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MACTEC

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Ms. Deirdre Dahlen
Battelle Memorial Institute
397 Washington Street
Duxbury, MA 02332

Subject: Comparison of Pre-Breach and Post-Breach Data and the Potential Impact of the 2001 Allendale Dam Breach on Preliminary Remediation Goal (PRG) Development – Centredale Manor Superfund Site

Dear Ms. Dahlen:

MACTEC Engineering and Consulting (MACTEC) is pleased to submit this letter report related to the development of Preliminary Remediation Goals (PRGs) for the Centredale Manor Restoration Project Superfund Site. MACTEC has, consistent with the approved scope of work, evaluated the potential impacts of the May 2001 breach of the Allendale Dam on the environmental data that would be used to develop sediment PRGs (particularly sediment PRGs that are based on potential human health and ecological risks associated with fish species). More specifically, the sediment and fish tissue chemical data collected both before the dam breach (pre-breach data) and after the dam breach (post-breach data) have been compared and contrasted to evaluate whether the available sediment and fish data from Allendale Pond and Lyman Mill Pond are representative of current site conditions and whether the collection of additional sediment and/or fish tissue sampling and analysis would be appropriate for the completion of the development of the sediment PRGs for the site. As you may recall, draft preliminary biota-sediment accumulation factors (BSAFs) and human health PRGs (based on the human consumption of a combined fish diet) were derived by MACTEC in July 2004. These draft preliminary BSAFs and PRGs were based on the available sediment and fish tissue data as of July 2004. The available data were a combination of pre-breach and post-breach sediment data and almost exclusively post-breach fish tissue data. Although this assessment focused in part on human health fish consumption risks, the conclusions are relevant to the Baseline Ecological Risk Assessment (BERA) as well.

As part of this current evaluation, MACTEC calculated BSAFs and PRGs for Allendale Pond and Lyman Mill Pond using only post-breach sediment data and separately using only pre-breach sediment data. The resulting pre-breach BSAFs and post-breach BSAFs were compared to the July 2004 draft preliminary BSAFs. In addition, the draft preliminary BSAFs for the predominant cancer risk and non-cancer risk contributors in the fish consumption risk assessment (dioxin TEQ and Aroclor-1254) were compared to BSAFs obtained from literature sources for the same or similar fish species. The draft preliminary BSAFs for the background area, reference area, and the four river reaches associated with the site were also compared to evaluate the consistency across the various areas. A finding that values associated with Allendale Pond and/or Lyman Mill Pond were inconsistent with values from the other areas, could suggest that the 2001 dam breach resulted in a state of disequilibrium between sediment and fish tissue and increased the magnitude of uncertainties in the BSAFs for those two areas.

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In another approach to addressing the uncertainty associated with the BSAF and PRG values, the range of published BSAFs for the key chemicals of concern (COCs), which are dioxin TEQ and Aroclor-1254, have been reviewed to put bounds on the likely sediment PRGs for the site. This was done to assess whether further refinement of the BSAFs and PRGs by reducing uncertainty might have a significant impact on the technical remedial requirements and practical remedies for the site.

This letter provides a summary of the results of the evaluation that has been conducted and of the recommendations for the development/refinement of PRGs for sediments in Allendale Pond and Lyman Mill Pond. Attachment A to this letter provides the details of the evaluation, including the associated figures and tables that are an integral part of the evaluation. Appendix A to Attachment A presents the analytical chemistry data for each of the sediment samples that have been evaluated. Appendix B to Attachment A provides the analytical data for fish tissue samples from Allendale Pond and Lyman Mill Pond.

The remainder of this letter identifies in bolded section headings the tasks that have been conducted and the text provided in each section describes the findings and implications related to each specific task. The final section of the letter provides recommendations with respect to development of sediment PRGs.

Compare the sample results with other data collected for the same media in the same area from 2000-2003, as appropriate, to determine whether contaminant concentrations appear to have changed substantially as a result of the 2001 dam breach.

Sediments

The breach of the Allendale Dam occurred in May of 2001. Therefore, the available sediment data have been sorted into pre-breach and post-breach data sets. The pre-breach data set includes aquatic sediment samples collected prior to or in May 2001 that were selected for use in the Interim Final Baseline Human Health Risk Assessment (BHHRA). The post-breach sediment data set includes aquatic sediment samples collected after May 2001 selected for use in the BHHRA as well as those aquatic sediment samples collected from within the top 12 inches of sediment from Allendale Pond and Lyman Mill Pond during 2003 (Battelle). A third data set already exists (the data set used in the BHHRA) and has also been considered in this evaluation. It includes sediment samples collected both prior to the breach of the dam as well as samples collected after the breach (primarily samples collected during the summer of 2001) but it does not include samples for which data were unavailable at the time of the BHHRA preparation. Therefore, the BHHRA data set does not include the 2003 sediment samples.

Summary statistics for the chemical parameters have been prepared for each of the data sets and then a group of key parameters became the focus of the remainder of the evaluation. The Chemicals of Concern (COC) for sediments, which are those chemicals that were identified in the BHHRA as having health risks above Superfund risk limits or points of departure. These parameters include dioxin and furan toxic equivalents (dioxin TEQ), Aroclor-1254, Aroclor-1268, technical chlordane, dieldrin, 4,4'-DDE, and dioxin-like polychlorinated biphenyl congener toxic equivalents (PCB TEQ). Comparisons of pre-breach, post-breach, and BHHRA data sets

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for the COCs for Allendale Pond and Lyman Mill Pond have been made in tabular and graphical formats. In addition, for dioxin TEQ and Aroclor-1254 each of the data sets has been reviewed to determine if single samples or small groups of samples may have an inordinate impact on the arithmetic mean concentrations of those analytes. Further, the BHHRA concluded that dioxin TEQ was by far the largest contributor to cancer risk and Aroclor-1254 was by far the largest contributor to non-cancer risk. Therefore, the sediment PRGs for these two parameters are considered to be the most important of the PRGs for this evaluation.

The post-breach organic carbon normalized dioxin TEQ average sediment concentrations are somewhat lower than the corresponding mean concentrations in the pre-breach data set for both Allendale Pond and Lyman Mill Pond. In contrast, the post-breach organic carbon normalized Aroclor-1254 mean sediment concentrations are higher than the corresponding mean concentrations in the pre-breach data set for both Allendale Pond (approximately 4 times) and Lyman Mill Pond (approximately 1.5 times).

While there are some differences in mean concentrations among the pre-breach, post-breach, and BHHRA data sets, the relative concentrations among the six exposure areas are generally consistent. In other words, the order of exposure areas ranked from highest to lowest mean concentration for dioxin TEQ and Aroclor-1254 are the same for the three data sets. Furthermore, for dioxin TEQ and for Aroclor-1254 the highest pre-breach and BHHRA mean sediment concentrations were reported for Allendale Pond and in the post-breach data the highest concentrations in sediment are also in Allendale Pond. This relationship is discussed further below.

In the pre-breach data set, the arithmetic mean Aroclor-1254 organic carbon-normalized concentrations in Allendale Pond and Lyman Mill Pond are 8.89 mg/kg and 4.65 mg/kg respectively. In the post-breach data set, the arithmetic mean Aroclor-1254 organic carbon-normalized concentrations in Allendale Pond and Lyman Mill Pond are 36.21 mg/kg and 6.87 mg/kg respectively. In other words, Allendale Pond has higher Aroclor-1254 sediment concentrations than does Lyman Mill Pond for both the pre-breach and post-breach data sets. In a similar manner, in the pre-breach data set, the arithmetic mean dioxin TEQ organic carbon-normalized concentrations in Allendale Pond and Lyman Mill Pond are 0.17 mg/kg and 0.03 mg/kg respectively. In the post-breach data set, the arithmetic mean dioxin TEQ organic carbon-normalized concentrations in Allendale Pond and Lyman Mill Pond are 0.06 mg/kg and 0.03 mg/kg respectively. Again, Allendale Pond has higher dioxin TEQ sediment concentrations than does Lyman Mill Pond for both the pre-breach and post-breach data sets.

It appears that differences in sediment concentrations between the pre-breach and post-breach data sets are related to differences in sampling locations rather than to transport of sediments from Allendale Pond to Lyman Mill Pond.

Biota tissue

Summary statistics for lipid normalized fish-tissue concentrations have been prepared in tabular form for the COCs for Allendale Pond and Lyman Mill Pond. Virtually all of the white sucker, American eel, largemouth bass, brown bullhead, and crayfish data were collected after the May 2001 breach of the Allendale Dam. It would generally be expected that, for each species, the

concentrations of bioaccumulating substances such as dioxin TEQ and Aroclor-1254 would mirror the corresponding sediment concentrations at the locations where the biota samples are collected. In that context, among the six exposure areas, the area with the highest mean sediment concentrations of bioaccumulating substances would generally be expected to also have the highest mean biota tissue concentrations.

The relationship between biota tissue concentrations and corresponding sediment concentrations at both Allendale Pond and Lyman Mill Pond was evaluated. While some of the biota tissue concentrations are consistent with those expectations, there are some data that are clearly not consistent with those expectations. The highest mean concentrations of dioxin TEQ, dieldrin, and methyl mercury in white sucker and American eel were reported for Allendale Pond which also contained the highest mean sediment concentrations of those parameters. The highest mean concentration of Aroclor-1254 in American eel was also reported for Allendale Pond, which had the highest mean Aroclor-1254 sediment concentration among the exposure areas.

