEs in Effluents Discharged to Estuarine Receiving Waters: Artifactual or Real Toxicity? Workshop on Toxicity Identification Evaluations in the San Francisco Bay Region: Lessons Learned. Sponsored by the Aquatic Habitat Institute, Richmond, California. 1993.

Diazinon Rain: Stormwater Toxicity Identification Evaluations. Workshop on Toxicity Identification Evaluations in the San Francisco Bay Region: Lessons Learned. Sponsored by the Aquatic Habitat Institute, Richmond, California. 1993.

Site-Specific Copper and Nickel Criteria for San Francisco Bay. Society of Environmental Toxicology and Chemistry, Cincinnati, Ohio. 1992.

Chronic Toxicity Identification & Reduction Evaluation of Oil Refinery Effluent Discharged into the San Francisco Bay System. Society of Environmental Toxicology and Chemistry, Cincinnati, Ohio. 1992.

Performance of Chronic Toxicity Identification/Reduction Evaluations: Case Studies. Workshop on Chronic Toxicity Identification Evaluations in the San Francisco Bay Region. Sponsored by the Aquatic Habitat Institute, Richmond, California. 1992.

Development of Site-Specific Cyanide Effluent Limits for Petroleum Refineries Discharging to San Francisco Bay. Society of Environmental Toxicology and Chemistry, Washington, D.C. 1990.

Water Hyacinth Treatment of Refinery Wastewater. Society of Environmental Toxicology and Chemistry, Washington, D.C. 1990.

Recent Developments in Toxicity Identification/Reduction Evaluations. Society of Environmental Toxicity and Chemistry, Washington, D.C. 1988.

Identification of Contaminants of Concern by Application of Toxicity Identification/Reduction Evaluation (TI/RE) Techniques. Aquatic Habitat Institute Conference on Bioavailability, Berkeley, Calif. 1988

Identifying Effluent Toxicity with Biomonitoring and Toxicity Reduction Evaluations. University of Wisconsin, Madison, Wisconsin. 1988 Workshop on Toxicity Reduction Evaluations. American Petroleum Institute, Houston, Texas. 1987.

Toxicity Reduction and PAC Addition to Meet Toxicity Limits. American Petroleum Institute Annual Committee Meeting on Refinery Environmental Control, Atlanta, Georgia. 1987.

Toxicity Reduction Evaluation at an Oil Refinery. Seventh Annual Meeting of the Society of Toxicology and Environmental Chemistry, Alexandria, Virginia, Nov. 1986.

Development of a Biological Toxicity Testing Protocol for Estuarine Organisms in the San Francisco Bay System. Workshop for Biological Toxicity Testing. 59th Annual Conference of the Water Pollution Control Federation. Los Angeles, Calif. October 1986.

The Disposal of Agricultural Drainage Water in California: A Case Study on How Potential Problems can Slip Through the Cracks in the Regulating Process. Workshop at the Annual Meeting of the Society of Toxicology and Environmental Chemistry, St. Louis, Missouri, November 1985.

The Development and Use of a Protocol for Setting Water Quality Criteria and Effluent Limits for Subsurface Agricultural Drainage Waters. Workshop on Protocol Development, U.S. Bureau of Reclamation, Kelseyville, Calif., September 1984.

Research Needs for Understanding the Cause of Avian Toxicity at Kesterson Reservoir. Conference on Kesterson Reservoir Toxicity Problems, U.S. Bureau of Reclamation, Sacramento, Calif., Dec. 1983.

Role of Toxic Substances in the Decline of Striped Bass in the San Francisco Bay - Delta System. San Francisco Bay and Estuarine Association, Concord, Calif., March 1982.

Squawfish Predation on Juvenile Chinook Salmon in the Sacramento River Downstream of the Red Bluff Diversion Dam. San Francisco Bay and Estuarine Association, Concord, California, Sept. 1982.

Ability of Simple Laboratory Toxicity Tests to Predict Real World Community Level Impacts. Society of Pacific Fisheries Biologists, Fallen Leaf Lake, Calif., April 1982.

Potential of Mechanistic Tests to Predict Sublethal Effects of Toxicants on Interspecies Interactions. Department of Biology, Portland State University, Portland, Oregon, Nov. 1980.

Use of Microcosms to Screen for Sub-lethal Effects on Interspecies Interactions. Workshop on Ecotoxicological Test Systems, Oak Ridge National Laboratory, Oak Ridge, Tennessee, Feb. 1980.

Effects of the Insecticide Diflubenzuron on a Complex Stream Community. Pacific Northwest Pollution Control Federation, Seattle, Wash., Nov. 1979.

INTERDISCIPLINARY COMMITTEE MEMBERSHIPS:

Toxicity Reduction Evaluation Research Meeting - USEPA, 1987.

Workshop on Protocol Development for Setting Water Quality Criteria and Effluent Limits for Sub-surface Agricultural Drainage Waters - U.S. Dep. Interior, Bureau of Reclamation, 1984.

Selenium Expert Panel: Research Directions and Priorities - U.S. Dep. Interior, Bureau of Reclamation, 1984.

Conference on Kesterson Reservoir Toxicity Problems, U.S. Dep. Interior, Bureau of Reclamation, 1983.

Striped Bass Task Force - California State Water Resources Control Board, 1982.

Workshop for Measuring Effects of Chemicals on Aquatic Population Interactions - Oak Ridge National Laboratory, 1980.

Microcosm Coordinating Committee - U.S. Environmental Protection Agency, 1978-80.

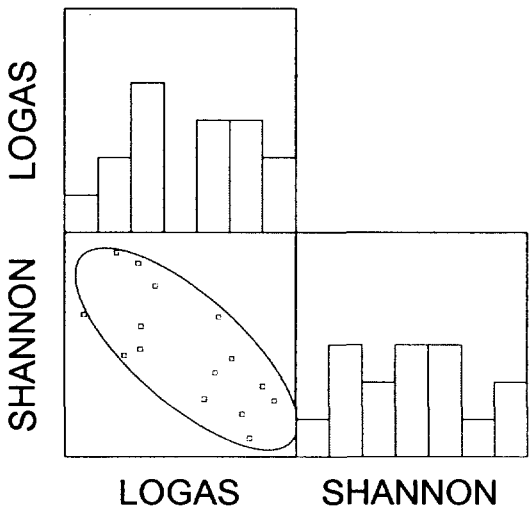
ATTACHMENT 1
EPA's Response to Comments
Statistical Output

Comparison of log-transformed arsenic concentrations to Shannon-Wiener Diversity

Data for the following results were selected according to:
(TYPE= 1) OR (TYPE= 2) (Wetland and stream stations)

Pearson correlation matrix

	LOGAS	SHANNON
LOGAS	1.000	
SHANNON	-0.736	1.000



Bartlett Chi-square statistic: 9.747 df=1 Prob= 0.002
Matrix of Bonferroni Probabilities

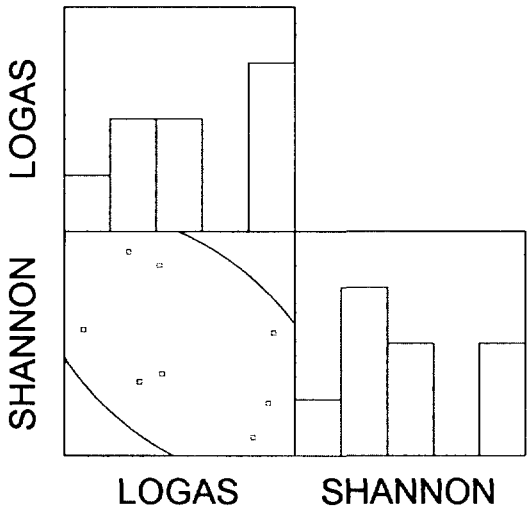
	LOGAS	SHANNON
LOGAS	0.000	
SHANNON	0.002	0.000

Number of observations: 15

Data for the following results were selected according to:
(TYPE= 1) (Stream stations, only, n=8)

Pearson correlation matrix

	LOGAS	SHANNON
LOGAS	1.000	
SHANNON	0.508	1.000



Bartlett Chi-square statistic: 1.641 df=1 Prob= 0.200

Matrix of Bonferroni Probabilities

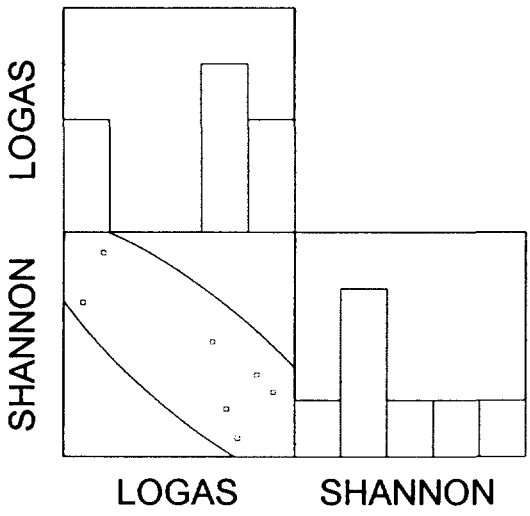
	LOGAS	SHANNON
LOGAS	0.000	
SHANNON	0.199	0.000

Number of observations: 8

Data for the following results were selected according to:
(TYPE= 2) (Wetland stations, only, n=7)

Pearson correlation matrix

	LOGAS	SHANNON
LOGAS	1.000	
SHANNON	0.838	1.000



Bartlett Chi-square statistic: 5.445 df=1 Prob= 0.020

Matrix of Bonferroni Probabilities

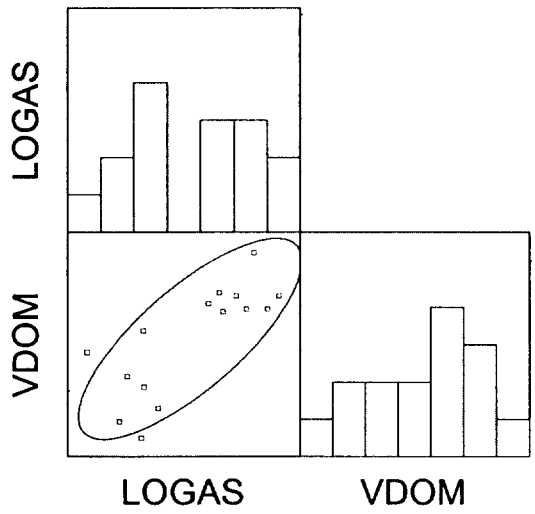
	LOGAS	SHANNON
LOGAS	0.000	
SHANNON	0.019	0.000

Number of observations: 7

Comparison of log-transformed arsenic concentrations to Percent Dominant Taxa

Data for the following results were selected according to:
(TYPE= 1) OR (TYPE= 2) (Stream and wetland stations)
Pearson correlation matrix

	LOGAS	VDOM
LOGAS	1.000	
VDOM	0.772	1.000



Bartlett Chi-square statistic: 11.337 df=1 Prob= 0.001
Matrix of Bonferroni Probabilities

	LOGAS	VDOM
LOGAS	0.000	
VDOM	0.001	0.000

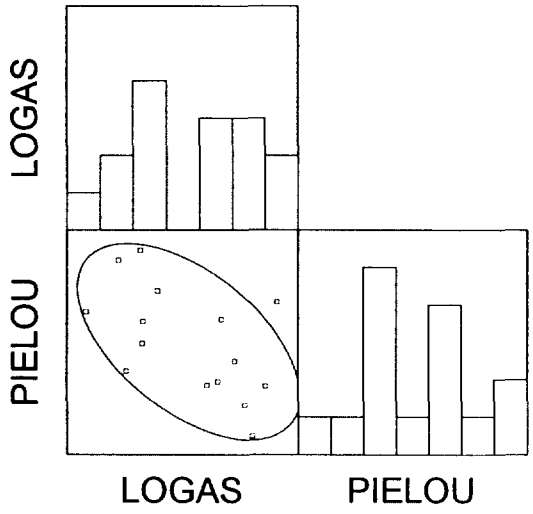
Number of observations: 15

Comparison of log-transformed arsenic concentrations to Pielou Evenness

Data for the following results were selected according to:
(TYPE= 2) OR (TYPE= 1) (Stream and wetland stations)

Pearson correlation matrix

	LOGAS	PIELOU
LOGAS	1.000	
PIELOU	-0.550	1.000



Bartlett Chi-square statistic: 4.508 df=1 Prob= 0.034
Matrix of Bonferroni Probabilities

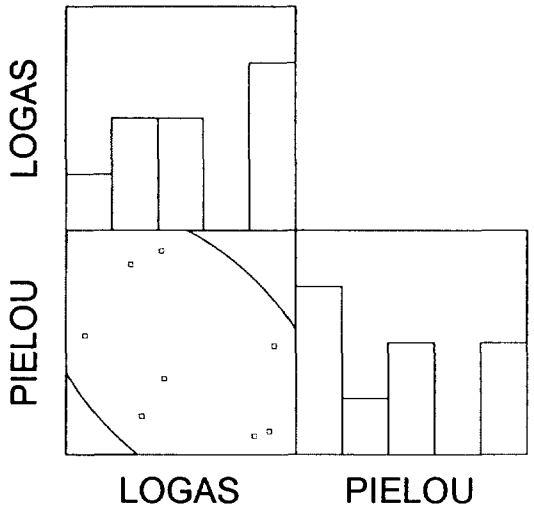
	LOGAS	PIELOU
LOGAS	0.000	
PIELOU	0.034	0.000

Number of observations: 15

Data for the following results were selected according to:
(TYPE= 1) (Wetland stations, only, n=8)

Pearson correlation matrix

	LOGAS	PIELOU
LOGAS	1.000	
PIELOU	-0.484	1.000



Bartlett Chi-square statistic: 1.470 df=1 Prob= 0.225

Matrix of Bonferroni Probabilities

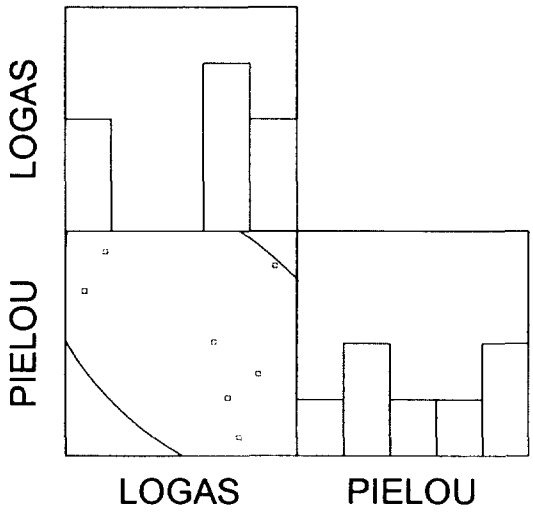
	LOGAS	PIELOU
LOGAS	0.000	
PIELOU	0.224	0.000

Number of observations: 8

Data for the following results were selected according to:
(TYPE= 2) (Stream samples, only, n=7)

Pearson correlation matrix

	LOGAS	PIELOU
LOGAS	1.000	
PIELOU	-0.503	1.000



Bartlett Chi-square statistic: 1.310 df=1 Prob= 0.252

Matrix of Bonferroni Probabilities

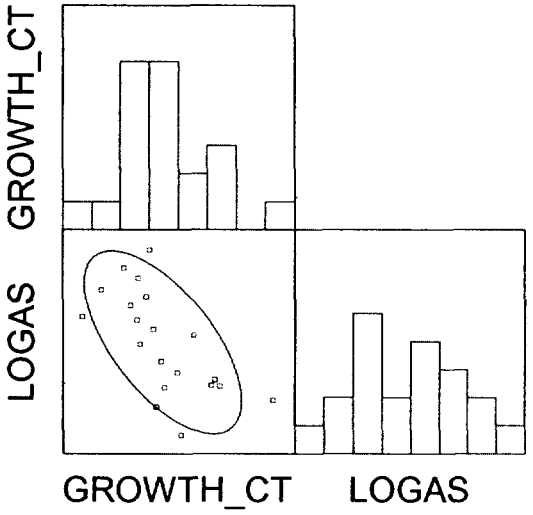
	LOGAS	PIELOU
LOGAS	0.000	
PIELOU	0.250	0.000

Number of observations: 7

Comparison of log-transformed arsenic concentrations to 10-day growth of *C. tentans*

Pearson correlation matrix

	GROWTH_CT	LOGAS
GROWTH_CT	1.000	
LOGAS	-0.645	1.000



Bartlett Chi-square statistic: 9.414 df=1 Prob= 0.002

Matrix of Bonferroni Probabilities

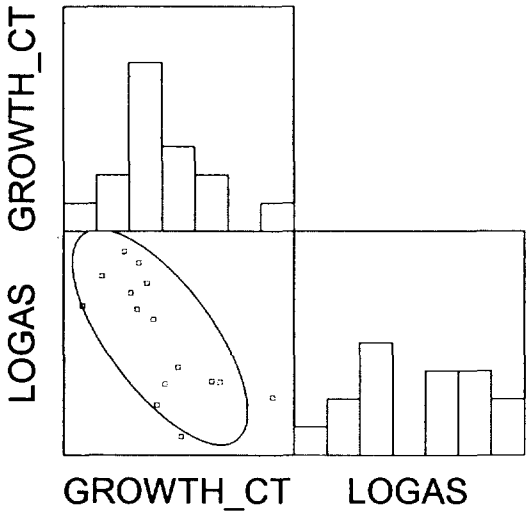
	GROWTH_CT	LOGAS
GROWTH_CT	0.000	
LOGAS	0.002	0.000

Number of observations: 20
(Includes pond samples)

Data for the following results were selected according to:
(TYPE= 1) OR (TYPE= 2) (stream and wetland, only)

Pearson correlation matrix

	GROWTH_CT	LOGAS
GROWTH_CT	1.000	
LOGAS	-0.698	1.000



Bartlett Chi-square statistic: 8.342 df=1 Prob= 0.004

Matrix of Bonferroni Probabilities

	GROWTH_CT	LOGAS
GROWTH_CT	0.000	
LOGAS	0.004	0.000

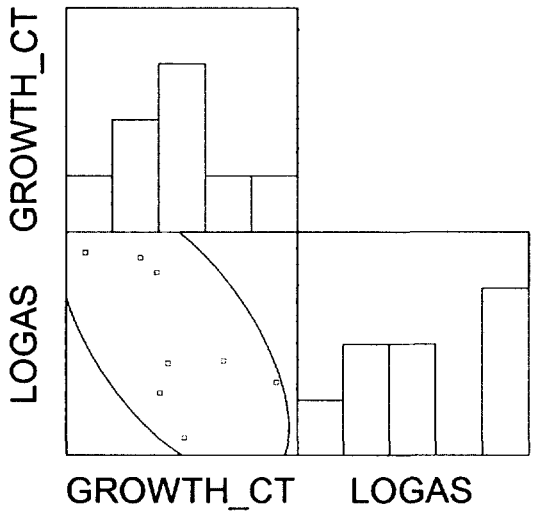
Number of observations: 15

Comparison of log-transformed arsenic concentrations to 10-day growth of *C. tentans* (stream and wetland stations, separately)

Data for the following results were selected according to:
(TYPE= 1) (Wetland stations, only, n=8)

Pearson correlation matrix

	GROWTH_CT	LOGAS
GROWTH_CT	1.000	
LOGAS	-0.619	1.000



Bartlett Chi-square statistic: 2.658 df=1 Prob= 0.103

Matrix of Bonferroni Probabilities

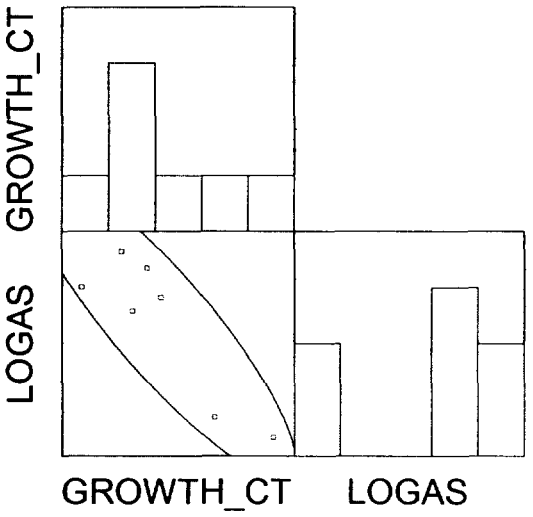
	GROWTH_CT	LOGAS
GROWTH_CT	0.000	
LOGAS	0.102	0.000

Number of observations: 8

Data for the following results were selected according to:
(TYPE= 2) (Stream Stations, only, n=7)

Pearson correlation matrix

	GROWTH_CT	LOGAS
GROWTH_CT	1.000	
LOGAS	-0.883	1.000



Bartlett Chi-square statistic: 6.808 df=1 Prob= 0.009

Matrix of Bonferroni Probabilities

	GROWTH_CT	LOGAS
GROWTH_CT	0.000	
LOGAS	0.008	0.000

Number of observations: 7

C. Solutia, Inc., Stauffer Management Company, LLC, and legal counsels Hush & Eppenberger, and Ropes & Gray

COMMENTS SUBMITTED BY
STAUFFER MANAGEMENT COMPANY LLC AND SOLUTIA, INC. ON BASELINE HUMAN HEALTH AND ECOLOGICAL RISK ASSESSMENT REPORT, WELLS G&H SUPERFUND SITE, ABERJONA RIVER STUDY, OPERABLE UNIT 3, WOBURN, MA
USEPA REGION 1

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Date: October 14, 2003

I. INTRODUCTION

These comments are submitted to the United States Environmental Protection Agency ("EPA") by Stauffer Management Company LLC ("SMC") and Solutia, Inc. ("Solutia" for itself and as attorney-in-fact for Monsanto Company (now known as Pharmacia Corporation)), (collectively with SMC, the "Commenters"), in response to the request for public comments issued by EPA with respect to its Baseline Human Health and Ecological Risk Assessment Report, Wells G&H Superfund Site, Aberjona River Study, Operable Unit 3, Woburn, MA, USEPA Region 1 (the "Report").

For the reasons set forth below, as well as in the concurrent reports prepared by Gradient Corporation ("Gradient") and Dr. Stephen R. Hansen, both the human health risk and ecological risk assessments suffer from several fundamental flaws, including: (i) the use of exposure scenarios that are unrealistic and unsupportable; (ii) the findings of unacceptable "risks" premised upon non-existing and unrealistic future uses; (iii) the use of overly conservative sediment ingestion rates for children and adults; (iv) the use of exposure point concentrations that overestimate risks at the Wells G&H and Cranberry Bog locations; (v) the improper design and interpretation of bioassay test results and community structure analyses used in assessing risk to the benthic invertebrate community; and (vi) the use of inappropriately high arsenic ingestion rates in the aquatic mammal food consumption model. The impact of these flaws is compounded by the EPA's improper refusal to allow public access to materials relied upon by EPA and its contractors. In view of these shortcomings, any decision to take anything other than "no action" based upon this Report would be arbitrary and capricious.

EPA Response: Please see responses to specific comments below.

II. THE REPORT'S EXPOSURE SCENARIOS ARE UNREALISTIC AND UNSUPPORTABLE

A. Current Exposure Scenarios

EPA's human health risk assessment report alleges current unacceptable risks at two locations – a non-cancer health risk at WH and non-cancer and cancer risks at CB-03. The supposed risks, however, are predicated on untenable exposure scenarios, entailing repeated visits to inhospitable sites where wading into and ingestion of sediment are assumed to occur. EPA's use of several, manifestly unrealistic exposure parameters, such as the frequency of exposure and the rate of sediment ingestion, results in findings that grossly overestimate the actual risk likely to be experienced by the local population. The use of more realistic exposure assumptions results in risks that fall comfortably within EPA's range of acceptable risks.

Included among the unrealistic exposure assumptions in the Report are the following:

- EPA assumes that a person will go wading in the Wells G&H wetland and come into contact with and ingest sediments containing arsenic (at the highest levels in the data set used) a minimum of 26 days per year, every year – for no fewer than 30 years – starting at age 1. This assumption is made despite the fact that the area is adjacent to a live shooting range, overrun with phragmites, cattails (rising over eight feet in height) and other thick vegetation (including vines and brambles), often flooded, underlain by soft peat sediments up to 30 feet thick that in many places will not support the weight of a human (child or adult),[1] and, during the

[1] Thus suggesting that, after the first visit, additional visits would be unlikely (or, at the very least, much less intrusive).

summer months (when the wading activity presumably would occur), teeming with mosquitos and the most dense undergrowth of the year.[2] The EPA's scenario also assumes that a child – again, starting at age 1 – will be allowed to wander off through the burrs and thorns in search of mud and then ingest sediment every single day that the child visits the site, for a period of six years. There is no conceivable way that anyone – let alone a one- or two-year old child – will be exposed to surface water or sediment with anywhere near the frequency or duration assumed by the EPA. Without such assumptions, there is no unacceptable risk.

- As for the Cranberry Bog location, which is an equally inhospitable environment, the Report goes even further and assumes that a child is allowed, starting at age 1, to wade – indeed, be physically guided to the mud, because it would be extremely difficult to get there on her own – no fewer than 104 days each year (again, for 30 years, starting at age 1), each time ingesting arsenic-containing sediment. Such an assumption is unreasonable and unsupportable.

- The Report fails to acknowledge that the frequency with which a person actually leaves a trail, boardwalk or pier to go wading into and ingest sediment – if at all – certainly will be far less than the frequency with which he or she visits the site.

A more detailed analysis of the unrealistic exposure scenarios employed in the Report is set forth in the Gradient report, filed herewith. That report also shows that the use of more

[2] It is impossible to reconcile the forbidding nature of the setting at which the alleged risks are found with the EPA's description (at page 1-9 of the Report) of the area as one featuring "prolonged and intimate contact with water and a significant risk of ingestion."

realistic exposure (though still conservative) assumptions leads to calculated risks that fall well within EPA's range of acceptable risk levels. For example, unlike the Report's assumption that a child, starting at age 1, would wade in sediment at the Cranberry Bog for four days each week, six months per year, Gradient utilizes an estimate of six days/year of wading into and ingesting sediment – itself highly unlikely. Moreover, for current risks in the Wells G&H wetland – which if anything is even less desirable for wading than the Cranberry Bog – Gradient employed an exposure frequency of four such events every year for thirty years.

EPA Response: All the samples applied to the human health risk assessment were thoroughly investigated by the Agency and risk assessors and considered reasonably accessible. The Wells G&H wetland and Cranberry Bog are areas that are well utilized by the surrounding neighborhoods and the community as a whole. The Wells G&H wetland has been reported by residents as an area that is used daily for nature walks, and recently, has been periodically utilized as a paint ball range by community children. During each visit to these areas, adults and children were observed utilizing these areas (e.g., walking dogs, playing in groups, sliding down the embankments). This site-specific information supports the use of the current 26 day/year exposure frequency (1 day per week for the warmest 6 months of the year) during which contact with contaminated media may occur. In addition, children and adults are naturally attracted to the edge of wetlands and surface water to observe the environment. Samples located in areas overgrown with reeds, vines, brambles or with excessively soft sediments, and considered not accessible, were not quantitatively evaluated for human exposures.

The Cranberry Bog wetland is used as a play area by local children. It is surrounded by residences, making it plausible that young children living in these residences may contact sediments and soils in areas adjacent to their yards. No fencing is in place to prevent a child from wandering from their yard into the wetland, which in some locations is a distance of as little as 5 to 10 feet. Therefore, for the Cranberry Bog, it is not unreasonable to assume an exposure frequency approaching one used in a residential setting. Activities reported and observed as occurring include fishing, catching frogs and insects and playing games (such as capture the flag or hide-and-go-seek). A bridge has been built to connect the eastern and western sides of the wetland to allow greater access by individuals utilizing this area recreationally. The community performs cleanup of these areas on a regular basis, which includes trash removal in the interior wetland areas. These activities may all result in contact with the wetland media.

Given the proximity of the wetlands to residential and future recreational properties, the evaluation estimated risks associated with childhood and adult exposures for a combined

duration of 30 years, as prescribed by EPA guidance. For this evaluation, it is assumed that 6 of those years are during childhood and 24 years are during adulthood. Since childhood exposures may in fact occur for longer than 6 years, a young child (age 1 to 6) was selected for evaluation to capture the reasonable maximum childhood risk that may occur during a 6 year childhood exposure duration.

Exposure frequencies used in Gradient's deterministic risk calculations are not sufficiently protective of reasonable maximum exposures that are occurring or may occur in the future at these stations. These areas are currently utilized by the community at a higher frequency than would be accounted for by an exposure frequency of 4 to 6 days/year. Future plans to develop these areas into more attractive and more highly utilized recreational spaces would only serve to increase the frequency with which individuals visit the site and contact impacted media.

According to EPA guidance, the maximum detected concentration of a contaminant is used as the reasonable maximum exposure point concentration if a calculated UCL exceeds the maximum detected concentration. It is acknowledged that the reasonable maximum EPC used at a small number of stations is uncertain due to one or a small number of elevated arsenic detects compared to the remainder of the data set. This uncertainty is specifically applicable to stations WH, CB-03 and 13/TT-27. During public presentations, this uncertainty was acknowledged, and the public was informed that the risk estimated for these stations was largely attributable to elevated arsenic levels in one or a small number of samples. This information will be added to the text of the risk assessment, with the locations of the highest arsenic levels identified. EPA will be using ProUCL version 3.0 for revisions to the draft report. Its use may result in a more accurate estimate of exposure point concentrations for these stations.

B. Future Exposure Scenarios

EPA also has calculated human health risk predicated on a speculative future use of City of Woburn property in the Wells G&H wetland. Specifically, it presupposes that the City's Redevelopment Authority will build a boardwalk into the wetland, enticing more people to visit. It then triples to 78 (from the assumption that current users will visit the site 26 times per year) the number of times the exposed visitor wades in the mud. Of course, this assumption presupposes that the visitor, including the toddler, will be allowed to leave the security of the hypothetical new walkway for the insecurity of the mud on each and every visit.

One cannot escape the fact that much of the area included as part of the Report's analysis of future land-use conditions – a wetland that is in many places inaccessible, and in any event

overrun by thick vegetation – is inhospitable. Portions are submerged in water, rendering it impassable, and pools of stagnant water on the side of the path attract mosquitoes. The thick growth covering the wetland provides no indication that anyone has even tried to go through it to enter the mud. When compounded by the fact that the wetland is located immediately adjacent to a live shooting range, the desirability of a nature trail, walkway or pier extending into these areas is particularly unreasonable. To make matters worse, however, EPA assumes, without basis, that further exposures will treble, from 26 to 78 times a year!

The Report's reliance upon the draft proposal prepared by the Woburn Redevelopment Authority ("WRA") as a basis for its future-use analysis is misplaced. None of the numerous proposals mentioned by the WRA has been approved. Indeed, the WRA recently announced its plans to seek an extension on the deadline for submitting final redevelopment plans to the EPA and suggested that the WRA intends to reconsider reusing portions of the 38-acre, municipally-owned wetland for nature trails and other public uses.[3] Moreover, Joseph LeMay, the EPA Remedial Project Manager, is on the panel involved in generating the draft proposals. It is inappropriate for the EPA to boot-strap the conclusions it reaches in the Report by relying upon speculative uses – unsupported by objective, scientific survey data – that EPA officials themselves have been involved in generating, and which the City itself is considering abandoning. Exposure scenarios used in human health risk assessments must be realistic, which EPA's are not.

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[3] "Wells G&H/Aberjona Study Area – City Seeks Extension For Grant to Direct Re-Use of Plan," Woburn Daily Times Chronicle, August 25, 2003.

EPA Response: It is acknowledged that children and adults would be unlikely to leave a hypothetical boardwalk each time the study area is visited. However, without the boardwalk being fenced and the exact construction details not available, it would be remiss to assume a lesser degree of exposure. This evaluation is intended to evaluate future uses proposed by the City of Woburn as described in the report. If the City of Woburn elected not to construct a pier or boardwalk, or design a pier or boardwalk to minimize exposures to sediments, then EPA may need to re-evaluate the future risks associated with NT-2 or NT-3. If the City of Woburn decided to construct a boardwalk or pier into the wetlands and unacceptable risks remained under the NT-2 or NT-3 exposure scenarios, then cleanup alternatives would need to be considered for the area to reduce those risks. The RPM for the Site, Joseph F. LeMay, is not a panel member of the advisory committee under the Superfund Redevelopment Iniative Grant. Mr. LeMay does periodically coordinate with the City of Woburn, WRA, and advisory panel regarding the status of the Site.

C. The Exposure Scenarios Were Predetermined

As more fully set forth in the Gradient report, the exposure scenarios utilized by EPA's risk assessors with regard to the two areas where theoretical current usage allegedly indicates a potential risk to human health are simply unreasonable and unsupportable, and not based on any objective evidence. In fact, EPA's representative has stated that the scenarios and assumptions related thereto resulted from negotiations between the Agency and the Massachusetts Department of Environmental Protection ("DEP"). The Report and the administrative record, however, are devoid of evidence reflecting (i) who was involved in these negotiations and what relevant qualifications they possess; (ii) how and when the negotiations transpired; (iii) what were the considerations; (iv) who made the final determinations; and (v) the bases for those conclusions.[4] As a result of this failure alone, the exposure scenarios contained in the Report cannot be defended. In fact, they are not only unsupported by the record, they are contrary to it. There is no evidence that the sites are being used with a frequency anywhere close to what EPA has assumed.

[4] By letter to EPA's Enforcement Counsel dated April 18, 2003, representatives of SMC and Solutia requested precisely this information, but the EPA has declined to make it available. This and other failures to respond to numerous information requests are discussed more fully infra.

The predetermined nature of the exposure scenarios is further suggested by EPA's "5-Year Review Report" for the Wells G&H Superfund Site, dated August 4, 1999. In that Report, the EPA indicated that "[d]ata from March 1998 provides the remainder of the information needed to complete a risk assessment of the Aberjona River from Route 128 in Woburn to Sandy Beach at the Upper Mystic Lake in Winchester" (emphasis added). This makes plain that, as of 1998, the EPA already had all of the information it needed in order to prepare the risk assessment. However, EPA took additional samples (including at WH and CB-03, where they now claim an unacceptable risk exists), and did not issue this latest Report until 2003, four years after it was said to be ready for completion.[5]

EPA Response: EPA and the State consider the exposure scenarios reasonable and appropriate. Please see EPA's specific responses to your client's contractor, Gradient Corporation, comments. Regarding the second part of the comment, as additional information becomes available, it is reasonable and appropriate to incorporate this information into a baseline risk assessment. In 2001, EPA discussed the preliminary analytical results of data collected along the Aberjona River with Stauffer Management Company and Solutia, Inc. In early 2002, EPA provided Stauffer Management Company and Solutia, Inc., with hard copies and electronic copies of the data collected along the Aberjona River.

III. THE SEDIMENT INGESTION RATES USED BY THE REPORT ARE OVERLY-CONSERVATIVE

The Report's use of sediment ingestion rates of 200 mg/day for children and 100 mg/day for adults is overly conservative. Those values were based upon a 1994 Region I Guidance. Studies performed since that time (and described more fully in Appendix A to the Gradient report) reflect that the average and high-end soil ingestion rates are much lower than the values used in the Report. Moreover, EPA's 1997 Exposure Factors Handbook recommends soil

[5] EPA's refusal to provide public access to this and other information utilized by the EPA and its contractors is discussed more fully infra.

ingestion rates half the amount of those used in the Report: 100 mg/day for children and 50 mg/day for adults.[6]

EPA Response: The child and adult soil ingestion values recommended in the 1997 Exposure Factors Handbook represent central estimate values and are appropriate for use in a central tendency evaluation. The Exposure Factors Handbook does not recommend upper percentile values for use with a reasonable maximum scenario. Therefore, EPA Region I values, recommended for use in a reasonable maximum scenario, were selected for use. These values are consistent with ingestion rates recommended by MADEP and, as stated in the Exposure Factors handbook, are within the range of ingestion estimates from published studies. The central tendency ingestion rates utilized are the same as those recommended in the Exposure Factors Handbook for use in a central tendency evaluation.