However, contrary to general expectations, the highest mean concentrations of Aroclor-1254, Aroclor-1268, and benzo(a)pyrene in white sucker were reported for Lyman Mill Pond, although the highest mean sediment concentrations of those parameters was reported for Allendale Pond. For American eel, the highest mean concentration of Aroclor-1268 was reported for Greystone Mill Pond and the highest mean concentration of benzo(a)pyrene was reported in Lyman Mill Pond. Largemouth bass were not collected from Allendale Pond (this fish species was not observed). For largemouth bass, the highest mean concentrations of dioxin TEQ, Aroclor-1254, dieldrin, and benzo(a)pyrene were reported for Lyman Mill Pond (it is not known if Allendale Pond concentrations are lower or higher than those in Lyman Mill Pond). The highest mean concentration of Aroclor-1268 for largemouth bass was reported in Manton Pond. Technical chlordane concentrations in sediments were higher in Lyman Mill Pond than in Allendale Pond. This relationship is inconsistent with the data for most of the other organic COCs. The highest mean concentrations of technical chlordane in white sucker and American eel were found in Lyman Mill Pond as would be expected, but the highest mean concentration of technical chlordane in largemouth bass fillets was reported for Manton Pond.

It appears that the most likely explanation for the highest mean concentrations of Aroclor-1254 in white sucker being present in Lyman Mill Pond appears to be the possible migration of Allendale Pond white sucker to Lyman Mill Pond (i.e., washed down through the breached dam with spring flood waters) during or immediately after the breach of the Allendale Dam in May 2001.

BSAFs for the background area, reference area, and the four river reaches associated with the site shall be compared and contrasted. Uncertainty in BSAFs associated with the 2001 dam breach should be of greatest concern for Allendale and Lyman Mill Ponds. If the BSAFs are reasonably consistent across all of the areas evaluated (the theoretically expected result), then the uncertainty associated with the 2001 breach event might be a minor concern.

The preliminary draft BSAFs (July 2004) for the COCs for each of the fish species were summarized and compared in tabular form and in graphical form for dioxin TEQ and Aroclor-1254. Generally the BSAFs for a given chemical and fish species vary across the six exposure

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areas, but the ratio of the highest BSAF to lowest BSAF among the six exposure areas is generally less than 10 (values range within one order of magnitude).

For dioxin TEQ, the BSAFs for largemouth bass range from 0.058 (Greystone Mill Pond) to 0.603 (Assapumpset). For American eel, the BSAFs range from 0.0043 (Allendale Pond) to 0.022 (Lyman Mill Pond). For white sucker (and brown bullhead from Assapumpset Pond) the dioxin TEQ BSAFs range from 0.037 (Greystone Mill Pond) to 0.262 (Lyman Mill Pond).

For Aroclor-1254, the BSAFs for largemouth bass range from 0.576 (Assapumpset Pond) to 6.27 (Manton Pond). For American eel, the BSAFs range from 0.064 (Dyerville Pond) to 0.674 (Lyman Mill Pond). For white sucker (and brown bullhead from Assapumpset Pond) the dioxin TEQ BSAFs range from 0.253 (Assapumpset Pond) to 10.7 (Lyman Mill Pond).

An inspection of the BSAFs for Allendale Pond and Lyman Mill Pond was conducted to evaluate whether there is evidence that the 2001 dam breach had resulted in BSAFs for Allendale Pond and/or Lyman Mill Pond that were inconsistent with those calculated for the other areas. The BSAFs for dioxin TEQ for American eel and white sucker in Allendale Pond and Lyman Mill Pond and largemouth bass in Lyman Mill Pond appear to be consistent with the BSAFs calculated for the other exposure areas. Although the BSAF for white sucker in Lyman Mill Pond is the highest among the exposure areas, it is only slightly higher than the BSAF calculated for Assapumpset Pond white sucker. The BSAFs for Aroclor-1254 for white sucker and American eel in Allendale Pond appear to be consistent with BSAFs for those species in other exposure areas.

However, the Aroclor-1254 BSAF for white sucker in Lyman Mill Pond appears to be considerably higher than the white sucker BSAFs for Assapumpset Pond, Greystone Pond, and Allendale Pond. This is an important point, because the BSAF for white sucker is a major determinant in the overall sediment PRG based on the combined fish diet. While the largemouth bass BSAF for Aroclor-1254 in Lyman Mill Pond is higher than those calculated for largemouth bass in Greystone Mill Pond and Assapumpset Pond, it is slightly lower than the calculated largemouth bass Aroclor-1254 BSAF for Manton Pond.

Derive post-breach BSAFs (i.e., based on sediment and fish tissue data collected after the May 2001 breach) for Allendale and Lyman Mill Ponds. The Contractor shall compare the newly calculated BSAFs to the previously calculated draft BSAFs for Allendale and Lyman Mill Ponds. Pre-breach BSAFs have also been calculated.

Using only the post-breach sediment data for Allendale Pond and Lyman Mill Pond, in conjunction with the post-breach fish tissue data, post-breach BSAFs were calculated for white sucker (Allendale Pond and Lyman Mill Pond), American eel (Allendale Pond and Lyman Mill Pond), and largemouth bass (Lyman Mill Pond only).

The differences between BSAFs based on pre-breach sediment data and post-breach sediment data for dioxin TEQ are not substantial. Lyman Mill dioxin TEQ BSAFs based on pre-breach and post-breach data are very similar for each of the three species. For Allendale Pond, the dioxin TEQ BSAFs based on post-breach sediment data are approximately two times the BSAFs

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based on pre-breach sediment data for both the white sucker and for the American eel (largemouth bass were not collected from Allendale Pond). The Lyman Mill Pond dioxin TEQ post-breach BSAFs for white sucker and American eel remain higher than the corresponding BSAFs for Allendale Pond and Greystone Mill Pond by a factor of approximately 2.5 and 5 times (white sucker) and 2.5 to 3 times (American eel).

For Aroclor-1254 BSAFs, the differences in BSAFs between pre-breach and post-breach data directly reflect the higher mean Aroclor-1254 concentrations in the pre-breach data sets. For white sucker, the post-breach Aroclor-1254 BSAF in Allendale Pond (0.597) is lower than the BHHRA BSAF (1.36) and the pre-breach BSAF (2.43). For Lyman Mill Pond, the post-breach BSAF for white sucker (8.17) is slightly lower than the BHHRA BSAF (10.7) and the pre-breach BSAF (12.1). The BSAFs for Lyman Mill Pond are consistently higher (approximately 5 times to 13.6 times higher) than for Allendale Pond as well as for Greystone Mill Pond and Assapumpset Pond for the pre-breach, BHHRA, and post-breach data. For Aroclor-1254 in American eel at Allendale Pond, the post-breach BSAF (0.07) is lower than the BBHRA (0.16) and the pre-breach (0.28) BSAFs. The Aroclor-1254 post-breach BSAF at Lyman Mill Pond (0.52) is slightly lower than the BHHRA BSAF (0.67) and pre-breach BSAF (0.76). The Lyman Mill Aroclor-1254 BSAF for American eel is highest in Lyman Mill Pond among the exposure areas. For largemouth bass, in Lyman Mill Pond, the post-breach Aroclor-1254 BSAF (4.44) is slightly lower than the BHHRA BSAF (5.81) and the pre-breach BSAF (6.56). Lyman Mill Pond has the highest BSAFs among the exposure areas. Largemouth bass could not be collected in Allendale Pond.

Overall, if only post-breach sediment data were used to calculate BSAFs for Allendale Pond and Lyman Mill Pond, it appears the dioxin TEQ BSAFs would change minimally. Only the Allendale BSAF for white sucker and American eel would be increased by a factor of approximately 2.5. For Aroclor-1254, in Allendale Pond, the post-breach BSAF is lower (in contrast to dioxin TEQ) by a factor of about 4 for white sucker and American eel than the pre-breach BSAF. In Lyman Mill Pond, the post-breach BSAF is lower by approximately 33% for white sucker, American eel, and largemouth bass. The BSAF at Lyman Mill Pond remains the highest among all exposure areas for all three species when the post-breach sediment data are used to calculate the BSAFs. It appears likely that the higher BSAFs for dioxin TEQ and Aroclor-1254 in Lyman Mill Pond could be the result of transport of fish from Allendale Pond into Lyman Mill Pond at the time of the May 2001 Allendale Dam breach. It appears that the BSAFs for dioxin TEQ and Aroclor-1254 in Lyman Mill Pond are not consistent with the values from the remainder of the site.

Site-specific BSAFs shall be compared to BSAFs for the same compounds as reported in the scientific literature. If the site-specific BSAFs are consistent with literature values, then this would be an indication that the impact of the 2001 breach event on the BSAFs is not substantial.

The *Draft Final Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds* (USEPA, September 2000) provides a summary of available information as of the year 2000, concerning BSAFs in freshwater fish species. This document is referred to hereafter as the "reassessment document". Table 4-1 of Volume 4 of the

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reassessment document summarizes Available Biota to Sediment Accumulation Factors, BSAFs, for dioxin-like compounds, including PCBs.

The BSAFs presented in Table 4-1 were developed and reported for the 2,3,7,8-TCDD congener. The dioxin TEQ in sediments and fish at the Centredale site is almost entirely contributed by the 2,3,7,8-TCDD congener. Therefore, the comparison of the BSAFs developed for dioxin TEQ at Centredale to the BSAFs derived for the 2,3,7,8-TCDD as reported in the literature is appropriate. The preliminary draft site specific BSAFs (July 2004) were compared to the information provided in the reassessment document in both tabular and graphical form. There is a considerable amount of variability in the available literature-based fish BSAFs for 2,3,7,8-TCDD. The American eel BSAFs have been compared to the BSAF reported in the reassessment document, which reported a BSAF of 0.009 for "migratory" fish (eel and striped bass). The BSAFs for dioxin TEQ for white sucker, brown bullhead, and largemouth bass were compared to field-derived BSAFs reported in the reassessment document for "resident" fish (including brown trout, lake trout, smallmouth bass, white perch, yellow perch, and pike). **The draft preliminary BSAFs for dioxin TEQ for all three species at all exposure points appear to be consistent with the range of available BSAFs reported in the reassessment document.**

The site-specific preliminary draft BSAFs for Aroclor-1254 have been compared in tabular form and in graphical form to published BSAF values for Aroclor-1254, Total PCBs, Pentachloro Biphenyls, Hexachloro Biphenyls, and Hexachloro PCB Congeners. Aroclor-1254 is comprised primarily of Pentachloro Biphenyls and Hexachloro Biphenyls. **The site-specific BSAFs for white sucker and largemouth bass are generally consistent (perhaps slightly lower) than most of the published values for trout, salmon, perch and bass.** The site-specific BSAFs for the migratory American eel are lower than those reported for trout, salmon, perch, and bass. This is not unexpected, given that the eels may not spend sufficient time to approach equilibrium conditions between the sediments and the biota tissue. Consistent with that concept, the published BSAFs for migratory species for dioxin TEQ are lower than those for "resident' species.

The range of published BSAFs for chemicals of concern (COCs) shall be reviewed to put bounds on the likely sediment PRGs for the site. This information shall be used to determine if the likely range of PRGs is equal to or below background concentrations as characterized at Greystone Mill Pond. If all of the values in the likely range of PRGs are equal to or below background concentrations, then it would appear that background concentrations, rather than risk-based PRGs, would be the realistic remedial goal. In that case, further refinement of the site-specific BSAFs via additional sediment and fish tissue sampling and analysis may not be warranted.

The range of dioxin TEQ and Aroclor-1254 BSAFs for fish were identified in the reassessment document. For dioxin TEQ, the BSAFs for fish range from 0.03 to 2.94 although the majority of the published BSAFs are less than 0.3. It is clear that the maximum value of 2.94 is an "outlier" and may not be appropriate for this exercise. The next highest published value that was identified is 0.86. For Aroclor-1254, the BSAFs for resident fish range from 0.253 to 20.8. It is clear that the BSAFs for American eel are lower than the BSAFs for the white sucker and largemouth bass and there is little published information concerning BSAFs for American eel. However, the

published dioxin TEQ (actually 2,3,7,8-TCDD) BSAF for migratory fish is 0.009. Therefore, it is not necessary to include the American eel in this exercise.

It appears from the evaluation that has been conducted that further refinement of the BSAFs for dioxin TEQ and Aroclor-1254 for white sucker and largemouth bass in Lyman Mill Pond would likely result in reductions of the identified preliminary draft BSAFs. The "combined diet" PRGs for Lyman Mill Pond for dioxin TEQ (0.0000028 mg/kg at 10-6 cancer risk and 0.00028 mg/kg at 10-4 cancer risk) were compared to the mean concentration in sediment at the background area (Greystone Pond 0.0000348 mg/kg). If the BSAFs were reduced (likely by less than a factor of 10), the corresponding PRGs would increase. It appears that the sediment PRG for dioxin TEQ (set at one in one million cancer risk) would likely still be below background conditions if the BSAFs were refined and the PRG based on cancer risk of one in ten thousand would continue to be above the mean concentration at the background area if it were refined.

For Aroclor-1254, the "combined diet" PRGs for Lyman Mill Pond for Aroclor-1254 (0.0045 mg/kg at 10-6 cancer risk and 0.45 mg/kg at 10-4 cancer risk) were compared to the mean concentration in sediment at the background area (Greystone Pond 0.15 mg/kg). If the BSAFs were reduced (likely by less than a factor of 10), the corresponding PRGs would increase. It appears that the sediment PRG for Aroclor-1254 (set at one in one million cancer risk) would likely still be below background conditions if the BSAFs were refined and the PRG based on cancer risk of one in ten thousand would continue to be above the mean concentration at the background area if it were refined. The "combined diet" preliminary draft PRG based on a non-cancer hazard index of one (0.058 mg/kg) is below the mean concentration in sediment at the background area (Greystone Mill Pond). If the BSAFs were refined for white sucker and largemouth bass in Lyman Mill Pond (possibly lowered by an order of magnitude), the "combined diet" PRG might increase to or near the background mean concentration of 0.15 mg/kg.

It appears that refinement of the BSAFs for Lyman Mill Pond might provide some meaningful refinement to the sediment PRGs for Aroclor-1254. However, a comparison of draft sediment PRGs for dioxin TEQ and Aroclor-1254 to sediment quality data in Allendale Pond and Lyman Mill Pond concluded that the sediment remedial goals would still (with refinement of the Aroclor-1254 BSAFs) likely be based upon the dioxin TEQ risks and dioxin TEQ sediment PRGs. This suggests that the refinement of the BSAFs for Lyman Mill Pond is not necessary to the development of the PRGs and it would be unlikely to have an impact on the sediment remedial requirements for the site.

RECOMMENDATIONS

Based upon the evaluation of the pre-breach and post-breach data, an evaluation of fish tissue concentrations, and the literature values for BSAFs for dioxin TEQ and Aroclor-1254, the following recommendations have been developed.

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- Calculate sediment PRGs for the site based on BSAFs calculated for the exposure areas other than Lyman Mill Pond. The BSAFs for the exposure areas other than Lyman Mill Pond appear to be consistent.
- The calculation of BSAFs and sediment PRGs for white sucker and largemouth bass should include an outlier analysis for chemical concentration data in sediments and fish tissue. Outliers should be removed from the data sets prior to calculation of BSAFs and PRGs. Alternatively, geometric mean concentrations of both the organic carbon normalized sediment concentrations and of the lipid normalized fish tissue concentrations could be used in the BSAF calculations in order to minimize the impacts of outliers in the data sets.
- Based on the evaluation of the data from pre-breach and post-breach conditions and a comparison of draft sediment PRGs to background sediment concentrations, the available data appear to be sufficient for PRG development and additional sampling and analysis is not recommended at this time.

Please contact Michael Murphy at (781) 245-6606 if we can provide additional information or clarify the information presented in this report.

Sincerely,
MACTEC ENGINEERING AND CONSULTING

Michael J. Murphy
Senior Principal Environmental Scientist

John Peters WITH PERMISSION EMA
John Peters
Senior Environmental Scientist

Enclosure: Attachment A Detailed Evaluation of the Impact of the May 2001 Allendale Dam Breach on BSAFs for Allendale Pond and Lyman Mill Pond

cc: MACTEC Project File [P:\W9-GVT\COE-NAE\Battelle\Centredale\Task27-HH PRGs\Pre_post_breach\Text and Cover\Pre_PostBreachLetter_042905.doc]

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Attachment A

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ATTACHMENT A

DETAILED EVALUATION OF THE IMPACT OF THE MAY 2001 ALLENDALE DAM BREACH ON BSAFS FOR ALLENDALE POND AND LYMAN MILL POND

INTRODUCTION

As part of the development of the Preliminary Remediation Goal (PRG) documents, MACTEC has been contracted to evaluate the existing data taken during the time periods prior to the May 2001 breach of the Allendale Dam (referred to as the pre-breach time period) and after the May 2001 Allendale Dam breach (referred to as the post-breach time period). The data are evaluated to determine if the differences in sample collection dates for sediment and fish samples (pre-or post-breach) affect the Biota-Sediment Accumulation Factors (BSAF). The evaluation consists of the items listed below:

- Clearly document the collection dates for samples used to develop BSAFs. Compare the sample results with other data collected for the same media in the same area from 2000-2003, as appropriate, to determine whether contaminant concentrations appear to have changed substantially as a result of the 2001 dam breach.
- BSAFs for the background area, reference area, and the four river reaches associated with the site shall be compared and contrasted. Uncertainty in BSAFs associated with the 2001 dam breach should be of greatest concern for Allendale and Lyman Mill Ponds. If the BSAFs are reasonably consistent across all of the areas evaluated (the theoretically expected result), then the uncertainty associated with the 2001 breach event might be a minor concern.
- If the data are appropriate for use in deriving BSAFs and the results from the evaluations discussed below indicate that the impact associated with the 2001 breach is likely to impact the BSAFs, the Contractor shall derive post-breach BSAFs (i.e., based on sediment and fish tissue data collected after the May 2001 breach) for Allendale and Lyman Mill Ponds. The Contractor shall compare the newly calculated BSAFs to the previously calculated draft BSAFs for Allendale and Lyman Mill Ponds.
- Site-specific BSAFs shall be compared to BSAFs for the same compounds as reported in the scientific literature. If the site-specific BSAFs are consistent with literature values, then this would be an indication that the impact of the 2001 breach event on the BSAFs is not substantial.
- The range of published BSAFs for chemicals of concern (COCs) shall be reviewed to put bounds on the likely sediment PRGs for the site. This information shall be used to determine if the likely range of PRGs is equal to or below background concentrations as characterized at Greystone Mill Pond. If all of the values in the likely range of PRGs are equal to or below background concentrations, then it would appear that background concentrations, rather than risk-based PRGs, would be the realistic remedial goal. In that case, further refinement of the site-specific BSAFs via additional sediment and fish tissue sampling and analysis may not be warranted.
- Based on the evaluations discussed above, make recommendations concerning the need for additional sampling and analysis.