IV. THE EXPOSURE POINT CONCENTRATIONS AND RISK CALCULATIONS USED AT STATIONS WH AND CB-03 OVERESTIMATE THE RISKS AT THOSE LOCATIONS

Also as discussed more fully in Gradient's report, the exposure point concentration ("EPC") used at station WH is heavily influenced by a single sample with a high arsenic concentration. Indeed, of the 12 total samples used at that station, 11 revealed arsenic concentrations in the range of 4.7 to 424 mg/kg, far below the EPC for that station ultimately used by the EPA (1900 mg/kg). The twelfth sample, however, had a concentration of 3230 mg/kg, which heavily influenced the EPC. Similarly, at station CB-03 in the Cranberry Bog, the Report used a maximum concentration of 1410 mg/kg as the EPC. The sediment concentrations in the other CB-03 samples were substantially lower, however, ranging from just 9.1 to 510

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[6] In addition, and as discussed more fully in Appendix B to the Gradient report, the arsenic toxicity factor used by EPA in the Report is overly conservative and results in an overestimation of the cancer risk from exposure to arsenic in sediment. In fact, estimated arsenic exposures along the Aberjona River are less than the arsenic exposures permitted in drinking water at the maximum contaminant level ("MCL") of 10 µg/L, the level designed to be health protective.

mg/kg. Thus, a person at that station will be exposed to concentrations far less than 1410 mg/kg, the EPC used in the Report.

The EPA used its software program, ProUCL, to calculate the EPC for these stations. This software statistically characterizes data sets and calculates upper confidence limits ("UCLs") on the mean concentration. Recent analyses by researchers at the University of Florida and GeoSyntec Consultants call the recommendations of EPA's ProUCL program into question, particularly as they relate to the arsenic data sets at the WH and CB-03 stations. These analyses, which include an evaluation specific to highly skewed data sets (included as Appendix C to the Gradient report), indicate that the ProUCL recommendation may be biased high, and that other UCL estimation methods which provide conservative estimates of the UCLs are still substantially lower than those developed by EPA.

EPA Response: EPA acknowledges that the reasonable maximum EPC used at a small number of stations may be uncertain due to one or a small number of elevated arsenic detects compared to the remainder of the data set. This uncertainty is specifically applicable to stations WH (sample SD-12-01-ME; 3230 mg/kg), CB-03 (sample CB-03-11; 1410 mg/kg), and 13/TT-27 (samples SD-13-01-FW and SD-13-02-FW; 4210 mg/kg and 2480 mg/kg, respectively). During public presentations, this uncertainty was acknowledged, and the public was informed that the risk estimated for these stations was largely attributable to elevated arsenic levels in one or a small number of samples. This information will be added to the text of the risk assessment, with the locations of the highest arsenic levels identified. In addition, EPA recently released version 3.0 of the ProUCL calculation software (version 2.1 was used for the draft report). ProUCL version 3.0 is being used in revisions to the draft report. Its use may result in a more accurate estimate of exposure point concentrations for these stations.

Finally, it is unclear why the Report ignored the central tendency ("CT") human health risk analysis that it performed for surface water, sediment and surface soil, in favor of the so-called "Reasonable Maximum Exposure" ("RME") cases. Indeed, the ultimate risks that the EPA found utilizing the CT approach at a number of locations were substantially lower than the

RME cases. The EPA nevertheless opted to base its conclusions on the worst-case scenarios. Simply put, use of the RME in this case is unsupported by the factual record.

EPA Response: The human health risk assessment has evaluated and documented the risk at all human health exposure stations for both the central tendency (CT) and reasonable maximum exposure (RME) scenarios. Table 5-1 provides an overall risk summary table for the exposure stations, showing the CT as well as RME estimated risks. These risk calculations, along with site-specific considerations, will be factored into risk management decisions for the study area. The purpose of the Executive Summary is to provide a concise overview of the results of the risk assessment. Therefore, only the areas with estimated CT and RME risks exceeding regulatory guidelines and major risk contributors for those areas have been included.

V. THE EPA IMPROPERLY HAS REFUSED TO ALLOW PUBLIC ACCESS TO INFORMATION UTILIZED BY THE EPA AND ITS CONTRACTORS

Commenters are hindered in their ability to respond to the assumptions, calculations and conclusions in the Report because of EPA's refusal to provide to the public access to all information cited in the Report. Indeed, notwithstanding numerous requests from the Commenters during the past three years for access to the information, the EPA repeatedly has refused to make the information available, invoking an indefensible claim of "deliberative process privilege." Thus, in preparing the Report, the EPA and its contractors have been able to view and rely upon materials to which the public has been denied access.[7]

EPA Response: Summaries of the analytical results of the 1995 and 1997 sampling were presented in the Foster Wheeler Data Compendium (1995) and the Metcalf & Eddy

[7] Page 2-33 of the Report claims that "results from the 1995 and 1997 investigations [are] presented in Appendix A.1 and A.2 (Foster Wheeler, 1996; M&E, 1998)," but no "results" are provided. In fact, the actual conclusions of Foster Wheeler and Metcalf & Eddy concerning risk assessments are not set forth anywhere in the Appendices. In addition, the database provided by EPA fails to include some of the samples that EPA used in their exposure areas (specifically, at stations 13/TT-27 and NT-1).

Supplemental Data Compendium (1998) which have been included in Appendices A.1 and A.2, respectively. The risk conclusions resulting from the 1995, 1997, and 2000, 2001, and 2002 data were presented in the March/May 2003 Wells G&H OU-3 Risk Assessment Report. As stated on page 3-4 of the report text (Volume I), station 13/TT-27 consisted of samples from stations 13 and TT-27 combined and station NT-1 consisted of samples collected from stations BW, WG, TT-29, 19, and sample SD-12-01-ME combined. The analytical data from these combined stations is presented in the data base by separate stations or samples.

VI. ECOLOGICAL RISK ASSESSMENT POINTS

The ecological risk assessment portion of the Report identified heightened "risk" – ascribed to elevated levels of arsenic – primarily to muskrats and benthos. Notably, the elevated risk was limited to Reach 1, the Wells G&H site. With respect to muskrats, though, the "significant" risk in Reach 1 is primarily based upon a food consumption model, in which consumption of plants is deemed to be the principal avenue of exposure. However, assumptions used in this estimation process can lead to substantial errors and, consequently, a finding of "significant" risk where it does not exist. More importantly, the finding of a hypothetical risk to muskrats is itself belied by the Report's own observation that the muskrat population currently inhabits all reaches of the study area. No evidence is presented that the muskrat population is suffering from arsenic, and no suggestion is made in that regard. The alleged impact is, at best, a mathematically-derived hypothesis that is unsupported by actual observation on the ground or in the water. Simply put, the risk associated with arsenic is overstated by the Report and should be ranked as low in all reaches of the study area.[8]

EPA Response: EPA used commonly accepted modeling methods of exposure estimation for the dietary exposure of muskrats, using reasonable assumptions. These issues are discussed more fully in the responses to the comments from Dr. Stephen R. Hansen, submitted herewith. It is standard practice in ecological risk assessment as well as human health risk assessment to

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[8] These issues are discussed more fully in the report of Dr. Stephen R. Hansen, submitted herewith.

base conclusions of risk on reasonable models of exposure for receptors, without corresponding documentation of mortality of individuals or reduction in populations that result from these risks. The presence of muskrat in the watershed does not mean that the populations are unaffected. Rather, the presence of individuals in the study area indicates that either portions of the study area are not harmful to muskrat survival or may be a result of immigration from other areas supplementing reproductive rates in the study area. Either of these results would be consistent with observation of individuals in the study area, and do not result in the dismissal of the potential risk to aquatic mammals.

With respect to benthic invertebrates, EPA's determination of "significant" risk in Reach 1 is primarily based on the exceedence of an "upper effects threshold" concentration of arsenic in sediment samples collected from within the reach. However, available data indicate that this threshold is set too low because it overestimates the bioavailability of arsenic. In addition, the results of bioassay tests and community analyses do not support the assigned risk levels. Bioassay tests demonstrate that benthic invertebrates survive, grow, and reproduce in samples which greatly exceed the selected threshold concentration. Community analyses demonstrate that benthic invertebrate communities found at sites which exceed the threshold concentration are as diverse and abundant as those found in reference areas. Based on the weight of evidence, the benthic invertebrate community in Reach 1 should be assigned a "low" risk from arsenic in the sediments.

EPA Response: Based on several lines of evidence in the evaluation of impacts on benthic invertebrates, EPA concludes that there is evidence that high sediment metals concentrations, particularly arsenic, may be associated with chronic impacts on benthic invertebrate communities. These issues are discussed more fully in the responses to the comments from Dr. Stephen R. Hansen, submitted herewith. EPA's risk management decision will take into account the strength of evidence of these results, as well as the severity and extent of the impacts on the ecosystem.

VII. SPECIFIC COMMENTS ON TEXT

In addition to the general comments outlined above, SMC and Solutia provide the following specific comments, organized by page number:

E-3: The Report should explain the basis for using "[o]nly those sediment samples collected from beneath two feet or less of standing water . . . in the quantitative evaluation."

EPA Response: As stated in EPA guidance, data from "surficial, near-shore sediments should be used" (USEPA, 1989). The use of sediment data from areas where the surface water depth is two feet or less meets this criterion, especially when considering childhood exposures. Adult may be exposed to sediments located in areas where the water depth is greater than 2 feet. However, it is anticipated that these sediments will not remain adhered to the skin to any significant extent but will wash off by the time the adult surfaces from the water. Sediment samples collected from areas where the surface water depth was greater than two feet were collected for and utilized in the ecological risk assessment. These samples are not considered applicable for use in the human health risk assessment.

E-3: The Report should indicate the basis by which the EPA assigned the "highest," "typical" or "lowest" exposure potential (e.g., what measured proximity to nearby residences qualified it as "highest exposure potential," and what factor(s) were used to conclude that a location was "partially isolated" or "industrial" such that a determination of "lowest exposure potential" was found).

EPA Response: Site-specific information gathered during site visits, along with professional judgment, was used to qualitatively determine stations assigned "high", "typical", and "low" exposure potential. Current land use as well as the potential for future land use change or development (e.g., zoning and surrounding land use) was also factored into the decision.

E-3: The Report should specify the basis for the assumption that future land use for stations NR, 22/TT-22, WG, WH and AS will increase as a result of future development. Similarly, the Report fails to provide the basis for the assumption that the physical barriers limiting current access to stations 13/TT-27, JY, WW and TT-31 will be removed.

EPA Response: Future plans by the City of Woburn include development of the Wells G&H wetland, including stations NR, 22/TT-22, WG and WH, into a passive recreational space. The evaluation of the NR stations is intended to evaluate future uses proposed by the City of Woburn as described in the report. Station AS is located in an area that may be further developed for residential use by the expansion of condominiums located in the vicinity of this station. The future exposure frequency used for stations 13/TT-27, JY, WW and TT-31 factors in that the land to the south of this area, with current controlled access, may become developed for recreational purposes along with the removal of access restrictions. Should this occur, these stations would also become available for public recreational use with access occurring through the currently controlled property. Since the sampling locations are in areas considered accessible by humans (e.g., close to shore and in shallow water), contact with impacted media may occur. An exposure frequency of 78 days per year is sufficiently

protective and not unreasonably conservative considering the land to the south of this station is currently being considered for development as an ice skating facility which would bring families, including young children, to this area.

E-5: The Report should indicate the relevance, if any, to the risk assessment of comprehensive surface water data to be collected from ten surface water gauging and monitoring stations along the entire Aberjona River.

EPA Response: The comprehensive surface water data collected south of Route 128 will be evaluated in the revised Wells G&H OU-3Risk Assessment Report. The surface water data collected to the north of Route 128 will be incorporated into the baseline risk assessment being conducted for the study area north of Route 128. The baseline risk assessment being conducted for the area north of Route 128 will be released with the Comprehensive RI.

Table E-1: Because all of the exposure scenarios set forth on Table E-1 relate to either current or future waders, the Report should describe precisely the type of wading activity contemplated, as well as the location and temporal duration of such activity under these assumed scenarios. Are the theoretical waders standing perfectly still in the wetlands? At precisely the point of highest concentration of sediment concentration? For how long?

EPA Response: The exposure assessment of the baseline human health risk assessment explains the activities may occur while wading exposures are being incurred. The exposure frequencies and exposure durations are also provided. To characterize exposure point concentrations (EPCs), the upper confidence limit (UCL) on the arithmetic mean is used. This calculated value represents an estimate of the typical concentration a receptor may contact while moving about the station. For a small number of contaminants, the UCL exceeded the maximum detected value and the maximum detected value was used as the EPC. EPA acknowledged that the reasonable maximum EPC used in this case may be uncertain due to one or a small number of elevated detects compared to the remainder of the data set for that compound. ProUCL version 3.0 is being used in revisions to the draft report. Its use may result on a more accurate estimation of exposure point concentrations for these stations.

1-1: The Report states that the EPA intends to incorporate the final risk assessment into a comprehensive remedial investigation ("RI"), documenting all the data collected along the Aberjona River and Halls Brook Holding Area to the Mystic Lakes and explaining "the nature and extent of contaminants and their fate and transport mechanisms." The relationship between the RI and the Multi-Source Groundwater Response Plan ("MSGWRP") is unclear (i.e., has the MSGWRP been abandoned, superseded, or modified by the forthcoming RI?). The EPA should include in its analysis all of the potential sources of arsenic identified by the Commenters in previous communications to the EPA.

EPA Response: The MSGRP is an RI/FS, which incorporates Groundwater Surface Water Investigation Plan (GSIP) data collected by the Industri-Plex Settlers under the Industri-Plex Consent Decree, as well as other data collected/obtained to support the MSGRP RI/FS. One aspect of the GSIP is the "evaluation of the potential for future, off-site migration of metals through the surface water pathway". The surface water pathway immediately downstream of the Industri-Plex is the Halls Brook Holding Area and Aberjona River. The Comprehensive RI Report referred to in these responses is the MSGRP RI, and will further explain nature and extent and fate and transport.

1-2: It is unclear from the description of the Aberjona River study area provided in the Report whether the area matches up geographically with the MSGWRP study area. If the EPA has drawn different geographical boundaries around these respective study areas, the Report should provide the basis for that decision.

EPA Response: The Comprehensive RI (MSGRP) will further explain nature and extent and fate and transport.

1-3: The Report should set forth the basis for the exclusion of tributaries to the Aberjona River and uplands within their respective sub-watersheds from the study area boundaries. To the extent that aerial photographs of the Wells G&H superfund site for years prior to 1938 exist, they should be considered.

EPA Response: The Comprehensive RI Report will further explain nature and extent and fate and transport. The RI Report will consider all the existing information, including EPA's historical aerial photographic analyses.

1-5: Reference is made to a 1986 report prepared by Planning Research Corporation (PRC). The Report should set forth the purpose(s) and conclusion(s) of those evaluations, as well as the purpose(s) and conclusion(s) of the risk assessment completed by Ebasco Corporation in 1988.

EPA Response: This information is documented in the Wells G&H Superfund Site Administrative Record, which supported the 1989 Wells G&H ROD.

1-6: The Report should indicate the status of negotiations and clean-up of the Olympia Nominee Trust property.

EPA Response: The report is a baseline risk assessment, and is not intended to provide a status of enforcement negotiations. Status of enforcement negotiations should be directed to EPA enforcement counsel.

1-7: The Report improperly identifies certain of the settling defendants at the Industri-Plex Superfund Site. Solutia, Inc. is not "formerly Monsanto", and SMC is not "formerly Stauffer Chemical." Pharmacia Corporation is the former Monsanto Company; Solutia, Inc. was spun off from Monsanto Company in 1997 and Monsanto Company eventually changed its name to Pharmacia Corporation.

EPA Response: Noted.

1-7: The Report improperly characterizes the remedy under the Industri-Plex Consent Decree. The interim groundwater remedy regarding hot spot treatment related only to benzene and toluene, and the groundwater/surface water investigation plan was to investigate potential for future off-site migration. Thus, the Consent Decree did not address, and was not intended to address, the issue of alleged historical releases and discharges along the river upon which EPA focuses in the current risk assessment and apparently in the forthcoming RI.

EPA Response: The purpose of the Groundwater/ Surface water investigation plan is outlined in Appendix H of the 1989 Industri-Plex Consent Decree. The Report was a baseline risk assessment from Route 128 to the Mystic Lakes. The Comprehensive RI Report will further explain nature and extent and fate and transport.

1-7: The Report fails to explain the basis for simply incorporating the MSGWRP data into the RI for the Aberjona River. The basis for mentioning the MSGWRP only under the sub-heading describing the Industri-Plex Superfund Site should also be set forth.

EPA Response: The Report was a baseline risk assessment between Route 128 to Mystic Lakes. The Comprehensive RI Report will further explain nature and extent and fate and transport.

1-8: It is unclear why a discussion of various MIT studies – which were conducted along the entire length of the Aberjona River – is found under the sub-heading describing the Industri-Plex Superfund Site. Indeed, there is no basis at all to tie these studies to the Industri-Plex site alone, when there is a plethora of other potential contributors to environmental conditions along the Aberjona River watershed (by way of example only, owner/operators of historic and current landfills for Woburn, railroad owners and operators, tanneries along the watershed, and any entities that have applied pesticides or herbicides in the area).

EPA Response: The MIT studies were mentioned in the text in the context of the samples that were collected at Halls Brook holding area, which is part of the Industri-Plex Site. The Comprehensive RI Report will further explain nature and extent and fate and transport.

1-9: The Report should explain the basis for the EPA's conclusion that "prolonged and intimate contact with water and a significant risk of ingestion" by way of wading exist in those portions of the River identified in the risk assessment.

EPA Response: The text referred to in the comment is part of the MADEP definition of Class B waters. As stated earlier in the text on page 1-9, the Aberjona River is classified by the Commonwealth as a Massachusetts Class B surface water.

1-10: The Report purports to rely upon information set forth in the "Upper Mystic Lake Watershed Urban Runoff Project Main Report," prepared in 1982 by the Department of Environmental Quality Engineering ("DEQE"), but fails to set forth the conclusions reached by the DEQE therein.

EPA Response: The Comprehensive RI Report will further explain nature and extent and fate and transport.

1-16: Included among the general objectives of the Aberjona River Study is the identification of sampling locations "where COPC concentrations in environmental media do and do not appear to pose potential risk to human and ecological receptors, based upon conservative exposure and toxicity assumptions." The Report should clarify what is meant by "conservative exposure and toxicity assumptions" and explain precisely how the EPA derived such assumptions.

EPA Response: Exposure scenarios and exposure and toxicity assumptions are explained in the Report, as well as EPA's responses to public comments (see responses to your contractor's Gradient Corporation and Hansen comments, as well as responses to ASC's comments).

2-1: The statement that site investigation activities were begun in 1995 is incorrect. EPA has been aware of and investigating the Wells G&H Superfund Site and related areas since at least the 1980s.

EPA Response: Site investigation activities from which analytical data was used to evaluate human health and ecological risk in the Wells G&H March/May 2003 Risk Assessment were begun in 1995.

2-11 and 2-12: The Report indicates that stations WH-01 through -10 and WW-01 through -12 in the eastern and western portions of the Wells G&H wetlands were not sampled until the 2000/2001 sampling round. The Report should indicate the reason(s) why those locations were not sampled or evaluated in the prior sampling rounds and investigations of the River. Similarly, an explanation should be provided as to why samples were not taken at locations CB-03-01 through -12 (the cranberry bog north of stations 9 and 16) prior to the 2000/2001 sampling round.

EPA Response: Stations WH, WW, and CB03-01 through 12 were not selected until 2000/2001. In 1995, sampling locations were selected in areas that were anticipated to be most impacted by potential contamination. In 1997, sampling locations were selected in depositional areas to fill data gaps. Subsequent to 1997, sampling was primarily focused on collecting additional samples for use in the Human Health Risk Assessment. Samples collected after 1997 that could be used to evaluate ecological risk were also included in the Ecological Risk Assessment.

2-15, 2-16, and 2-18: In its discussion of the 1995 sampling round, the Report notes that sediment samples were collected "where undisturbed sediment existed from a depth of 0-6 inches." The Report should explain the basis for this decision (i.e., why EPA did not take samples from locations deeper than six inches – particularly where page E-3 of the report notes that sediment samples collected from "two feet or less of standing water were used" in the quantitative evaluation – and why it did not differentiate among the depths within the zero to six inch range). The same questions should be answered with respect to the 1997, 1999, and 2000/2001 sampling rounds.

EPA Response: Samples were collected at a depth of 0-6 inches, since this depth of sediments is most likely to have exposure to ecological receptors. Incidental sediment ingestion of waterfowl, mammals and fish would be only in the top few inches of sediment. Even assuming scouring events could remove the top few inches of sediment, exposing underlying sediments to the surface, EPA considers 0-6 inches as a reasonable estimate of likely exposure of ecological receptors. It is standard practice to sample benthic invertebrate communities at a depth of 0-6 inches, since this is usually the depth of greatest biological activity. Exposure pathways for normal ecological exposure were not identified for deep contamination, therefore these were not considered significant and were not included in the BERA.

For a human health risk assessment, data from "surficial, near-shore sediments should be used" (USEPA, 1989). The use of 0-6 inch sediment data from areas where the surface water depth is two feet or less meets this criterion, especially when considering childhood exposures. Adult may be exposed to 0-6 inch sediments located in areas where the water depth is greater than 2 feet. However, it is anticipated that these sediments will not remain adhered to the skin to any significant extent but will wash off by the time the adult surfaces from the water. Sediment samples collected from areas where the surface water depth was greater than two feet are not are not considered applicable for use in the human health risk assessment.

2-34: The Report should identify the reference samples used by the EPA for comparing levels of inorganics detected in the river and lake samples.

EPA Response: The habitat for each of the reference samples is presented in Tables 2-1 and 2-2. Table 2-14 presents analytical data for the eleven reference samples referred to in the surface water table presented on pages 2-34 through 2-36 of the text.

2-38: The EPA should address the fate and transport implications of the facts that (i) above-average chromium concentrations were detected in the "Wildwood area", and (ii) the maximum concentration of lead was detected "near the rifle range."

EPA Response: Fate and transport will be addressed in the Comprehensive RI Report.

2-52 et seq.: An incomplete contaminant fate and transport analysis should not be included in the risk assessment.

EPA Response: Fate and transport will be addressed in the Comprehensive RI Report.

2-62: The Report fails to set forth the basis for the conclusion that "[c]ontamination of matrices within the Aberjona River Study has occurred most likely from past industrial disposal practices."[9] For example, it is entirely unclear how or why the EPA has concluded, at the current time, that the alleged matrix contamination is not the result of proximate sources or other historic activity such as aerial application of herbicides and pesticides, urban water runoff, and the like.

EPA Response: Fate and transport will be addressed in the Comprehensive RI Report.

VIII. CONCLUSION

It is well established under CERCLA that the EPA is acting at its own risk if it makes a response action decision that is "arbitrary or capricious or otherwise not in accordance with law." 42 U.S.C. § 9613(j). Indeed, EPA action will be set aside as arbitrary and capricious if the

[9] Page 2-63 of the Report similarly sets forth the contention – without providing the basis therefor – that "[c]ontamination of matrices within the Aberjona River Study area has occurred

Agency has "entirely failed to consider an important aspect of [a] problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise." Motor Vehicles Mfrs. Ass'n of U.S. v. State Farm Mut. Ins. Co., 463 U.S. 29, 43 (1983). In view of the flaws with the Report outlined above (and detailed more fully in the reports submitted by Gradient and Dr. Hansen), it is clear that any remedial action, other than no action, taken in reliance upon the Report would be arbitrary and capricious.

Respectfully submitted,

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in the past as a result of disposal practices, most likely from upgradient NPL and/or industrial sites."

D. Aberjona Study Coalition

October 10, 2003

Mr. Joseph F. LeMay P.E.
Remedial Project Manager
Office of Site Remediation & Restoration
Suite 1100 (HBO)
1 Congress Street
Boston, MA 02114-2023

Dear Mr. LeMay,

In April of 2002 we received a telephone call from Mayor John Curran asking us if we would be interested in acting as a citizens advisory group for the upcoming Environmental Protection Agency (EPA) study of the Aberjona Watershed. In July of 2002 we invited you and members of your group to speak at the Woburn Neighborhood Association meeting regarding the Watershed Study. It was after that meeting the idea to establish the Aberjona Study Coalition was born.

Over the past eighteen months we have established a coalition consisting of six community groups that represent over 225,000 residents who border the Aberjona Watershed. Our first task was to hire a technical advisor who is an expert in the many environmental sciences and would act as our interpreter to translate the many complex reports that will be issued over the next few years as result of the EPA Aberjona Watershed Study.

The first of the complex reports "Baseline Human Health and Ecological Risk Assessment Report" was released in two parts during the spring and summer of 2003. This report is the foundation of all of the reports that will be issued from the EPA over the next few years. If the assumptions are not correct in the baseline report it could have a lasting effect on all of the decisions that will be made. With this in mind when searching for a technical advisor we chose Cambridge Environmental, Inc.

Attached, and as a joint effort of the Aberjona Study Coalition, Inc. and its technical advisor Cambridge Environmental, Inc. are our comments on the Baseline Human Health and Ecological Risk Assessment for Operable Unit 3 of the Wells G&H Superfund Site.

As stated in the text of the comments; by necessity, our comments are in part incomplete, in that we expect to receive, and then comment on, additional information from the EPA by way of response to some of the preliminary comments presented here. We reserve the right to provide further comment to the EPA on issues for which information is currently incomplete. We also will comment in the future on issues tied to information to be provided by EPA in subsequent reports (e.g. the fate and transport analysis that EPA intends to provide in the Remedial Investigation report for the site).

Thank you for giving us the vehicle in which to voice our comments and concerns, we look forward to your response.

Sincerely,

Linda A. Raymond, Treasurer
Aberjona Study Coalition, Inc.

Cc:
Anna Mayor, DEP Project Manger Superfund Section

Comments on the

Baseline Human Health and Ecological Risk Assessment
Wells G&H Superfund Site
Operable Unit 3
Woburn, Massachusetts

Prepared on behalf of the

Aberjona Study Coalition

by

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Cambridge Environmental Inc.

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and

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October 10, 2003

Introduction and Summary

The Cambridge Environmental Inc. team was selected by the Aberjona Study Coalition (ASC), a stakeholder in the U.S. Environmental Protection Agency's (EPA) investigation of chemical contamination of the Aberjona River, to provide technical assistance in evaluating the results of EPA's work. The ASC represents a broad group of citizens – more than 225,000 residents in Woburn, Winchester, Wilmington, Medford, and Arlington, Massachusetts – who have diverse and long-standing interests in the Aberjona River and surrounding areas. The ASC has three goals with respect to EPA's efforts:

- to ensure that the investigation is technically sound;
- to ensure that the investigation is complete; and, most importantly
- to ensure that the investigation is adequately protective of human health and the environment.

Our review of the EPA's *Baseline Human Health and Ecological Risk Assessment* (hereinafter "the Risk Assessment") for Operable Unit 3 of the Wells G&H Superfund Site (the "Site") indicates that EPA has satisfied some, but not all, of the ASC's goals. In general, the Risk Assessment is technically sound, *i.e.*, the methods are consistent with U.S. EPA guidance and procedures, and the calculations set forth are mathematically correct. However, significant data gaps exist. It is not clear that enough data have been generated and analyzed to support the Record of Decision that must be developed for the Site. Moreover, the Risk Assessment does not adequately characterize potential risks to human health, and therefore may not represent a health-protective analysis.

Many of our concerns about the Risk Assessment can be addressed through presentation of additional information and the collection and/or analysis of additional data. In what follows, we offer specific suggestions for changes and additions to supplement the Risk Assessment.

Our comments are presented in four categories:

- General comments on the Risk Assessment and Site investigation;
- Major comments on the human health risk assessment;
- Major comments on the ecological risk assessment; and
- Minor comments.

By necessity, our comments are in part incomplete, in that we expect to receive, and then comment on, additional information from EPA by way of response to some of the preliminary comments presented here. We reserve the right to provide further comment to EPA on issues for which information is currently incomplete. We also will comment in the future on issues tied to information to be provided by EPA in subsequent reports (*e.g.*, the fate and transport analysis that EPA intends to provide in the Remedial Investigation report for this site).

General Comments on the Risk Assessment and Site Investigation

EPA should facilitate access to the Risk Assessment and future documents through electronic media

The Risk Assessment comprises six thick binders of material, including many color figures. We would expect that the costs of producing a large number of hard-copy reports are prohibitive, and hence distribution of such hard-copy report must be limited. Public access through libraries is necessary and appropriate, but it limits the ability of individuals to review documents (*e.g.*, many people work during the majority of the hours that libraries are open, materials get lost and damaged, *etc.*).

Distribution of electronic media, however, provides a cost-effective means of providing wider access to documents. We commend EPA's effort in making the document available on its web site. In the future, we also encourage EPA to distribute reports on CD-ROM, since the on-line dynamic links require considerable navigation time. The need to wait for linked sections, tables, and figures to download and display limits both the utility and the accessibility of the on-line document. A CD-ROM version would facilitate report access and navigation. Thus, we recommend that EPA plan for CD-ROM dissemination of future reports.

EPA Response: This suggestion will be considered for future deliverables.

Report format

Generally, the Risk Assessment report is well organized. However, many tables are long and cumbersome, and many portions of the appendices are difficult to navigate or even to find, due to a lack of page-numbering. Figures in the report were generally quite helpful and illustrative, *e.g.*, the use of color overlays on black-and-white aerial photographs. We recommend the incorporation of more summary tables (*e.g.*, summary tables of risk, as described in detail below). Also use of a single, sequential, page-numbering system would help to identify specific locations in the document, especially in the volumes of tables and appendices.

EPA Response: A risk summary table is provided in Section 5 (Table 5-1). The summary table presents cumulative risk by receptor for each exposure station.

The EPA Sampling program has not covered all of the contaminated areas

Over the past decade, a large body of research has been published on the fate and transport of pollutants in the Aberjona watershed. Much of this research has been conducted by investigators from the Massachusetts Institute of Technology (MIT) as part of a project funded by the Superfund Basic Research Program at the National Institute of Environmental Health Sciences (NIEHS). A significant thrust of this research has been on contamination by metals, particularly arsenic (As), chromium (Cr), and lead (Pb), in the watershed. The MIT data show that these elements are present in the sediments in

many parts of the watershed at concentrations significantly elevated above background. For example, Knox (1991) analyzed 27 surface (0-20 cm) sediment samples collected along the thalweg (*i.e.*, the deepest part) of the main stem of the Aberjona. Of these, 21 were collected south of Route 128/95. The results show that As, Cr, and Pb concentrations are elevated in sediment deposition areas all along the length of the river. In over half of the samples, arsenic concentrations were >10 ppm, and in 9 out of 21 samples the levels were >100 ppm.

Moreover, MIT investigators have reported that the more deeply buried sediments in the Wells G&H wetland area and Upper Mystic Lake also contain significantly elevated levels of metals -- indeed, the highest levels of As, Pb, and Cr found in the watershed were reported in these areas. Spliethoff and Hemond (1996) discovered very high levels of As (>1,500 ppm), Cr (>8,000 ppm) and Pb (>2,500 ppm) in sediment 20-60 cm below the sediment-water interface at the bottom of Upper Mystic Lake. Zeeb (1996) reported As levels in excess of 6,000 ppm at a depth of 50 cm in a peat core collected between the Aberjona River and the former well H structure.

The EPA study has not utilized any of the MIT data or any other historical sediment data in its analysis. This omission undermines the comprehensiveness of the report.

Several points should be considered.

1. It would have been prudent for EPA to have used the historical sediment sampling results to inform their sampling strategy. For example, historical hotspots in the river should have been mapped and re-sampled as part of the EPA effort. If the original findings were confirmed, areas around the hotspots (both immediately upstream and downstream and near the shores) should have been sampled to determine the extent of contamination.

EPA Response: In preparing the sampling design, EPA did consider areas that were previously sampled by other parties where historical results indicated elevated concentrations of metals, as well as other historical information, such as the location and operation of previous facilities within the study area. EPA's sampling strategy also considered field reconnaissance information to focus the sampling on areas of greatest deposition (i.e., areas expected to contain the highest contaminant levels), areas that represented a variety of typical ecological habitats (i.e., pond, wetland, stream, floodplain, lake, etc.), and areas that represented potential human activity (fishing, wading, swimming, etc.). In addition, EPA has recently conducted sediment core (0 to 4 feet) sampling along various reaches of the river to characterize the vertical deposition of contamination. The results from these samples will be used in the nature and extent portion of the comprehensive Remedial Investigation (RI) and in the revised OU3 risk assessment. Where appropriate, MIT information may be qualitatively applied and referenced in the RI.

2. The EPA study is regarded as the basis for the Human Health and Ecological Risk Assessment and the Record of Decision. Historical data could be used as a consistency

check to assess sampling uncertainties. For example, the Risk Assessment includes only limited numbers of samples in many of the reaches downstream of the Wells G&H Site. The limited data used in the Risk Assessment should be compared with the wider body of historical data, in order to gauge the representativeness of the Risk Assessment samples. By not including a comprehensive assessment of all available and reliable data, EPA is ignoring a valuable source of information.

EPA Response: The historical samples were not necessarily collected or analyzed using the same methods and procedures as those employed for the current data, nor were the historical data validated in accordance with EPA data validation procedures. This would likely result in possible uncertainties when comparing different data sets. However, where appropriate, the historical data sets will be qualitatively applied and referenced in the RI.

3. The sites in the study area where the very highest levels of metals contamination have been reported are not considered in the Risk Assessment. While we recognize that humans are rarely exposed to peat deposits at the Wells G&H wetland or to sediments in the deepest parts of Upper Mystic Lake, it is possible that the contamination in these areas could be having significant ecological impacts. For the sake of being complete and thorough, EPA should acknowledge the presence of the high levels of contamination in these areas, and at the very least justify omission of these data from the Ecological Risk Assessment.

EPA Response: The revised Wells G&H OU-3 Risk Assessment will evaluate the sediment core data for human exposures that may occur as part of a potential future dredging scenario. The comprehensive RI will further discuss nature and extent as well as fate and transport mechanism. As for the Baseline Ecological Risk Assessment (BERA), exposure pathways for normal ecological exposure were not identified for deep contamination, therefore these were not considered significant and were not included in the BERA.

4. The focus of the Risk Assessment on the quality of near-shore and surficial sediments does not take into account the potential effects of sediment scouring (*e.g.*, as caused by floods and possible dredging activities), which could serve both to mobilize contaminants and to expose or bring deeper layers to the surface. Better knowledge of sediment contamination at depth (particularly in sediment deposition areas along the river) is required to evaluate potential future risk scenarios and risk management options. Core sampling and analysis is also consistent with the important goal of defining the extent and nature of contamination, even if the contamination is likely to remain in place.

EPA Response: Sediment core (0 to 4 feet) sampling has been conducted recently along various reaches of the study area to generally characterize the vertical extent of contamination. The results from these samples will be used in the nature and extent portion of the comprehensive RI and in the revised Wells G&H OU-3 Risk Assessment.