COMPARISON OF PRE-BREACH, POST-BREACH, AND BHHRA-BASED SEDIMENT DATA

Question: Does it appear that contaminant concentrations in sediments of Allendale Pond and Lyman Mill Pond have changed substantially as a result of the 2001 dam breach?

The breach of the Allendale Dam occurred in May of 2001. Therefore, the available sediment data for Allendale Pond and Lyman Mill Pond have been sorted into pre-breach and post-breach data sets. The pre-breach data set includes aquatic sediment samples collected prior to or in May 2001 that were selected for use in the Interim Final Baseline Human Health Risk Assessment (BHHRA). The post-breach sediment data set includes aquatic sediment samples collected after May 2001 selected for use in the BHHRA as well as those aquatic sediment samples collected from within the top 12 inches of sediment from Allendale Pond and Lyman Mill Pond during 2003. A third data set already exists (the data set used in the BHHRA) and has also been considered in this evaluation. It includes sediment samples collected both prior to the breach of the dam as well as samples collected after the breach (primarily samples collected during the summer of 2001) but it does not include samples for which data were unavailable at the time of the BHHRA preparation. Therefore, the BHHRA data set does not include the 2003 sediment samples.

Summary statistics for the chemical parameters have been prepared for each of the data sets and then a group of key parameters became the focus of the remainder of the evaluation. The Chemicals of Concern (COC) for sediments, which are those chemicals that were identified in the BHHRA as having health risks above Superfund risk limits or Superfund points of departure. These parameters include dioxin and furan toxic equivalents (dioxin TEQ), Aroclor-1254, Aroclor-1268, technical chlordane, dieldrin, 4,4'-DDE, and dioxin-like polychlorinated biphenyl congener toxic equivalents (PCB TEQ). Comparisons of pre-breach, post-breach, and BHHRA data sets for the COCs for Allendale Pond and Lyman Mill Pond have been made in tabular and graphical formats. In addition, for dioxin TEQ and Aroclor-1254 each of the data sets has been reviewed to determine if single samples or small groups of samples may have an inordinate impact on the arithmetic mean concentrations of those analytes. Further, the BHHRA concluded that dioxin TEQ was by far the largest contributor to cancer risk and Aroclor-1254 was by far the largest contributor to non-cancer risk. Therefore, the sediment PRGs for these two parameters are considered to be the most important of the PRGs for this evaluation.

The evaluation and comparisons of pre-breach, post-breach, and BHHRA data has been done in a step-wise manner. Appendix A (provided in electronic format on the attached CD) contains the sediment data for Allendale Pond and Lyman Mill Pond that were considered in this evaluation. The Allendale Pond pre-breach sediment data are presented in Table A-1 of Appendix A while the Allendale Pond post-breach sediment data are presented in Table A-2. The pre-breach Lyman Mill Pond sediment data are

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presented in Table A-3 and the Lyman Mill Pond post-breach sediment data are presented in Table A-4. In this evaluation, the sediment data have been evaluated in the following order:

- The raw data (as reported by the lab, not organic carbon-normalized) for all pre-breach, post-breach, and BHHRA sediment samples have been evaluated as the initial step. This evaluation is presented in Appendix B.
- The raw data (as reported by the lab, not organic carbon-normalized) for all pre-breach, post-breach, and BHHRA sediment samples that were analyzed for total organic carbon were evaluated as a second step. The samples included here are those samples that would be used in calculating the BSAFs, since organic carbon-normalized chemical data are used to calculate the BSAFs. The samples used here are the samples included in the "BSAF data set". This evaluation is also presented in Appendix B.
- The organic carbon-normalized chemical data for samples included in the "BSAF data set" were reviewed as a third step in the evaluation and comparison of pre-breach and post-breach sediment quality in Allendale Pond and Lyman Mill Pond. These data were sorted into pre-breach, post-breach, and BHHRA (combination of a portion of the pre-breach and a portion of the post-breach data sets). The organic carbon-normalized data are used in calculating BSAFs, they tend to "equalize" differences in concentrations that may be associated with differences in substrate type at the sample location, and therefore are perhaps most useful in evaluating whether sediment concentrations have changed substantially as a result of the 2001 dam breach. The evaluation based on the carbon-normalized sediment data is presented in the following text.

Answer:

Are pre-breach and post-breach sediment concentrations of COCs (all data and then BSAF data only) substantially different?

- **For all samples collected, the arithmetic mean concentrations of most organic analytes in the post-breach data set for both Allendale Pond and Lyman Mill Pond are generally higher (generally 2 to 3 times higher in Allendale and 3 to 9 times higher in Lyman Mill Pond) than in the pre-breach data set. However, dioxin TEQ mean concentrations are very consistent between pre-breach and post-breach data sets for both Allendale Pond and Lyman Mill Pond. In addition, the post-breach mean concentrations of Aroclor-1254 and Aroclor-1268 are lower (approximately 60% of the pre-breach mean) than the corresponding pre-breach mean for Allendale Pond. In contrast, the post-breach mean concentrations of Aroclor-1254 and Aroclor-1268 in Lyman Mill Pond are higher (factors of 4.3 and 1.3 times) than the corresponding pre-breach mean.**
- **For the subset of samples for which TOC data are available, the arithmetic mean concentrations of most organic analytes in the post-breach data set for both Allendale Pond and Lyman Mill Pond are generally 2 to 4 times higher in Allendale and 3 to 8 times higher in**

Lyman Mill Pond) than in the pre-breach data set. However, while the dioxin TEQ post-breach mean concentration for Allendale Pond is approximately 1.9 times the corresponding pre-breach mean, the dioxin TEQ post-breach mean concentration for Lyman Mill Pond is essentially identical (essentially no difference) to the corresponding pre-breach mean. For Aroclor-1254, the post-breach mean concentrations are higher (by a factor of approximately 3.6) than the corresponding pre-breach mean for both Allendale Pond and Lyman Mill Pond.

- For the subset of sediment samples for which TOC data are available for both Allendale Pond and Lyman Mill Pond, there is not a consistent relationship (consistently higher or consistently lower) between the post-breach arithmetic mean and pre-breach mean of the organic carbon-normalized (normalized) concentrations of most organic analytes as was seen in the raw (not carbon normalized) data sets (Appendix B). Rather than seeing a consistent trend where the post-breach mean concentration (raw data) has been higher than the pre-breach mean, for the normalized data, we see a mix where approximately half of the analytes have post-breach means that are higher than the pre-breach mean and the other half have post-breach means that are lower than the pre-breach means. In Allendale Pond, the post-breach mean concentration of Aroclor-1254 is 4.07 times (higher than) the pre-breach mean while the dioxin TEQ post-breach mean is 0.34 times (lower than) the pre-breach mean. In Lyman Mill Pond, the post-breach mean concentration of Aroclor-1254 is 1.48 times (48% higher than) the pre-breach mean while the dioxin TEQ post-breach mean is 0.92 times (slightly lower than) the pre-breach mean. Those relationships are not indicative of any substantial impact on sediment quality associated with the Allendale Dam breach (presumably causing transport of highly contaminated sediment from Allendale Pond to Lyman Mill Pond).

Does it appear those differences between pre-breach and post-breach data are the result of the dam breach?

- Higher sediment concentrations (all sediment data considered) of most organic analytes in the post-breach data set for both Allendale Pond and Lyman Mill Pond appears to be inconsistent with the transport of highly contaminated sediments from Allendale Pond into Lyman Mill Pond. This type of transport may explain the higher post-breach concentrations in Lyman Mill Pond, but does not appear to explain the higher post-breach concentrations in Allendale Pond. Deeper sediments in Allendale Pond could have been uncovered and moved to the head of the dam.
- The spatial distribution of pre-breach and post-breach sediment samples is quite different for both Allendale Pond and Lyman Mill Pond. It is possible that the post-breach samples were collected more often in depositional areas than were the pre-breach sediment samples.
- Despite the general trend of higher post-breach concentrations in both ponds, the mean concentration of dioxin TEQ was almost identical in both

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pre-breach and post-breach data sets for Lyman Mill Pond for all samples collected and also for those samples that were analyzed for TOC. An obvious explanation of this inconsistency has not been identified. For Allendale Pond, the post-breach mean dioxin TEQ concentration (based on all samples collected) was consistent with the pre-breach mean. However, based on the subset of samples for which TOC data are available, the post-breach mean dioxin TEQ concentration was greater (1.9 times) than the corresponding pre-breach mean.