Fate-and-transport considerations

The EPA report does not explicitly consider the consequences of chemical transformation and transport in the watershed. Importantly, As, a redox-sensitive element, can be remobilized from sediments under certain conditions — for example, when dissolved oxygen levels become very low, such as at the bottom of stratified lakes in the summer. Senn and Hemond (2002) observed that As is remobilized from the sediments of Upper Mystic Lake when both oxygen and nitrate are depleted in the bottom waters. Dissolved As levels as high as about 15 ppm were measured. Similarly high levels of dissolved As (~27 ppm) in Upper Mystic Lake were reported in an earlier study by Spliethoff and co-workers (1995). These elevated levels of dissolved As should be recognized by EPA in their study, and should be evaluated in the context of the ecological risk assessment.

EPA Response: EPA acknowledges that chemical transformation and transport of arsenic in the watershed is an important fate and transport issue which will be discussed in the RI. EPA recently conducted an 18-month surface water sampling program at 10 stations spaced throughout the study area that included monthly base-flow and selected storm flow samples. The results of these surface water samples will be evaluated further for ecological risks in the revised Wells G&H OU-3 Risk Assessment.

Soils Outside of the Delineated 100-Year Flood Plain Should be Sampled

Another issue worthy of attention is flooding, and the possibility that flood waters may transport metals-contaminated sediments to over-bank areas. The "100-year flood plain" is inaccurate, since areas outside of the 100-year flood plain (as presently defined) are known to flood considerably more regularly. These areas are possibly subject to transport and deposition of contaminants from the Aberjona. For example, a grassy area adjacent to the parking lot of the International Family Church, located at 620 Washington Street in Winchester, routinely floods (McKinney, 2003). This area, however, is depicted as being outside the 100-year flood plain on Figure 2-6 of the Risk Assessment. Many residences in the neighborhood near the International Family Church are subject to periodic basement flooding.

Significant flooding events have occurred in October 1996, June 1998, March 2001 (CDM, 2003), and as recently as October 2, 2003 (Winchester Star, 2003) Photographs posted by the U.S. Geological survey during the March 2001 flooding event appear at http://ma.water.usgs.gov/floods/flood032001_img.htm. These photographs are indicative of recurrent flooding problems that have developed in the Aberjona watershed that are not adequately characterized by the flood plain delineation. All locations that flood are of potential concern in the Risk Assessment from the standpoint of contaminant transport and deposition. Ginn Field, a town recreational facility, has been inundated (CDM, 2003). Residents of Wickham Road, approximately 1,500 feet to the east of the Upper Mystic Lake and well outside of the current 100-year flood plain delineation, have experienced recurring flooding problems (Winchester Star, 2003).

Given limited time and resources, we have not been able to develop a comprehensive list of all flood-prone locations not accounted for in the Risk Assessment, but we believe that such areas might be extensive. Flooding problems have plagued the Aberjona River watershed in recent years, and the flood plain delineation is known to be out-of-date. In fact, the Massachusetts Department of Environmental Management (DEM) is presently updating the flood plain delineation (DEM, 2003). We suggest that EPA consult with DEM to identify unaccounted areas subject to flooding, and that EPA conduct additional sampling as appropriate to characterize additional areas possibly influenced by Site-related contamination. If updated flood plain information cannot be generated in the time frame of EPA's investigation, we recommend that EPA move forward with other aspects of the investigation, but then return to this issue when the updated flood plain delineation becomes available.

Moreover, the six soil sampling stations included in the Risk Assessment are not adequate to characterize flood plain soils because of potentially differing land uses. The Risk Assessment is predicated on recreational land use scenarios. The extensive nature of flooding may be affecting a wide variety of land uses, including residential areas.

EPA Response: Soil contaminant levels in residential yards and recreational spaces, present as a result of flooding events, are expected to be lower than those present in soils on the river banks or sediments within the streambed as demonstrated by soil sample results from several floodplain areas along the river, such as Davidson Park, Kraft Foods, Danielson Park, the Cranberry Bog, and station WS/WSS. The extrapolation of the recreational risk calculations to a residential scenario indicates that risk above regulatory guidelines would not be present at these residences. This extrapolation assumes that the measured contaminant levels would be present in the residential yards. This issue will be discussed and documented more fully in the revised Wells G&H OU-3 Risk Assessment. The revised Wells G&H OU-3 Risk Assessment will also use storm event surface water to determine the risk to residents who contact this medium during flooding events. Additional details regarding the floodplain sampling strategy can be found in responses provided in the next section (Major Comments on the Human Health Risk Assessment).

Major Comments on the Human Health Risk Assessment

Risk estimates require more complete presentation

Figure E-1 of the Risk Assessment depicts a very limited number of areas that "present current and/or future risks to human health." The implication of the figure is that all *other* areas on the map do *not* present any such risks. But this implication is inappropriate. Not noted on the figure is that a judgement has apparently already been made by EPA as to what levels of risk are acceptable for this site. In particular, the judgement appears to be that any incremental, site-related risks of cancer up to 100 in 1,000,000 (or 1×10^{-4}) are acceptably small, and present "no risk." But, as is well known, EPA has applied criteria that are 10 or 100 times more stringent at other sites – that is, EPA has determined that site-related risks of cancer may be no more than 10 in 1,000,000 or even no more than 1 in 1,000,000. Separate from whether one does or does not agree with such judgements (please see the next point below), it is entirely inappropriate to be making these judgements within the context of a Baseline Risk Assessment. The Risk Assessment should, by definition, assess risk: it is elsewhere, in full consideration of the many dimensions of risk *management*, that one judges what levels of risk are acceptably small.

EPA Response: The sampling strategy EPA employed targeted areas representing the greatest potential risk due to the deposition and accumulation of contaminants. The human health risk assessment has evaluated and documented the risk at all human health exposure stations, including those where the estimated risk is within or below regulatory guidelines. Table 5-1 provides an overall risk summary table for the exposure stations. These risk calculations, along with site-specific considerations, will be factored into risk management decisions for the study area prior to finalizing the Record of Decision. The purpose of the Executive Summary is to provide a concise overview of the results of the risk assessment. Therefore, only the areas with estimated risks exceeding regulatory guidelines and major risk contributors for those areas have been included.

EPA should present better and more informative summaries of the risks as they are assessed, separate from judgements as to "acceptability" or lack thereof. Figure E-1 should be re-labeled to reflect the *specific risk criteria* exceeded at various locations (*i.e.*, a non-cancer hazard index of 1 and an incremental cancer risk of 1×10^{-4}). Figures similar to Figure E-1, but based on the more stringent criteria of incremental cancer risk levels of 1×10^{-6} and 1×10^{-5}, should be added to the report. A figure depicting hazard indices that round to 1 should also be added (the current Figure E-1 shows locations with hazard indices that round to 2 or greater). Moreover, numerical summary tables of the overall risk estimates at each sampling station should be clearly and prominently presented in the document. At present, the reader must sift through several long and detailed tables in Volume III of the report to extract the various receptor-specific risk estimates that contribute to the total incremental cancer risk estimates, since, for example, the child and adult risk estimates are presented separately. Simplified summary tables of total

incremental cancer risk estimates (adult plus child) for the present and future case are needed to provide readers with ready access to comparative risk estimates at the various sampling stations.

EPA Response: The text of the Executive Summary states that Figure E-1 summarizes those stations where risks exceed regulatory guidelines. This information will be added as a footnote to Figure ES-1. Figure ES-1 is summarizing cumulative risk at stations with target organ HIs greater than 1, not 2. The total HI may exceed 1 without the HI, segregated by target organ, exceeding 1. Table 5-1 in the Summary and Conclusions section summarize cumulative risks for all exposure stations.

Tables 1a and 1b, shown below, are examples of potential risk summary tables, based on our reproduction of a portion of EPA's risk calculations for potential exposure to arsenic (As) in sediments and soils. Note that the values in Tables 1a and 1b do not include risk estimates for all chemicals of concern in sediments and soils, nor do they include exposure pathways that evaluate other environmental media (surface water and fish). These values can easily be included in the location-specific risk totals.[1]

Table 1a Risk estimates due to exposure to arsenic (As) in sediment
Reasonable Maximum Exposure Scenario

Exposure Point	Current Risks		Future Risks	
	Lifetime Incremental Cancer Risk	Child Hazard Index	Lifetime Incremental Cancer Risk	Child Hazard Index
Station 01	1.E-06	2.E-02	1.E-06	2.E-02
Station 03	**2.E-05**	3.E-01	**2.E-05**	3.E-01
Station 05	5.E-06	8.E-02	5.E-06	8.E-02
Station 07/DP	**1.E-05**	3.E-01	**1.E-05**	3.E-01
Station 08	5.E-06	9.E-02	5.E-06	9.E-02
Station 09	6.E-06	1.E-01	6.E-06	1.E-01
Station 13/TT-27	NA	NA	**8.E-04**	**1.E+01**
Station 14	4.E-06	8.E-02	9.E-06	2.E-01
Station 16/TT-33	**4.E-05**	8.E-01	**4.E-05**	8.E-01
Station 22/TT-22	4.E-06	6.E-02	**1.E-05**	2.E-01
Station AM	7.E-06	1.E-01	7.E-06	1.E-01
Station AS	7.E-06	1.E-01	**2.E-05**	4.E-01
Station CB-01	**1.E-05**	2.E-01	**1.E-05**	2.E-01
Station CB-02	**1.E-05**	2.E-01	**1.E-05**	2.E-01
Station CB-03	**3.E-04**	**6.E+00**	**3.E-04**	**6.E+00**
Station CB-04	**6.E-05**	**1.E+00**	**6.E-05**	**1.E+00**

[1] Since arsenic in sediments and soils contributes the substantial majority of total risk estimates at most locations, the values in Tables 1a and 1b are fairly representative of total risk estimates.

Station CB-06	**3.E-05**	6.E-01	**3.E-05**	6.E-01
Station CB-07	**1.E-05**	2.E-01	**1.E-05**	2.E-01
Station JY	NA	NA	**7.E-05**	**1.E+00**
Station KF	**1.E-05**	2.E-01	**1.E-05**	2.E-01
Station LP	**3.E-05**	5.E-01	**3.E-05**	5.E-01
Station NR	**1.E-05**	2.E-01	**3.E-05**	4.E-01
Station NT-1	NA	NA	**5.E-04**	**8.E+00**
Station NT-2	NA	NA	**2.E-04**	**3.E+00**
Station NT-3	NA	NA	**9.E-05**	**2.E+00**
Station TT-30	**7.E-05**	**1.E+00**	**7.E-05**	**1.E+00**
Station TT-31	NA	NA	6.E-06	1.E-01
Station WG	**2.E-05**	3.E-01	**5.E-05**	8.E-01
Station WH	**1.E-04**	**2.E+00**	**3.E-04**	**6.E+00**
Station WS/WSS	**6.E-05**	**1.E+00**	**6.E-05**	**1.E+00**
Station WW	NA	NA	9.E-06	2.E-01

Table 1b Risk estimates due to exposure to arsenic in soil
Reasonable Maximum Exposure Scenario

Exposure Point	Current Risks		Future Risks	
	Lifetime Incremental Cancer Risk	Child Hazard Index	Lifetime Incremental Cancer Risk	Child Hazard Index
Station 07/DP	**1.E-05**	2.E-01	**1.E-05**	2.E-01
Station CB-05	**2.E-05**	4.E-01	**2.E-05**	4.E-01
Station DA	**4.E-05**	**1.E+00**	**6.E-05**	**1.E+00**
Station KF	**1.E-05**	3.E-01	**1.E-05**	3.E-01
Station NR	**1.E-05**	4.E-01	**4.E-05**	7.E-01
Station WS/WSS	3.E-06	7.E-02	4.E-06	7.E-02

The incremental cancer risk estimates in Tables 1a and 1b represent the sum of the values for the child and adult receptors. Risk estimates are highlighted in Tables 1a and 1b as follows. Boldface highlighting is used to indicate incremental cancer risk estimates equal to or greater than 1×10^{-5} and hazard indices equal to or greater than 1. Risk estimates that are additionally underlined equal or exceed an incremental cancer risk of 1×10^{-4} and/or have hazard indices that round to values of 2 or higher.

Note that a figure depicting sampling locations with hazard indices greater than or equal to 1 would include five additional sampling stations beyond those shown in Figure E-1 (sediment stations CB-04, JY, TT-30, and WS/WSS, and soil sampling station DA).

EPA Response: This information is presented in the report in Table 5-1. Table 5-1 highlights exposure stations where cancer risks exceed $1x10^{-4}$ and target organ HIs exceed 1. However, the cumulative cancer and noncancer risks are presented for all exposure stations. Please note that a cumulative HI may exceed 1 without target organ HIs exceeding 1.

An incremental lifetime cancer risk of 1×10^{-4} is not necessarily a valid criterion for acceptable, site-related risk

The upper-limit of acceptable, incremental, site-related, lifetime cancer risks under the Massachusetts Contingency Plan (MCP) is 1×10^{-5}, not 1×10^{-4}. If the Aberjona River Study had been conducted under the auspices of the Massachusetts Contingency Plan (MCP), a number of additional sampling stations depicted in Figure E-1 would be deemed to present a potentially significant risk to human health. Based on our recalculations of EPA's work, *more than two-thirds of the sediment sampling stations* (23 of 31 stations; please see Table 1a) and all but one of the soil sampling stations (please see Table 1b) present risks that are greater than or equal to an incremental cancer risk of 1×10^{-5}.

Some consideration of the nature of contamination is important with respect to EPA's risk management criteria. EPA considers incremental cancer risks ranging from 1×10^{-6} to 1×10^{-4} as ambiguous in the sense that they may or may not merit remedial action. EPA can choose to pursue a "no action" alternative for incremental cancer risk levels within the 1×10^{-6} to 1×10^{-4} range. EPA can also choose to act on risks within this range. The choice to act or not to act is a case-by-case decision that depends on many factors. In the case of the Aberjona River Study, there may be compelling reasons to pursue remedial actions at incremental cancer risk levels more stringent than 1×10^{-4}. First, arsenic – the contaminant that dominates the cancer risk estimates – has been *definitively* shown to cause cancer in humans exposed *at environmental levels*. Indeed, among the 90 or so established human carcinogens – and the hundreds of rodent carcinogens that are presumed by EPA to be human carcinogens, even absent human data – arsenic is unique in being demonstrably carcinogenic in people who drink elevated amounts in water (and receive elevated doses in foods). It is curious that EPA has demanded strict risk criteria at many other sites contaminated only by chemicals known to cause cancer in rodents, not humans: yet here in Woburn, at a site dominated by risks from arsenic, the most lenient of risk criteria seem already to have been chosen. Second, as we discuss in the next comment, the risk estimates are based on an exposure assessment that incorporates a lesser degree of conservatism than is found in many other EPA risk assessments, and may not be protective of all future uses. Third, given the infamous reputation of the Wells G&H and Industri-Plex sites, citizens within the Aberjona watershed have lived with higher degrees of publicity, concerns, stigma, and fears than have neighbors of many other Superfund sites.

EPA Response: The human health risk assessment has evaluated and documented the risk at all human health exposure stations, including those where the estimated risk is

within or below regulatory guidelines. These risk calculations, along with site-specific considerations, will be factored into risk management decisions for the study area. EPA is working closely with DEP to develop a remedy that DEP agrees is consistent with the goals of the state regulations. EPA will continue its public relations activities with the communities regarding risk communication, cleanup alternatives, and cleanup solutions. It is anticipated that the next public meeting will occur after the completion of the comprehensive Remedial Investigation Report. Regarding the selection of exposure assumptions, please refer to the following comment response.

The Risk Assessment's emphasis on realism runs counter to conservative risk assessment tradition, and is inappropriate for future land use considerations

The Risk Assessment evaluates potential exposure to contaminants on the basis of the characteristics of individual sampling stations. For current land use, EPA does not calculate risks at seven of its thirty-one sampling stations because the locations are inaccessible. Qualitative judgment was used to assign exposure frequencies of 26, 52, 78, and 104 days per year to contaminants in sediments and soils at each of the other twenty-four sampling stations.

At face value, EPA's assumptions on exposure frequency seem reasonable for *current* land use. For future use scenarios, however, the differentiation among land uses is not as justifiable, and in our opinion should be abandoned. Substantial changes in land use have occurred in the Aberjona watershed, are likely to continue to occur, and cannot be anticipated in detail. For example, EPA judges the highest potential exposure intensity to occur in the former Cranberry Bog area for both current and future land use. If this risk assessment had been conducted at some point in the past when the cranberry bogs were still operating (and walking trails were nonexistent), it is likely that EPA would have considered the potential exposure intensity in the former Cranberry Bog area to be considerably lower than is now in fact the case.

Hence, we do not find it appropriate to make extensive assumptions concerning future land use in a risk assessment that is designed to be hypothetical in nature. Rather, we recommend that EPA adopt more uniform reasonable worst-case assumptions in addressing future land use. For example, in assessing recreational exposure to contaminated sediments and soils, the assumed high-end exposure frequency of 104 days per year should be applied to all locations unless there are compelling reasons for considering restrictions to access into the indefinite future. As described in the following comment, the unknowable nature of future land use strongly suggests that EPA consider additional exposure routes.

EPA Response: Future land use assumptions were selected to be adequately protective of exposures that may occur within a recreational space. Generally, stations were

evaluated with a future exposure frequency of 78 days per year. The future exposure frequency of 26 days per year was only applied to a small number of stations where future land use is assumed to remain the same as current land use, due to their location further into the wetland or abutting Route 93 (station AM). This exposure frequency is adequately protective of recreational exposures in undeveloped areas. The 104 days per year exposure frequency was utilized for areas where residences were close to the station, in some cases, immediately abutting the area. Using an exposure frequency of 104 days per year for areas not near residences would likely overestimate the risk associated with future recreational exposures at these stations.

Additional exposure pathways and scenarios should be considered

EPA's Risk Assessment focuses only on exposure to contaminants that might occur during recreational activities. While we agree that recreational use is the most plausible means of potential contaminant exposure under current land use, other scenarios are possible. Unfortunately, in some cases, the data to determine the viability of these pathways are not available.

The Aberjona River watershed has undergone many changes since the time that the 100-year flood plain was delineated. As noted above, the recent history of flooding along the Aberjona suggests that the flood plain definition is out –of date, and raises the possibility of contaminant transport to areas beyond the 100-year flood plain during flooding events. EPA has not collected sufficient data to evaluate whether flooding has increased the concentrations of river-related contaminants in upland soils. For example, the backyards of many residences line the western shores of the Upper and Lower Mystic Lakes. Is it possible that flooding has brought contaminants to these areas? If so, what are the concentrations of contaminants in these soils? We note that residential exposure assumptions assume a significantly higher degree of potential exposure than that considered in the Risk Assessment's recreational use scenarios, and hence even a modest increase in contaminant concentrations in soil could reflect potentially significant risks to human health.

Consider the portion of the International Family Church property (620 Washington Street, Winchester) that periodically floods. EPA has not sampled soils in this area, so there is no way to tell if contaminants have been deposited in soils during flooding events. The church runs an elementary school (nursery school through 8th grade). Children generally do not play in the grassy area subject to flooding, since it is located adjacent to a well-utilized parking area; however, the area is occasionally used for picnics and volleyball games (McKinney, 2003). Since this area has not been sampled, risk estimates cannot be determined.

Similarly, the Winchester playing fields built atop the culverted river (shown at the bottom of Risk Assessment Figure 2-8) have also been subject to flooding (CDM, 2003; Winchester Star, 2003), and hence may be receiving potential deposition of contaminants mobilized in flood waters. This area is potentially important, since athletic recreational exposure may be more intense and frequent than exposures considered by EPA. For

example, in an athletic exposure scenario, it might be appropriate to assume a higher degree of dermal adherence of soil. Again however, no data have been collected in this regard.

More generally, it is conceivable that river-related contaminants have migrated to residential soils through flooding events. If so, a complete residential exposure pathway may *currently* exist. For example, consider Risk Assessment Figure 2-8, which depicts the course of the Aberjona just to the north of Winchester center. Several homes are located in or near the 100-year flood plain delineation in Winchester at the point where the Aberjona River is culverted beneath the playing field area (at the bottom portion of Figure 2-8, along the river's eastern bank). In addition, the 100-year flood plain delineation, as superimposed on the aerial photograph in Figure 2-8, goes through or near a number of the housing units on the Aberjona's western bank.[2]

If residential soils have been affected by river-related contaminants through flooding, then the residential exposure pathway is complete under current land use conditions. In this case, the nature of the risk assessment would change, since a higher degree of potential exposure to contaminants must be considered.

In addition, a broader view of future residential use should be considered in the Risk Assessment. There are already some residential properties that overlap the existing delineation of the 100-year flood plain, which is widely believed to be undersized. Barring permanent land use restrictions, additional residential properties could be constructed closer to the river in the future. EPA should carefully consider land use all along the Aberjona River, to identify areas where new homes might be constructed, even if the likelihood of residential development is small. These areas should be considered for residential use in future-case risk calculations, since the purpose of future land use consideration is meant to be hypothetical and encompassing in nature: fundamentally, the Risk Assessment should be health protective under reasonably foreseeable conditions.

Residential exposure scenarios should also consider the possibility of vegetable gardening. In residential areas already subject to flooding, ingestion of homegrown vegetables raised in contaminant-affected soils may already represent a complete exposure pathway. As lands in and near the flood plain become redeveloped, new residential areas could provide opportunities for gardening. It is also conceivable that lands in the flood plain might be developed as community gardens to make use of land that cannot be used for building. In addition, the Site-specific soil-to-plant uptake factors provided in Risk Assessment Table 4-27 for arsenic and lead are substantially higher than literature-based reference values. The average Site-specific uptake factor of 0.4 for arsenic indicates that plants are capable of assimilating arsenic from the sediments. Developed for the ecological risk assessment, the Site-specific uptake factors are not necessarily applicable to consumable vegetables, but the elevated values do suggest that

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[2] Presumably, these housing units were not built in the 100-year flood plain without mitigating measures (*e.g.*, filling of low-lying areas). This again illustrates the out-of-date nature of the 100-year flood plain delineation.

arsenic may be available for uptake, and that vegetables raised in Site-contaminated soils could contain elevated arsenic concentrations. Hence, in addition to identifying and collecting data from soils that may be subject to flooding, potential dietary intake of arsenic should also be considered via the consumption of home-grown vegetables.

Finally, the Risk Assessment should assess risks to construction workers who may work in contaminated areas where future excavation and building is plausible. A construction worker can receive more intense exposure to contaminants over periods of limited duration, introducing the possibility of potential subchronic and acute risks to health.

EPA Response: Soil contaminant levels present in residential yards and recreational spaces as a result of flooding events are expected to be lower than those present in soils on the river banks or sediments within the streambed as demonstrated by soil sample results from several floodplain areas along the river, such as Davidson Park, Kraft Foods, Danielson Park, the Cranberry Bog, and station WS/WSS. The extrapolation of the recreational risk calculations to a residential scenario indicates that risk above regulatory guidelines would not be present at these residences. This extrapolation assumes that the measured contaminant levels would be present in the residential yards. This issue will be discussed and documented more fully in the revised Wells G&H OU-3 Risk Assessment. Note that the dermal adherence factor used for the recreational scenario, selected for the adherence of wet soil, is also protective of residential and athletic exposures. The revised Wells G&H OU-3 Risk Assessment will also use storm event surface water data to determine the risk to residents who contact this medium during flooding events. To address an excavation scenario, sediment core samples, up to 4 feet in depth, have been collected from 13 locations along various reaches of the study area in 2003 where elevated concentrations of metals have been observed. These samples, which generally characterize the vertical deposition of contamination, will be evaluated for a dredging scenario, as well as for potential ecological impact. This evaluation will determine whether risk above regulatory guidelines is indicated for workers who may contact contaminated sediments during dredging or ecological receptors that may be in contact with this material. This information will also be presented in the revised Wells G&H OU-3 Risk Assessment.

The data screening procedure is arbitrary and uncertainties should be assessed

EPA chose to include only sediment samples collected within two feet of the water surface within the human health risk assessment calculations. This choice was presumably governed by the nature of the available data, which were not necessarily collected for use in a human health risk assessment. The assumption seems reasonable for current land use in most of the study area. However, it seems inappropriate for Sandy Beach (sampling station 01), which is operated by the Division of Urban Parks and Recreation as a public swimming area. Many individuals will walk out to depths greater than two feet prior to swimming, especially when first entering the water. Application of the two-foot screening criterion eliminates some of the most contaminated samples found at the Sandy Beach sampling location, and hence may serve to underestimate risks to public health.

We recommend that EPA reconsider its two-foot screening criterion at the Sandy Beach location and consider all of the samples. In addition, as a sensitivity study, we also recommend that EPA test the implications of the two-foot screening criterion at the other sampling locations in the study area. For example, application of the screening criteria at sampling station TT-30 eliminates three of the available samples, reducing data consideration to a single sample. Twenty-one other areas are not considered at all in the human health risk calculations because all samples are eliminated. Sensitivity calculations should be developed that consider all of the available samples. These sensitivity calculations should be added to the uncertainty section. If there are other areas for which samples are eliminated from consideration that might significantly increase risk estimates if included in calculations, EPA should make a more critical examination of land use in the area to determine if the risk estimates are protective of human health under all plausible conditions.

EPA Response: As stated in EPA guidance, data from "surficial, near-shore sediments should be used" (USEPA, 1989). The use of sediment data from areas where the surface water depth is two feet or less meets this criterion, especially when considering childhood exposures. Adults may be exposed to sediments located in areas where the water depth is greater than two feet. However, it is anticipated that these sediments will not remain adhered to the skin to any significant extent but will wash off by the time the adult surfaces from the water. Sediment samples collected from areas where the surface water depth was greater than two feet were collected for and utilized in the ecological risk assessment. These samples are not considered applicable for use in the human health risk assessment.

Data coverage is inadequate

Considerable holes exist in the spatial coverage of data used in the human health risk assessment. There are several areas that have not been sampled adequately. As described in other comments, sampling of soils subject to flooding has not been sufficient. Since it is widely known that the 100-year flood plain delineation is out of date, its boundaries should not be used as a principal factor in determining soil sampling locations. Rather, EPA should consult in detail with local officials and especially individuals knowledgeable with conditions in the river. For example, the Mystic River Watershed Association (MyRWA) has conducted a detailed shoreline investigation of the Aberjona River. We recommend that EPA convene an *ad hoc* panel of individuals to discuss areas affected by flooding and develop a systematic approach to identifying and sampling flood-impacted soils. Work currently being done by the Massachusetts Department of Environmental Management to update the flood plain delineation may be useful for this purpose.

Sampling should be considered both within the current, inaccurate 100-year flood plain delineation and in areas that flood that may not be covered by the current delineation. We have not identified all such areas; however, as examples we list four areas that are prone to flooding:

- The playing fields located east of the Mystic Valley Parkway, just downstream of sampling station 5 should be sampled, since they are depicted within the current delineation, and are subject to recurrent flooding.

- There is a bike trail that runs north from Davidson Park, past the International Family Church property. There is a considerable gap in sampling between Davidson Park and sampling station 08 that is easily accessed (due to the presence of the bike path). We recommend further sampling be conducted in this area.

- The Kraft Foods property and wooded areas to the south were flooded in March 2001. These areas are depicted in Figure 2-6 as a relatively large area within the current 100-year flood plain delineation that has not been sampled at all (the KF and 08 sampling stations focused on sediments). We recommend soil sampling in this area to check for contaminants that might have been deposited during flooding events,

- Similarly, there are residences south of sampling location 08 (Risk Assessment Figure 2-6) that appear to have yards that intrude into the 100-year flood plain delineation. These yards should be sampled for the presence of river-related contaminants. Given the inaccuracy of the flood plain definition, it would be prudent to identify and sample the yards of other homes in this area that might have experienced flooding.

Additionally, there are at least three areas that have not been adequately sampled to characterize sediment contamination. Risk Assessment Figure 2-8 indicates only two samples along the one-half mile stretch of the Aberjona River to the north of its culverting in Winchester center. Similarly, Risk Assessment Figure 2-5 indicates an even longer stretch of river that is currently characterized by a single sample. Also, public parkland extends along the entire western shorelines of the Upper and Lower Mystic Lakes. Appropriately, EPA sampled the Sandy Beach location, but with the exception of six samples collected in deep water (and hence not used in the human health risk assessment), there have been no samples taken along the western shorelines south of Sandy Beach that cover a distance of significantly more than a mile. There appear to have been no samples collected in the vicinity of the Winchester Boat Club, a facility used for sailing and other activities. Given the nature of sailing, it is reasonable to assume that individuals will contact sediments on an occasional basis, often in water deeper than two feet. Similarly, sediments along the privately-owned eastern shorelines of the Upper and Lower Mystic Lakes have not been sampled. By not sampling along the shorelines, EPA may be missing some areas of historical contamination that deposited and accumulated over many years. The degree of this contamination may not be well-represented by the sampling at Sandy Beach, which has probably received large amounts of uncontaminated sands from outside of the watershed to enhance its use as a public recreation area.

Even at locations that have been sampled, spatial coverage is at times inadequate because the two-foot screening criterion eliminates available data from use in the human health risk assessment. In fact, some of the sampled locations have no data suitable for use in the Risk Assessment, and hence no health risk calculations were developed for them. As a specific example, Reach 4, which includes Judkins Pond and Mill Pond, has no sediment samples under less than two feet of water, and hence no associated risk calculations. The supplemental Risk Assessment Table C.1-1 indicates 21 sampling stations for which no human health risk calculations have been performed (sampling locations 02, 04, 06, 10, 11, 12, 15, 18, 19, 20, 21, AO, BW, LF, LM, MP, TT-28, TT-29, TT-32, LF, and UM).

EPA Response: EPA consulted with municipal officals regarding areas frequently flooded and used for recreational purposes. EPA's sampling strategy targeted areas representing the greatest potential risk due to the depositional patterns and potential to accumulate contaminants. Areas with the highest concentrations of contaminants were primarily found in Reach 1 and portions of Reach 2 (e.g., the former cranberry bog), which exhibited potential risks to human health. High concentrations were not found downstream of these areas along the river, and consequently, these areas did not exhibit excessive risks to human health. These locations demonstrated contaminant levels corresponding to risk below regulatory guidelines. Therefore, it may be inferred that other depositional areas within Winchester, downstream of or in proximity to those that were sampled, would also demonstrate levels of contaminants corresponding to risk below regulatory guidelines. This approach also allowed EPA to focus their resources on the most highly contaminated areas and to further assess human health risks.

As stated previously, soil contaminant levels present in residential yards and recreational spaces as a result of flooding events are expected to be lower than those present in soils on the river banks or sediments within the streambed. An example of this was demonstrated by soil samples collected from the floodplain area of Davidson Park, Kraft Foods, Danielson Park, the Cranberry Bog, and station WS/WSS. The extrapolation of the recreational risk calculations to a residential scenario indicates that risk above regulatory guidelines would not be present at these residences. This extrapolation assumes that the measured contaminant levels would be present in the residential yards. This issue will be discussed and documented more fully in the revised Wells G&H OU-3 Risk Assessment. The revised Wells G&H OU-3 Risk Assessment will also use storm event surface water data to determine the risk to residents who contact this medium during flooding events.

The sampling stations not included for quantitative risk evaluation have been justified as to their exclusion. The stations excluded are: (1) located far from the shoreline; (2) in greater than 2 feet of surface water; and/or (3) in areas with access obstacles present (e.g., steep banks, soft organic deposits). These samples are not considered applicable for use in the human health risk assessment.

Exposure assumptions

In general, EPA's exposure assumptions are developed in a manner consistent with Superfund risk assessment guidance. However, the mix of exposure assumptions employed by EPA in this Assessment is not highly protective of human health, especially when considered in the context of baseline human health risk assessments for other sites.

While it is generally not possible to confirm or evaluate site-specific exposure assumptions, it may be possible to gauge the appropriateness of the assumptions made for the recreational swimming pathway at Sandy Beach on the Upper Mystic Lake (EPA sampling station 01). EPA's reasonable maximum exposure profile assumes swimming occurs thirty-nine days per year (three times a week during the thirteen summer months), and that the swimmer is in the water for an hour during each swimming day. These assumptions seem reasonable, but it is quite possible that there are significant numbers of children who swim more frequently (*e.g.*, children who attend day camps or take swimming lessons) and/or spend more time in the water. In this case, however, EPA does not need to rely solely on default assumptions and professional judgment, but can instead seek information to reduce the uncertainty of the exposure estimates. We recommend that EPA consult with officials and lifeguards who have worked at Sandy Beach to determine appropriate assumptions for evaluating reasonable maximum exposure to surface water.

In evaluating potential exposure to contaminants in sediments and soils, EPA incorporates a factor of 0.5 in its sediment/soil ingestion pathway to reflect the assumption that not all of a person's daily contact with soil is likely to occur in contaminated Site areas. This factor (labeled ET in equations) seems arbitrary, is not taken from default guidance or recommendations, and may be inappropriate. Places such as the Cranberry Bog area may be utilized on a daily basis by people who jog or walk their dogs. In such cases, these areas may afford the predominant source of access to exposed soils. Reducing the potential level of exposure by 50% through the ET factor, while already assuming limited exposure frequency ranging from 26 to 104 days per year, seems less than health-protective. We recommend that the ET factor be dropped from the calculations.

Also, we note that the assumptions used to evaluate dermal exposure to contaminants in sediments have been taken from an interim guidance document labeled "Review Draft – For Public Comment" (EPA, 2001). Use of this document as guidance that has not been finalized should be clearly noted in the text of the Risk Assessment. It is possible that changes will be made in the guidance document's recommendations based on response to public comment. It should be noted that the mix of exposure assumptions suggested in the draft dermal guidance is not highly protective of human health, especially when considered in the context of baseline human health risk assessments, which are generally meant to be highly protective. In estimating reasonable maximum exposure levels, it is appropriate to combine upper-end and best-estimate values. Key factors, however, are usually assigned higher-than-average values to ensure that upper-end exposure estimates are generated.

In particular, an aspect that concerns us is the dermal adherence factor (DAF), or the rate at soil or sediment is assumed to stick to the skin. EPA's (2001) draft recommendations are based on "best estimate" values, and not upper-end estimates. The suggested values of 0.20 mg/cm^2 and 0.07 mg/cm^2 are not very high compared with similar values used in regulatory contexts. For example, the Massachusetts DEP performed a critical evaluation of dermal adherence data. DEP (2001) notes a large amount of sediment tends to adhere to the skin of children playing in sediments, with measurements indicating more than 20 mg/cm^2 of sediment sticking to their skin. Not all of this sediment is in direct contact with the skin layer, however, and absorption of contaminants from the soil layer is limited. Based upon consideration of this factor, DEP recommends the use of a 1 mg/cm^2 DAF for sediment. For recreational exposure to soils, DEP's default recommendation for a DAF for an adult is the same as that used by EPA (0.07 mg/cm^2), but DEP recommends a somewhat higher DAF for a child (0.35 mg/cm^2 *v.* 0.2 mg/cm^2).

Because (1) the Massachusetts DEP has carefully considered the topic of dermal adherence, (2) the Aberjona River is located in Massachusetts, and hence deserves similar regulatory considerations as other properties in the Commonwealth, and (3) DEP's recommended values are more health protective than those used by EPA, we recommend that EPA adopt the following dermal adherence factors:

- for evaluating potential exposure to sediments (both adults and children), 1 mg/cm^2; and
- for evaluating potential exposure to soils, 0.35 mg/cm^2 for children and 0.07 mg/cm^2 for adults.

EPA Response: Information obtained from the MDC and the town Parks and Recreation Department on swimming at Sandy Beach indicates that the exposure assumptions are appropriate for the activities occurring. Exposures to a child attending one-week of swimming class for up to six weeks during the summer would be accounted for by the exposure frequency of 39 days per year.

The Fraction Ingested (FI) term has been used to account for the portion of dose that it is anticipated an individual would incur in upland or background locations. It is likely that an individual would spend a portion of their day in their yard or in other unimpacted areas. The FI term is a standard term described in EPA risk assessment guidance.

The "Supplemental Guidance for Dermal Risk Assessment" document will be noted in the references section as being "Interim-Review Draft for Public Comment".

The intent of the reasonable maximum exposure (RME) scenario is to evaluate the maximum exposure that is reasonably expected to occur at a site. The RME scenario is constructed by combining some maximum or near maximum exposure values with others left at their mean values. In doing so, exposures are modeled that are

reasonably anticipated to occur. Exposures of a higher frequency or intensity may occasionally occur, but should not serve as the basis for remedial actions at a site.

It is acknowledged that EPA and DEP differ in some of their recommended exposure assumptions. There are cases in which EPA assumptions are more conservative (e.g., soil ingestion rates) and cases, as pointed out, that DEP assumptions are more conservative. Because each method is more conservative in some areas than others, the final assessment result of both the EPA and DEP methods is roughly equivalent. EPA is working closely with DEP to develop a remedy that DEP agrees is consistent with the goals of the state regulations.

Assumptions regarding the fish ingestion pathway are not justified

The risk assessment assumptions for the fish ingestion pathway are not consistent with Superfund guidance. The risk assessment calculations assume that an adult ingests 5 g/day or 13 g/day, respectively, in the central tendency and reasonable maximum exposure calculations. However, the U.S. EPA's exposure factors handbook recommends higher fish ingestion rates of 8 g/day (mean) and 25 g/day (95^{th} percentile) for freshwater recreational fishers (U.S. EPA, 1997a). We recommend that the ingestion rates be raised to these values or even higher ones. For example, the U.S. EPA default recommendation for consumption of locally-caught fish is 54 g/day, a value that roughly equates to two half-pound servings per week (U.S. EPA, 1991). Thus, the fish ingestion rates in the Risk Assessment do not reflect high levels of fish consumption. The current U.S. EPA's reasonable maximum exposure rate of 13 g/day corresponds to less than a pound of fish per month.

Also, the assumption that only half of the fish are caught in the Aberjona study area should be eliminated. The assumption is based on professional judgement and an incorrect interpretation of information in the U.S. EPA's (1997a) Exposure Factors Handbook. The fish ingestion rates in the Exposure Factors Handbook are intended to represent consumption rates of recreationally-caught fish, and not total fish consumption rates, as erroneously discussed in the Risk Assessment (p. 3-32). There is discussion of total and recreational fish consumption in U.S. EPA (1997a), but it is irrelevant to the recommended consumption rates. Table 10-63 of U.S. EPA (1997a) provides a comparison of the intake rate of all fish and the portion recreationally-caught. Interestingly, the 50^{th} and 95^{th} percentile consumption rates of recreational fish alone, 11 g/day and 39 g/day respectively, are higher than the values used in the Risk Assessment.

The Risk Assessment provides very little information about local fishing habits. As a default, health protective assumption, it is reasonable to believe that there are individuals who fish frequently in the Mystic Lakes and perhaps other parts of the Aberjona Watershed, and that these individuals use the watershed as their prime source of recreational fishing. This is especially the case for the Upper and Lower Mystic Lakes, which are accessible from many public and private points.

More work needs to be done by EPA to investigate and characterize recreational fishing habits in the study area in order to justify any site-specific assumptions. The information provided in the Risk Assessment is scant and non-descriptive. The Risk Assessment (p. 3-1) mentions that Board of Health officials in Woburn and Winchester were contacted for information about local fishing habits, but little information is provided about these discussions and their use in characterizing the fish ingestion pathway (save for the belief on the part of health officials that local populations are not consuming eel and crayfish from the study area). Davidson Park, Leonard Pool, and the Upper Mystic Lake were identified as areas that might be fished by recreational anglers (p. 3-15). No specific reasons for focusing on these three areas are provided in the Risk Assessment. Why, for example, was the Lower Mystic Lake not included? A recent fishing report for the Lower Mystic Lake supplies the following anecdotal information (see http://www.wmi.org/bassfish/reports/95294.htm):

> Excellent action in Lower Mystic Lake at dusk on 9/17. Caught six LMB in the pads at the southwest corner of the Lower Lake between 6:15 and 7:30. Three were in excess of 3lbs, with one weighing in just over 4. All taken on a Yamamoto twin tailed hula grub in watermelon. Four taken by hopping it across the pads and letting it drop in the openings, one in the channel where Mill Brook flows into the lake, and one on the outside edge of the pads. Tons of bait started jumping just as it was getting too dark to fish. Tried a perch pattern floating rap just before leaving, but no takers.

Barring the development of site-specific information, EPA should revise its fish pathway assumptions in a health protective manner, as described above. In addition to the fish ingestion rates used for adults, EPA should also reconsider its fish ingestion rates for children. Also, the assumption that fish are caught by older children may be a reasonable one, but younger children may well consume fish caught and prepared by their parents. Thus, the use of a 31 kg body weight for children in exposure calculations is not necessarily justified, and we recommend that the default body weight of 15 kg for a young child be used in the calculations.

EPA Response: The fish ingestion rates selected for use are based on recreational fishing data gathered in the New England area. Other recreational fish ingestion rates are provided in the Exposure Factors Handbook, but are appropriate for other areas of the country. Since the study area is in New England, fish ingestion rates derived for the New England region have been applied.

As noted, FI term of 50% has been used to account for the likelihood that anglers will utilize other surface water bodies in the area for fishing. This is a reasonable assumption since there are a number of other attractive fishing spots in the area, and information from local anglers indicates that multiple surface water bodies are utilized for recreational fishing. Table 10-63 was used to derive age-specific fish ingestion rates. Ingestion rates in that table are higher than those assumed in this report since other regions of the country are included in the analysis.

Fillet data obtained from fish collected throughout the study area were evaluated. No particular areas were targeted or excluded. Fish collected from the Lower Mystic Lake were included in the analysis. Local officials could not provide site-specific information relative to the frequency and intensity of fish ingestion exposures. Therefore, data collected and provided in the Exposure Factors Handbook relative to ingestion rates were utilized.

Based on age-specific ingestion rates showing that young children ingest less fish than older children, it is equally conservative to evaluate an older child or a young child. This is not the case for soil ingestion pathway since young children are assumed to ingest more soil than an older child. Since the older child is more likely to be fishing and the evaluation is equally conservative, the older child was selected for evaluation.

Risk sensitivity calculations

As suggested above, we recommend a few key changes to the assumptions used by EPA in the evaluation of sediments and soils in the Risk Assessment. Specifically, we recommend (i) the elimination of the exposure time factor of 0.5 used in the sediment/soil ingestion calculations, (ii) the adoption of an upper-end exposure frequency of 104 days of contact per year with contaminated soil and sediment for all locations under future land use consideration, and (iii) more health protective assumptions on the rate at which sediment and soil are assumed to adhere to skin. To appreciate the combined effect of these assumptions on the location-specific risk estimates, please see Tables 2a and 2b below, which provide revised risk estimates for potential exposure to arsenic in sediments and soils. Risk estimates are highlighted according to the same conventions as those in Tables 1a and 1b. Note that the Table 2 estimates maintain all of EPA's other assumptions, including limited bioavailability of arsenic via the soil ingestion pathway, and that the Table 2 estimates do not account for all other chemicals in sediments/soils, nor for pathways other than exposure to sediments and soils. Even so, the Table 2 estimates indicate a much larger number of sampling locations that do not meet the upper limits of EPA's risk management criteria. In particular, 23 of the 31 of the sediment sampling locations (Table 2a) and 2 of the 6 soil sampling locations (Table 2b) are projected to have incremental cancer risks equal to or exceeding 1×10^{-4} and/or a total (non-cancer) hazard index equal to or exceeding 1. If the incremental cancer risk threshold criterion is lowered to 1×10^{-5}, consistent with standard Massachusetts policy, then all 31 of the 31 sampling stations fail to meet target criteria for risks to health that are acceptably small.

EPA Response: Please see responses to specific comments above relative to the issues of the FI term, exposure frequencies, and dermal adherence factors. The calculations presented below have not been reviewed for accuracy since they do not represent current or future exposures that may reasonably occur within the study area.

Table 2a Sensitivity calculations for exposure to arsenic in sediment
Reasonable Maximum Exposure Scenario

Exposure Point	Modified Current Risks		Modified Future Risks	
	Lifetime Incremental Cancer Risk	Child Hazard Index	Lifetime Incremental Cancer Risk	Child Hazard Index
Station 01	7.E-06	8.E-02	**1.E-05**	1.E-01
Station 03	**1.E-04**	**1.E+00**	**1.E-04**	**2.E+00**
Station 05	**3.E-05**	3.E-01	**4.E-05**	4.E-01
Station 07/DP	**9.E-05**	**1.E+00**	**1.E-04**	**1.E+00**
Station 08	**3.E-05**	4.E-01	**4.E-05**	5.E-01
Station 09	**4.E-05**	4.E-01	**5.E-05**	6.E-01
Station 13/TT-27	NA	NA	**6.E-03**	**7.E+01**
Station 14	**3.E-05**	3.E-01	**1.E-04**	**1.E+00**
Station 16/TT-33	**3.E-04**	**3.E+00**	**4.E-04**	**4.E+00**
Station 22/TT-22	**2.E-05**	3.E-01	**9.E-05**	**1.E+00**
Station AM	**4.E-05**	5.E-01	**2.E-04**	**2.E+00**
Station AS	**4.E-05**	5.E-01	**2.E-04**	**2.E+00**
Station CB-01	**9.E-05**	**1.E+00**	**9.E-05**	**1.E+00**
Station CB-02	**7.E-05**	8.E-01	**8.E-05**	9.E-01
Station CB-03	**2.E-03**	2.E+01	**2.E-03**	**2.E+01**
Station CB-04	**4.E-04**	**4.E+00**	**4.E-04**	**4.E+00**
Station CB-06	**2.E-04**	**2.E+00**	**2.E-04**	**2.E+00**
Station CB-07	**8.E-05**	9.E-01	**3.E-04**	**4.E+00**
Station JY	NA	NA	**6.E-04**	**7.E+00**
Station KF	**6.E-05**	7.E-01	**8.E-05**	9.E-01
Station LP	**2.E-04**	**2.E+00**	**2.E-04**	**3.E+00**
Station NR	**8.E-05**	9.E-01	**3.E-04**	**4.E+00**
Station NT-1	NA	NA	**4.E-03**	**4.E+01**
Station NT-2	NA	NA	**1.E-03**	**1.E+01**
Station NT-3	NA	NA	**8.E-04**	**9.E+00**
Station TT-30	**4.E-04**	**5.E+00**	**2.E-03**	**2.E+01**
Station TT-31	NA	NA	**5.E-05**	5.E-01
Station WG	**1.E-04**	**1.E+00**	**4.E-04**	**5.E+00**
Station WH	**7.E-04**	**8.E+00**	**3.E-03**	**3.E+01**
Station WS/WSS	**3.E-04**	**4.E+00**	**4.E-04**	**4.E+00**
Station WW	NA	NA	**7.E-05**	9.E-01

Table 2b Sensitivity calculations for exposure to arsenic in soil

Exposure Point	Modified Current Risks		Modified Future Risks	
	Lifetime Incremental Cancer Risk	Child Hazard Index	Lifetime Incremental Cancer Risk	Child Hazard Index
Station 07/DP	**3.E-05**	6.E-01	**4.E-05**	8.E-01
Station CB-05	**5.E-05**	**1.E+00**	**6.E-05**	**1.E+00**
Station DA	**1.E-04**	**2.E+00**	**2.E-04**	**3.E+00**
Station KF	**3.E-05**	6.E-01	**4.E-05**	8.E-01
Station NR	**4.E-05**	8.E-01	**2.E-04**	**3.E+00**
Station WS/WSS	9.E-06	2.E-01	9.E-06	2.E-01

Hexavalent chromium data

Chromium (Cr) may exist in either of two valence states: as hexavalent Cr (Cr VI), which is an established human carcinogen, or as trivalent Cr (Cr III), which is an essential nutrient with little toxicity. In aquatic systems, there is a tendency to find hexavalent chromium dissolved in water samples and trivalent chromium bound in sediments. This generality is not absolute, however, and both forms of chromium can be found in environmental media under various conditions of oxidation or reduction.

Total chromium analysis methods do not distinguish between the hexavalent and trivalent forms, but a separate method is available to quantify the hexavalent portion. The analysis method for hexavalent chromium was used by EPA on surface water samples and some sediment/soil samples. Hexavalent chromium was detected at anomalously high levels in some sediment sample analyses. EPA checked the quality assurance procedures on these samples and found them to be flawed, and hence rejected the use of the sampling results. Because of the complexities of the inter-conversions between the two valence states of Cr, more testing should be performed to characterize the nature and extent of hexavalent chromium concentrations in sediments and soils.

EPA *estimates* hexavalent chromium concentrations in sediment samples based on information *inferred* from an ion chromatography study (Risk Assessment, p. 3-17). Because it rejected its own data, EPA has no direct measurements of hexavalent chromium in sediments. Given the existence of a published test method for hexavalent chromium, the lack of direct measurements is a serious shortcoming that should be remedied through additional sample analyses.

Better knowledge of hexavalent chromium is important because it, like As, is a carcinogen. It also is known to cause allergic contact dermatitis (ACD), which can result from one-time contact with sufficient concentrations of hexavalent chromium in soils or sediments. We recommend that an assessment of ACD be added to the Risk Assessment

upon collection of direct sampling data (as described above). As a possible benchmark, the Massachusetts DEP has established a 170 mg/kg guideline for ACD (DEP, 1998).

EPA Response: Direct hexavalent chromium measurements via ion chromatography are available for the study area. The rejection of some hexavalent chromium data was due to possible matrix interferences that may have biased the data. Ion chromatography methods were later employed and the hexavalent chromium data was determined to be acceptable and reliable. Hexavalent chromium results were non-detect except for the results at location SD-WW-06 (17.3 mg/kg) where the total chromium level was 13,400 mg/kg. Because sampling via ion chromatography was not performed at all locations, hexavalent chromium data were estimated using the available ion chromatography results for those sampling locations without sample-specific hexavalent chromium results. Since hexavalent chromium was not detected at a level approaching the DEP ACD guideline, it is not necessary to include this information in the report.

Major Comments on the Ecological Risk Assessment

Previous work on ecological risk assessment should be review and incorporated

As mentioned in the general discussion of sampling data, the Aberjona watershed is a well-studied area, and considerable information on potential ecological risks is available outside of EPA's remedial investigation. EPA should devote effort to integrating and assimilating this information, either using it directly if possible or comparing previous findings to their own.

By its mandate under the Superfund program, EPA's Risk Assessment focuses on chemical contamination, specifically the various lists of metals and organic compounds on the priority pollutant lists. Ecological threats to the Aberjona River watershed, however, are not limited to the pollutants considered in the Risk Assessment. The Aberjona River is listed as an impaired stream (pending confirmation) for reasons of un-ionized ammonia, organic enrichment/low dissolved oxygen, and pathogens (DEP, 1999). The chemical contaminants of interest to the Superfund program are likely influenced by these basic water quality issues that potentially complicate the ecological risk evaluation. Individual chemicals cannot necessarily be examined in isolation. The ecological risk assessment should discuss, and to the extent possible, consider interactions between overall water quality parameters and the chemical contaminants of interest to the Superfund program.

DEP conducted a benthic macroinvertebrate survey as part of its Water Quality Assessment for the Boston Harbor watershed (DEP, 1999). The sampling station located in the Aberjona was determined to have the lowest total metric score of the fourteen stations examined. EPA should review this finding to determine whether their results are consistent with those of DEP.

Also, ecological risks within the Aberjona watershed were the subject of a recent Ph.D. dissertation (Rogers, 1998). EPA should review this study for a number of reasons, and consider the relevance of its methods and information. It was conducted directly within the Aberjona watershed, and considers the integrated effects of all factors that affect the urban watershed. The methods developed in Rogers (1998) are worthy of consideration as a framework for a more comprehensive ecological risk assessment, as they integrate chemical contamination with other relevant determinants of watershed health. The data presented, along with an extensive bibliography, offer potentially valuable information that can be used to enhance the ecological risk assessment. Also, the analysis and conclusions of Rogers (1998) provide a point of comparison for EPA's ecological risk assessment and findings.

EPA Response: EPA has utilized other studies to prepare the BERA, to develop the problem formulation and to interpret the results. However, data collected to estimate risk, in particular, need to be part of a comprehensive study, and address specific assessment and measurement endpoints presented in the BERA. The conclusion of risk in the BERA would not be altered, for example, by the data collected by DEP in 1999 with one station within the study area. In addition to her Ph.D. thesis, Catriona Rogers has co-authored recent papers (Rogers et al., 2002). EPA acknowledges the work done by Rogers and others in documenting the physical, chemical, and biological conditions in the complex Aberjona River system. EPA can, and has used, the works of other professional scientists to develop the study design and problem formulation for the site, as well as compare results. However, the calculation of risk must be based upon data collected by EPA or with oversight by EPA, utilizing EPA methods and subjected to EPA data validation methods.

EPA acknowledges that general water quality and physical habitat conditions have important influences on habitat quality and health of ecological communities. Ambient water quality parameters (pH, temperature, conductivity, dissolved oxygen and hardness) were measured at each surface water station during the data collection in 1995, and additional data were collected at the stations sampled for the triad study in 2001. In addition, EPA has continued to collect detailed surface water data throughout the watershed that will be incorporated into the comprehensive RI report. Consideration of the influence of both chemical and non-chemical stressors is incorporated into EPA's risk assessment methodology. The influence of non-chemical stressors, such as sediment grain size, organic carbon content, and oxygen depletion is considered in the interpretation of the benthic invertebrate community results.

Selection of sediment sampling locations

A detailed rationale for the selection of sediment sampling stations is not provided. Some reaches are more sparsely sampled than others, and it is not clear that sampling adequately characterizes the nature and extent of contamination. Specifically, the ecological risk assessment should address the following issues:

- In Section 2.1.1.1 (page 2-4), a description of how sediment sampling locations were selected should be added.

- In Section 2.1.2.1 (page 2-16), the report states that sediment samples from a depth of 0 to 6 inches were collected. However, EPA does not justify its decision not to sample at lower depths. Because the ecological impact of deep sediment contamination could be significant, EPA should justify its decision. In addition, the ecological risk assessment should provide sediment core description profiles.

- In the same section (Section 2.1.2.1, page 2-17), a description of how sediment bioassay locations were selected should be added.

EPA Response: Sampling locations were selected in 1995 in areas that were anticipated to be most impacted by potential contamination (the Wells G&H Wetland). In 1997, sampling locations were selected in depositional areas to fill data gaps. Subsequent to 1997, sampling was primarily focused on collecting additional samples for the Human Health Risk Assessment. Samples collected after 1997 that could be used to evaluate ecological risk were also included in the Ecological Risk Assessment. Sediment core description profiles for the 2003 core samples will be provided in the comprehensive RI Report.

Samples were collected at a depth of 0-6 inches, since this depth of sediments is most likely to have exposure to ecological receptors. Incidental sediment ingestion of waterfowl, mammals and fish would be only in the top few inches of sediment. Even assuming scouring events could remove the top few inches of sediment, exposing underlying sediments to the surface, EPA considers 0-6 inches as a reasonable estimate of likely exposure of ecological receptors. It is standard practice to sample benthic invertebrate communities at a depth of 0-6 inches, since this is usually the depth of greatest biological activity. Exposure pathways for normal ecological exposure were not identified for deep contamination, therefore these were not considered significant and were not included in the BERA.

Sediment bioassay locations were selected based on the following criteria: all locations were previously sampled for sediment chemistry and used for exposures for other receptors. All locations were depositional, where the highest levels of contamination were expected. Locations were selected to represent replicates of each of the three major habitats (pond, stream, wetland). Based on results of previous sediment sampling and earlier bioassays, stations from each habitat were stratified (if possible), to represent stations with the high concentrations of COPCs including arsenic, chromium, or lead and/or showed toxicity in earlier bioassays.

Data gaps in ecological risk assessment sampling

Data gaps exist for ecological risk assessment sampling. For example, the numbers of crayfish collected from various reaches are quite limited. Only two samples were collected from reaches 1 and 2, three from reach 3, one from reach 5, and no samples at

all from reaches 4 and 6. These are extremely small crayfish datasets for reaches that measure at least 100 feet each in length. Additionally, there is no figure showing where the crayfish sampling occurred within each reach. If additional samples cannot be collected, the results of the analyses should be supplemented with modeling based on biota sediment bioaccumulation factors to estimate tissue concentrations in crayfish. The crayfish tissue data that were collected could be used to verify the results of the modeling.

The average concentration of contaminants in crayfish is used to assess risk in each reach. Although this provides a best estimate of risk, due to the limited nature of the data, it would be more conservative and more protective of the environment to use the maximum detected concentrations.

Although no crayfish samples were collected from reaches 4 and 6, dietary exposures associated with ingestion of crayfish were calculated for these areas using data from reaches 3 and 5. Using crayfish body burden data from another reach to represent potential crayfish body burdens in reaches 4 and 6 does not provide useful information that can aid in making a risk management decision.

EPA response: EPA acknowledges that there is uncertainty associated with using a limited number of crayfish samples to estimate exposure of mallards and muskrat to COPCs through dietary intake of invertebrate tissue. However, using literature values for BCFs also has associated uncertainty, and does not necessarily improve the estimate of risk. Where appropriate, EPA prefers applying site-specific data to the risk assessment. Also, it could be counter-argued that the application of maximum values over estimate risks making conclusions of risks highly conservative and difficult to defend. EPA believes that the limited data set for crayfish tissue was used in an appropriate and consistent manner to estimate risk on site. It should also be noted that the proportion of the diet contributed by COPCs in crayfish tissue was only a major factor for mallards (67% of diet invertebrates), whereas only 10% of the muskrat diet was based on invertebrate tissue. Shrew dietary composition was based on BCFs, and not on the crayfish data.

Reference locations are inappropriate

Reference locations selected by the U.S. EPA to evaluate background (local) conditions are potentially inappropriate. Horn Pond is one of the least contaminated ponds in the area, but may still have been contaminated by historical tanning industry activity. The reference location upstream of the Wells G&H site is downstream of the Industri-Plex site, a potential source of sediment contamination. A cursory examination of data from the reference locations indicates levels of contamination that may exceed true background levels. Figure 2-21 of the Risk Assessment shows that arsenic concentrations at five Industri-Plex surface water sampling locations (SW-01, SW-02, SW-03, SW-04, and SW-12) range from 1.1 to 15.7 μg/l. Concentrations at three locations in Wilmington (SW-23, SW-24, and SW-27) range from non-detect to 3.2 μg/l.

These results seem high relative to the published USGS range, which has a 75th percentile value for arsenic of 3 µg/l.

Concentrations of some contaminants in sediment reference samples also appear to be somewhat elevated. According to Figure 2-23, the concentrations of PAHs at SD-03, SD-04, SD-12, and SD-25 range from 4.4 mg/kg to 57 mg/kg. While not extremely high, these concentrations of PAHs are indicative that sediment in the reference areas have been affected by the surrounding urban environment. If DEP's 90th percentile background levels for individual PAHs in natural soil (DEP, 2002) are summed, the total is approximately 27 mg/kg. The concentrations of PAHs in some reference sediment samples thus exceed this level of PAHs.

Similarly, chromium concentrations in some reference sediment sampling locations are higher than DEP's 30 mg/kg 90th percentile background concentration for chromium. Chromium concentrations indicated on Figure 2-24 at locations SD-02-IP, SD-04-IP, and SD-24 range from 198 mg/kg to 512 mg/kg.

On selecting reference locations, EPA should address and discuss the larger philosophic issue of what constitutes an appropriate reference location for the Aberjona watershed. The entire watershed and its surroundings have been affected historically by similar industrial activities. One can view reference locations as attempting to (1) distinguish specific sources from a larger industrialized area (*i.e.*, the Industri-Plex and Wells G&H sites *v.* the area-wide diffuse contributions of the tanning industry and other industrial actitivies) or (2) identify a similar habitat that has been largely free of the general industrial activity that has affected the Aberjona watershed. In this context, EPA should explicitly discuss the philosophy used to identify and select reference locations.

EPA Response: EPA spent a considerable effort in screening and selecting reference locations. There were four main criteria for selection of reference locations. The first was that their locations would ensure that they were not exposed to site-related contaminants. The second was that they were reasonably undisturbed, as evidenced by a lack of physical disturbance of the sediment or vegetation, and not obviously impacted from any known pollution sources. The third was that they were similar to (in terms of vegetative composition, hydrology and general characteristics of sediment composition) and representative of one of the three main habitat types sampled on site (pond, stream or wetland). And lastly, the reference locations were selected to be reasonably close to the site area. EPA believes these criteria are reasonable, and the reference locations are consistent with the criteria. As much as possible, reference locations were selected within the Aberjona River watershed, and if not, located close by. As this area is largely urban, it was anticipated that the reference locations could include media (sediment, surface water or tissue from biota) with low levels of potential contaminants. The approach included using locations assumed to be outside of the influence of site-related contamination. The reference locations included samples that have normal concentrations of contaminants found in urban water sheds, including low levels of PAHs and metals. The reference locations were used in an appropriate

manner. They were not used to screen out contaminants, but only as comparison to local habitat conditions, outside of the influence of contaminants detected on site.

Ecological toxicity data should be more completely documented

Risk Assessment Tables 4-142 through 4-145 compile the specific toxicologic data and benchmarks used in the ecological risk assessment. The values and cited references, however, do not match those discussed in the short toxicity profiles provided in the Risk Assessment text (Section 4.2.1). We recommend that the toxicity profiles be refined to include discussion and selection of the specific values used in the risk assessment calculations. Some relevant information might already be contained in the referenced footnotes to Tables 4-142 to 4-145, which we could not locate in the Risk Assessment document.

Also, EPA should cite the primary references of ecotoxicological data. Most of the citations provided are secondary references, *i.e.*, publications in which others have assembled and reviewed multiple data sources from the literature. In cases where the review publications are recent and specifically targeted to the species considered in the risk assessment, secondary referencing is potentially acceptable, although it is more reflective of a screening-level analysis. Referencing publications such as the Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profiles, however, is inappropriate. The ATSDR profiles are largely geared toward human health and do not provide the critical review needed to examine ecological endpoints. At a minimum, we recommend that EPA document the specific rationale for selecting values from ATSDR toxicological profiles and similar secondary review publications.

In general, it appears that EPA has used chronic toxicity values when available, focusing mostly on mortality and reproductive health effects. Occasionally, sub-chronic or shorter term values are used (*e.g.*, the value of 9 mg/kg-d used for chromium for the muskrat and shrew).[1] Given the chronic design focus of the ecological risk assessment, we recommend that EPA avoid the use of non-chronic values when possible, and provide detailed documentation when the use of non-chronic values is unavoidable. The use of safety factors should also be considered in conjunction with less-than-chronic data.

EPA Response: The purpose of Section 4.2.1 was to give an overview of the nature of the toxicity of the wide spectrum of contaminants detected on site. This section was prepared prior to the identification of the COPCs contributing the major risk to ecological receptors. It was not the purpose of this section to identify specific toxicity

[1] The chromium value serves as a good example of a case in which greater documentation is needed. The value of 9 mg/kg-d apparently is selected from Table 2-2 of ATSDR's toxicological profile for chromium. Further on in Table 2-2, lower (and hence more protective) values of 3.5 mg/kg-d and 0.46 mg/kg-d are provided from other studies that were longer in duration (and hence more chronic in nature) than the study that yielded 9 mg/kg-d. Given these data, EPA should explain their rationale in choosing the 9 mg/kg-d value.

reference values for individual receptors to each compound. The last page of Tables 142-145 were omitted in printing the BERA. This page gives citations for the footnotes. EPA will include the last page of these tables in the revised Wells G&H OU-3 Risk Assessment.

For specific compounds, when standard ecological references failed to provide a toxicity value for a similar wildlife receptor species, EPA consulted the Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profiles. These profiles utilize a variety of data, and frequently use rodents in laboratory toxicity tests. For the major contaminants of concern in the watershed, which included metals, only 2 values (cobalt and silver) were used from ATSDR for avian species. It was determined by EPA to be preferable to use a documented value from ATSDR from a laboratory toxicity study cited in this database, than to list the value as not available and assume there was no risk from exposure to the specific COPC. For the mammals, EPA considered using a TRV from a rodent in a laboratory study as a reasonable reference value, when other wildlife values were not available.

The primary sources for each of the toxicity reference values used are from sources readily obtained through electronic databases available on-line. As stated in the text (BERA, Section 4.3.2.1, page 4-60), TRVs were selected which were associated with chronic exposures (i.e., long duration exposures) and no adverse effects (NOAELs - no observed adverse effect levels), relating to reproduction or mortality, preferentially. The value of 9 mg/kg-day for chromium, specifically questioned in the comment, was selected as it was a reproductive end-point for chromium III. No chronic, NOAEL reproductive endpoints were presented in ATDSR for chromium III. The alternative value, referenced in Sample (1996) was 2,737 mg/kg (reproductive), and was not selected, as other values from ATDSR for reproductive effects in rodents ranged from 2 mg/kg to 32 mg/kg for LOAEL values, which were not consistent with the high TRV cited by Sample (1996).

Habitat identification and sampling stations

There are no figures in the ecological risk assessment showing the types of habitat that occur in the study area and their locations. In addition, the text of the report (page 4-52) indicates that sampling stations can represent an area of habitat from a few square feet to 20,000 square feet, but there is no indication of which stations represent a small area and which represent a much larger area. It is difficult to determine whether the sampling stations are given sufficient weight in the Risk Assessment without knowing the size and location of the area they represent, as well as the habitats they encompass.

EPA Response: Section 4.2.2.1 of the BERA describes the habitats included in the study. The general habitat type is characterized for each sampling station in Table 4-32. The location of each sampling station is then shown on Figures 2-1 through 2-20. The aerial photographs of the basemaps in Figures 2-3 to 2-20 depict the habitat (open water, river channel, emergent wetland or deciduous forested habitat). Detailed descriptions of habitat conditions at the 20 stations for Triad sampling are provided in

Appendix D.1 to D.3. EPA believes that there are sufficient data presented to review the document and interpret risk at the site.

Plant uptake factors were generally applied to all reaches

Plant uptake factors based on a small number of plant samples were applied to plants in all areas considered in the ecological risk assessment. Six plant samples were collected from stations in the 38-acre wetland of reach 1. Plant tissue data are not available for the other 5 reaches. Because the plant species present may vary, and because sediment chemistry may not be the same at all locations, it may not be correct to use generic plant uptake factors for all reaches. U.S. EPA screening guidance (1997b) recommends using a plant uptake factor of 1 in the absence of site-specific information. Using average plant uptake values derived from another reach to represent potential plant tissue concentrations for the other five reaches will not provide useful information that can aid in making a risk management decision.

EPA Response: EPA's (1997) guidance is for screening and in cases when no data is available. Although the data set is not large, EPA did collect site-specific data for concentrations of COPCs in plant tissue. Data were collected in the reach with the highest observed contaminant concentrations, and the potentially largest area of habitat for herbivores (Reach 1). Utilizing these data for the other reaches is a reasonable estimate of plant uptake, and the uncertainty in these extrapolations was discussed in the BERA. Utilizing an uptake factor of one for all plant tissue would result in an overly conservative assumption.

Data usage in food-chain pathways

Although the EPA collected media-specific data for the ecological risk assessment, EPA did not necessarily collect the most appropriate data. For example, in evaluating potential dietary risks to the muskrat, EPA sampled cattails, the muskrat's primary food item. Instead of sampling the roots and basal portions of the plants eaten by muskrats (as stated on page 4-38), however, EPA chose to sample the stems and leaves of the cattails.

Further, the risk evaluation for the muskrat population was conducted on a station-by-station basis. However, the size of each station is not indicated. Thus it is unclear whether the station size was appropriate for evaluating the muskrat population.

EPA Response: Samples of plant tissue were collected to estimate dietary exposure of both muskrat and mallard in food-chain models. It is correct that EPA collected above-ground portions of plants for plant tissue analysis. This was done in part to allow these values to be used as estimates for mallard consumption as well, for which it would not be generally appropriate to use root portions of the plant. As is true for most food-chain modeling, the best available data were used as an estimate in the models. EPA acknowledges that the utilization of stem/leaf samples likely underestimated dietary exposure of muskrat to metal COPCs. However plant tissue concentrations were not measured at each station, but rather estimated from sediment concentrations.

Evaluation of the potential error in this estimate of plant tissue concentrations for sediment concentrations and BCFs, is provided in Table 4-276 of the BERA. There is uncertainty involved in each assumption, and EPA attempted to use the data in a consistent and reasonable manner.

Formal surveys of flora and fauna

No formal surveys of fauna and flora were conducted throughout the study area. Wildlife use of the study area is based only on limited field observations. A formal survey, performed by a wildlife biologist, would determine the presence or absence of species in parts of the study area. Without such a survey, it is possible that the ecological risk assessment missed key receptors or did not characterize areas that may be important to wildlife.

EPA Response: Although no formal survey of flora and fauna were conducted, habitats were qualitatively surveyed during several site visits on numerous dates by qualified biologists. In 1985, the USEPA conducted an evaluation of the wetlands near Wells G&H to determine the extent and type of wetlands in the study area (PRC, 1986). In both 1995 and 1997, USEPA, USF&WS, and NOAA biologists were extensively involved in qualitative field surveys, biological sampling, and reference site selection. The qualitative assessments provided an adequate characterization of the major flora and fauna present or potentially present based on habitat conditions. It was the opinion of EPA and the other reviewing resource agencies (USFWS, DEP, NOAA), that the characterization and qualitative description of the site from the early surveys were sufficient to develop a sound site conceptual model and problem formulation. More recently, in preparation of the revised BERA, the majority of the sampling stations were re-visited by teams of biologists from EPA, USFWS and DEP to confirm the habitat conditions and suitability of each station to represent each of the wildlife receptors, and also to select the sampling locations for the triad sampling. In addition, Habitat Assessment Field data sheets were completed (Appendix C) for each of the triad sampling locations. EPA believes that the site was adequately characterized for the purposes of the BERA. It is neither a practical expectation nor necessarily a goal of a risk assessment to provide quantitative data on all flora and fauna in a resource area.

In addition, quantitative surveys are very unlikely to detect population effects in highly mobile animals such as the muskrat and mallard. The results of the BERA identified probable effects (i.e. chronic impacts) on reproduction. For the BERA, the assessment population was operationally defined to be the population within study area (Aberjona River Basin, south of Route 128). The population is regulated by births and deaths (which may be affected by site conditions) as well as immigration and emigration of individuals from adjacent areas. Severe effects on a receptor could remove individuals from the assessment population, or decrease reproductive rates and cause the study area to serve a sink for the regional population. In this case, lower reproduction rates within the study area might be compensated by an increase in immigration. The

resulting subtle impacts on population density within the study area would not likely be detected using standard field survey methods.