- Also, despite the general trend of higher post-breach concentrations in both ponds, the mean concentration of Aroclor-1254 in the post-breach Allendale Pond data set (all samples collected) was lower than the corresponding pre-breach mean (approximately 60% of the pre-breach mean). This is a direct result of the differences in the spatial distribution of the pre-breach and post-breach samples. The pre-breach data set includes several samples in one specific area of Allendale Pond that exhibited the highest Aroclor-1254 concentrations within the pond. The post-breach data set (all samples) does not include samples collected from that area of elevated Aroclor-1254 concentrations as identified by the pre-breach samples. In contrast to Allendale Pond, Lyman Mill Pond shows a post-breach mean concentration of Aroclor-1254 that is approximately 4.3 times the corresponding pre-breach mean. The post-breach data set exhibits a frequency of detection of 100% while the pre-breach data set exhibits a frequency of detection of only 54%. There is very little overlap in the spatial distribution of the pre-breach and post-breach samples. Several of the pre-breach samples that had no detectable Aroclor-1254 were collected very close to or on the eastern or western shore of Lyman Mill Pond. No post-breach sediment samples were collected from most of those "near-shore" areas where Aroclor-1254 had not been detected in pre-breach samples. This strongly suggests that the higher post-breach mean concentration of Aroclor-1254 in Lyman Mill sediments is a consequence of differences in the spatial distribution of samples. The summary and comparison of organic carbon-normalized sediment concentrations in the pre-breach and post-breach data sets suggests that the perceived trend for the raw data (consistently higher post-breach concentrations) was an artifact of sample locations and less representation of lower organic carbon content sediments in the post-breach sampling than in the pre-breach sampling.
- A review of the pre-breach and post breach data summaries for both Allendale Pond and Lyman Mill Pond shows that overall, the frequency of detection for most organic analytes (dioxin TEQ is an exception) is lower in the pre-breach data set than in the post-breach data set. For most of the key organic analytes, the frequency of detection in the post-breach data set is 100%, while the frequency of detection is less than 50% for several analytes in the pre-breach data set. This strongly suggests that the trend observed and discussed above (post-breach mean sediment concentrations are generally higher than corresponding pre-breach mean concentrations) may be the result of difference in spatial distribution of pre-breach and post-

breach samples. Those same "near-shore" pre-breach sample locations in Lyman Mill Pond that exhibited no detectable Aroclor-1254 also exhibit no detectable concentrations of most semi-volatile compounds (such as benzo(a)pyrene) and pesticides (such as 4,4'-DDE and dieldrin). This further suggests the pre-breach and post-breach concentration differences are a consequence of differences in spatial distribution of samples.

The evaluation that yielded these observations concerning sediments is presented in Appendix B (raw data) and in the following section (organic carbon-normalized sediment data). The sediment data collected in May 2003 were not included in the BHHRA since the validation of the 2003 data was not completed until after the submission of the Interim Final BHHRA. The locations of the Allendale Pond and Lyman Mill Pond pre-breach and post-breach sediment samples are shown in Figure 1. On that figure, pre-breach sample locations are identified with solid square symbols and the post-breach sample locations are identified with open square symbols.

Table 1 lists the sample IDs and sample dates for the Allendale and Lyman Mill data that have been considered in this evaluation. Table 1 lists all of those sediment samples that were evaluated in the Interim Final BHHRA (MACTEC, 2004) as well as those sediment samples that were collected in 2003 from Allendale Pond and Lyman Mill Pond. Table 1 also shows the start and end depth of each sample and it identifies which samples have been analyzed for a group of select analytes of interest. Samples collected within one foot of the sediment surface consistent with the BHHRA have been used in this analysis.

Table 1 also indicates which of the samples considered in this evaluation were utilized in developing the July 2004 preliminary draft BSAFs and sediment PRGs (based on a combined fish diet) and which sediment samples have been utilized, in this evaluation, to calculate "pre-breach" or "post-breach" BSAFs. All of the samples listed in Table 1 that were collected prior to 2003 and for which TOC data were available were utilized in calculating the July 2004 preliminary BSAFs and PRGs. In this evaluation, "Pre-Breach" BSAFs were calculated using only those samples identified in Table 1 as "Pre-Breach" and for which TOC data were available. Also in this current evaluation, "Post-Breach" BSAFs were calculated using only those samples collected after May 30, 2001 for which TOC data were available. Figure 2 shows the locations of "pre-breach" and "post-breach" sediment samples for which TOC data are available. These sample locations, therefore, are representative of the data that are used in calculation of BSAFs. Only those sediment samples with validated analytical data available as of July 2004 and for which total organic carbon analysis had been conducted were utilized in development of the preliminary draft BSAFs and sediment PRGs (based on a combined fish diet).

Figures 3 through 6 summarize, in plan view, the pre-breach and post-breach raw sediment concentrations in Allendale Pond and Lyman Mill Pond for Aroclor-1254, Dioxin TEQ, HCX, and mercury. In those figures, the distribution of sediment concentrations is shown by the size of the symbol representing each sampling location. The size of the symbol is proportional to the concentration reported at each sampling

location. Again, pre-breach locations are identified with solid square symbols and the post-breach sample locations are identified with open square symbols.

The BHHRA utilized both pre-breach and post-breach sediment data, but did not include the May 2003 data. In Appendix A, Tables A-1 and A-2 present all of (not only samples with TOC data) the pre-breach and post-breach sediment data respectively for Allendale Pond. Tables A-3 and A-4 present the pre-breach and post-breach sediment data respectively for Lyman Mill Pond.

ORGANIC CARBON-NORMALIZED ANALYTICAL DATA FOR SEDIMENT SAMPLES USED IN CALCULATING BSAFS

Table 2 presents and compares pre-breach and post-breach summary statistics for organic carbon-normalized sediment concentrations for key analytes at Allendale Pond and Lyman Mill Pond. Table 2 also shows the ratio of the post-breach mean and pre-breach arithmetic mean organic carbon-normalized sediment concentrations for each of the key analytes in both Allendale Pond and Lyman Mill Pond. A ratio greater than one indicates that the post-breach mean is higher than the pre-breach mean, and a ratio lower than one indicates that the post-breach mean is lower than the pre-breach mean. Table 2 indicates, next to each ratio, whether the post-breach mean is "HIGHER" or "LOWER" than the corresponding pre-breach mean.

Table 3 presents and compares pre-breach and post-breach summary statistics for raw (not organic carbon-normalized) sediment concentrations for the same key analytes at Allendale Pond and Lyman Mill Pond as are shown in Table 2. A comparison of the ratios of post-breach and pre-breach arithmetic mean concentrations between Tables 2 and 3 provide some important insight into the similarities and differences between sediment quality in the pre-breach and post-breach time periods.

There are some striking differences in the post-breach/pre-breach concentration ratios and the "HIGHER" or "LOWER" designations between Tables 2 and 3. It is clear that the post-breach/pre-breach ratios for most key analytes are lower for the carbon-normalized data in both Allendale Pond and Lyman Mill Pond (Table 2) as compared to the ratios for the raw data in both Allendale Pond and Lyman Mill Pond (Table 3). In addition, because of the lower ratios based on carbon-normalized sediment concentrations, there is not a clear trend **(among the COCs, is the post-breach mean consistently higher or consistently lower than the pre-breach mean?)** among the key analytes for either Allendale Pond or Lyman Mill Pond. As shown in Table 3 (raw data), the post-breach mean raw concentrations of almost all key analytes (gamma chlordane and Aroclor-1268 in Allendale pond are the only exceptions) are higher than the corresponding pre-breach mean raw concentration in both Allendale Pond and Lyman Mill Pond. However, as shown in Table 2, based on organic carbon-normalized concentrations, for both Allendale Pond and Lyman Mill Pond, approximately half of the key analytes have post-breach concentrations that are higher than the pre-breach concentrations and approximately half of the key analytes have mean post-breach mean concentrations that are lower than the corresponding pre-breach means. Putting aside the ratio for PCB TEQ (ratio based on 1

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pre-breach sample and 2 post-breach samples) the average carbon-normalized post-breach/pre-breach ratio for the key analytes in Lyman Mill Pond is 1.10. This indicates that on average, the post-breach mean concentrations of key analytes in Lyman Mill Pond are approximately 10% higher than the corresponding pre-breach mean concentrations. For Allendale Pond, the average carbon-normalized ratio for the key analytes is 1.38. In other words, on average, the post-breach mean concentration for the key analytes in sediments of Allendale Pond is approximately 38% higher than the corresponding pre-breach mean. **Higher post-breach mean concentrations for both Allendale Pond (theoretical contributor of contaminated sediment) and Lyman Mill Pond (theoretical recipient of contaminated sediment) and a greater difference in Allendale Pond compared to Lyman Mill Pond does not appear to be consistent with the theoretical model of significant transport of contaminated sediment from Allendale Pond into Lyman Mill Pond during or immediately after the 2001 breach of the Allendale Dam. In addition, even if any differences in post-breach and pre-breach sediment quality were due to the breach of the dam, the increase, on average, of 10% in the mean sediment concentration in Lyman Mill Pond would not appear to be a substantial difference, and would not, by itself, warrant additional sediment sampling programs to characterize post-breach sediment conditions.**

It appears that the differences between pre-breach mean raw sediment concentrations and post-breach mean raw sediment concentrations were due in large part to differences in sediment sample substrate type, and in particular, to differences in organic carbon content of the pre-breach and post-breach samples. These differences reflect the differences in the spatial distribution and specific sample locations between the pre-breach and post-breach sediment data sets.