Relative bioavailability of arsenic in ecological receptors

The relative bioavailability of arsenic found in the site-specific study in Appendix C.9 is not appropriate for all ecological receptors. The site-specific study is based on absorption in swine. Pigs, however, are omnivores with different digestive physiology than the muskrat and the shrew. Pigs have acidic stomachs and long intestines, while muskrats are herbivores with alkaline stomachs. The shrew is a carnivore with an acidic stomach but a much shorter intestine than the pig. These biological differences may result in different rates of arsenic uptake among the species.

EPA Response: EPA acknowledges that the bioavailability of arsenic calculated in the swine study is not appropriate for all ecological receptors. The value derived for pigs (50%) was used to adjust only the small contribution to the diet of muskrat contributed by incidental sediment ingestion. The bioavailability of arsenic was not applied to other ecological receptors in the BERA. Specifically, the incidental sediment ingestion factor for muskrat utilized in the BERA was 3.3% (Table 4-28). The contribution of incidental sediment to total dietary exposure ranged from 3.4 % (Station 16) to 8.1 % (Station 13 and BW) for muskrat (Tables 4-146 to 4-192). EPA considers the application of this site-specific bioavailability data to be reasonable and appropriate.

Amphibians and reptiles

Amphibians and reptiles are not considered in the ecological risk assessment, despite the fact that they were commonly found in the study area. Bullfrog tadpoles, for example, were frequently found in shallow waters. The Risk Assessment states that there are limited data on the toxicological effects of chemicals of potential concern on these organisms. It would be possible, however, to do at least a screening analysis using tests such as FETAX (frog embryo teratogenesis assay – Xenopus) tests.

EPA Response: EPA acknowledges that amphibians and reptiles were not utilized as receptors in the BERA, and it is discussed in the BERA (Section 4.2.3.2) that selection of receptor species/communities is a complex decision process with input from a number of concerned parties. It is not possible to use all potential receptors in a risk assessment, and the collective professional judgment in designing the problem formulation was that, with the available tests and toxicity reference values, an assessment endpoint for amphibians and reptiles was not as valuable as the other endpoints selected. Utilization of FETAX tests was considered. However, literature suggesting expected teratogenic effects of metals from exposure to sediments was lacking and questions about the variability of the tests were also raised. The other issue with FETAX testing is that it most reliably addresses concentrations of contaminants in surface water. In the BERA, the main exposure route (highest media concentrations) for amphibians was likely to be sediment.

Exposure parameters for the heron

The ecological risk assessment states that the great blue heron has a foraging distance of 2 to 15 miles, corresponding to the size of the study area (7 miles). Therefore, the entire study area is used as the foraging range for the heron. Although this is a reasonable estimate of heron exposure; it would be more conservative and more protective of the heron to assume the heron has a foraging distance of only 2 miles, perhaps focused on a more contaminated portion of the river. The heron will forage near its nest; hence, nesting sites should be identified, and the foraging area should be defined based on nesting sites.

Further, the ecological risk assessment excludes sediment stations under more than three feet of water when evaluating heron exposure to sediment. This may be reasonable; however, no justification is provided for this threshold depth criterion. This threshold does not appear in EPA's wildlife exposure factor handbook (U.S. EPA, 1993). EPA should provide the basis for this assumption.

EPA Response: The receptor species modeled in the BERA was a green heron. Little information on the foraging distance of this species was found. Making the assumption that the foraging distance would be similar to a great blue heron may have overestimated the foraging range of the heron. Even under the highly conservative scenario of maximum exposure for heron (using maximum observed fish, invertebrate and sediment concentrations site-wide) the only COPC for heron above 1.0 was for iron (Table 4-194). The risk calculations would not have indicated risk, even using the most conservative assumptions, and appear to be protective of the receptor.

Natural history references for the green heron used the term "shallow" water to describe the depth of water the bird will forage for small fish or invertebrate prey. EPA used a reasonable assumption of "shallow" to mean 2-3' of water. Changing this assumption would alter the stations selected for incidental sediment ingestion, and would have little effect on the results of the BERA risk calculations, since the majority of the dietary exposure for the diet is from ingestion of animal prey.

Exposure parameters for the mallard

As for the heron, only sediment samples beneath less than three feet of water were used to evaluate exposure of mallard ducks to sediment. The justification and references for this threshold should be elucidated.

Many species of ducks live on Mystic Lake for at least a portion of the year. Because it is the largest open water body in the Aberjona River watershed, exposures for mallards in Mystic Lake should be calculated separately. Sediment sampling location SD-02-01 was used to evaluate exposure of a muskrat to sediment, but was not used to evaluate mallard exposure.

EPA Response: Mallards are dabbling ducks. Water depth for feeding and brooding is typically listed as 1 up to 3 feet deep (Johnson, et al., 1987). Up to 2.0 to 2.5 may be more typical for mallards; however, since water levels may vary, EPA considered less than 3 feet a reasonable estimate of forage depth for a dabbling duck.

Mallard use of Mystic Lakes was included in the site-wide model. Based on the depth, sediment sample SD-02-01 should have been used for mallard exposure calculation, and was an error in Table 4-32. The sitewide model was re-calculated with this sample; Tables E.1-51, E.1.52, 4-198 and 4-199 were revised (attached) and will be included in the revised Wells G&H OU-3 Risk Assessment. Table 4-197, which summarized HQs for mallard, did not require revision, as none of the HQs, rounded to whole numbers, differed from the previously reported values.

Shrew

The Risk Assessment should provide information about the size of the area (acreage) that is suitable shrew habitat in each reach of the Aberjona River. The Risk Assessment should also describe the size of the area that is represented by each station used to estimate the shrew's exposure. Information should also be provided as to how many soil or sediment samples were used within each reach to calculate sediment and dietary exposure to the shrew.

EPA Response: Sampling locations not inundated with water were considered potential shrew habitat. Sampling stations within these locations were applied to the shrew habitat. The size of each station can be estimated by identifying the stations/samples used for characterizing exposures for shrew and estimating the areas represented by these samples in Figures 2-3 to 2-20. Shrew risk was not calculated by reach, but by station. The stations/samples used in each reach to calculate exposure to shrew are shown in Table 4-32.

Eels

Eels were caught in the fish survey but were not used in the Risk Assessment. Though eels are a key species in the study area, no justification is provided for the exclusion of eels from the study. Eels have a higher lipid content than the white sucker, a species that was considered in the study, and could therefore contain higher concentrations of lipophilic chemicals. The eel should replace the white sucker in the Risk Assessment. Eels should additionally be used in the small fish tissue data used to calculate dietary fish exposure for the heron.

EPA Response: There were 17 white sucker samples in the Aberjona River study area as compared to 5 eel samples (all from reach 6). White sucker was selected as a reasonable receptor to evaluate potential tissue residue effects, since more data were available and more tissue residue values were available from similar species. Although eels may have higher lipid content, metals, are not lipophilic, and do not generally bioaccummulate through the food web. Eel samples were not used in the small fish

tissue data used to calculate dietary exposure to heron, since the 5 samples were all greater than 17 cm, and recorded as "large fish."

Fish body burden study and fish community

The Risk Assessment performed a fish body burden study to determine whether fish within the study area carry a greater body burden of chemicals than fish in reference bodies of water. However, due to the small sample size of fish in the reference area, fish data should also be compared to the fish data collected by the Massachusetts DEP's Fish Toxics Program.

Because benchmarks are not available for some chemicals of concern, and because the ecological effects of exceeding the benchmarks are not well-defined, another measurement endpoint should be used to evaluate the potential effect of chemicals on the fish populations in the Aberjona River and Mystic Lake. This endpoint should be an assessment of the fish community to evaluate the biological integrity of the Aberjona River. One such endpoint could be the Index of Biotic Integrity, which is an aggregation of 12 biological metrics that are based on the fish community's taxonomic and trophic composition and the abundance and condition of fish. These metrics assess the species richness component of diversity and the health of resident taxonomic groupings and habitat guilds of fish. Two of the metrics assess the community composition in terms of tolerant or intolerant species. Fish protocols are described in U.S. EPA (1999).

Further, recreational fishers in the Mystic Lakes have reported seeing spots on fish caught in the lakes. (MyRWA, 2003). The ecological risk assessment should investigate the presence of diseases or tumors in the fish.

EPA Response: EPA used two evaluations for fish. One was a comparison to tissue residue benchmarks, and a second was a comparison to reference values. The comparison to reference values was useful, particularly in the cases where tissue residue benchmarks were not available. For the main contaminants of concern in the Study Area, these analyses did not indicate elevated tissue levels in fish. There is no evidence of magnification of arsenic in aquatic food chains (Eisler, 2000), and no evidence in EPA's study for elevated concentrations of metals in fish tissue collected on site. Consequently, EPA determined no additional studies were necessary.

As part of the fish survey observations were recorded on the condition of the fish, including the presence of spots or tumors. These data are presented in Appendix A, Section 5. Among the fish collected, one white sucker collected in Reach 5, was observed to have subdermal black spots. Three fish (brown bullhead) with tumors were collected from Davidson Pond.

Crayfish

Crayfish are mobile, epibenthic organisms, not sessile, infaunal benthic invertebrates. Therefore, concentrations of chemicals in crayfish tissue should not be used to represent

potential levels of chemicals in the tissues of infaunal benthic organisms such as midges and amphipods (page 4-66). This measurement endpoint should not be used as an indicator for the sustainability of the benthic invertebrate community.

EPA Response: EPA believes the use of the crayfish data to model dietary uptake was a reasonable estimate for the invertebrate tissue concentrations in diets of muskrat, mallard and heron. Crayfish are a normal invertebrate food source for the modeled receptors. Where appropriate, EPA prefers applying site-specific data to the risk assessment.

Summary tables

Summary tables that show individual samples and the calculated exposure point concentrations for all media for all indicator wildlife species should be provided. Because such tables are not included in the ecological risk assessment, it is impossible to check some of the calculations.

EPA Response: The individual samples and the calculated exposure concentration were presented in the BERA. Sediment and surface water concentrations calculated for each scenario are presented in Tables 4-7 to 4-15 and Tables 4-33 through 4-101. Tissue concentrations for plants were calculated based on the sediment concentration (noted in tables, above) multiplied by an uptake factor. Fish and crayfish tissue concentrations were used in the models either by reach or for site-wide concentrations. The site-wide concentrations used in the heron and mallard models for fish and crayfish are summarized in Tables 4-25 and 4-26. The concentrations of COPCs by reach are not presented in a Table for small fish and crayfish. However, in addition to the summary tables by media noted above, each value for each medium for each receptor is presented for each model in Appendix E.1. The concentration from each medium utilized for each receptor for each scenario is not readily presented in "Summary Tables." All values used in the calculations are presented in Appendix E.1.

Minor Comments

- The Risk Assessment does not clearly show the locations of biota sampling. Also, data usage in the ecological risk assessment is not well documented. For example, fish sampling results are provided, but the Risk Assessment does not indicate what samples were used to derive exposure point concentrations.

EPA Response: As described in the report, fish samples were collected by US Fish and Wildlife Service and EPA at each reach along the Aberjona River and Mystic Lakes. Large fish samples were collected from Reaches 3 – 6; small fish samples were collected from Reaches 1 – 6; and crayfish were collected from Reaches 1- 3 and 5. Further descriptions of the fish sampling locations are attached and will be included in the revised Wells G&H OU-3 Risk Assessment. Benthic invertebrate samples were collected as part of the sediment triad sampling effort. The locations of the triad sediment samples are illustrated on Figures 2-1, 2-3 and 2-4 and denoted by "TR" and

the color pink. Plant tissue samples were presented in the tables. The plant tissue samples were collected near sediment stations 18, 20 and 21 and reference station 23.

In addition, Table 4-23 lists the sample group for each biological tissue (crayfish and fish) used for each exposure calculation. Sitewide average and maximum concentrations of crayfish and small fish tissues are presented in Tables 4-25 and 4-26, respectively. The data for individual samples are presented in Appendix A (Sections 5.0 and 6.0).

- In the ecological risk assessment (section 2.1.2.3), the depth of each surface water sample is not cited in the analysis. The Risk Assessment should specify whether water samples were collected at the surface or at depths greater than 2 feet.

EPA Response: According to Appendix A.1 (the Foster Wheeler Compendium), surface water samples were collected in accordance with the protocols outlined in the FW 1995 Field Operations Plan. According to the field notes, samples were collected within the water column at varying depths based on the depth of the water column. This is consistent with typical surface water sampling field protocols of sample collection at a depth from the bottom of 60% of the water column.

- It would be useful to present a second version of Figure 2-25 on a logarithmic scale to show the concentrations of each of the metals.

EPA Response: At this time, EPA will not be producing an additional version of Figure 2-25.

- On page 4-58, justification should be provided for the worm uptake factor of 0.5 used for antimony, beryllium, cobalt, silver, thallium, and vanadium. In the absence of site-specific information, U.S. EPA (1997b) recommends the use of an uptake factor of 1.

EPA Response: A value of 1 is recommended for screening-level risk calculations, and is very conservative for metals. As noted in the footnotes of the shrew models in the BERA, uptake values (UFs) values for arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, and zinc were based on regression analyses of literature derived soil-biota uptake data provided in Sample et al. (1998); uptake factors for aluminum, barium and iron were taken from Beyer and Stafford (1993). Sample (1998) also provides UFs (90^{th} percentile UF for data from Oak Ridge Reservation, Appendix C.1 of Sample 1998) for beryllium (1.18), cobalt (0.29), silver (15) and vanadium (0.09). No values for UFs were available for antimony or thallium in Sample 1998. Shrew models were re-calculated using a UF of 1.0 rather than 0.5 in the earthworm model for antimony and thallium, and using the Sample 1998 values for beryllium, cobalt, silver and vanadium. These results are shown in the attached revision of Table 4-245, and will be included in the revised Wells G&H OU-3 Risk Assessment. Re-calculating the shrew models using the higher UF values for Be and

Ag, resulted in all HQ values all remaining below 1.0. Although a few stations had higher HQs for antimony using a UF of 1.0, no other notable changes resulted from these recalculated results. The BERA documented the high uncertainty associated with the estimates used in the shrew model; these suggested changes in UFs for the shrew model do not change the conclusions of the BERA.

- Based on examination of other maps, the legend on the bottom of Figure 2-7 appears to cover a school. While it may not affect the risk assessment calculations, it does obscure the location of an elementary school (the Muraco School), a land use characteristic that might interest some readers.

EPA Response: At this time, EPA will not be amending Figure 2-7.

- There are a number of tributaries to the Aberjona River that are not depicted in the baseline maps. Sampling station TT31 appears to be located on an unnamed tributary that flows from the east and joins the Aberjona just north of the Cranberry Bog area. Further to the south, Sweetwater Brook enters the Aberjona in the vicinity of the Kraft Foods facility (under which it is culverted). Risk Assessment maps such as Figures E-1, E-2, E-3, and 2-2 should be updated to show these tributaries.

EPA Response: At this time, EPA will not be amending Figures E-1, E-2, E-3 and 2-2.

- The 100-year flood plain delineation does not correspond to the physical stream pictures depicted in Figure 2-4. It appears that there has been a distortion in coordinate scaling, the result of which is most easily seen at the top of Figure 2-4, where the 100-year flood plain delineation does not line up with the unnamed tributary. It also appears that the flood plain delineation is somewhat shifted with respect to the borders of the Cranberry Bog area.

EPA Response: The 100 year flood plain was obtained from Massachusetts GIS, and scaled on the figures in a best fit capacity. At this time, EPA will not be amending Figure 2-4.

- Major MWRA sewer mains run along the Aberjona and interact with it, particularly during flooding events. Consideration of these sewer mains may be relevant within the fate and transport assessment that will be developed in the Remedial Investigation report.

EPA Response: Your comment is acknowledged. Subsurface utilities such as the MWRA sanitary sewer mains mentioned in the comment will be considered in the comprehensive RI.

References

CDM (2003). Town of Winchester, Aberjona River Flood Improvements Program, May 2003. Expanded Environmental Notification Form, submitted to the Massachusetts Executive Office of Environmental Affairs.

DEM (2003). Personal communication with staff members of the Massachusetts Department of Environmental Management.

DEP (1998). Evaluation of the Risk Assessment Methodologies Based on the Hexavalent Chromium [Cr(vi)]-elicited Allergic Contact Dermatitis (ACD) in Sensitized Population and MADEP's Recommendations. Massachusetts Department of Environmental Protection, Office of Research and Standards. Available at http://www.state.ma.us/dep/ors/files/crviderm.doc

DEP (1999). Boston Harbor 1999 Water Quality Assessment Report. Massachusetts Department of Environmental Protection and the Massachusetts Executive Office of Environmental Affairs. Available on-line at: http://www.state.ma.us/dep/brp/wm/wqassess.htm

DEP (2001). Technical Update: Weighted Skin Soil Adherence Factor, Update to: Appendix B of *Guidance for Disposal Site Risk Characterization – In Support of the Massachusetts Contingency Plan* (MADEP, 1995). Available at: http://www.state.ma.us/dep/ors/files/dermadhe.doc

DEP (2002). Technical Update; Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil. Massachusetts Department of Environmental Protection, Office of Research and Standards. May 2002.

Knox, M.L. (1991). The distribution and depositional history of metals in surface sediments of the Aberjona River watershed, MS Thesis, MIT Cambridge, MA, 1991.

McKinney (2003). Personal communication with Keith McKinney, International Family Church. Phone: (781) 729-6033.

MyRWA (Mystic River Watershed Association) (2003). Personal communication.

Rogers (1998). A method to assess the ecological integrity of urban watersheds that integrates chemical, physical, and biological data. Ph.D. Thesis, Catriona Rogers, Massachusetts Institute of Technology.

Senn, D.B. and H.F. Hemond (2002). Nitrate controls on iron and arsenic in an urban lake, Science, 296, 28 June, 2002, 2373-2376.

Spliethoff, H.M., Mason, R.P. and H.F. Hemond (1995). Interannual variability in the speciation and mobility of arsenic in a dimictic lake, Environmental Science and Technology, 29, 1995, 2157-2161.

Spliethoff, H.M. and H.F. Hemond (1996). History of toxic metal discharge to surface waters of the Aberjona watershed, Environmental Science & Technology, 30, 1996, 121-128.

U.S. EPA (1991). OSWER Directive 9285.6-03. *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors.* U.S. Environmental Protection Agency, Office of Emergency and Remedial Response, Washington, DC. March 25, 1991.

U.S. EPA (1993). *Wildlife Exposure Factors Handbook; Volume I of II.* Office of Research and Development. Washington, DC. December 1993. EPA/600/R-93/187.

U.S. EPA (1997a). *Exposure Factors Handbook.* U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC.

U.S. EPA (1997b). *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments Interim Final.* Solid Waste and Emergency Response. Washington, DC. June 1997. EPA 540-R-97-006.

U.S. EPA (1999). *Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers: Peryphyton, Benthic Macroinvertebrates, and Fish, Second Edition.* Office of Water. Washington, DC. EPA 841-B-99-002.

U.S. EPA (2001). Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Assessment), Interim. Marked "Review Draft – for Public Comment." Washington, DC: U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. EPA/540/R-99/005.

Winchester Star (2003). Flash floods cause problems. October 2, 2003 newspaper article. Available on-line at: http://www.townonline.com/winchester/news/local_regional/win_newwswickham 10022003.htm

Zeeb, P.J. (1996). Piezocone mapping, groundwater monitoring, and flow modeling in a riverine peatland: implications for the transport of arsenic, Ph.D. Thesis, MIT, Cambridge, MA, 1996.

EPA Response to ASC Comments
EPA New/ Revised Ecological Tables

1) Description of Fish Sampling Locations Table;
2) Table E.1 – 51 Average Exposure Calculations for Mallard (Site-Wide);
3) Table E.1 – 52 Maximum Exposure Calculations for Mallard (site Wide);
4) Table 4-198 Average Exposure Case Hazard Quotients for Mallard (Site-Wide);
5) Table 4-199 Maximum Exposure Case Hazard Quotients for Mallard (Site-Wide);
6) Table 4-245 Revised Hazard Quotient Summary for Shrew; and
7) Table 4-32 Applicability of Sediment Samples to Exposure Scenarios for Indicator Species.

DESCRIPTION OF FISH SAMPLING LOCATIONS

WELLS G&H SUPERFUND SITE OU3

Reach	Location of Fish Samples	Species Collected	Number of Individuals
Reach 1	North of Olympia Ave	white sucker	18
	nr	brown bullhead	1
	nr	pumpkinseed	7
Reach 2	Near Station 8	white sucker	9
	North of Washington Circle	white sucker	4
	North of Washington Circle	redfin pickerel	2
Reach 3	South of Swanton Road	largemouth bass	4
	Davidson Pond and south of pond	white sucker	5
	Davidson Pond	yellow perch	5
	Davidson Pond	brown bullhead	5
	nr	pumpkinseed	19
Reach 4	Judkins Pond	largemouth bass	5
	Judkins Pond	white sucker	8
	Judkins Pond	pumpkinseed	15
Reach 5	nr	white sucker	3
	nr	pumpkinseed	21
	Everett	largemouth bass	2
	North or guaging station	largemouth bass	2
	nr	white sucker	3
	Near guaging station	white sucker	4
	nr	largemouth bass	1
	nr	white sucker	1
	Above bridge at Mystic Valley Parkway	largemouth bass	2
Reach 6	Upper Mystic Lake	largemouth bass	4
	Upper Mystic Lake	pumpkinseed	21
	Upper Mystic Lake	brown bullhead	1
	Upper Mystic Lake	carp	5
	Upper Mystic Lake	eel	5
Reach 7 (Reference)	Wright's Pond	largemouth bass	10
	Wright's Pond	pumpkinseed	20
	Wright's Pond	eel	8
	Wright's Pond	brown bullhead	11

nr = not recorded

Table E.1-51. Average Exposure Calculations for Mallard (Site-Wide)

	Mean Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
	Volatile Organics																				
	2-Butanone	0.0381354	0.0025			12.1	0	0	0	3.587E-05	0.0000725	1.08E-04	0.00E+00	0.00E+00	2.96E-06	5.99E-06	*8.96E-06*	0	0	0.33097319	0.66902681
	Acetone	0.3823545	0.0025			1700.0	0	0	0	0.0003596	0.0000725	4.32E-04	0.00E+00	0.00E+00	2.12E-07	4.26E-08	*2.54E-07*	0	0	0.83221649	0.16778351
	cis-1,2-Dichloroethene	0.0953947	0.0009063			3114.0	0	0	0	8.972E-05	2.62813E-05	1.16E-04	0.00E+00	0.00E+00	2.88E-08	8.44E-09	*3.73E-08*	0	0	0.7734375	0.2265625
	Tetrachloroethene	0.0366228	0.0005938			14.0	0	0	0	3.444E-05	1.72188E-05	5.17E-05	0.00E+00	0.00E+00	2.46E-06	1.23E-06	*3.69E-06*	0	0	0.66670699	0.33329301
	Trichloroethene	0.0541293	0.0006875			7.0	0	0	0	5.091E-05	1.99375E-05	7.08E-05	0.00E+00	0.00E+00	7.27E-06	2.85E-06	*1.01E-05*	0	0	0.7185802	0.2814198
	Semivolatile Organics																				
	2-Methylnaphthalene	0.2040397	0.0025			143.70	0	0	0	0.0001919	0.0000725	2.64E-04	0.00E+00	0.00E+00	1.34E-06	5.05E-07	*1.84E-06*	0	0	0.72579355	0.27420645
	Acenaphthylene	0.199619	0.0025			133.30	0	0	0	0.0001877	0.0000725	2.60E-04	0.00E+00	0.00E+00	1.41E-06	5.44E-07	*1.95E-06*	0	0	0.72141284	0.27858716
	Anthracene	0.2578203	0.0025			1000.00	0	0	0	0.0002425	0.0000725	3.15E-04	0.00E+00	0.00E+00	2.42E-07	7.25E-08	*3.15E-07*	0	0	0.76982666	0.23017334
	Benzo(a)anthracene	0.8474324	0.0025			1.30	0	0	0	0.000797	0.0000725	8.70E-04	0.00E+00	0.00E+00	6.13E-04	5.58E-05	*6.69E-04*	0	0	0.91661972	0.08338028
	Benzo(a)pyrene	0.8965417	0.0025		0.14	1.30	0	0.010606922	0.010606922	0.0008432	0.0000725	1.15E-02	0.00E+00	8.16E-03	6.49E-04	5.58E-05	*8.86E-03*	0	0.92053044	0.07317758	0.00629197
	Benzo(b)fluoranthene	1.4623875	0.0025		0.11	1.30	0	0.008297522	0.008297522	0.0013754	0.0000725	9.75E-03	0.00E+00	6.38E-03	1.06E-03	5.58E-05	*7.50E-03*	0	0.85142982	0.14113077	0.00743941
	Benzo(g,h,i)perylene	0.5296176	0.0025			133.30	0	0	0	0.0004981	0.0000725	5.71E-04	0.00E+00	0.00E+00	3.74E-06	5.44E-07	*4.28E-06*	0	0	0.87294197	0.12705803
	Benzo(k)fluoranthene	1.0587601	0.0025		0.21	1.30	0	0.015711377	0.015711377	0.0009958	0.0000725	1.68E-02	0.00E+00	1.21E-02	7.66E-04	5.58E-05	*1.29E-02*	0	0.93633571	0.05934358	0.00432071
	Carbazole	0.2466667	0			133.30	0	0	0	0.000232	0	2.32E-04	0.00E+00	0.00E+00	1.74E-06	0.00E+00	*1.74E-06*	0	0	1	0
	Chrysene	1.06212	0.0025		0.12	1.30	0	0.009237821	0.009237821	0.0009989	0.0000725	1.03E-02	0.00E+00	7.11E-03	7.68E-04	5.58E-05	*7.93E-03*	0	0.89607154	0.09689593	0.00703252
	Dibenz(a,h)anthracene	0.2668231	0.0025			1.30	0	0	0	0.0002509	0.0000725	3.23E-04	0.00E+00	0.00E+00	1.93E-04	5.58E-05	*2.49E-04*	0	0	0.77585207	0.22414793
	Dibenzofuran	0.2632391	0.0025			133.30	0	0	0	0.0002476	0.0000725	3.20E-04	0.00E+00	0.00E+00	1.86E-06	5.44E-07	*2.40E-06*	0	0	0.77349158	0.22650842
	Fluoranthene	1.8244125	0.0025		0.09	125.00	0	0.006427178	0.006427178	0.0017159	0.0000725	8.22E-03	0.00E+00	5.14E-05	1.37E-05	5.80E-07	*6.57E-05*	0	0.78231979	0.20885547	0.00882474
	Fluorene	0.2211875	0.0025			125.00	0	0	0	0.000208	0.0000725	2.81E-04	0.00E+00	0.00E+00	1.66E-06	5.80E-07	*2.24E-06*	0	0	0.74155771	0.25844229
	Indeno(1,2,3-cd)pyrene	0.5705423	0.0025		0.24	1.30	0	0.017911737	0.017911737	0.0005366	0.0000725	1.85E-02	0.00E+00	1.38E-02	4.13E-04	5.58E-05	*1.42E-02*	0	0.96711298	0.02897251	0.00391451
	Naphthalene	0.2528984	0.0025			140.00	0	0	0	0.0002379	0.0000725	3.10E-04	0.00E+00	0.00E+00	1.70E-06	5.18E-07	*2.22E-06*	0	0	0.76639352	0.23360648
	N-nitrosodiphenylamine	0.2804694	0.0025			150.00	0	0	0	0.0002638	0.0000725	3.36E-04	0.00E+00	0.00E+00	1.76E-06	4.83E-07	*2.24E-06*	0	0	0.78440679	0.21559321
	Phenanthrene	0.8854225	0.0025		0.24	133.30	0	0.017770225	0.017770225	0.0008327	0.0000725	1.87E-02	0.00E+00	1.33E-04	6.25E-06	5.44E-07	*1.40E-04*	0	0.95152785	0.04459005	0.0038821
	Pyrene	1.4777215	0.0025		0.09	133.30	0	0.006751452	0.006751452	0.0013898	0.0000725	8.21E-03	0.00E+00	5.06E-05	1.04E-05	5.44E-07	*6.16E-05*	0	0.82196958	0.16920375	0.00882666
	Pesticides and PCBs																				
	4,4'-DDD	0.02559	0.00005	0.0024	1.32E-03	8.50	0.0001964	9.85799E-05	0.000294933	2.407E-05	0.00000145	3.20E-04	2.31E-05	1.16E-05	2.83E-06	1.71E-07	*3.77E-05*	0.61274069	0.30762949	0.07510493	0.00452488
	4,4'-DDE	0.0165019	0.00005	0.0050	7.17E-04	1.90	0.0004056	5.34308E-05	0.000459064	1.552E-05	0.00000145	4.76E-04	2.13E-04	2.81E-05	8.17E-06	7.63E-07	*2.51E-04*	0.85210971	0.1122415	0.03260279	0.003046
	4,4'-DDT	0.005267	0.00005	0.0012	8.46E-04	0.00	9.426E-05	6.30795E-05	0.000157337	4.954E-06	0.00000145	1.64E-04	3.37E-02	2.25E-02	1.77E-03	5.18E-04	*5.85E-02*	0.57565134	0.38524015	0.03025304	0.00885547
	Aldrin	0.0013441	0.000025	0.0003		0.20	2.316E-05	0	2.31572E-05	1.264E-06	0.000000725	2.51E-05	1.16E-04	0.00E+00	6.32E-06	3.63E-06	*1.26E-04*	0.92089709	0	0.05027171	0.02883119
	alpha-Chlordane	0.0112708	2.365E-05	0.0009	1.15E-03	2.14	7.563E-05	8.60133E-05	0.000161643	1.06E-05	6.85934E-07	1.73E-04	3.53E-05	4.02E-05	4.95E-06	3.21E-07	*8.08E-05*	0.43734612	0.49738963	0.06129769	0.00396656
	Aroclor 1248	0.0629743	0.0005	0.0026		0.98	0.0002143	0	0.000214268	5.923E-05	0.0000145	2.88E-04	2.19E-04	0.00E+00	6.04E-05	1.48E-05	*2.94E-04*	0.74399817	0	0.20565378	0.05034805
	Aroclor 1254	0.147685	0.0005	0.0157		1.50	0.0012775	0	0.001277465	0.0001389	0.0000145	1.43E-03	8.52E-04	0.00E+00	9.26E-05	9.67E-06	*9.54E-04*	0.89279349	0	0.09707276	0.01013375
	Aroclor 1260	0.1894472	0.0005	0.0258	1.18E-02	0.35	0.0021025	0.000882276	0.002984748	0.0001782	0.0000145	3.18E-03	6.09E-03	2.56E-03	5.16E-04	4.20E-05	*9.21E-03*	0.66169102	0.27767019	0.05607535	0.00456345
	beta-BHC	0.0013687	0.000025	0.0003		4.00	2.27E-05	0	2.26992E-05	1.287E-06	0.000000725	2.47E-05	5.67E-06	0.00E+00	3.22E-07	1.81E-07	*6.18E-06*	0.9185704	0	0.05209093	0.02933867
	delta-BHC	0.0018763	0.000025	0.0003		1.60	2.173E-05	0	2.17322E-05	1.765E-06	0.000000725	2.42E-05	1.36E-05	0.00E+00	1.10E-06	4.53E-07	*1.51E-05*	0.89721452	0	0.07285379	0.02993169
	Endosulfan I	0.0045651	0.000025	0.0004	7.51E-04	10.00	3.105E-05	5.60179E-05	8.70639E-05	4.294E-06	0.000000725	9.21E-05	3.10E-06	5.60E-06	4.29E-07	7.25E-08	*9.21E-06*	0.33715406	0.60834565	0.04662691	0.00787338
	Endosulfan Sulfate	0.0022584	0.00005	0.0008		10.00	6.209E-05	0	6.20919E-05	2.124E-06	0.00000145	6.57E-05	6.21E-06	0.00E+00	2.12E-07	1.45E-07	*6.57E-06*	0.94557314	0	0.03234538	0.02208148
	Endrin Aldehyde	0.0028964	0.00005	0.0020	8.90E-04	0.30	0.0001664	6.63744E-05	0.000232801	2.724E-06	0.00000145	2.37E-04	5.55E-04	2.21E-04	9.08E-06	4.83E-06	*7.90E-04*	0.70229581	0.28009023	0.01149517	0.00611879
	gamma-Chlordane	0.0147596	2.361E-05	0.0004	1.42E-03	2.14	3.247E-05	0.000105642	0.000138114	1.388E-05	6.84742E-07	1.53E-04	1.52E-05	4.94E-05	6.49E-06	3.20E-07	*7.13E-05*	0.21267411	0.69192257	0.09091849	0.00448483
	Inorganics																				
	Aluminum	10317.885	0.2530118	50.0063	1.72E+02	109.70	4.072109	12.80647515	16.8785841	9.7039705	0.007337341	2.66E+01	3.71E-02	1.17E-01	8.85E-02	6.69E-05	*2.42E-01*	0.153145	0.48162945	0.3649496	0.00027594
	Antimony	6.1499791	0.0006794	0.0484		0.13	0.0039436	0	0.003943638	0.0057841	1.97029E-05	9.75E-03	3.15E-02	0.00E+00	4.63E-02	1.58E-04	*7.80E-02*	0.40458372	0	0.59339492	0.00202135
	Arsenic	278.39904	0.0139059	2.2175	14.67	5.14	0.1805755	1.094184487	1.274759947	0.2818343	0.000403271	1.54E+00	3.51E-02	2.13E-01	5.09E-02	7.85E-05	*2.99E-01*	0.11748585	0.71189737	0.1703544	0.00026238
	Barium	86.916154	0.0367206	10.1813	8.48	208.00	0.8290796	0.631975536	1.461055086	0.0817446	0.001064897	1.54E+00	3.99E-03	3.04E-03	3.93E-04	5.12E-06	*7.42E-03*	0.5370157	0.40934647	0.05294806	0.00068976
	Beryllium	0.6792656	5.141E-05	0.0054		0.66	0.0004372	0	0.000437192	0.0006388	1.49094E-06	1.08E-03	6.62E-04	0.00E+00	9.68E-04	2.26E-06	*1.63E-03*	0.40573456	0	0.59288178	0.00138366
	Cadmium	6.2554596	0.0002963	0.0701	0.67	1.45	0.0057061	0.049969298	0.055675352	0.0058833	8.59253E-06	6.16E-02	3.94E-03	3.45E-02	4.06E-03	5.93E-06	*4.25E-02*	0.09268009	0.81162201	0.09555834	0.00013956
X	Chromium	1210.0115	0.0125894	1.1325	22.61	1.00	0.0922217	1.686142846	1.778364586	1.1380159	0.000365093	2.92E+00	9.22E-02	1.69E+00	1.14E+00	3.65E-04	*2.92E+00*	0.03161803	0.57809049	0.39016631	0.00012517
	Cobalt	14.654962	0.000905	0.4388	1.30	5.00	0.0357283	0.097058015	0.132786305	0.013783	2.6245E-05	1.47E-01	7.15E-03	1.94E-02	2.76E-03	5.25E-06	*2.93E-02*	0.24372017	0.66208027	0.09402054	0.00017903
	Copper	388.70288	0.0117853	49.6688	19.69	47.00	4.0446257	1.468005909	5.512631559	0.3655751	0.000341774	5.88E+00	8.61E-02	3.12E-02	7.78E-03	7.27E-06	*1.25E-01*	0.68803136	0.24972252	0.06218798	5.8139E-05
	Cyanide	1.028494	0.0025	0.2394		68.70	0.0194928	0	0.019492785	0.0009673	0.0000725	2.05E-02	2.84E-04	0.00E+00	1.41E-05	1.06E-06	*2.99E-04*	0.94935861	0	0.04711042	0.00353097
X	Iron	26458.808	1.5612941	345.0313	2190.25	3.19	28.096585	163.3229148	191.4194996	24.884509	0.045277529	2.16E+02	8.81E+00	5.12E+01	7.80E+00	1.42E-02	*6.78E+01*	0.12986678	0.75490388	0.11502006	0.00020928
X	Lead	341.71173	0.0073871	0.7778	31.16	1.13	0.0633388	2.32371827	2.387057097	0.3213799	0.000214225	2.71E+00	5.61E-02	2.06E+00	2.84E-01	1.90E-04	*2.40E+00*	0.0233839	0.8578876	0.11864942	7.9089E-05
	Manganese	453.4175	0.4224	98.9250	255.69	977.00	8.0556606	19.06600674	27.12166734	0.4264392	0.0122496	2.76E+01	8.25E-03	1.95E-02	4.36E-04	1.25E-05	*2.82E-02*	0.2922916	0.69179102	0.01547292	0.00044446
X	Mercury	2.4003144	0.0001451	0.0092	0.08	0.01	0.0007482	0.006269881	0.007018037	0.0022575	4.20671E-06	9.28E-03	1.17E-01	9.80E-01	3.53E-01	6.57E-04	*1.45E+00*	0.08062257	0.67565266	0.24327144	0.00045332
	Nickel	21.689192	0.00207	0.0846	0.56	77.40	0.0068861	0.041780761	0.048666855	0.0203987	0.00006003	6.91E-02	8.90E-05	5.40E-04	2.64E-04	7.76E-07	*8.93E-04*	0.09961717	0.60441832	0.29509609	0.00086842
	Selenium	3.2337891	0.0007941	0.4069	0.28	0.40	0.0331326	0.020719722	0.053852367	0.0030414	2.30294E-05	5.69E-02	8.28E-02	5.18E-02	7.60E-03	5.76E-05	*1.42E-01*	0.58212443	0.36403542	0.05343554	0.00040462
	Silver	0.5480786	0.0003224	0.0323		181.20	0.0026313	0	0.002631272	0.0005155	9.34823E-06	3.16E-03	1.45E-05	0.00E+00	2.84E-06	5.16E-08	*1.74E-05*	0.83371306	0	0.16332497	0.00296197
	Thallium	1.3554096	0.0008206	0.0825		0.07	0.0067181	0	0.00671814	0.0012748	2.37971E-05	8.02E-03	9.08E-02	0.00E+00	1.72E-02	3.22E-04	*1.08E-01*	0.83801816	0	0.15901341	0.00296844
	Vanadium	43.7275	0.0013816	0.1467	1.52	11.40	0.0119472	0.113457409	0.125404648	0.0411257	4.00669E-05	1.67E-01	1.05E-03	9.95E-03	3.61E-03	3.51E-06	*1.46E-02*	0.07172485	0.68113776	0.24689685	0.00024054
	Zinc	1191.4208	0.0717029	25.3938	46.12	14.50	2.0678639	3.439285228	5.507149078	1.1205312	0.002079385	6.63E+00	1.43E-01	2.37E-01	7.73E-02	1.43E-04	*4.57E-01*	0.31190631	0.51876469	0.16901536	0.00031364

Table E.1-52. Maximum Exposure Calculations for Mallard (Site-Wide)

	Maximum Concentrations Compound	$C_{Sediment}$ (mg/Kg)	C_{Water} (mg/L)	C_{Animal} (mg/Kg)	C_{Plant} (mg/Kg)	TRV mg/Kg day	DOSE animal	DOSE plant	DOSE food (a+p)	DOSE soil/ sediment	DOSE water	Total Dose	HQ animal	HQ plant	HQ soil/ sediment	HQ water	TOTAL HQ	% HQ animal	% HQ plant	% HQ soil/ sediment	% HQ water
	Volatile Organics																				
	2-Butanone	0.059639	0.0025			12.10	0	0	0	5.609E-05	0.0000725	1.29E-04	0.00E+00	0.00E+00	4.64E-06	5.99E-06	1.06E-05	0	0	0.43619459	0.56380541
	Acetone	1.0706758	0.0025			1700.00	0	0	0	0.001007	0.0000725	1.08E-03	0.00E+00	0.00E+00	5.92E-07	4.26E-08	6.35E-07	0	0	0.93283745	0.06716255
	cis-1,2-Dichloroethene	0.1962503	0.0020356			3114.00	0	0	0	0.0001846	5.9031E-05	2.44E-04	0.00E+00	0.00E+00	5.93E-08	1.90E-08	7.82E-08	0	0	0.75767665	0.24232335
	Tetrachloroethene	0.041	0.0010024			14.00	0	0	0	3.156E-05	2.90695E-05	6.76E-05	0.00E+00	0.00E+00	2.75E-06	2.08E-06	4.83E-06	0	0	0.57016851	0.42983149
	Trichloroethene	0.2057465	0.0012458			7.00	0	0	0	0.0001935	3.61287E-05	2.30E-04	0.00E+00	0.00E+00	2.76E-05	5.16E-06	3.28E-05	0	0	0.84266777	0.15733223
	Semivolatile Organics																				
	2-Methylnaphthalene	0.22	0.0025			143.70	0	0	0	0.0002069	0.0000725	2.79E-04	0.00E+00	0.00E+00	1.44E-06	5.05E-07	1.94E-06	0	0	0.74052468	0.25947532
	Acenaphthylene	0.2588704	0.0025			133.30	0	0	0	0.0002435	0.0000725	3.16E-04	0.00E+00	0.00E+00	1.83E-06	5.44E-07	2.37E-06	0	0	0.77054612	0.22945388
	Anthracene	0.3193702	0.0025			1000.00	0	0	0	0.0003004	0.0000725	3.73E-04	0.00E+00	0.00E+00	3.00E-07	7.25E-08	3.73E-07	0	0	0.80556105	0.19443895
	Benzo(a)anthracene	1.317523	0.0025			1.30	0	0	0	0.0012391	0.0000725	1.31E-03	0.00E+00	0.00E+00	9.53E-04	5.58E-05	1.01E-03	0	0	0.94472528	0.05527472
	Benzo(a)pyrene	1.4139931	0.0025		0.22	1.30	0	0.016728853	0.016728853	0.0013299	0.0000725	1.81E-02	0.00E+00	1.29E-02	1.02E-03	5.58E-05	1.39E-02	0	0.9226549	0.07334647	0.00399863
	Benzo(b)fluoranthene	2.1934721	0.0025		0.17	1.30	0	0.012445663	0.012445663	0.002063	0.0000725	1.46E-02	0.00E+00	9.57E-03	1.59E-03	5.58E-05	1.12E-02	0	0.85354623	0.14148158	0.00497218
	Benzo(g,h,i)perylene	0.8163217	0.0025			133.30	0	0	0	0.0007678	0.0000725	8.40E-04	0.00E+00	0.00E+00	5.76E-06	5.44E-07	6.30E-06	0	0	0.91371621	0.08628379
	Benzo(k)fluoranthene	1.2592954	0.0025		0.25	1.30	0	0.018687203	0.018687203	0.0011844	0.0000725	1.99E-02	0.00E+00	1.44E-02	9.11E-04	5.58E-05	1.53E-02	0	0.9369804	0.05938443	0.00363517
	Carbazole	0.2817051	0			133.30	0	0	0	0.0002649	0	2.65E-04	0.00E+00	0.00E+00	1.99E-06	0.00E+00	1.99E-06	0	0	1	0
	Chrysene	1.5941169	0.0025		0.19	1.30	0	0.01386488	0.01386488	0.0014993	0.0000725	1.54E-02	0.00E+00	1.07E-02	1.15E-03	5.58E-05	1.19E-02	0	0.89817951	0.09712388	0.00469662
	Dibenz(a,h)anthracene	0.4031752	0.0025			1.30	0	0	0	0.0003792	0.0000725	4.52E-04	0.00E+00	0.00E+00	2.92E-04	5.58E-05	3.47E-04	0	0	0.83949035	0.16050965
	Dibenzofuran	0.3506513	0.0025			133.30	0	0	0	0.0003298	0.0000725	4.02E-04	0.00E+00	0.00E+00	2.47E-06	5.44E-07	3.02E-06	0	0	0.81978065	0.18021935
	Fluoranthene	2.8861589	0.0025		0.14	125.00	0	0.010167578	0.010167578	0.0027144	0.0000725	1.30E-02	0.00E+00	8.13E-05	2.17E-05	5.80E-07	1.04E-04	0	0.78486779	0.2095357	0.00559651
	Fluorene	0.2575241	0.0025			125.00	0	0	0	0.0002422	0.0000725	3.15E-04	0.00E+00	0.00E+00	1.94E-06	5.80E-07	2.52E-06	0	0	0.76962287	0.23037713
	Indeno(1,2,3-cd)pyrene	0.6775208	0.0025		0.29	1.30	0	0.021270247	0.021270247	0.0006372	0.0000725	2.20E-02	0.00E+00	1.64E-02	4.90E-04	5.58E-05	1.69E-02	0	0.96771111	0.02899043	0.00329846
	Naphthalene	0.4076694	0.0019945			140.00	0	0	0	0.0003834	5.78416E-05	4.41E-04	0.00E+00	0.00E+00	2.74E-06	4.13E-07	3.15E-06	0	0	0.86891556	0.13108444
	N-nitrosodiphenylamine	0.3572571	0.0025			150.00	0	0	0	0.000336	0.0000725	4.09E-04	0.00E+00	0.00E+00	2.24E-06	4.83E-07	2.72E-06	0	0	0.82252155	0.17747845
	Phenanthrene	1.4907461	0.0025		0.40	133.30	0	0.029918927	0.029918927	0.001402	0.0000725	3.14E-02	0.00E+00	2.24E-04	1.05E-05	5.44E-07	2.36E-04	0	0.95303015	0.04466045	0.0023094
	Pyrene	1.9747232	0.0025		0.12	133.30	0	0.009022166	0.009022166	0.0018572	0.0000725	1.10E-02	0.00E+00	6.77E-05	1.39E-05	5.44E-07	8.22E-05	0	0.82379966	0.16958048	0.00661986
	Pesticides and PCBs																				
	4,4'-DDD	0.0404952	0.00005	0.0033	2.09E-03	8.50	0.000271	0.000155999	0.000426991	3.809E-05	0.00000145	4.67E-04	3.19E-05	1.84E-05	4.48E-06	1.71E-07	5.49E-05	0.58087143	0.33438375	0.08163674	0.00310807
	4,4-DDE	0.0235832	0.00005	0.0069	1.02E-03	1.90	0.0005583	7.63589E-05	0.000634665	2.218E-05	0.00000145	6.58E-04	2.94E-04	4.02E-05	1.17E-05	7.63E-07	3.46E-04	0.84810926	0.11599501	0.03369307	0.00220266
	4,4'-DDT	0.0069455	0.00005	0.0015	1.12E-03	0.00	0.0001235	8.31814E-05	0.000206709	6.532E-06	0.00000145	2.15E-04	4.41E-02	2.97E-02	2.33E-03	5.18E-04	7.67E-02	0.57537228	0.38744745	0.03042638	0.0067539
	Aldrin	0.0025052	0.000025	0.0003		0.20	2.537E-05	0	2.53702E-05	2.356E-06	0.000000725	2.85E-05	1.27E-04	0.00E+00	1.18E-05	3.63E-06	1.42E-04	0.89170472	0	0.08281318	0.0254821
	alpha-Chlordane	0.0160499	2.6E-05	0.0012	1.64E-03	2.14	0.0001005	0.000122485	0.000223028	1.509E-05	7.54138E-07	2.39E-04	4.70E-05	5.72E-05	7.05E-06	3.52E-07	1.12E-04	0.42089925	0.51275273	0.06319102	0.00315701
	Aroclor 1248	0.0870042	0.0005	0.0032		0.98	0.0002634	0	0.00026344	8.183E-05	0.0000145	3.60E-04	2.69E-04	0.00E+00	8.35E-05	1.48E-05	3.67E-04	0.73225091	0	0.22744528	0.04030381
	Aroclor 1254	0.2906733	0.0005	0.0204		1.50	0.0016601	0	0.001660103	0.0002734	0.0000145	1.95E-03	1.11E-03	0.00E+00	1.82E-04	9.67E-06	1.30E-03	0.85221713	0	0.14033927	0.0074436
	Aroclor 1260	0.3261114	0.0005	0.0337	2.04E-02	0.35	0.0027414	0.001518735	0.004260131	0.0003067	0.0000145	4.58E-03	7.95E-03	4.40E-03	8.89E-04	4.20E-05	1.33E-02	0.59838309	0.3315047	0.0669472	0.00316501
	beta-BHC	0.0016994	0.000025	0.0004		4.00	2.883E-05	0	2.88265E-05	1.598E-06	0.000000725	3.11E-05	7.21E-06	0.00E+00	4.00E-07	1.81E-07	7.79E-06	0.92541673	0	0.05130863	0.02327464
	delta-BHC	0.0036897	0.000025	0.0003		1.60	2.672E-05	0	2.67175E-05	3.47E-06	0.000000725	3.09E-05	1.67E-05	0.00E+00	2.17E-06	4.53E-07	1.93E-05	0.86429125	0	0.11225557	0.02345318
	Endosulfan I	0.0086487	0.000025	0.0005	1.42E-03	10.00	4.475E-05	0.000106126	0.000150873	8.134E-06	0.000000725	1.60E-04	4.47E-06	1.06E-05	8.13E-07	7.25E-08	1.60E-05	0.2801376	0.66440032	0.05092324	0.00453884
	Endosulfan Sulfate	0.0021	0.00005	0.0010		10.00	8.068E-05	0	8.06782E-05	1.975E-06	0.00000145	8.41E-05	8.07E-06	0.00E+00	1.98E-07	1.45E-07	8.41E-06	0.95927564	0	0.02348364	0.01724072
	Endrin Aldehyde	0.0035637	0.00005	0.0027	1.10E-03	0.30	0.000222	8.16653E-05	0.000303658	3.352E-06	0.00000145	3.08E-04	7.40E-04	2.72E-04	1.12E-05	4.83E-06	1.03E-03	0.71968205	0.26475152	0.01086566	0.00470077
	gamma-Chlordane	0.0525403	2.604E-05	0.0006	5.04E-03	2.14	4.808E-05	0.00037606	0.000424138	4.941E-05	7.55028E-07	4.74E-04	2.25E-05	1.76E-04	2.31E-05	3.53E-07	2.22E-04	0.10136456	0.79286171	0.10418187	0.00159186
	Inorganics																				
	Aluminum	11152.083	0.5420334	59.1894	1.86E+02	109.70	4.8199097	13.841875	18.66178469	10.488534	0.015718968	2.92E+01	4.39E-02	1.26E-01	9.56E-02	1.43E-04	2.66E-01	0.16525761	0.47458881	0.35961463	0.00053895
	Antimony	7.7332382	0.0009696	0.0516		0.13	0.0042	0	0.004199967	0.0072731	2.81176E-05	1.15E-02	3.36E-02	0.00E+00	5.82E-02	2.25E-04	9.20E-02	0.36517658	0	0.63237867	0.00244476
	Arsenic	360.89016	0.026428	3.0890	19.02	5.14	0.2515426	1.418397189	1.669939787	0.3394172	0.000766412	2.01E+00	4.89E-02	2.76E-01	6.60E-02	1.49E-04	3.91E-01	0.12513789	0.70562693	0.16885391	0.00038128
	Barium	89.138509	0.0410548	13.2536	8.69	208.00	1.0792698	0.648134487	1.727404283	0.0838348	0.001190589	1.81E+00	5.19E-03	3.12E-03	4.03E-04	5.72E-06	8.71E-03	0.59548231	0.35760532	0.04625546	0.0006569
	Beryllium	0.7413126	8.784E-05	0.0062		0.66	0.0005013	0	0.000501281	0.0006972	2.54743E-06	1.20E-03	7.60E-04	0.00E+00	1.06E-03	3.86E-06	1.82E-03	0.41737473	0	0.58050424	0.00212103
	Cadmium	6.9159415	0.0009399	0.1367	0.74	1.45	0.0111287	0.0552453	0.066373979	0.0065044	2.72583E-05	7.29E-02	7.67E-03	3.81E-02	4.49E-03	1.88E-05	5.03E-02	0.15264488	0.757764	0.08921723	0.00037388
X	Chromium	1675.307	0.0201654	1.6250	31.31	1.00	0.1323288	2.334528966	2.466857765	1.5756263	0.000584797	4.04E+00	1.32E-01	2.33E+00	1.58E+00	5.85E-04	4.04E+00	0.03272979	0.57741509	0.38971047	0.00014464
	Cobalt	16.362145	0.0015326	0.5353	1.45	5.00	0.043592	0.108364481	0.151956464	0.0153886	4.44646E-05	1.67E-01	8.72E-03	2.17E-02	3.08E-03	8.89E-06	3.35E-02	0.26042244	0.64737918	0.09193287	0.00026552
	Copper	445.26533	0.0390789	57.4012	22.55	47.00	4.6742967	1.681624101	6.355920773	0.418772	0.001133287	6.78E+00	9.95E-02	3.58E-02	8.91E-03	2.41E-05	1.44E-01	0.68984897	0.24817994	0.06180384	0.00016725
	Cyanide	1.5067364	0.0025	0.2611		68.70	0.0212629	0	0.021262905	0.0014171	0.0000725	2.28E-02	3.10E-04	0.00E+00	2.06E-05	1.06E-06	3.31E-04	0.93453088	0	0.06228266	0.00318646
X	Iron	30190.559	2.326423	463.3638	2499.17	3.19	37.732638	186.3579851	224.0906235	28.394221	0.067466268	2.53E+02	1.18E+01	5.84E+01	8.90E+00	2.11E-02	7.92E+01	0.14940524	0.73789856	0.11242907	0.00026714
X	Lead	385.3944	0.0263184	1.0509	35.15	1.13	0.0855751	2.620770465	2.706345613	0.3624634	0.000763234	3.07E+00	7.57E-02	2.32E+00	3.21E-01	6.75E-04	2.72E+00	0.02787852	0.85379011	0.11808272	0.00024865
	Manganese	531.78196	0.5079414	121.8323	299.88	977.00	9.9210481	22.36119788	32.28224597	0.5001409	0.014730301	3.28E+01	1.02E-02	2.29E-02	5.12E-04	1.51E-05	3.36E-02	0.30249756	0.68180376	0.01524954	0.00044913
X	Mercury	3.3336899	0.0003559	0.0128	0.12	0.01	0.0010425	0.008707959	0.009750421	0.0031353	1.03197E-05	1.29E-02	1.63E-01	1.36E+00	4.90E-01	1.61E-03	2.02E+00	0.08083565	0.67524093	0.2431232	0.00080022
	Nickel	23.965252	0.0025426	0.1027	0.62	77.40	0.0083643	0.046165227	0.054529494	0.0225393	7.3736E-05	7.71E-02	1.08E-04	5.96E-04	2.91E-04	9.53E-07	9.97E-04	0.10842612	0.59844051	0.29217753	0.00095584
	Selenium	3.7134374	0.0008316	0.4778	0.32	0.40	0.038907	0.023792953	0.062699927	0.0034925	2.4115E-05	6.62E-02	9.73E-02	5.95E-02	8.73E-03	6.03E-05	1.66E-01	0.58757193	0.35932044	0.05274345	0.00036418
	Silver	0.7184275	0.0003568	0.0505		181.20	0.0041087	0	0.00410871	0.0006757	1.03482E-05	4.79E-03	2.27E-05	0.00E+00	3.73E-06	5.71E-08	2.65E-05	0.85692043	0	0.14092133	0.00215825
	Thallium	1.6414679	0.0008405	0.1502		0.07	0.0122293	0	0.012229322	0.0015438	2.43738E-05	1.38E-02	1.65E-01	0.00E+00	2.09E-02	3.29E-04	1.86E-01	0.88634356	0	0.1118899	0.00176654
	Vanadium	46.834783	0.0020127	0.1875	1.63	11.40	0.015265	0.12151971	0.136784667	0.0440481	5.83682E-05	1.81E-01	1.34E-03	1.07E-02	3.86E-03	5.12E-06	1.59E-02	0.08438753	0.67178362	0.24350618	0.00032267
	Zinc	1321.288	0.2243946	27.8736	51.15	14.50	2.2698021	3.814174273	6.083976332	1.2426714	0.006507443	7.33E+00	1.57E-01	2.63E-01	8.57E-02	4.49E-04	5.06E-01	0.30952598	0.52012731	0.16945931	0.0008874

TABLE 4-198
AVERAGE EXPOSURE CASE HAZARD QUOTIENTS FOR MALLARD (SITE-WIDE)

WELLS G&H SUPERFUND SITE OU3

	COPC	Total Dose (mg/kg-day)	TRV (mg/kg-day)	Total HQ	Percent Animal HQ	Percent Plant HQ	Percent Surface Sediment HQ	Percent Surface Water HQ
	Volatile Organics							
	2-Butanone	0.00011	12.1	<0.1	0.0	0.0	33	66.9
	Acetone	0.00043	1700	<0.1	0.0	0.0	83	16.8
	cis-1,2-Dichloroethene	0.00012	3114	<0.1	0.0	0.0	77	22.7
	Tetrachloroethene	0.00005	14.00	<0.1	0.0	0.0	67	33.3
	Trichloroethene	0.00007	7.00	<0.1	0.0	0.0	72	28.1
	HAZARD INDEX			*0.000023*	*0.0*	*0.0*	*56*	*0.4*
	Semivolatile Organics							
	2-Methylnaphthalene	0.0003	143.7	<0.1	0.0	0.0	73	27.4
	Acenaphthylene	0.0003	133.3	<0.1	0.0	0.0	72	27.9
	Anthracene	0.0003	1000	<0.1	0.0	0.0	77	23.0
	Benzo(a)anthracene	0.001	1.30	<0.1	0.0	0.0	92	8.3
	Benzo(a)pyrene	0.01	1.30	<0.1	0.0	92.1	7.3	0.6
	Benzo(b)fluoranthene	0.01	1.30	<0.1	0.0	85.1	14.1	0.7
	Benzo(g,h,i)perylene	0.001	133.3	<0.1	0.0	0.0	87	12.7
	Benzo(k)fluoranthene	0.02	1.30	<0.1	0.0	93.6	5.9	0.4
	Carbazole	0.0002	133.3	<0.1	0.0	0.0	100	0.0
	Chrysene	0.01	1.30	<0.1	0.0	89.6	9.7	0.7
	Dibenz(a,h)anthracene	0.0003	1.30	<0.1	0.0	0.0	78	22.4
	Dibenzofuran	0.0003	133.3	<0.1	0.0	0.0	77	22.7
	Fluoranthene	0.01	125.0	<0.1	0.0	78.2	20.9	0.9
	Fluorene	0.0003	125.0	<0.1	0.0	0.0	74	25.8
	Indeno(1,2,3-cd)pyrene	0.02	1.30	<0.1	0.0	96.7	2.9	0.4
	Naphthalene	0.0003	140.0	<0.1	0.0	0.0	77	23.4
	N-nitrosodiphenylamine	0.0003	150	<0.1	0.0	0.0	78	21.6
	Phenanthrene	0.02	133.3	<0.1	0.0	95.2	4.5	0.4
	Pyrene	0.01	133.3	<0.1	0.0	82.2	16.9	0.9
	HAZARD INDEX			*0.05*	*0.0*	*90.7*	*8.6*	*0.8*
	Pesticides and PCBs							
	4,4'-DDD	0.00032	8.50	<0.1	61.3	30.8	7.5	0.5
	4,4'-DDE	0.00048	1.90	<0.1	85.2	11.2	3.3	0.3
	4,4'-DDT	0.00016	0.003	<0.1	57.6	38.5	3.0	0.9
	Aldrin	0.00003	0.20	<0.1	92.1	0.0	5.0	2.9
	alpha-Chlordane	0.00017	2.14	<0.1	43.7	49.7	6.1	0.4
	Aroclor 1248	0.00029	0.98	<0.1	74.4	0.0	21	5.0
	Aroclor 1260	0.0032	0.35	<0.1	66.2	27.8	5.6	0.5
	beta-BHC	0.00002	4.00	<0.1	91.9	0.0	5	2.9
	delta-BHC	0.00002	1.60	<0.1	89.7	0.0	7	3.0
	Endosulfan I	0.00009	10.0	<0.1	33.7	60.8	4.7	0.8
	Endosulfan Sulfate	0.00007	10.0	<0.1	94.6	0.0	3.2	2.2
	Endrin Aldehyde	0.00024	0.30	<0.1	70.2	28.0	1.1	0.6
	gamma-Chlordane	0.00015	2.14	<0.1	21.3	69.2	9.1	0.4
	HAZARD INDEX			*0.07*	*59.5*	*36.2*	*3.5*	*0.8*
	Inorganics							
	Aluminum	26.6	110	0.24	15.3	48.2	36.5	0.0
	Antimony	0.01	0.13	<0.1	40.5	0.0	59	0.2
	Arsenic	1.54	5.14	0.30	11.7	71.2	17.0	0.0
	Barium	1.54	208	<0.1	53.7	40.9	5.3	0.1
	Beryllium	0.00	0.66	<0.1	40.6	0.0	59	0.1
	Cadmium	0.06	1.45	<0.1	9.3	81.2	9.6	0.0
X	Chromium	2.92	1.00	**2.92**	3.2	57.8	39.0	0.0
	Cobalt	0.15	5.00	<0.1	24.4	66.2	9.4	0.0
	Copper	5.88	47.0	0.13	68.8	25.0	6.2	0.0
	Cyanide	0.02	68.7	<0.1	94.9	0.0	4.7	0.4
X	Iron	216	3.19	**67.8**	13.0	75.5	11.5	0.0
X	Lead	2.71	1.13	**2.40**	2.3	85.8	11.9	0.0
	Manganese	27.56	977	<0.1	29.2	69.2	1.5	0.0
X	Mercury	0.01	0.01	**1.45**	8.1	67.6	24.3	0.0
	Nickel	0.07	77.4	<0.1	10.0	60.4	29.5	0.1
	Selenium	0.06	0.40	0.14	58.2	36.4	5.3	0.0
	Silver	0.00	181	<0.1	83.4	0.0	16.3	0.3
	Thallium	0.01	0.07	0.11	83.8	0.0	15.9	0.3
	Vanadium	0.17	11.4	<0.1	7.2	68.1	24.7	0.0
	Zinc	6.6	14.5	0.46	31.2	51.9	16.9	0.0
	HAZARD INDEX			*76.16*	*12.6*	*74.4*	*13.0*	*0.02*

NOTES:
HQ = Hazard quotient
TRV = Toxicity Reference Value
X = Indicates a COPC with a HQ >= 1.
0.0 = Indicates COPC was not detected in medium, or that the detected concentration was low, contributing less than 0.05% of the Total HQ.
Total Dose = Sum of exposure from ingestion of food (plant and animal), sediment, and water.

TABLE 4-199
MAXIMUM EXPOSURE CASE HAZARD QUOTIENTS FOR MALLARD (SITE-WIDE)

WELLS G&H SUPERFUND SITE OU3

	COPC	Total Dose (mg/kg-day)	TRV (mg/kg-day)	Total HQ	Percent Animal HQ	Percent Plant HQ	Percent Surface Sediment HQ	Percent Surface Water HQ
	Volatile Organics							
	2-Butanone	0.0001	12.1	<0.1	0.0	0.0	44	56.4
	Acetone	0.0011	1700	<0.1	0.0	0.0	93	6.7
	cis-1,2-Dichloroethene	0.0002	3114	<0.1	0.0	0.0	76	24.2
	Tetrachloroethene	0.0001	14.00	<0.1	0.0	0.0	57	43.0
	Trichloroethene	0.0002	7.00	<0.1	0.0	0.0	84	15.7
	HAZARD INDEX			*0.00005*	*0.0*	*0.0*	*73*	*27.1*
	Semivolatile Organics							
	2-Methylnaphthalene	0.000	143.7	<0.1	0.0	0.0	74	25.9
	Acenaphthylene	0.0003	133.3	<0.1	0.0	0.0	77	22.9
	Anthracene	0.000	1000	<0.1	0.0	0.0	81	19.4
	Benzo(a)anthracene	0.001	1.30	<0.1	0.0	0.0	94	5.5
	Benzo(a)pyrene	0.018	1.30	<0.1	0.0	92.3	7.3	0.4
	Benzo(b)fluoranthene	0.015	1.30	<0.1	0.0	85.4	14.1	0.5
	Benzo(g,h,i)perylene	0.001	133.3	<0.1	0.0	0.0	91	8.6
	Benzo(k)fluoranthene	0.020	1.30	<0.1	0.0	93.7	5.9	0.4
	Carbazole	0.000	133.3	<0.1	0.0	0.0	100	0.0
	Chrysene	0.015	1.30	<0.1	0.0	89.8	9.7	0.5
	Dibenz(a,h)anthracene	0.000	1.30	<0.1	0.0	0.0	84	16.1
	Dibenzofuran	0.000	133.3	<0.1	0.0	0.0	82	18.0
	Fluoranthene	0.013	125.0	<0.1	0.0	78.5	21.0	0.6
	Fluorene	0.000	125.0	<0.1	0.0	0.0	77	23.0
	Indeno(1,2,3-cd)pyrene	0.022	1.30	<0.1	0.0	96.8	2.9	0.3
	Naphthalene	0.000	140.0	<0.1	0.0	0.0	87	13.1
	N-nitrosodiphenylamine	0.000	150	<0.1	0.0	0.0	82	17.7
	Phenanthrene	0.031	133.3	<0.1	0.0	95.3	4.5	0.2
	Pyrene	0.011	133.3	<0.1	0.0	82.4	17.0	0.7
	HAZARD INDEX			*0.07*	*0.0*	*90.3*	*9.1*	*0.6*
	Pesticides and PCBs							
	4,4'-DDD	0.0005	8.50	<0.1	58.1	33.4	8.2	0.3
	4,4-DDE	0.0007	1.90	<0.1	84.8	11.6	3.4	0.2
	4,4'-DDT	0.0002	0.003	<0.1	57.5	38.7	3.0	0.7
	Aldrin	0.00003	0.20	<0.1	89.2	0.0	8.3	2.5
	alpha-Chlordane	0.0002	2.14	<0.1	42.1	51.3	6.3	0.3
	Aroclor 1248	0.0004	0.98	<0.1	73.2	0.0	23	4.0
	Aroclor 1260	0.0046	0.35	<0.1	59.8	33.2	6.7	0.3
	beta-BHC	0.00003	4.00	<0.1	92.5	0.0	5	2.3
	delta-BHC	0.00003	1.60	<0.1	86.4	0.0	11	2.3
	Endosulfan I	0.0002	10.0	<0.1	28.0	66.4	5.1	0.5
	Endosulfan Sulfate	0.0001	10.0	<0.1	95.9	0.0	2.3	1.7
	Endrin Aldehyde	0.0003	0.30	<0.1	72.0	26.5	1.1	0.5
	gamma-Chlordane	0.0005	2.14	<0.1	10.1	79.3	10.4	0.2
	HAZARD INDEX			*0.09*	*58.5*	*37.1*	*3.8*	*0.6*
	Inorganics							
	Aluminum	29.2	110	0.3	16.5	47.5	36.0	0.1
	Antimony	0.01	0.13	<0.1	36.5	0.0	63	0.2
	Arsenic	2.01	5.14	0.4	12.5	70.6	16.9	0.0
	Barium	1.81	208	<0.1	59.5	35.8	4.6	0.1
	Beryllium	0.001	0.66	<0.1	41.7	0.0	58	0.2
	Cadmium	0.07	1.45	<0.1	15.3	75.8	8.9	0.0
X	Chromium	4.04	1.00	**4.0**	3.3	57.7	39.0	0.0
	Cobalt	0.17	5.00	<0.1	26.0	64.7	9.2	0.0
	Copper	6.78	47.0	0.1	69.0	24.8	6.2	0.0
	Cyanide	0.02	68.7	<0.1	93.5	0.0	6.2	0.3
X	Iron	253	3.19	**79.2**	14.9	73.8	11.2	0.0
X	Lead	3.07	1.13	**2.7**	2.8	85.4	11.8	0.0
	Manganese	32.8	977	<0.1	30.2	68.2	1.5	0.0
X	Mercury	0.01	0.01	**2.0**	8.1	67.5	24.3	0.1
	Nickel	0.08	77.4	<0.1	10.8	59.8	29.2	0.1
	Selenium	0.07	0.40	0.2	58.8	35.9	5.3	0.0
	Silver	0.00	181	<0.1	85.7	0.0	14.1	0.2
	Thallium	0.01	0.07	0.2	88.6	0.0	11.2	0.2
	Vanadium	0.18	11.4	<0.1	8.4	67.2	24.4	0.0
	Zinc	7.3	14.5	0.5	31.0	52.0	16.9	0.1
	HAZARD INDEX			*89.8*	*14.3*	*72.7*	*13.0*	*0.0*

NOTES:
HQ = Hazard quotient
TRV = Toxicity Reference Value
X = Indicates a COPC with a HQ >= 1.
0.0 = Indicates COPC was not detected in medium, or that the detected concentration was low, contributing less than 0.05% of the Total HQ.
Total Dose = Sum of exposure from ingestion of food (plant and animal), sediment, and water.