The conclusions that have been drawn for the key analytes also apply specifically to the two primary human health risk contributors: dioxin TEQ and Aroclor-1254. As shown in Table 2, the post-breach carbon-normalized mean sediment concentration for dioxin TEQ in Lyman Mill Pond (0.029 mg/kg) is slightly lower (approximately 8% lower) than the corresponding pre-breach mean concentration in Lyman Mill Pond. As shown in Table 2 which presents the pre-breach and post-breach carbon-normalized sediment concentrations for Aroclor-1254 in Lyman Mill Pond, the post-breach mean concentration (6.87 mg Aroclor-1254/kg organic carbon) is approximately 48% higher than the pre-breach mean (4.65 mg/kg). This difference between post-breach and pre-breach data for Aroclor-1254 is far less than the approximate four-fold difference in means for the raw, pre-breach and post-breach data sets (all samples, including those without TOC analytical results). The carbon-normalized sediment concentrations are used directly in calculating BSAFs and PRGs and are more relevant for evaluating the pre-breach/post-breach impacts on BSAFs and PRGs than are the raw sediment data. The differences in post-breach and pre-breach mean carbon-normalized sediment concentrations for dioxin TEQ and Aroclor-1254 in Lyman Mill Pond do not appear to be associated with a single causative factor (because the dioxin TEQ post-breach mean is slightly lower and the Aroclor-1254 post-breach mean is somewhat higher) and the magnitude of the differences is not considered substantial.

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SUMMARY OF FISH TISSUE DATA COLLECTION AND RESULTS

Fish tissue samples and collection dates are shown in Table 4. In order to evaluate the potential impact of fish tissue data on BSAFs for the site, it is important to review the lipid-normalized fish tissue data. The BSAFs are calculated with both organic carbon-normalized sediment data and lipid-normalized fish tissue data. Table 5 presents a summary of arithmetic mean lipid-normalized concentrations of COCs in fish tissue at each of the six exposure areas. Table 6 presents summaries of the mean lipid content of fish tissue samples by species and exposure point as well as the mean organic carbon content of sediments by exposure area. The analytical data tables (reproduced from the Data Evaluation Report (January 2003) for American eel tissue (whole body) and white sucker tissue (whole body) in Allendale Pond and Lyman Mill Pond are presented in Appendix B. The analytical data table for largemouth bass (fillet) in Lyman Mill Pond is also presented in Appendix B. Table 7 presents summaries of lipid-normalized concentrations of key analytes in crayfish as well as the organic carbon-normalized sediment concentrations for the paired crayfish/sediment samples collected from Allendale Pond and Lyman Mill Pond.

For white sucker, among the six areas evaluated, Allendale Pond exhibited the highest lipid-normalized concentrations of dioxin TEQ, dieldrin, and methyl mercury while Lyman Mill Pond exhibited the highest mean concentrations of Aroclor-1254, Aroclor-1268, technical chlordane, and benzo(a)pyrene. For American eel, Allendale Pond exhibited the highest mean concentrations for dioxin TEQ, Aroclor-1254, Aroclor-1268, dieldrin, and methyl mercury while Lyman Mill Pond exhibited the highest mean concentration of technical chlordane and benzo(a)pyrene. Allendale Pond and Lyman Mill Pond had very similar concentrations of dioxin TEQ in fish tissue of both white sucker and American eel. For largemouth bass, Lyman Mill Pond exhibited the highest mean concentrations of dioxin TEQ, Aroclor-1254, dieldrin, and benzo(a)pyrene while Manton Pond exhibited the highest mean concentrations of Aroclor-1268 and technical chlordane. Since largemouth bass were not collected (could not be found) from Allendale Pond, it is not known if Allendale Pond largemouth bass COC tissue concentrations were higher or lower than those reported for largemouth bass from Lyman Mill Pond. Therefore, comparisons of fish tissue concentrations and of BSAFs between Allendale Pond and Lyman Mill Pond need to be limited to white sucker and American eel. Under equilibrium conditions, the highest lipid-normalized fish tissue concentrations would be expected in the exposure area with the highest organic carbon-normalized sediment concentrations (Allendale Pond for almost all of the COCs except technical chlordane). Lyman Mill Pond sediment has approximately 3-fold higher concentrations of technical chlordane than Allendale Pond. Aroclor-1268 has sediment concentrations that are very similar in Allendale Pond and Lyman Mill Pond.

Figure 7 shows graphically the distribution of COCs in the tissue of white sucker, American eel, and crayfish in Allendale Pond and Lyman Mill Pond. Those figures indicate that lipid-normalized tissue concentrations of dioxin TEQ are similar between Allendale Pond and Lyman Mill Pond for white sucker, American eel, and crayfish. Those figures clearly show that the lipid-normalized concentrations in white sucker of

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Aroclor-1254, benzo(a)pyrene, and technical chlordane are higher overall in Lyman Mill Pond than in Allendale Pond. For American eel, it appears that concentrations of Aroclor-1254, technical chlordane, and DDE are higher overall in Lyman Mill Pond than in Allendale Pond. For crayfish, the figures indicate that among COCs, only technical chlordane appears to have overall higher concentrations in Lyman Mill Pond. For the other COCs, concentrations are roughly equal in the two exposure areas or the concentrations in Allendale Pond appear to be slightly higher.

It appears that the dioxin TEQ and Aroclor-1254 are exhibiting differences with respect to biota accumulation in fish. The dioxin TEQ concentrations in Allendale Pond sediments (both pre-breach and post-breach concentrations) are approximately 3 times higher on average than the Lyman Mill Pond sediment concentrations but the fish tissue concentrations are very similar for fish collected from the two exposure areas. In contrast, the Aroclor-1254 organic carbon-normalized sediment concentrations in Allendale Pond are approximately 2-5 times higher than the corresponding concentrations in Lyman Mill Pond – both pre-breach and post-breach), but the lipid-normalized fish tissue concentrations in white sucker collected from Allendale Pond are actually lower (expected to be higher) than in the fish collected from Lyman Mill Pond (they are approximately half of the corresponding Lyman Mill concentrations). Organic carbon-normalized sediment concentration summaries for Allendale Pond and Lyman Mill Pond are shown in Table 2.

For crayfish (perhaps less likely to have been transported from Allendale Pond to Lyman Mill Pond at the time of the breach) tissue, Allendale Pond exhibited the highest mean concentrations of both dioxin TEQ and Aroclor-1254. Lyman Mill Pond exhibited the highest technical chlordane concentrations for crayfish. These data are consistent with expectations since the sediment concentrations of dioxin TEQ and Aroclor-1254 are higher in Allendale Pond than in Lyman Mill Pond while technical chlordane sediment concentrations are higher in Lyman Mill Pond than in Allendale Pond. As shown in Figures 8 and 9, there is generally a strong relationship between crayfish tissue concentrations and the corresponding co-located sediment samples. In most cases, as the sediment concentration increases, the concentration in the co-located crayfish tissue sample also increases. One of the sediment/crayfish co-located pairs from Allendale Pond (CMS-SD-4007 and CMS-CF-4007) does however, show inconsistencies in that trend for both dioxin TEQ and Aroclor-1254. Lipid normalized crayfish tissue concentrations of Aroclor-1254 are very consistent among all samples, but the lipid normalized crayfish tissue concentrations of dioxin TEQ appear to exhibit more variability among the samples. Based on the sediment concentrations of dioxin TEQ and Aroclor-1254 in CMS-SD-4007, the tissue concentration of dioxin TEQ in CMS-CF-4007 is higher than would be expected and the Aroclor-1254 tissue concentration is lower than expected.

Figures 10, 11, and 12 summarize graphically for all six exposure areas how mean biota tissue concentrations and organic carbon-normalized sediment concentrations are related for dioxin TEQ, Aroclor-1254, and 4,4'-DDE. As shown in Figure 10, dioxin TEQ sediment concentrations (the BHHRA BSAF data set) are dramatically (almost two

orders of magnitude) higher in Allendale Pond, Lyman Mill Pond, Manton Pond, and Dyerville Pond than in Assapumpset Pond and Greystone Mill Pond. As expected, the corresponding lipid-normalized tissue concentrations are also approximately two orders of magnitude higher in Allendale Pond, Lyman Mill Pond, Manton Pond, and Dyerville Pond than in Greystone Pond. The shapes of the biota tissue concentration vs. exposure area curves for largemouth bass, American eel, white sucker, and the crayfish samples are very similar to the concentration vs. exposure area for sediments (organic carbon-normalized). There is a very strong positive relationship between dioxin TEQ sediment concentrations and dioxin concentrations in the tissue of all four biota species that were analyzed.