TABLE 4-245 REVISED
HAZARD QUOTIENT SUMMARY FOR SHREW[1]
MAXIMUM EXPOSURE CASE WITH REVISED UPTAKE FACTORS [2]
WELLS G&H SUPERFUND SITE OU3

Station	Habitat Type	Aberjona River Reach	COPC HAZARD QUOTIENT																				
			Benzo(b) fluoranthene	Benzo(k) fluoranthene	Aroclor 1254	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Chromium	Cobalt	Copper	Cyanide	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium
	Wetland	Reference[3]				5		2								77								6
20	Wetland	1				11	2	16			1	1				148	1							7
21	Wetland	1				7		13			1	3				95			4					5
22/TT-22	Wetland	1				4	94	3								31	29							3
BW	Wetland	1				8	18	142				1				506	1		3				2	6
CB-01	Wetland	2				6		3								63								6
CB-02	Wetland	2				2		3								23								2
CB-03	Wetland	2				4		67			1					217								4
CB-04	Wetland	2				4	1	13								150								4
CB-05	Wetland	2				2		3								39								2
CB-06	Wetland	2				3	1	7			2					55								5
DA	River	2				4		10								125								2
NRSE	Wetland	1				3		11								82			1					2
JY	Wetland	1			5	5	3	19			1					130								4
NRSO	River	1				3		11								97								2
KFSO	River	2				2		3								58								2
WSS	Wetland	1				4										37								2
WG	Wetland	1				6	4	14				1				98								4
WH	Wetland	1				5	8	21			1					198	2							6
WS	Riparian	1				4	1	12								126								3
% of OU3 stations (non-reference) with HQ>1					5	100	47	95	0	0	32	21	0	0	0	100	21	0	16	0	0	0	5	100

[1] Only COPCs having one or more station with HQ>1 are presented.
[2] HQs were calculated using 95% UCL values for surface water and sediment data. Where 95% UCLs could not be calculated (number of samples <4), maximum station values were used.
[3] Reference stations include 24, HB, and SA.
[4] A blank cell indicates that the HQ <1.0

TABLE 4-32
APPLICABILITY OF SEDIMENT SAMPLES TO EXPOSURE SCENARIOS FOR INDICATOR SPECIES

WELLS G&H SUPERFUND SITE OU3

Station	Reach	Habitat	Sample ID	Date Sampled	Standing Water Depth (ft)	Applicability of Samples/Stations to Ecological Exposures[1]					Notes
						Muskrat	Heron	Mallard	Shrew	Invertebrates	
01	6	lake	SD-01-01-FW	8/15/1995	1.0	x	x	x		x	
			SD-01-02-FW	8/15/1995	4.0	x				x	
			SD-01-03-FW	8/15/1995	1.0	x	x	x		x	
			SD-01-04-FW	8/15/1995	4.0	x				x	
			SD-01-05-FW	8/15/1995	1.0	x	x	x		x	
			SD-01-06-FW	8/15/1995	5.0	x				x	
			SD-01-06-ME	11/12/1997	7.0					x	
			SD-01-07-FW	8/15/1995	6.0					x	
			SD-01-07-ME	11/12/1997	8.0					x	
			SD-01-08-FW	8/15/1995	1.0	x	x	x		x	
			SD-01-09-FW	8/15/1995	5.0	x				x	
			SD-01-10-FW	8/15/1995	6.0					x	
02	6	lake	SD-02-01-FW	8/16/1995	1.5	x		x		x	
			SD-02-01-ME	11/13/1997	5.0	x				x	
			SD-02-02-FW	8/16/1995	4.9	x				x	
			SD-02-02-ME	11/13/1997	7.0					x	
			SD-02-03-FW	8/16/1995	1.0 or 3.3	x	x	x		x	
03	6	lake	SD-03-01-FW	8/16/1995	1.6	x	x	x		x	
			SD-03-02-FW	8/16/1995	2.5	x	x	x		x	
			SD-03-02-ME	11/13/1997	1.5	x	x	x		x	
			SD-03-03-FW	8/16/1995	0.3	x	x	x		x	
04	6	lake	SD-04-01-FW	8/17/1995	4.9	x				x	
			SD-04-02-FW	8/17/1995	4.9	x				x	
			SD-04-02-ME	11/14/1997	7.0					x	
			SD-04-03-FW	8/17/1995	3.3	x				x	
			SD-04-03-ME	11/14/1997	7.0					x	
			SD-AO-01	7/18/2000	4.7	x				x	
			SD-AO-02	7/18/2000	4.4	x				x	
			SD-AO-03	7/18/2000	4.5	x				x	
			SD-AO-03-TR	6/27/2001	5.0	x				x	
			SD-AO-04	7/18/2000	6.3					x	
			SD-AO-05	7/18/2000	5.5					x	
05	5	river	SD-05-01-FW	8/17/1995	1.0	x	x	x		x	
			SD-05-02-FW	8/17/1995	N/A	x	x	x		x	
			SD-05-03-FW	8/17/1995	2.0	x	x	x		x	
			SD-05-03-ME	11/13/1997	3.0	x	x	x		x	
06	4	lake	SD-06-01-FW	8/18/1995	3.3	x				x	
			SD-06-02-FW	8/18/1995	3.3	x				x	
			SD-06-03-FW	8/18/1995	3.3	x				x	
			SD-06-03-ME	11/18/1997	4.0	x				x	
			SD-06-03-TR	6/26/2001	3.8	x				x	
			SD-JP-01	7/10/2000	4.0	x				x	
07	3	lake	SD-07-01-FW	8/18/1995	NA	x				x	
			SD-07-02-FW	8/21/1995	5.0	x				x	
			SD-07-02-ME	11/20/1997	3.4	x				x	
			SD-07-03-FW	8/21/1995	NA	x				x	
			SD-07-04-FW	8/29/1995	NA	x				x	
			SD-07-05-FW	8/21/1995	2.0	x	x	x		x	
			SD-07-05-ME	11/20/1997	1.2	x	x	x		x	
			SD-07-06-FW	8/21/1995	4.0	x				x	
			SD-07-07-FW	8/21/1995	1.5	x	x	x		x	
			SD-07-08-FW	8/21/1995	1.5	x	x	x		x	
			SD-07-09-FW	8/21/1995	1.0	x	x	x		x	
			SD-07-10-FW	8/21/1995	1.0	x	x	x		x	
			SD-07-10-ME	11/19/1997	2.0	x	x	x		x	

TABLE 4-32
APPLICABILITY OF SEDIMENT SAMPLES TO EXPOSURE SCENARIOS FOR INDICATOR SPECIES

WELLS G&H SUPERFUND SITE OU3

Station	Reach	Habitat	Sample ID	Date Sampled	Standing Water Depth (ft)	Applicability of Samples/Stations to Ecological Exposures[1]					Notes
						Muskrat	Heron	Mallard	Shrew	Invertebrates	
08	2	river	SD-08-01-FW	8/21/1995	1.0	x	x	x		x	
			SD-08-02-FW	8/21/1995	1.5	x	x	x		x	
			SD-08-03-FW	8/21/1995	1.5	x	x	x		x	
09	2	river	SD-09-01-FW	8/22/1995	1.0	x	x	x		x	
			SD-09-02-FW	8/22/1995	NA	x	x	x		x	
			SD-09-03-FW	8/22/1995	0.5	x	x	x		x	
			SD-09-04-FW	8/22/1995	1.0	x	x	x		x	
			SD-09-05-FW	8/22/1995	1.0	x	x	x		x	
			SD-09-06-FW	8/22/1995	1.5	x	x	x		x	
			SD-09-07-FW	8/22/1995	2.0	x	x	x		x	
			SD-09-08-FW	8/22/1995	2.0	x	x	x		x	
			SD-09-09-FW	8/22/1995	0.5	x	x	x		x	
			SD-09-10-FW	8/22/1995	0.5	x	x	x		x	
10	1	river	SD-10-01-FW	8/23/1995	2.0	x	x	x		x	
			SD-10-01-ME	11/19/1997	2.0	x	x	x		x	
			SD-10-02-FW	8/23/1995	NA	x	x	x		x	
			SD-10-02-ME	11/19/1997	2.0	x	x	x		x	
			SD-10-02-TR	6/22/2001	1.4	x	x	x		x	
			SD-10-03-FW	8/23/1995	1.5	x	x	x		x	
11	1	river	SD-11-01-ME	11/14/1997	0.5	x	x	x		x	
			SD-11-02-FW	8/24/1995	2.0 or 2.5	x	x	x		x	
			SD-11-03-FW	8/24/1995	2.0 or 2.5	x	x	x		x	
12	1	river	SD-12-01-FW	8/31/1995	1.0	x	x	x		x	
			SD-12-02-FW	8/31/1995	NA	x	x	x		x	
			SD-12-03-FW	8/31/1995	0.5	x	x	x		x	
			SD-12-03-ME	11/20/1997	5.0	x	x	x		x	
			SD-12-03-TR	6/19/2001	4.5	x	x	x		x	
13	1	wetland	SD-13-01-FW	9/1/1995	0.3	x	x	x		x	
			SD-13-01-ME	11/17/1997	2.0	x	x	x		x	
			SD-13-01-TR	6/22/2001	0.3	x	x	x		x	
			SD-13-02-FW	9/1/1995	0.3	x	x	x		x	
			SD-13-03-FW	9/1/1995	0.0	x	x	x		x	
			SD-13-03-ME	11/17/1997	2.0	x	x	x		x	
14	1	river	SD-14-01-FW	9/5/1995	1.0	x				x	
			SD-14-02-FW	9/5/1995	1.0	x				x	
			SD-14-03-FW	9/5/1995	1.5	x				x	
15	1	wetland	SD-15-01-FW	9/5/1995	0.5	x	x	x		x	
			SD-15-01-ME	11/17/1997	2.5	x	x	x		x	
			SD-15-02-FW	9/5/1995	0.5	x	x	x		x	
			SD-15-03-FW	9/5/1995	0.5	x	x	x		x	
16	2	river	SD-16-01-FW	8/29/1995	NA	x	x	x		x	
			SD-16-02-FW	8/23/1995	1.0	x	x	x		x	
			SD-16-03-FW	8/23/1995	1.5	x	x	x		x	
18	1	river	SD-18-01-FW	8/29/1995	NA	x	x	x		x	
			SD-18-02-FW	9/7/1995	0.2	x	x	x		x	
			SD-18-02-ME	11/18/1997	0.5	x	x	x		x	
			SD-18-02-TR	6/21/2001	1.1	x	x	x		x	
			SD-18-03-FW	9/7/1995	0.4	x	x	x		x	
			SD-18-03-ME	11/18/1997	0.3	x	x	x		x	
			SD-11-01-FW	8/24/1995	2.0	x	x	x		x	
19	1	wetland	SD-19-01-FW	8/31/1995	0.0	x	x	x		x	
			SD-19-01-TR	6/19/2001	0.8	x	x	x		x	
			SD-19-02-FW	8/31/1995	0.0	x	x	x		x	
			SD-19-03-FW	8/31/1995	0.0	x	x	x		x	
20	1	wetland	SD-20-01-FW	9/7/1995	0.0	x	x	x	x	x	
			SD-20-01-ME	11/17/1997	2.0	x	x	x		x	
			SD-20-02-FW	9/7/1995	0.0	x	x	x	x	x	
			SD-20-03-FW	9/7/1995	0.0	x	x	x	x	x	

TABLE 4-32
APPLICABILITY OF SEDIMENT SAMPLES TO EXPOSURE SCENARIOS FOR INDICATOR SPECIES

WELLS G&H SUPERFUND SITE OU3

Station	Reach	Habitat	Sample ID	Date Sampled	Standing Water Depth (ft)	Applicability of Samples/Stations to Ecological Exposures[1]					Notes
						Muskrat	Heron	Mallard	Shrew	Invertebrates	
21	1	wetland	SD-21-01-FW	9/8/1995	0.0	x	x	x	x	x	
			SD-21-01-ME	11/14/1997	1.0	x	x	x	x	x	
			SD-21-02-FW	9/8/1995	0.0	x	x	x	x	x	
			SD-21-03-FW	9/8/1995	0.0	x	x	x	x	x	
22/TT-22	1	wetland	SD-22-01-FW	9/8/1995	0.0				x	x	
			SD-22-01-TR	6/18/2001	0.2				x	x	
			SD-22-02-FW	9/8/1995	0.0				x	x	
			SD-22-02-ME	11/12/1997	0.0				x	x	
			SD-22-03-FW	9/8/1995	0.0				x	x	
			SD-TT-22-01	2/7/2001	0.5				x	x	
			SD-TT-22-02	2/7/2001	0.5				x	x	
			SD-TT-22-03	2/7/2001	1.0				x	x	
AM	2	river	SD-AM-01	7/10/2000	1.0	x	x	x		x	(a)
AS	3	river	SD-AS-01	7/10/2000	1.0	x	x	x		x	(a)
			SD-AS-02	7/10/2000	1.5	x	x	x		x	(a)
BW	1	wetland	SD-BW-01	7/17/2002	0.0	x	x	x	x	x	
			SD-BW-02	7/17/2002	0.0	x	x	x	x	x	
			SD-BW-03	7/17/2002	0.0	x	x	x	x	x	
			SD-BW-04	7/17/2002	0.0	x	x	x	x	x	
			SD-BW-05	7/17/2002	0.0	x	x	x	x	x	
			SD-12-01-ME	11/20/1997	1.0	x	x	x	x	x	
CB-01	2	wetland	SD-CB-01-01	2/9/2001	0.5	x	x	x	x	x	(a)
			SD-CB-01-02	2/9/2001	0.5	x	x	x	x	x	(a)
			SD-CB-01-03	2/9/2001	0.3	x	x	x	x	x	(a)
			SD-CB-01-04	2/9/2001	0.3	x	x	x	x	x	(a)
			SD-CB-01-05	2/9/2001	0.7	x	x	x	x	x	(a)
			SD-CB-01-06	2/9/2001	0.2	x	x	x	x	x	(a)
			SD-CB-01-07	2/9/2001	0.5	x	x	x	x	x	(a)
			SD-CB-01-08	2/9/2001	0.7	x	x	x	x	x	(a)
			SD-CB-01-09	2/9/2001	0.5	x	x	x	x	x	(a)
			SD-CB-01-10	2/9/2001	0.3	x	x	x	x	x	(a)
CB-02	2	wetland	SD-CB-02-01	2/8/2001	0.5	x	x	x	x	x	(a)
			SD-CB-02-02	2/8/2001	0.5	x	x	x	x	x	(a)
			SD-CB-02-03	2/8/2001	0.5	x	x	x	x	x	(a)
			SD-CB-02-04	2/8/2001	0.5	x	x	x	x	x	(a)
			SD-CB-02-05	2/8/2001	0.5	x	x	x	x	x	(a)
			SD-CB-02-06	2/8/2001	0.7	x	x	x	x	x	(a)
			SD-CB-02-07	2/8/2001	0.8	x	x	x	x	x	(a)
			SD-CB-02-08	2/8/2001	0.9	x	x	x	x	x	(a)
			SD-CB-02-09	2/8/2001	0.9	x	x	x	x	x	(a)
			SD-CB-02-10	2/8/2001	1.2	x	x	x	x	x	(a)
CB-03	2	wetland	SD-CB-03-01	2/9/2001	0.7	x	x	x	x	x	(a)
			SD-CB-03-02	2/9/2001	1.0	x	x	x	x	x	(a)
			SD-CB-03-03	2/9/2001	1.2	x	x	x	x	x	(a)
			SD-CB-03-04	2/8/2001	1.0	x	x	x	x	x	(a)
			SD-CB-03-05	2/8/2001	0.7	x	x	x	x	x	(a)
			SD-CB-03-06	2/8/2001	0.3	x	x	x	x	x	(a)
			SD-CB-03-07	2/8/2001	0.7	x	x	x	x	x	(a)
			SD-CB-03-08	2/8/2001	0.5	x	x	x	x	x	(a)
			SD-CB-03-09	2/8/2001	0.5	x	x	x	x	x	(a)
			SD-CB-03-10	2/8/2001	0.5	x	x	x	x	x	(a)
			SD-CB-03-11	2/8/2001	0.3	x	x	x	x	x	(a)
			SD-CB-03-12	2/8/2001	0.7	x	x	x	x	x	(a)

TABLE 4-32
APPLICABILITY OF SEDIMENT SAMPLES TO EXPOSURE SCENARIOS FOR INDICATOR SPECIES

WELLS G&H SUPERFUND SITE OU3

Station	Reach	Habitat	Sample ID	Date Sampled	Standing Water Depth (ft)	Applicability of Samples/Stations to Ecological Exposures[1]					Notes
						Muskrat	Heron	Mallard	Shrew	Invertebrates	
CB-04	2	wetland	SD-CB-04-01	7/11/2002	< 1.0	x	x	x	x	x	(a)
			SD-CB-04-02	7/11/2002	0.0	x	x	x	x	x	(a)
			SD-CB-04-03	7/11/2002	0.0	x	x	x	x	x	(a)
			SD-CB-04-04	7/11/2002	0.0	x	x	x	x	x	(a)
			SD-CB-04-05	7/11/2002	< 1.0	x	x	x	x	x	(a)
			SD-CB-04-06	7/11/2002	0.0	x	x	x	x	x	(a)
			SD-CB-04-07	7/11/2002	0.0	x	x	x	x	x	(a)
			SD-CB-04-08	7/11/2002	< 1.0	x	x	x	x	x	(a)
			SD-CB-04-09	7/11/2002	< 1.0	x	x	x	x	x	(a)
			SD-CB-04-10	7/11/2002	< 1.0	x	x	x	x	x	(a)
CB-05	2	riparian	SO-CB-05-01	7/11/2002	0.0				x		(a)
			SO-CB-05-02	7/11/2002	0.0				x		(a)
			SO-CB-05-03	7/11/2002	0.0				x		(a)
			SO-CB-05-04	7/11/2002	0.0				x		(a)
			SO-CB-05-05	7/11/2002	0.0				x		(a)
			SO-CB-05-06	7/11/2002	0.0				x		(a)
			SO-CB-05-07	7/11/2002	0.0				x		(a)
			SO-CB-05-08	7/11/2002	0.0				x		(a)
			SO-CB-05-09	7/11/2002	0.0				x		(a)
			SO-CB-05-10	7/11/2002	0.0				x		(a)
CB-06	2	wetland	SD-CB-06-01	7/11/2002	< 0.5	x		x	x	x	(a)
			SD-CB-06-02	7/11/2002	< 1.0	x		x	x	x	(a)
			SD-CB-06-03	7/11/2002	< 1.0	x		x	x	x	(a)
			SD-CB-06-04	7/11/2002	< 1.0	x		x	x	x	(a)
			SD-CB-06-05	7/11/2002	0.0	x		x	x	x	(a)
			SD-CB-06-06	7/11/2002	< 1.0	x		x	x	x	(a)
			SD-CB-06-07	7/11/2002	< 0.5	x		x	x	x	(a)
			SD-CB-06-08	7/11/2002	< 1.0	x		x	x	x	(a)
			SD-CB-06-09	7/11/2002	< 0.5	x		x	x	x	(a)
			SD-CB-06-10	7/11/2002	0.0	x		x	x	x	(a)
DA	2	riparian	SO-DA-01	7/11/2002	0.0				x		(a)
			SO-DA-02	7/11/2002	0.0				x		(a)
			SO-DA-03	7/11/2002	0.0				x		(a)
			SO-DA-04	7/11/2002	0.0				x		(a)
			SO-DA-05	7/11/2002	0.0				x		(a)
NRSE	1	wetland	SD-NR-01	9/4/2002	0.1	x		x	x	x	(a)
			SD-NR-02	9/4/2002	0.1	x		x	x	x	(a)
			SD-NR-03	9/4/2002	0.0	x		x	x	x	(a)
			SD-NR-04	9/4/2002	0.0	x		x	x	x	(a)
			SD-NR-05	9/4/2002	0.1	x		x	x	x	(a)
JY	1	wetland	SD-JY-06	7/18/2002	0.0	x		x	x	x	(a)
			SD-JY-07	7/18/2002	0.0	x		x	x	x	(a)
			SD-JY-08	7/18/2002	0.0	x		x	x	x	(a)
			SD-JY-09	7/18/2002	0.0	x		x	x	x	(a)
			SD-JY-10	7/18/2002	0.0	x		x	x	x	(a)
			SD-JY-11	7/18/2002	0.0	x		x	x	x	(a)
			SD-JY-12	7/18/2002	0.0	x		x	x	x	(a)
			SD-JY-13	7/18/2002	0.0	x		x	x	x	(a)
			SD-JY-14	7/18/2002	0.0	x		x	x	x	(a)
			SD-JY-15	7/18/2002	0.0	x		x	x	x	(a)
NRSO	1	riparian	SO-NR-16	9/4/2002	0.0				x		(a)
			SO-NR-17	9/4/2002	0.0				x		(a)
			SO-NR-18	9/4/2002	0.0				x		(a)
			SO-NR-19	9/4/2002	0.0				x		(a)
			SO-NR-20	9/4/2002	0.0				x		(a)

TABLE 4-32
APPLICABILITY OF SEDIMENT SAMPLES TO EXPOSURE SCENARIOS FOR INDICATOR SPECIES

WELLS G&H SUPERFUND SITE OU3

Station	Reach	Habitat	Sample ID	Date Sampled	Standing Water Depth (ft)	Applicability of Samples/Stations to Ecological Exposures[1]					Notes
						Muskrat	Heron	Mallard	Shrew	Invertebrates	
KFSE	2	river	SD-KF-01	9/4/2002	0.3	x	x	x		x	(a)
			SD-KF-02	9/4/2002	0.3	x	x	x		x	(a)
			SD-KF-03	9/4/2002	0.3	x	x	x		x	(a)
			SD-KF-04	9/4/2002	0.2	x	x	x		x	(a)
			SD-KF-05	9/4/2002	0.3	x	x	x		x	(a)
			SD-KF-06	9/4/2002	0.5	x	x	x		x	(a)
			SD-KF-07	9/4/2002	0.0	x	x	x		x	(a)
			SD-KF-08	9/4/2002	0.2	x	x	x		x	(a)
			SD-KF-09	9/4/2002	0.8	x	x	x		x	(a)
			SD-KF-10	9/4/2002	0.3	x	x	x		x	(a)
KFSO	2	riparian	SO-KF-01	9/4/2002	0.0				x		(a)
			SO-KF-02	9/4/2002	0.0				x		(a)
			SO-KF-03	9/4/2002	0.0				x		(a)
			SO-KF-04	9/4/2002	0.0				x		(a)
			SO-KF-05	9/4/2002	0.0				x		(a)
			SO-KF-06	9/4/2002	0.0				x		(a)
			SO-KF-07	9/4/2002	0.0				x		(a)
			SO-KF-08	9/4/2002	0.0				x		(a)
			SO-KF-09	9/4/2002	0.0				x		(a)
			SO-KF-10	9/4/2002	0.0				x		(a)
LF	6	lake	SD-LF-01	7/17/2000	5.2					x	(a)
			SD-LF-02	7/17/2000	6.8					x	(a)
LM	6	lake	SD-LM-01	7/17/2000	75.0					x	(a)
			SD-LM-02	7/17/2000	37.0					x	(a)
			SD-LM-03	7/17/2000	52.0					x	(a)
LP	3	river	SD-LP-01	7/12/2002	1.5	x	x	x		x	(a)
			SD-LP-02	7/12/2002	1.0	x	x	x		x	(a)
			SD-LP-03	7/12/2002	1.5	x	x	x		x	(a)
			SD-LP-04	7/12/2002	1.0	x	x	x		x	(a)
			SD-LP-05	7/12/2002	2.0	x	x	x		x	(a)
			SD-LP-06	7/12/2002	1.0	x	x	x		x	(a)
			SD-LP-07	7/12/2002	1.5	x	x	x		x	(a)
			SD-LP-08	7/12/2002	2.0	x	x	x		x	(a)
			SD-LP-09	7/12/2002	0.0	x	x	x		x	(a)
			SD-LP-10	7/12/2002	0.3	x	x	x		x	(a)
			SD-LP-11	9/13/2002	0.1	x	x	x		x	(a)
			SD-LP-12	9/13/2002	0.0	x	x	x		x	(a)
			SD-LP-13	9/13/2002	0.0	x	x	x		x	(a)
			SD-LP-14	9/13/2002	0.0	x	x	x		x	(a)
			SD-LP-15	9/13/2002	0.0	x	x	x		x	(a)
MP	4	lake	SD-MP-01	7/10/2000	2.2			x		x	(a)
			SD-MP-02	7/10/2000	2.0			x		x	(a)
WSS	1	riparian	SO-SS-01	7/12/2002	0.0				x		(a)
			SO-SS-02	7/12/2002	0.0				x		(a)
			SO-SS-03	7/12/2002	0.0				x		(a)
			SO-SS-04	7/12/2002	0.0				x		(a)
			SO-SS-05	7/12/2002	0.0				x		(a)
TT-28	1	river	SD-TT-28-01	2/7/2001	1.0	x	x	x		x	(a)
			SD-TT-28-02	2/7/2001	1.0	x	x	x		x	(a)
			SD-TT-28-03	2/7/2001	1.0	x	x	x		x	(a)
TT-29	1	river	SD-TT-29-01	2/12/2001	2.0	x	x	x		x	(b)
			SD-TT-29-02	2/12/2001	1.5	x	x	x		x	(b)
			SD-TT-29-03	2/12/2001	1.5	x	x	x		x	(b)
			SD-TT-29-03-TR	6/19/2001	1.0	x	x	x		x	(b)
TT-30	2	river	SD-TT-30-01	2/12/2001	0.5	x	x	x		x	
			SD-TT-30-01-TR	6/22/2001	0.6	x	x	x		x	
			SD-TT-30-02	2/12/2001	0.5	x	x	x		x	
			SD-TT-30-03	2/12/2001	0.5	x	x	x		x	

TABLE 4-32
APPLICABILITY OF SEDIMENT SAMPLES TO EXPOSURE SCENARIOS FOR INDICATOR SPECIES

WELLS G&H SUPERFUND SITE OU3

Station	Reach	Habitat	Sample ID	Date Sampled	Standing Water Depth (ft)	Applicability of Samples/Stations to Ecological Exposures[1]					Notes
						Muskrat	Heron	Mallard	Shrew	Invertebrates	
TT-31	2	wetland	SD-TT-31-01	2/12/2001	0.3	x		x		x	(a)
			SD-TT-31-02	2/12/2001	0.8	x		x		x	(a)
			SD-TT-31-03	2/12/2001	0.5	x		x		x	(a)
TT-32	2	river	SD-TT-32-01	2/9/2001	0.8	x	x	x		x	(a)
			SD-TT-32-02	2/9/2001	0.5	x	x	x		x	(a)
			SD-TT-32-02-TR	6/20/2001	0.6	x	x	x		x	(a)
			SD-TT-32-03	2/9/2001	0.3	x	x	x		x	(a)
TT-33	2	river	SD-TT-33-01	2/8/2001	0.3	x	x	x		x	
			SD-TT-33-02	2/8/2001	0.5	x	x	x		x	
			SD-TT-33-02-TR	6/20/2001	0.5	x	x	x		x	
			SD-TT-33-03	2/8/2001	0.3	x	x	x		x	
UF	6	lake	SD-UF-01	7/18/2000	4.5	x				x	
			SD-UF-02	7/18/2000	5.6					x	
			SD-UF-02-TR	6/27/2001	7.1					x	
			SD-UF-03	7/18/2000	3.7	x				x	
UM	6	lake	SD-UM-01	7/17/2000	85.0					x	(a)
			SD-UM-02	7/17/2000	78.0					x	(a)
			SD-UM-03	7/17/2000	52.0					x	(a)
WG	1	wetland	SD-WG-01	7/13/2000	0.3	x		x	x	x	
			SD-WG-02	7/13/2000	0.2	x		x	x	x	
			SD-WG-03	7/13/2000	0.0	x		x	x	x	
			SD-WG-04	7/13/2000	0.0	x		x	x	x	
			SD-WG-05	7/13/2000	0.3	x		x	x	x	
			SD-WG-06	7/13/2000	0.3	x		x	x	x	
			SD-WG-07	7/13/2000	0.2	x		x	x	x	
			SD-WG-08	7/13/2000	0.2	x		x	x	x	
			SD-WG-09	7/13/2000	0.0	x		x	x	x	
			SD-WG-10	7/13/2000	0.2	x		x	x	x	
			SD-WG-11	7/13/2000	0.0	x		x	x	x	
			SD-WG-12	7/13/2000	0.2	x		x	x	x	
			SD-WG-13	7/13/2000	0.0	x		x	x	x	
			SD-WG-14	7/13/2000	0.0	x		x	x	x	
			SD-WG-15	7/13/2000	0.2	x		x	x	x	
			SD-WG-16	7/13/2000	0.0	x		x	x	x	
			SD-WG-17	7/13/2000	0.0	x		x	x	x	
			SD-WG-18	7/13/2000	0.0	x		x	x	x	
			SD-WG-19	7/13/2000	0.0	x		x	x	x	
			SD-WG-20	7/13/2000	0.0	x		x	x	x	
			SD-19-01-ME	11/19/1997	0.3	x		x	x	x	
WH	1	wetland	SD-WH-01	7/12/2000	0.2	x		x	x	x	
			SD-WH-02	7/12/2000	0.3	x		x	x	x	
			SD-WH-03	7/12/2000	0.2	x		x	x	x	
			SD-WH-04	7/12/2000	0.3	x		x	x	x	
			SD-WH-05	7/12/2000	0.2	x		x	x	x	
			SD-WH-06	7/12/2000	0.2	x		x	x	x	
			SD-WH-07	7/12/2000	0.1	x		x	x	x	
			SD-WH-07-TR	6/18/2001	1.2	x		x	x	x	
			SD-WH-08	7/12/2000	0.2	x		x	x	x	
			SD-WH-09	7/12/2000	0.3	x		x	x	x	
			SD-WH-10	7/12/2000	0.3	x		x	x	x	

TABLE 4-32
APPLICABILITY OF SEDIMENT SAMPLES TO EXPOSURE SCENARIOS FOR INDICATOR SPECIES

WELLS G&H SUPERFUND SITE OU3

Station	Reach	Habitat	Sample ID	Date Sampled	Standing Water Depth (ft)	Applicability of Samples/Stations to Ecological Exposures[1]					Notes
						Muskrat	Heron	Mallard	Shrew	Invertebrates	
WS	1	river	SD-WS-01	7/11/2000	0.3	x	x	x	x	x	(a)
			SD-WS-02	7/11/2000	0.2	x	x	x	x	x	(a)
			SD-WS-03	7/11/2000	0.1	x	x	x	x	x	(a)
			SD-WS-04	7/11/2000	0.2	x	x	x	x	x	(a)
			SD-WS-05	7/11/2000	0.2	x	x	x	x	x	(a)
			SD-WS-06	7/11/2000	0.2	x	x	x	x	x	(a)
			SD-WS-07	7/11/2000	0.3	x	x	x	x	x	(a)
			SD-WS-08	7/11/2000	0.2	x	x	x	x	x	(a)
			SD-WS-09	7/11/2000	0.1	x	x	x	x	x	(a)
			SD-WS-10	7/11/2000	0.2	x	x	x	x	x	(a)
WW	1	wetland	SD-WW-01	11/28/2000		x		x		x	(c)
			SD-WW-02	11/28/2000		x		x		x	(c)
			SD-WW-03	11/28/2000		x		x		x	(c)
			SD-WW-04	11/28/2000		x		x		x	(c)
			SD-WW-05	11/28/2000		x		x		x	(c)
			SD-WW-06	11/28/2000		x		x		x	(c)
			SD-WW-06-TR	6/21/2001	0.8	x		x		x	(c)
			SD-WW-07	11/28/2000		x		x		x	(c)
			SD-WW-08	11/28/2000		x		x		x	(c)
			SD-WW-08	2/6/2001		x		x		x	(c)
			SD-WW-09	11/28/2000		x		x		x	(c)
			SD-WW-10	11/28/2000		x		x		x	(c)
			SD-WW-11	11/28/2000		x		x		x	(c)
			SD-WW-12	11/28/2000		x		x		x	(c)
REFERENCE											
01I		river	SD-01-00-IP	6/21/1999	0.3	x	x	x		x	
			SD-01-00-IP-TR	6/25/2001	0.3	x	x	x		x	
02I		pond	SD-02-00-IP	6/21/1999	2.0	x	x	x		x	
03I		pond	SD-03-00-IP	6/18/1999	9.2					x	
			SD-03-00-IP-TR	6/25/2001	13.0					x	
04I		river	SD-04-00-IP	6/17/1999	NA	x	x	x		x	
			SD-04-00-IP-TR	6/26/2001	0.4	x	x	x		x	
12I		river	SD-12-00-IP	6/17/1999	0.3	x	x	x		x	
23		river	SD-23-01-FW	8/30/1995	NA	x	x	x		x	
			SD-23-02-FW	8/30/1995	1.5	x	x	x		x	
			SD-23-03-FW	8/30/1995	1.0	x	x	x		x	
24		wetland	SD-24-01-FW	8/30/1995	0.7	x	x	x	x	x	
			SD-24-02-FW	8/30/1995	1.0	x	x	x	x	x	
			SD-24-03-FW	8/30/1995	NA	x	x	x	x	x	
			SD-24-03-ME	11/12/1997	1.0	x	x	x	x	x	
25		lake	SD-25-01-FW	9/11/1995	3.5	x	x	x		x	
			SD-25-02-FW	9/11/1995	4.0	x	x	x		x	
			SD-25-02-ME	11/18/1997	NA	x	x	x		x	
			SD-25-03-FW	9/11/1995	3.0	x	x	x		x	
26		lake	SD-26-01-FW	9/11/1995	3.0	x	x	x		x	
			SD-26-02-FW	9/11/1995	2.5	x	x	x		x	
			SD-26-03-FW	9/11/1995	2.5	x	x	x		x	
27		river	SD-27-01-FW	9/12/1995	2.5	x	x	x		x	
			SD-27-02-FW	9/12/1995	1.5	x	x	x		x	
			SD-27-03-FW	9/12/1995	1.5	x	x	x		x	
HB		wetland	SD-HB-00-TR	6/26/2001	0.8	x	x	x	x	x	
SA		wetland	SD-SA-01-TR	6/25/2001	0.7	x	x	x	x	x	

(a) Data includes Inorganics only
(b) Data includes Acetone and Inorganics only
(c) <1 ft water (most WW <6" water)

E. City of Woburn

Comments on Baseline Human Health Risk Assessment

Wells G & H Superfund Site

Aberjona River Study

Operable Unit 3

Woburn, Massachusetts

Anne Marie Desmariais, Tufts University

For the Technical Outreach Services to Communities (TOSC) prorram

This review of the Aberjona River Study Baseline Human Health Risk Assessment was conducted by the Civil and Environmental Engineering Department at Tufts University on behalf of the City of Woburn City Council in order to provide comments regarding the appropriateness of the study and its compliance with EPA Superfund Risk Assessment Guidelines.

This review is limited to the Baseline Human Health Risk Assessment, and focuses on the methodology and conclusions. This review did not evaluate the completeness or validity of the data used in the Risk Assessment.

The Wells G & H Human Health Risk Assessment used data from multiple sampling rounds conducted between 1995 and 2002. The Wells G & H area has been the subject of intense study since the early 1980's. This Risk Assessment, which was done by Metcalf & Eddy for EPA Region 1, focused on the Aberjona River from Route 128 to the Mystic Lakes, and included sediment, surface water, and some upland soils in its sampling and analysis program. It also evaluated fish tissue, and considered eating some fish from the Aberjona River and the Mystic Lakes as exposure pathways. The Wells G & H Superfund site is included within the boundaries of the Study Area, which does not include the Industriplex Superfund site, north of Route 128.

The purpose of Risk Assessment under Superfund, which is the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) is to determine if a site that has been contaminated by release or disposal of hazardous wastes presents an

unacceptable risk to human health, human welfare, or the environment. The Human Health Risk Assessment should not be used to attempt to determine if specific individuals who live in the City of Woburn are at risk of becoming ill as a result of living near the Study Area. The Risk Assessment uses hypothetical scenarios, which describe the types of contacts that people may have with contaminated environmental media, either under the current conditions present at the site, or under future conditions. In this case, the future scenarios presumed that a park or some other area where recreation was encouraged would be present on portions of the site in the future. If this were to be the case, there would be more opportunities for contact with contaminated water and sediment.

The purpose of Risk Assessment is to determine if the risks under the conditions assumed by the risk assessor are higher than levels determined to be acceptable based on the Superfund guidance. The Risk Assessment looks at risk of getting cancer and at risk of getting other illnesses, such as kidney disease, immune dysfunction, reproductive disorders, and other non-cancer effects. Each type of risk is evaluated separately, and is based on calculations of exposures, or doses, of chemicals that the hypothetical persons would incur. These exposures are compared to toxicity values that are derived from studies on the effects of each chemical found at the site. The comparisons allow the risk assessor to characterize the risk from each chemical related to each type of exposure. This Risk Assessment evaluated exposures to chemicals in some upland soils near the River, sediment, and surface water, as well as in fish, to people who wade in the River, swim in the Mystic Lakes and certain parts of the River, and play or walk in the flood plain. The Risk Assessment used conservative assumptions that hypothetical people were exposed to contaminants by ingesting small amounts of sediment, soil, and surface water, eating fish, and primarily from contacting surface water, soil, and sediment with their skin.

The Risk Assessment used different exposure factors for different sections of the River. These factors were conservative, but within reasonable expectations for some individuals. By using conservative factors, the Risk Assessment has greater validity, because if there

is no unacceptable risk with conservative factors, risk managers will have a lot more confidence in the outcome. If under reasonable worst cases, such as an older child or teenager playing in the River nearly every day in the summer, the risks are all below the limits of concern, then it is easier for risk managers to decide that no additional studies or no remedial action is needed. If a Risk Assessment does not use reasonable worst case scenarios, it is difficult to reach decisions about possible cleanup because there will always be nagging questions about whether some individuals who are exposed to the contaminated environment are at a higher risk that the Risk Assessment indicated.