However, as shown in Figure 11, for Aroclor-1254, the expected high degree of correlation between sediment concentrations and biota concentrations is not observed. Based on the BHHRA BSAF data set, Aroclor-1254 in sediments is not as dramatically nor consistently higher in Allendale Pond, Lyman Mill Pond, Manton Pond, and Dyerville Pond compared to Greystone Mill Pond and Assapumpset Pond as was dioxin TEQ (not as clearly site-related). For white sucker, American eel, and crayfish, the tissue concentrations increase from Assapumpset to Greystone, to Allendale and to Lyman Mill. However, the sediment concentrations increase from Assapumpset to Greystone to Allendale but then decrease in Lyman Mill and decrease further in Manton. The white sucker Aroclor-1254 concentrations in Lyman Mill Pond and Allendale Pond and the largemouth bass concentrations in Lyman Mill Pond and Manton Pond appear to be substantially higher than would be expected based on the sediment data for Allendale Pond, Lyman Mill Pond, and Manton Pond. Even if the post-breach mean sediment concentrations for Allendale Pond (13.5 mg/kg) and Lyman Mill Pond (4.36 mg/kg) were plotted on the figure, the white sucker and largemouth bass tissue concentrations continue to appear to be higher than expected, especially so for Lyman Mill Pond. The tissue concentrations for American eel and crayfish in Allendale Pond appear to be consistent with sediment concentrations and in Lyman Mill Pond the tissue concentrations for American eel and crayfish appear to be only slightly higher than expected.

Figure 12 summarizes the 4,4'-DDE sediment and biota concentrations among the six exposure areas. The sediment data indicate that 4,4'-DDE concentrations are consistent among the six exposure areas, indicating this compound is not a site-related compound. A review of Figure 12 indicates that there are some deviations from the expected relationships between sediment concentrations and biota tissue concentrations. In particular, the concentrations of 4,4'-DDE in white sucker in Lyman Mill Pond and in largemouth bass in Lyman Mill Pond appear to be substantially higher than expected based on the corresponding sediment concentrations. It is noteworthy that, for this substance that is unrelated to the site, the tissue concentrations are higher than expected in the same species and same exposure areas as was the case for Aroclor-1254. The 4,4'-DDE tissue concentrations for American eel and crayfish appear to be well correlated with sediment concentrations in Assapumpset Pond, Greystone Mill Pond, Allendale Pond, and Lyman Mill Pond.

Based on the expectation that higher sediment concentrations would result in higher fish tissue concentrations (for a given species) and on the generally good agreement with that model demonstrated by the American eel and crayfish and sediment data for dioxin TEQ and Aroclor-1254, it appears possible that the white sucker and largemouth bass collected from Lyman Mill Pond may not be representative of conditions in Lyman Mill Pond. It appears that it might be possible that the white sucker and largemouth bass collected from Lyman Mill Pond may have been located in Allendale Pond immediately prior to the May 2001 dam breach. Because the dioxin TEQ sediment concentrations in Allendale Pond and Lyman Mill Pond were reported to be similar, the dioxin TEQ concentrations in fish from the two ponds would be expected to be similar. If white sucker and largemouth bass migrated from Allendale Pond to Lyman Mill Pond (i.e., washed down through the breached dam with spring flood waters) and were subsequently sampled and analyzed, it is unlikely that the analytical results would suggest any inconsistency or deviation from expected results. However, in the case of Aroclor-1254, the sediment concentrations in Allendale Pond were reported to be higher than in Lyman Mill Pond. Higher Aroclor-1254 concentrations would be expected in Allendale Pond fish. If those white sucker and largemouth bass migrated to Lyman Mill Pond and were sampled and analyzed, they would likely show higher than expected concentrations based on the sediment concentrations. No largemouth bass were found in Allendale Pond at the time of fish sample collections.

There is some uncertainty concerning the lower concentrations of Aroclor-1254 in white sucker collected from Allendale Pond compared to those white sucker collected from Lyman Mill Pond. If the fish collected from Lyman Mill Pond actually had migrated from Allendale Pond (where the higher Aroclor-1254 sediment concentrations were reported), then it might be reasonable to expect that the white sucker from both ponds would have similar concentrations. It may be possible that the white sucker collected from Allendale may have migrated, at the time of the dam breach, from areas of Allendale Pond (that subsequently became dry land at the time of the breach) remote from the Aroclor-1254 "hot spot" into the remaining submerged areas of Allendale Pond, where they were collected shortly after the breach. These fish might have lower concentrations of Aroclor-1254 than those fish that migrated to Lyman Mill Pond.

COMPARISON OF BSAFS AMONG THE REFERENCE AREA, BACKGROUND AREA, AND THE FOUR RIVERINE EXPOSURE POINTS

Question: How do the July 2004 preliminary BSAFs for each of the COCs compare across the six exposure points. Is there an indication that BSAFs calculated for fish in Allendale Pond and Lyman Mill Pond may have been affected by the May 2001 breach of the Allendale Dam?

The preliminary draft BSAFs (July 2004) for the COCs for each of the fish species were summarized and compared in tabular form and in graphical form for dioxin TEQ and Aroclor-1254. Generally the BSAFs for a given chemical and fish species vary across the six exposure areas, but the ratio of the highest BSAF to lowest BSAF among the six exposure areas is generally less than 10 (values range within one order of magnitude).

As shown in Table 8, for dioxin TEQ, the BSAFs for largemouth bass range from 0.058 (Greystone Mill Pond) to 0.603 (Assapumpset). For American eel, the BSAFs range from 0.0043 (Allendale Pond) to 0.022 (Lyman Mill Pond). For white sucker (and brown bullhead from Assapumpset Pond) the dioxin TEQ BSAFs range from 0.037 (Greystone Mill Pond) to 0.262 (Lyman Mill Pond).

For Aroclor-1254, the BSAFs for largemouth bass range from 0.576 (Assapumpset Pond) to 6.27 (Manton Pond). For American eel, the BSAFs range from 0.064 (Dyerville Pond) to 0.674 (Lyman Mill Pond). For white sucker (and brown bullhead from Assapumpset Pond) the dioxin TEQ BSAFs range from 0.253 (Assapumpset Pond) to 10.7 (Lyman Mill Pond).

An inspection of the BSAFs for Allendale Pond and Lyman Mill Pond was conducted to evaluate whether there is evidence that the 2001 dam breach had resulted in BSAFs for Allendale Pond and/or Lyman Mill Pond that were inconsistent with those calculated for the other areas. As shown in Figure 13, the BSAFs for dioxin TEQ for American eel and white sucker in Allendale Pond and Lyman Mill Pond and largemouth bass in Lyman Mill Pond appear to be consistent with the BSAFs calculated for the other exposure areas. Although the BSAF for white sucker in Lyman Mill Pond is the highest among the exposure areas, it is only slightly higher than the BSAF calculated for Assapumpset Pond white sucker. As shown in Figure 14, the BSAFs for Aroclor-1254 for white sucker and American eel in Allendale Pond appear to be consistent with BSAFs for those species in other exposure areas. However, the Aroclor-1254 BSAF for white sucker in Lyman Mill Pond appears to be considerably higher than the white sucker BSAFs for Assapumpset Pond, Greystone Pond, and Allendale Pond. This is an important point, because the BSAF for white sucker is a major determinant in the overall sediment PRG based on the combined fish diet. While the largemouth bass BSAF for Aroclor-1254 in Lyman Mill Pond is higher than those calculated for largemouth bass in Greystone Mill Pond and Assapumpset Pond, it is slightly lower than the calculated largemouth bass Aroclor-1254 BSAF for Manton Pond. The detailed evaluation that yielded these observations is presented in the following section.

Table 8 summarizes and compares draft BSAFs (based on sediment and biota data from the Interim final BHHRA) for the various fish species across the reference area (Assapumpset Pond), the background area (Greystone Mill Pond), and the four riverine exposure points (Allendale Pond, Lyman Mill Pond, Manton Pond, and Dyerville Pond. Figures 13 and 14 summarize the distribution of dioxin TEQ and Aroclor-1254 BSAFs for largemouth bass, American eel, and white sucker (brown bullhead for Assapumpset Pond) at all of the exposure areas. As shown in Figure 13, the dioxin TEQ BSAFs for each species are reasonably consistent (generally less than 10-fold difference between the highest and lowest BSAFs for a given species) across all five of the exposure points where American eel samples were collected and for all of the exposure points (except Assapumpset Pond) that were sampled for largemouth bass and white sucker (brown bullhead was sampled in place of white sucker in Assapumpset Pond). The higher dioxin TEQ BSAF in Assapumpset (the geographically removed reference area) reflects higher

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tissue concentrations than in Greystone Mill Pond but slightly lower sediment concentrations than in Greystone Mill Pond. There is no obvious explanation for this variability. Empirical studies suggest that the relationship between sediment and tissue deviates from expectations at low concentrations.

The dioxin TEQ BSAF for largemouth bass in Assapumpset Pond (0.603) is substantially higher than the BSAFs for Greystone (0.058), Lyman Mill Pond (0.117), and Manton Pond (0.132). The dioxin TEQ BSAF for white sucker in Lyman Mill Pond (0.262) is approximately 6 times the corresponding BSAF in Allendale Pond (0.0427) and the dioxin TEQ BSAF for American eel in Lyman Mill (0.0221) is approximately 5 times the corresponding BSAF in Allendale Pond (0.00434).

As shown in Figure 14, the preliminary draft BSAFs for Aroclor-1254 were generally consistent among the exposure areas for a given species. There are some notable exceptions however. The Lyman Mill Pond and Manton Pond Aroclor-1254 BSAFs for largemouth bass are higher than in the other exposure areas and the Aroclor-1254 BSAF for white sucker in Lyman Mill Pond appears to be substantially higher than those reported for white sucker in the other exposure areas. The Aroclor-1254 BSAF for white sucker in Lyman Mill Pond (10.7) is approximately 8 times the corresponding BSAF in Allendale Pond (1.36) and the Aroclor-1254 BSAF for American eel in Lyman Mill Pond (0.674) is also approximately 4 times the corresponding BSAF in Allendale Pond (0.156).