The Risk Assessment assumed that for the worst case, a person swims or wades in the River 104 days per year, for 24 years for adults and six years for children, in the most accessible portions of the river. For less accessible areas, the Risk Assessment assumed that people went into the River 26 times per year, or twice a week during the summer, between late May and Labor Day. Although the argument could be made that EPA's consultant should have used the same conservative factor, 104 days per year, or approximately every day between the middle of May and Labor Day, using more conservative exposure factors would not change the overall conclusion of the Risk Assessment, although it would identify additional areas of the River that presented unacceptable risk.

EPA Response: ***Generally, stations were evaluated with a future exposure frequency of 78 days per year. This exposure frequency is adequately protective of recreational exposures in undeveloped areas (i.e., not in close physical proximity to residences). The exposure frequency of 26 days per year was only applied to a small number of stations where future land use is assumed to remain the same as current land use, due to their location further into the wetland or abutting Route 93 (station AM). The 104 days per year exposure frequency was utilized for areas where residences were close to the station, in some cases, immediately abutting the area. Using an exposure frequency of 104 days per year for areas not near residences would likely overestimate the risk associated with these stations.***

The methods used for this Risk Assessment were appropriate and consistent with Superfund Guidance. The study included a large number of samples and sampling rounds. In some cases, the data were not complete because some sampling locations were not included on all rounds. However, the overall data set used for the Risk Assessment include adequate data for the evaluations and analyses that were performed. It is likely that slightly different conclusions about risk would be reached if there were additional data points. However, the overall conclusion of the Risk Assessment would not change.

EPA Response: ***Sampling was conducted in depositional areas likely containing the highest levels of contaminants. Additional sampling would likely demonstrate contaminant levels consistent with those already determined.***

There were three objectives of the overall study, and these objectives were followed in the Risk Assessment. The first objective was to identify contaminated environmental media and to determine the Contaminants of Potential Concern. The second was to identify pathways of exposure to the contaminants and to evaluate potential health effects and toxic responses. The last objective was to identify sampling locations where environmental media do and do not contribute to health risks.

The focus of the Human Health Risk Assessment sampling was on portions of the River study area where people would likely contact surface water, sediments, or the upland soils subject to flooding from the River. This was an appropriate emphasis for this study. The samples were analyzed for all Superfund target analytes and target metals, and the method used to select the Contaminants of Potential Concern for this site was appropriate. The Contaminants of Potential Concern for this site for the three environmental media studied were properly selected.

The Human Health Risk Assessment evaluated the following pathways for human exposure:

1. Recreation including wading: ingestion of sediment and surface soil; dermal contact with surface water, sediment, and surface soil.
2. Recreation including swimming: ingestion of surface water and sediment; dermal contact with surface water and sediment.
3. Recreation including fishing: ingestion of fish

This Risk Assessment evaluated both the most likely exposure scenario, using the average of the contaminant concentrations in environmental media (CT or central tendency exposures), and the worst case exposure, using the upper 95 percent confidence limit of the means of the concentration data (RME, or reasonable maximum exposures). This is consistent with Superfund Guidance. Exposure doses were calculated for each of the three receptor scenarios listed above using both the CT and the RME receptor. This Risk Assessment evaluated adults, children and older children for each exposure scenario.

The Baseline Human Health Risk Assessment concludes that Hazard Indices are greater than 1 and that ILCR's are greater than 1E-04 at some locations within the Study Area based on both current and future recreational scenarios. This means that the noncancer risk, indicated by the Hazard Index, and the cancer risk, indicated by the ILCR, are unacceptable at some locations based on the exposure analysis used. These risks require EPA to consider further action at the site. In addition, several ILCR's are between 1E-6 and 1E-4. Cancer risks in this range require EPA to make site-specific decisions about risk, based on several factors, including the likelihood that people may be exposed to contaminants. Because it is likely that people will be exposed to contaminants in the river, seeing the river flows within highly populated areas, it is recommended that EPA consider conservative action at locations where the risks are in this range.

EPA Response: ***The human health risk assessment has evaluated and documented the risk at all human health exposure stations, including those where the estimated risk is***

within or below regulatory guidelines. These risk calculations, along with site-specific considerations, will be factored into risk management decisions for the study area.

The primary concerns are with arsenic in the sediments. Benzo(a)pyrene also contributed to cancer risk in four of the sampling locations, but the risks from this compound were within the EPA risk range, although greater than 1E-06. The risks from arsenic in sediment drive the Risk Assessment, and should be considered the most significant risks at this site.

The inclusion of benzo(a)pyrene as a Contaminant of Potential Concern, although supported by the data, is a possible point for discussion, as this compound could have originated from sources other than those historically associated with the Wells G & H site. Benzo(a)pyrene is a polycyclic aromatic hydrocarbon produced from combustion of fossil fuels as well as from other combustion sources. It is also present in heavy oils, coal, asphalt, and other petroleum-based products. It is present in road runoff and in atmospheric deposition in urban areas. Benzo(a)pyrene in the sediments could have originated from several sources in addition to the G&H site and Industriplex. However, the cancer and noncancer risks from arsenic are significantly higher than those from benzo(a)pyrene, and provide sufficient basis for the conclusion that portions of the site warrant further evaluation and remediation in order to be used as a recreational area.

EPA Response: ***The significance of benzo(a)pyrene as a risk contributor will be evaluated further through the risk management, feasibility study, and proposed plan process. Data within the BRA suggest that this compound is present at levels consistent with those found at background locations.***

The Human Health Risk Assessment must be considered along with the Ecological Risk Assessment, which demonstrates potential significant risks to the environment in the Study Area. Given the relatively limited human contact with sediments and surface water throughout most of the Study Area, and the relative inaccessibility of the most highly contaminated areas, the human health risks must be communicated to the public in an

appropriate manner. If individuals are concerned about the risks associated with exposure to the river water and sediments, they should be cautioned against that exposure. Avoiding the river and its sediments will protect against risk from arsenic in the sediments. This is not a substitute for remediation, but advising against contact should be part of any risk communication program in Woburn. People should be reassured that they are not at risk of cancer or other illnesses from these exposures if they do not contact the sediments.

EPA Response: ***An active community relations component is in place for this project. Public meetings have been held, informing the public of the results of the human health and ecological risk assessments. These public forums will continue as more information becomes available for the study area or as need dictates. It is anticipated that the next public meeting will occur after the completion of the Comprehensive Remedial Investigation Report.***

Third Party Review of the Baseline Risk Assessment of the Aberjona River Study Area

Christopher Perkins, M.S.
University of Connecticut
Technical Outreach Service to Communities
USEPA Center for Hazardous Substances in Urban Environments

Objective

The objective of this document is to provide a third party review of the "Baseline Human Health and Ecological Risk Assessment Report – May 2003" and evaluate 1) the protocols applied in the studies used in the risk assessment (RA); 2) interpretation of information included in the risk assessment; and 3) report conclusions.

Questions Addressed in the Review

To fully evaluate this document, there were specific questions which required consideration:

1) Was the ecosystem properly characterized and then the information applied appropriately in the RA?
2) Was the selection of contaminants of potential concern (COPCs), receptor species, assessment and measurement endpoints appropriate?
3) Were the estimates of exposure and effects metrics appropriate?
4) Were the statistical techniques used appropriate and properly applied?
5) Was the assessment of risk supported by the available information?
6) Were the uncertainties in the analysis of the endpoints identified and adequately addressed?
7) Is the weight of evidence analysis regarding risk appropriate?

EPA Response: Responses are provided to the specific comments, below.

General Comments

Based upon my review of the report there was an adequate characterization of the site as it relates to surface water and sediment sampling. In addition, appropriate methodologies and associated detection limits were utilized for chemical characterization, with the possible exception of PCB Aroclor analysis. Aroclor analysis of biota (small fish and crayfish) is not appropriate for use in ecological risk assessment due to the potential underestimation of total PCBs. It should be noted that the use of more appropriate congener analysis would not change the associated risk to the indicator species.

EPA Response: No response required.

The biggest weakness of this report, from the ecological risk perspective, is the lack of a formal survey of flora and fauna. As a result of this, there may have been a more appropriate species that could be utilized as an indicator of risk for a species from a higher trophic level. The habitats, especially in reaches 1 and 2, are suitable for weasel species and possibly mink. These two mammals or an applicable raptor species, owl or hawk, are top level predators and are more representative of maximum exposure and potential effects. The report adequately took into account applicable exposure scenarios regarding home range and habitat usage, by undertaking both site-wide and 38 acre scenarios for muskrat and mallard indicators.

EPA Response: Although no formal survey of flora and fauna were conducted, habitats were qualitatively surveyed during several site visits on numerous dates by qualified biologists. In 1985, the USEPA conducted an evaluation of the wetlands near Wells G&H to determine the extent and type of wetlands in the study area (PRC, 1986). In both 1995 and 1997, USEPA, USF&WS, and NOAA biologists were extensively involved in qualitative field surveys, biological sampling, and reference site selection. The qualitative assessments provided an adequate characterization of the major flora and fauna present or potentially present based on habitat conditions. It was the opinion of EPA and the other reviewing resource agencies (USFWS, DEP, NOAA) that the characterization and qualitative description of the site from the early surveys were sufficient to develop a sound site conceptual model and problem formulation. More recently, in preparation of the revised BERA, the majority of the sampling stations were re-visited by teams of biologists from EPA, USFWS and DEP to confirm the habitat conditions and suitability of each station to represent each of the wildlife receptors, and also to select the sampling locations for the triad sampling. In addition, Habitat Assessment Field data sheets were completed (Appendix C) for each of the triad sampling locations. EPA believes that the site was adequately characterized for the purposes of the BERA. It is not a practical expectation or necessarily the goal of a risk assessment to provide quantitative data on all flora and fauna in a resource area.

The selection of receptor species was based not only on organisms potentially present, but also on the ecotoxicity of the contaminants identified on site. Using higher trophic level species would have been more appropriate if the major COPCs were organic compounds that are bioaccumulative. Metals, in general, and arsenic, specifically, do not tend to bioconcentrate in the food chain. In order to select receptors with greatest exposure, omnivorous species (muskrat and mallard) were selected. In order to address the issue of a potentially sensitive predator, however, the heron was included to provide a thorough and conservative assessment.

The selection of the COPCs was appropriate based on the criteria utilized in this study. The selection tended to be more inclusive by utilizing the maximum detected levels of the

chemicals as a screening method. This allowed for a more inclusive list of chemicals in the risk assessment than if alternate methods were utilized.

EPA Response: In accordance with EPA guidance, screening was conducted based on maximum observed concentrations in each medium of concern.

The report acknowledges the magnitude of uncertainty when it is associated with a benchmark. An example of this is the use of benchmark analysis in sediment for invertebrates and the acknowledgement of the uncertainty associated with bioavailability. However, in some cases uncertainty was not addressed. This is the case for the sediment toxicity testing data. There was no adequate explanation for the differences in the data or uncertainty associated with 10 day vs. chronic tests and reference vs. control comparisons.

EPA Response: See response under Specific Comments.

This report tends to accurately portray risk associated with each of the macro indicator species. The weight of evidence presented in this report support its assessment of risk for each of the indicator species within the study area.

EPA Response: No response required.

In general, this report tended to be conservative in its estimates of risk. One example that illustrates this is the way the report treats analytical data for use in the risk assessment. Analytical detection limits vary from sample to sample based upon dilutions and sample weight, and can be high in some instances. The report assigned ½ the sample specific detection limit to any data where data was reported from the laboratory as below the detection limit. This is standard practice, because it is assumed that the true sample concentration is somewhere between 0 and the detection limit.

EPA Response: It is standard practice to use ½ the detection limit for the sample, especially if the detection limit was not high and/or the contaminant was detected at quantified levels in other samples (USEPA, 1989).

One thing that needs to be taken into consideration while interpreting this report is that a Risk Assessment is a tool and not a certainty. It is meant to be used to guide management options which will enable regulators, decision-makers, and the public make better informed decisions. Inconsistencies are to be expected in a complex system, and

EPA Response: In the Risk Assessment Process for Superfund, completion of the baseline ecological risk assessment represents a step prior to preparation of the RI and Feasibility Study Reports and before scientific/management decisions related to

potential cleanup and preparation of a record of decision (USEPA, 1997). As a major part in the process, the BERA will be used by EPA to make an informed risk management decision.

Specific Comments

No formal surveys of flora or fauna was conducted
The biggest weakness of this report, from the ecological risk perspective, is the lack of a formal survey of flora and fauna. When conclusions are made regarding potential impacts on the survival and/ or reproduction of muskrats and mallards (pg 4-126) with no supporting field data, it only opens the door for uncertainty. This is especially true considering that in these two cases, there was a moderate level of uncertainty associated with the risk (Table 4-275). A survey can help assess whether or not these populations are stable, increasing, or decreasing and allow for comparisons with published data.

EPA Response:

EPA believes that the site was adequately characterized for the purposes of the BERA. It is neither a practical expectation nor necessarily a goal of a risk assessment to provide quantitative data on all flora and fauna in a resource area. In addition, quantitative surveys are very unlikely to detect population effects in highly mobile animals such as the muskrat and mallard. The results of the BERA identified probable effects (i.e. chronic impacts) on reproduction. For the BERA, the assessment population was operationally defined to be the population within study area (Aberjona River Basin, south of Route 128). The population is regulated by births and deaths (which may be affected by site conditions) as well as immigration and emigration of individuals from adjacent areas. Severe effects on a receptor could remove individuals from the assessment population, or decrease reproductive rates and cause the study area to serve a sink for the regional population. In this case, lower reproduction rates within the study area might be compensated by an increase in immigration. The resulting subtle impacts on population density within the study area would not likely be detected using standard field survey methods.

No formal sampling of indicator species for target organ analysis

The other main weakness in this report is its lack of tissue sampling from the higher level organisms/ indicator species. One potential criticism that can be aimed at this report is that you cannot assume that 100% of the chemical ingested is bioavailable (i.e. 100 % can be assimilated into the organism through the digestive process). There was an exception made for arsenic, where a laboratory study set this at 50% in the mammalian species. The 100% factor tends to be conservative in its estimation of risk.

By conducting analysis of tissues in indicator species, one can get a better idea of an individual's exposure and associated contaminant accumulation. The use of tissue

analysis can give a much truer estimation of what the species are being exposed to. Additionally, body burdens can be compared to data published in peer reviewed literature to help assess individual and population level effects. This tool could be used for the shrew and muskrat with minimal field effort. When this tool is used in conjunction with the other metrics, it can increase the weight of evidence regarding ecological risk.

EPA Response: No tissue samples were collected from mammalian or avian species, however, tissue samples were collected and analyzed for several fish species. Although acute or subacute arsenic exposure can lead to elevated tissue residues (Eisler, 2000) in some mammals, low-level chronic exposures may not result in elevated tissue levels. Inorganic arsenicals are metabolized by many species and usually excreted rapidly in the urine. In studies on mallards, arsenic did not accumulate significantly in either the brain or the liver (Camardese, et al., 1990). Although arsenic was absorbed from the intestinal tract of young chicks, after the earliest stages (3 weeks) it is rapidly eliminated from the body. These studies conclude that although arsenic associated with vegetation could alter growth, development and physiology of ducklings, at low doses, there may not be indications of elevated concentration in brain or liver tissue. Consequently, sampling for tissue residues may not clarify the conclusion of effects on these species, if there are no tissue residue concentrations at which effects have been consistently documented for the species. The paucity of data linking tissue residues to effects contributed to EPA's decision not to collect samples from receptor species other than fish.

The quantitative analysis of PCBs as Aroclor equivalents in biota for use in risk assessment

Aroclor analysis of prey items (i.e. fish, crayfish) can result in a significant error in assessing the toxicological significance of PCBs especially as it relates to bioaccumulation. Aroclor analysis is based upon the assumption that the distribution of PCB congeners in biota is similar to that of the parent Aroclors. Aroclors are altered significantly via biological processes, which does not allow for an accurate analysis. These changes can significantly underestimate the actual concentration of PCBs in biological tissue. In some published reports and studies Aroclor analysis may underreport the total PCB concentration by 230% (USEPA Publication 823-B-00-007). Either PCB congener or homologue analysis is a more appropriate method for analysis. Unfortunately the only biota data is from the 1995 sampling round and congener and homolog analysis were not in common use during this period.

The use of Aroclor equivalents enters additional uncertainty into the estimates of risk by underestimating exposure from potential prey items, especially under the maximum case scenario. Although this potential underestimation may not effect the risk characterization, there should be some mention of this under uncertainties.

EPA Response: As noted in the comment, the original data was collected at a time when PCB congener and homolog analysis were not in common use. Consequently,

this analysis was not done. EPA acknowledges the uncertainty associated with the underestimation of PCB toxicity from prey items. However, as the comment acknowledges, PCBs were detected infrequently and at low concentrations in the study area. Inclusion of a more detailed analysis of PCB risk was not indicated from the potential risk calculated from the exposure to PCBs in the study area.

Muskrat (mallard) are likely present throughout the entire study area (pg 4-39) or overgeneralization of habitat use

The general assumption is made that muskrat populations inhabit all reaches of the watershed. The report states "Muskrats...likely occur in all of the open water habitats within the study area". Unfortunately with no actual population assessments, this statement must be taken with skepticism. It is implied in section 4.2.2.2 that the habitat quality, outside of the 38 acre wetland site (Wells G&H), is poor due to the presence of scrub and forested wetlands, maintained park lands, and encroaching development. The majority of anticipated muskrat activity would occur in reaches one and two, the areas with the highest ecological risk to the populations. Based upon my review of the appended field notes, aerial photographs, and limited first person observation, the remaining reaches, including the mystic lakes are not prime habitat for muskrats.

EPA Response: Comment noted. EPA, DEP, USF&WS, and various contractor biologists observed the entire study area. The study area was considered capable of supporting muskrat habitat, and there was a strong presence of muskrat habitat in Reach 1 and 2. The muskrat was selected to represent the assessment endpoint for aquatic mammals in the study area. Other aquatic mammals were also present in the study area, such as the beaver and river otter. It is important to note that the ecological risk assessment broadly evaluates the potential risks to various ecological habitats. The selection of the muskrat and calculated ecological risks represent risks to the muskrat and aquatic mammals.

Inconsistencies in the 10 day vs. the chronic toxicity tests are not adequately explained

On several occasions, growth and survival effects that occurred during the 10-day acute test did not occur in the chronic tests for the respective site and test species. Additionally, on several occasions the station vs. reference toxicity differs from the comparison to the laboratory control samples (Tables 4-267 and 4-268). There was no discussion of these occurrences in the document. Since both the control and reference tests are key in the interpretation of the data, any inconsistencies that occur when comparing the data should be addressed.

EPA Response: Variability in toxicity tests is not unusual. The only stations with significant difference in* C. tentans *growth for the ten-day growth experiments, as compared to laboratory controls, are stations 12 and 13. However, for stream and wetland samples, stations TT-32, 13, TT-30, 12, 18, 10 had lower growth of* C. tentans *as compared to laboratory controls. The three stream stations with highest arsenic

concentrations (Stations 12, 18 and 10) did demonstrate the lowest growth rate of C. tentans, *and similarly, the four wetland stations with the highest arsenic concentrations had the lowest growth rates for* C. tentans, *although the growth at all stations but 12 and 13 were not significantly different from the laboratory controls. This is due, in part to poor growth rate of* C. tentans *in the laboratory controls. This is why, when comparing these low growth rates against reference samples, significant differences were documented for stations that did not show significant differences in the comparison with laboratory controls.*

Although laboratory controls are frequently used as the basis of comparison for determination of significant toxicity endpoints, this is not their purpose. A major purpose of the laboratory controls are to establish that laboratory conditions (organism health, temperature, dissolved oxygen, ammonia concentrations), are maintained at acceptable growth levels during the test. Since the laboratory controls are based on artificial sediments, it is not uncommon to observe reduced growth of organisms in the laboratory controls, as compared to field reference. In reality, the better measure of comparison for possible chronic effects is natural reference sediment.

In the 20-day growth measurements, none of the stations had a significantly lower growth than the laboratory controls. The growth after 20-days was more variable, in part because it was based on fewer surviving individual organisms. Often in toxicity tests, the number of surviving individuals in a replicate influences the growth rate of the remaining individuals. In addition, the fewer number of individuals remaining decreases the power of the statistical tests to detect differences.

However, using these growth data for the 10-day C. tentans *tests, a consistent trend for lower growth rates on sediments with higher arsenic concentrations was observed. A plot of sediment arsenic concentration (log-transformed) versus the 10-day growth of* C. tentans *indicates the decreasing growth as compared with increasing arsenic concentration. This is a statistically significant relationship (r^2 = -0.70, p = 0.004, n=15) for wetland and stream samples alone or for all 20 samples, including the 5 lake/pond locations (r^2 = -0.65, p=0.002, n=20).*

This statistically significant relationship of arsenic concentration with growth of C. tentans *is not the sole basis of EPA's conclusion of evidence of impairment of benthic invertebrate communities associated with high concentrations of metals, including arsenic. These results were supported by other lines of evidence and presented in the text of the BERA. The growth of* H. azteca *was also significantly reduced as compared to reference at stations TT-33, TT-32, 19 and 13. Reduction in growth of* H. azteca *was correlated to arsenic concentration in the sediment. The analysis of community statistics also support the conclusions that the same stations with reduced growth of* C. tentans *and* H. azteca, *and high metal concentrations, also showed reduction in diversity and high dominance of pollution-tolerant species. As stated in the BERA, EPA believes these separate lines of evidence, cumulatively, indicate that there is impairment of the benthic invertebrate communities at the stations with higher*

metals concentrations, which is most closely associated with the concentration of arsenic.

The use of superfluous and potentially confounding metrics in the assessment of the benthic invertebrate community composition

The use of % Oligochaetes and Chironomids analysis to help determine community abundance can be confounding in the analysis of the data. All of the stations selected were to represent depositional (i.e. fine sediment) areas, which would be expected to have a high abundance of these species. This in and of itself adds uncertainty to the data analysis by predisposing these sites to be high and then utilizing this in your analysis.

EPA Response: Community metrics used by EPA were considered relevant and appropriate. Many of the "standard" indices are most suitable for stream communities in riffle/run habitats. In the slow-moving, depositional environments characteristic of the samples in the river and wetlands, some of the "normal" stream metrics are not applicable. However, all of the metrics used are listed in Barbour, et al., 1999 or Plafkin, et al., 1989 as acceptable community metrics, and most have been used in other studies of metal toxicity to evaluate similar data sets (e.g., Canfield, 1994). The only modification of these metrics was to use the tolerance of the dominant species as a simplified metric rather than Hisenhoff's Biotic Index and to use percent oligochaetes plus chironomids, rather than just percent chironomids. Due to the depositional nature of the sediments, it is not surprising that high abundances of oligochaetes and chironomids are found. It has been noted in other studies, high proportions of these groups, with the relative low proportions of other taxa are usually considered indicative of contaminated sediments (Canfield, et al., 1994). Based on these characteristics, evaluation of percent dominant and percent oligochaetes and chironomids was considered relevant.

References:

Eisler, R. 2000. *Handbook of chemical risk assessment: health hazards to humans, plants and animals, Volume III: Metalloids, radiation, cumulative index to chemicals and species.*. Lewis Publishers, Boca Raton, FL.

U.S. Environmental Protection Agency (USEPA). 1997. Risk Assessment Guidance for the Superfund Program.

Carmardese, M.B., D.J. Hoffman, J. LeCaptain, and G.W. Pendleton. 1990. *Effects of arsenate on growth, physiology in mallard ducks.* Environmental toxicology and Chemistry. 9:785-95.

F. Town of Winchester

August 19, 2003

Ms. Angela Bonarrigo
U.S. Environmental Protection Agency
One Congress Street, Suite 1100 (HIO)
Boston, MA 02114

Dear Ms. Bonarrigo:

Re: Draft Baseline Human Health Risk Assessment Report
Aberjona River Study Area

The town of Winchester appreciates this opportunity to comment on the Draft Baseline Human HealthRisk Assessment Report (the Draft Report). Overall, we find the Draft Report to be thorough. For simplicity, our comments are numbered below:

1. Arsenic concentrations in Davidson Park -- We note that arsenic and other contaminants have been detected in the soil and sediments in and around Davidson Park. Recognizing and accepting EPA's methodology which indicates that the levels are within acceptable limits,. please comment on the relationship between your risk findings and DEP's standards. Of particular interest are EPA's exposure assumptions and how they compare/differ with the residential and recreational exposure assumptions in DEP's published standards.

EPA Response: DEP's regulation (the Massachusetts Contingency Plan or the MCP) provides for 3 different methods of evaluating risk. We assume that the DEP standards mentioned in the comment are referring to the MCP risk assessment Method 1 standards, which are promulgated lists of soil and groundwater standards that are compared to contaminant concentrations detected at a site. All of the DEP risk assessment procedures are intended to be generally consistent with guidance provided by the EPA; however, the EPA's methods are most similar to DEP's Method 3 risk characterization procedures, which employ site-specific information, including potential exposure scenarios, to evaluate the risks of harm to health, public welfare and the environment and develop site-specific clean-up numbers. Generally, Method 1 standards are not intended for use in Method 3 risk assessments. Nevertheless, to address the comment a comparison of the Method 1 MCP standard exposure assumptions and those used in the EPA risk assessment are set forth below.

DEP's Method 1 S-1 soil standards are based on a residential scenario which assumes 153 days of outdoor exposure and 212 days of indoor dust exposure per year. The Wells G&H OU-3 risk assessment for Davidson Park assumed 78 days of outdoor exposure per year. Both EPA and DEP methodologies evaluate childhood and adult exposures. EPA uses higher soil ingestion rates but lower dermal adherence factors and skin surface areas than DEP. These factors would tend to offset each other. Toxicity assumptions are generally consistent between the two. However, the 2003

Wells G&H OU-3 report may have used some updated toxicity values that have not, as of yet, been incorporated into the DEP standards. The most notable difference between the two methods is that DEP's Method 1 standards are based on a cancer risk of $1x10^{-6}$ and/or a noncancer hazard quotient of 0.2 for individual compounds, while the Wells G&H OU-3 risk assessment uses a cumulative risk management guideline for all contaminants of a cancer risk between 1×10^{-6} and 1×10^{-4} and a target organ hazard index of 1. The DEP's Method 1 standards are developed to be used generically and to be protective of sites with multiple contaminants present. By using Method 3/EPA-type risk assessment methods, more precise estimates of risk can be developed, since site-specific information is used and cumulative risk (the presence of multiple contaminants) is factored into the evaluation.

2. Impacts from future flooding events – We understand that the conditions described in the Draft Report are based upon conditions that have been measured one or more times between 1995 and 2002. The town of Winchester has the following concerns about how future heavy rain/high river flow/flooding events may change these conditions and impact Winchester and its residents in the future. Our concerns are as follows:

a. If no cleanup is performed in Woburn and other portions of the Aberjona River, will additional contamination continue to migrate downstream, particularly into areas of the river that Winchester may have dredged or excavated as part of its flood control projects?

EPA Response: The comprehensive Remedial Investigation (RI) for the entire study area, north and south of Route 128, being prepared by TetraTech NUS, will evaluate and address potential downstream migration of contaminated sediments. One goal of the RI is to understand the transport of contamination within the study area so that measures may be implemented to prevent downstream migration, as necessary.

b. Will implementation of Winchester's flood control projects affect EPA's conclusions of no unacceptable risk to human health?

EPA Response: At this time, EPA does not believe the Town's proposed work will affect EPA conclusions. EPA and the Town have discussed their potential projects, and the agency has suggested that the Town's contractor collect additional information in areas they propose work and assess the situation further with their LSP. EPA understands that the Town's contractor has collected some additional sediment information and the results are consistent with Agency data. Note: EPA has recently collected sediment core samples at 13 locations along various reaches of the river to evaluate historical contamination deposition. These sediment core samples will be evaluated for potential human health risks posed by dredging. EPA will document the results of the dredging risk assessment in the revised Wells G&H OU-3 Risk Assessment report. At this time, EPA does not anticipate that the dredging risk assessment will affect EPA's Aberjona River Study conclusions.

c. Based on the Report's findings, would EPA require notification from Winchester prior to undertaking any of the flood control projects along the

Aberjona River and its banks?

EPA Response: EPA would request that Winchester officials communicate the findings of any sampling conducted at areas targeted for dredging/excavation. EPA can then work with the community to provide guidance in maintaining a condition of no significant risk.

3. Sampling adequacy – Please explain the rationale for the sampling locations, in particular whether enough samples were collected in Winchester to assess the risk to human health and the environment? We note that no samples were collected between Bacon Street and the Upper Mystic Lakes, a slow moving portion of the river that appears to be an area of heavy sediment deposition.

EPA Response: Sampling was conducted further upstream of these areas in depositional locations. Since contaminant levels are generally decreasing from north to south, locations in Winchester were selected to represent what were believed to be the most highly contaminated depositional areas. These locations demonstrated contaminant levels corresponding to risks below regulatory guidelines. Therefore, it may be inferred that other depositional areas within Winchester, downstream of those that were sampled, would also demonstrate similar levels of contaminants and risks. Notwithstanding this approach, EPA will further assess the area between Bacon Street and the mouth of the Aberjona River, and agrees with the Town that the area is much wider, slower moving and may contain significant sediment deposition. As a result, EPA will collect additional sediment samples in this area to further evaluate human health and ecological risks. The evaluation of these data will be presented in the revised Wells G&H OU-3 Risk Assessment.

4. Residential Areas - The Winchester Board of Health has inquired as to why residential areas adjacent to the Aberjona, **that are prone to flooding,** were not sampled and included in the risk assessment as these areas represent different exposure scenarios than those contemplated in the Report. Will this issue be addressed in your fate and transport report? If not, please explain the basis for the scope of the assessment work.

EPA Response: Soils samples were collected along frequently flooded areas of the river (e.g., Davidson Park and Kraft Foods), as well as other frequently flooded areas further upstream in Woburn such as Danielson Park and the former Cranberry Bog. Human health risks were assessed at each of these locations and considered to be within acceptable guidelines. Soil contaminant levels in residential yards, present as a result of flooding events, are expected to be lower than those present in soils on the river banks or sediments within the streambed. The extrapolation of the recreational risk calculations to a residential scenario indicates that risk above regulatory guidelines would not be present at these residences. This extrapolation assumes that the measured contaminant levels would be present in the residential yards. This issue will be discussed and documented more fully in the revised Wells G&H OU-3 Risk Assessment. The revised Wells G&H OU-3 Risk Assessment will also evaluate storm

event surface water data, collected after the draft risk assessment was completed, to determine the risk to residents who contact this medium during flooding events.

Thank you for the opportunity to comment and request clarifications on this important subject.

Very truly yours,

Brian F. Sullivan
Town Manager

BFS/pt

cc: Board of Selectmen
Mark J. Twogood
Wade Welch
Hamilton Hackney
Joseph Tabbi
Board of Health
Joseph Lemay

G. Other Comments

Comment provided by Ms. Carol Michelini on April 30, 2003:

Dear Ms. Bonarrigo,

I am a resident of Woburn and I just received the pamphlet that was left at the homes in the area. My question is what type of impact has the resent flooding had on the homes and yards along the Old Cranberry Bog due to this contaminated sediment? In the past few years there have been some extensive flooding along the Aberjona River. During the last severe storm the Aberjona River overflowed on to Salem Street and the companies along the street were flooded. I live on Pernokas Dr and I know that the house along the street in the back had water up to their back yard (the bog is directly behind them). The house on the corner of Washington St and Washington Circle was completely flooded, the yard was under several feet of water and the house had a considerable amount water in the lower level. They sold the house this past fall. Also what about the families that lived here in the past? I know of many people I went to school with that would play in and around the bog when they were younger. The bog was a great place to ice skate years ago.

Thank you.

EPA Response (provided to Ms. Michelini on May 2, 2003): The study evaluated potential health concerns to adults and children using the river sediments and floodplain soils areas for recreational purposes. The floodplain includes low lying areas intermittently flooded by the river which may transport contaminants to the floodplain. Evaluation of these floodplain areas did not reveal any health concerns to children or adults. In addition, contact with surface waters coming from the river, which might occur during times of flooding, was also not of concern.

Only one of seven areas evaluated within the former cranberry bog indicated a health concern to children and adults who come in contact with sediments. This area was CB-03 which is located on the west side of the center of the cranberry bog. As a landmark, the center of the cranberry bog contains a recently constructed foot bridge. The exterior drainage channels to the west of the foot bridge is the area representing exposure station CB-03. This station is on the opposite side of the cranberry bog (west side) from your property and neighborhood. We will work with the town at posting signs by this area.

Near your property and the house at the corner of Washington and Washington Circle , we collected sediment samples along the edge of the bog in back of residential yards (e.g. station CB-01 and CB-02). These sediment samples exhibited relatively low levels of metals , such as arsenic. Neither of these areas were a health concern, nor is the residential use of these properties a health concern.

Comment provided by Mr. Hamilton H. Hackney, III, on April 29, 2003:

Angela - I have two questions concerning the draft risk assessment for the Aberjona that USEPA recently released:

1. When does the 60-day public comment period end?
2. The figures for the risk assessment are not available with the .pdf file online. Are they available electronically?

Thank you.

EPA Response (provided to Mr. Hackney on May 1, 2003): The report was publically released on April 28, 2003. The 60 day comment period will conclude on June 27, 2003.

The figures should be accessible through the internet web address provided in EPA Fact Sheet (www.epa.gov/region01/superfund/sites/wellsgh/42364_TOC_Text.pdf). If you have a telephone dial up modem, then it may take up to 5 minutes per figure to download. If you continue to have difficulty downloading the figures, please reply to this e-mail with a telephone number and EPA will have a technician contact you directly for assistance.

Comment provided by Mr. James Graham on April 28, 2003:

Angela,

Thanks for the recent information on the Aberjona River. Our home is located on Marilyn Ct., which is the third right off of Washington Street as you travel from Salem St. Woburn going south towards Winchester. Our culdesac backs up to the cranberry bogs and I would guess the Aberjona River is about 150 yards from our house (although the cranberry bog area seems fairly wet and I'm sure the river runs higher at different times).Going by the map you circulated, our house would be located about 150 yards east of the Aberjona River and perhaps slightly north of sample station CB-03.

My questions are, from your study, are there any indications of health risks for children (or adults) playing in the street, in the yards or,in general living in this area ? Also question # 2 : my wife would like to start a vegetable garden in our yard, is that okay or would there be any health risks associated with the consumption of vegetables grown here?

Thanks very much,
Jim Graham

EPA Response (provided to Mr. Graham on May 1, 2003): The study evaluated potential health concerns to adults and children using the river and floodplain areas for recreational purposes. The floodplain includes low lying areas intermittently flooded by the river which may transport contaminants to the floodplain. Evaluation of these floodplain areas did not reveal any health concerns to children or adults. Therefore, areas that do not flood and are

further removed from the river (upland areas) would not be a health concern. Typical residential use of these upland areas, including a vegetable garden, would not be of concern.

One area within the former cranberry bog did indicate a health concern to children and adults should contact with sediments along a drainage channel located at the west side of central portion of the cranberry bog occur. As a landmark, the center of the cranberry bog contains a recently constructed foot bridge. The exterior drainage channels to the west of the foot bridge is the area representing exposure station CB-03. This station is on the opposite side of the cranberry bog (west side) from your property. We will work with the town at posting signs by this area.