As shown in Table 8, the white sucker BSAFs for dioxin TEQ and Aroclor-1254 in Lyman Mill Pond are approximately 6-8 times those calculated for Allendale Pond while the American eel BSAFs for dioxin TEQ and Aroclor-1254 in Lyman Mill Pond are approximately 4-5 times those calculated for Allendale Pond. Upon detailed review of those BSAFs, it appears that the BSAF for dioxin TEQ for white sucker and American eel have been unduly influenced by a single sediment sample that appears to be an outlier. Sample WRC-SD-2014-01 had one of the higher sediment concentrations of dioxin TEQ (0.00831 mg/kg) and a very low organic carbon content (0.269 %), yielding an organic carbon-normalized dioxin TEQ concentration of 3.089 mg/kg which was more than ten times the next highest concentration and more than 100 times higher than many of the other 29 samples from Allendale Pond. The arithmetic mean concentration of normalized dioxin TEQ was 0.1410 mg/kg for the 30 samples. If the "outlier" is removed from the data set, the mean concentration becomes 0.039 mg/kg. Since the mean normalized concentration is the denominator in the BSAF calculation, that change in the normalized sediment mean (reduced by a factor of 3.6) would have a net result of **increasing** the dioxin TEQ BSAF for Allendale Pond in white sucker and American eel by a factor of 3.6. The Aroclor-1254 BSAF for white sucker and American eel in Allendale Pond is also affected by the determinants of the arithmetic mean concentration of organic carbon –normalized sediment concentration. That mean is impacted (elevated) by an extreme value (the maximum organic carbon normalized sediment concentration of 258.99 mg/kg) as well as a specific area of elevated Aroclor-1254 concentrations in the central portion of Allendale Pond.

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In Lyman Mill Pond, the Aroclor-1254 BSAF for the white sucker is 7.8 times the white sucker BSAF for Allendale Pond and 17.2 times the white sucker BSAF calculated for Greystone Pond. Among the dioxin TEQ BSAFs for white sucker, the Lyman Mill BSAF is only slightly higher than that calculated for brown bullhead (collected in the absence of white sucker) in Asssapumpset Pond, and both of these values are approximately 7 times higher than the lowest BSAF reported for dioxin TEQ in white sucker.

In order to evaluate the possible reasons for the higher BSAF for Aroclor-1254 in white sucker and largemouth bass in Lyman Mill Pond, comparisons were made between Lyman Mill Pond and Allendale Pond with respect to: concentrations of dioxin TEQ and Aroclor-1254 in fish (Table 5 and Figures 15 and 16); concentrations of dioxin TEQ and Aroclor-1254 in sediments (Tables 2 and 3); lipid content of the fish (Table 6 and 17); size of the fish (approximation of age); and organic carbon content of the sediments (Table 3 and 6). The following conclusions were reached:

- The mean concentration of dioxin TEQ in white sucker from Lyman Mill Pond (0.000580 mg/kg) was approximately 1.7 times the corresponding mean concentration in Allendale Pond (0.000346 mg/kg).
- The mean concentration of Aroclor-1254 in TEQ in white sucker from Lyman Mill Pond (4.19359 mg/kg) was approximately 2.6 times the corresponding mean in Allendale Pond (1.5832 mg/kg).
- The concentrations of dioxin TEQ and Aroclor-1254 in largemouth bass in Lyman Mill Pond cannot be compared to corresponding concentrations in Allendale Pond (largemouth bass were not available for collection in Allendale pond).
- Concentrations of lipid in each of the species analyzed were consistent among the exposure points sampled. Differences in lipid content of sampled biota would not explain the higher BSAF for Aroclor-1254 for white sucker in Lyman Mill Pond.
- The white sucker samples collected from Allendale Pond and Lyman Mill Pond had very similar length (means of 430 mm and 468 mm), weight (means of 1135 grams and 1240 grams), and lipid content (means of 6.1% and 7.4%). It is unlikely that differences in BSAFs between the two exposure areas is due to differences in length, weight, or lipid content.
- The mean concentration of dioxin TEQ in sediments from Lyman Mill Pond (0.00179 mg/kg) was approximately 0.31 times the corresponding mean concentration in Allendale Pond (0.00574 mg/kg). (Lyman Mill Pond is lower).
- The mean concentration of Aroclor-1254 in TEQ in sediments from Lyman Mill Pond (0.27 mg/kg) was approximately 0.18 times the corresponding mean in Allendale Pond (1.5 mg/kg). (Lyman Mill Pond is lower).
- **The higher concentrations of Aroclor-1254 and dioxin TEQ (to a lesser extent) in fish tissue in Lyman Mill Pond relative to Allendale Pond appears to be inconsistent with the lower concentrations of the same parameters in sediments of Lyman Mill Pond relative to Allendale Pond.**
- All of the fish tissue data used in this analysis were collected in the summer of 2001, after the May 2001 breach of the Allendale Dam.

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- Based on only sediment data collected after the May 2001 breach of the Allendale Dam (post-breach data), the mean concentrations of dioxin TEQ (0.00219 mg/kg) and Aroclor-1254 (0.722 mg/kg) in sediments of Lyman Mill Pond are lower than the corresponding mean concentrations (0.00616 mg/kg for dioxin TEQ and 1.04 mg/kg for Aroclor-1254) in Allendale Pond.
- The post-breach mean concentration of dioxin TEQ (0.00219 mg/kg) in sediment from Lyman Mill Pond is slightly higher than (approximately 1.2 times) the pre-breach sediment mean concentrations of dioxin TEQ (0.00186 mg/kg) while the post-breach mean concentration of Aroclor-1254 (0.722 mg/kg) is approximately 4.3 times the pre-breach mean concentration of 0.1675 mg/kg.

Note: The draft BSAFs and PRGs for Lyman Mill Pond were based on a subset of the BHHRA sediment data for Lyman Mill Pond. That subset of data included all samples collected through the summer of 2001 for which Total Organic Carbon (TOC) data were available (the samples for which organic carbon-normalized contaminant concentrations could be calculated). As a point of comparison, the raw (not normalized) mean concentrations of dioxin TEQ and Aroclor-1254 were 0.00233 mg/kg and 0.3232 mg/kg respectively. Using only the post-breach BHHRA samples (with TOC analytical results) and those 2003 sediment samples (top 12 inches) that have TOC analytical results, the "post-breach" sediment mean concentrations of dioxin TEQ and Aroclor-1254 are 0.00177 mg/kg and 0.624 mg/kg respectively. If only post-breach sediment data were used to calculate the BSAFs, the Lyman Mill Aroclor-1254 BSAF (white sucker) might be reduced by a factor of 50% (cut in half).

COMPARISON OF PRE-BREACH, POST- BREACH, AND BHHRA-BASED BSAFS (IF NECESSARY)

Question: Does it appear that there is a substantial difference between Pre-Breach, Post-Breach, and "BHHRA" BSAFs for white sucker, American eel, and largemouth bass for Allendale Pond and Lyman Mill Pond?

Table 8 documents the calculation of BSAFs for benzo(a)pyrene, 4,4'-DDE, Aroclor-1254, Aroclor-1268, dieldrin, technical chlordane, methyl mercury, PCB TEQ, and dioxin TEQ. Figures 13 and 14 show the distribution of calculated draft July 2004 BSAFs for dioxin TEQ and Aroclor-1254 in fish species at the six exposure points. Table 9 shows the calculation of BSAFs for benzo(a)pyrene, 4,4'-DDE, Aroclor-1254, Aroclor-1268, dieldrin, technical chlordane, methyl mercury, PCB TEQ, and dioxin TEQ using only post-breach sediment data for Allendale Pond and Lyman Mill Pond. Figures 18 and 19 show the distribution of BSAFs for dioxin TEQ and Aroclor-1254 in fish species at the six exposure points using only post-breach sediment data for Allendale Pond and Lyman Mill Pond and the BHHRA data for the remainder of the exposure areas. The distribution of dioxin TEQ BSAFs shown in Figure 18 is very similar to that shown in Figure 13 (the latter is based on BHHRA sediment data). The distribution of Aroclor-1254 BSAFs shown in Figure 19 is also very similar to that shown in Figure 14

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(the latter is based on BHHRA sediment data). These results suggest that the inconsistent BSAFs for Aroclor-1254 in white sucker and largemouth bass in Lyman Mill Pond are not associated with differences between the pre-breach, BHHRA-, and post-breach sediment concentrations.

Figures 20, 21, and 22 compare BHHRA-, pre-breach-, and post-breach- dioxin TEQ BSAFs for white sucker, American eel, and largemouth bass respectively. Figures 23, 24, and 25 compare BHHRA-, pre-breach-, and post-breach- Aroclor-1254 BSAFs for white sucker, American eel, and largemouth bass respectively.

As seen in Figures 20, 21, and 22, the differences between BSAFs based on pre-breach sediment data and post-breach sediment data for dioxin TEQ are not substantial. Lyman Mill dioxin TEQ BSAFs based on pre-breach and post-breach data are very similar for each of the three species. For Allendale Pond, the dioxin TEQ BSAFs based on post-breach sediment data are approximately two times the BSAFs based on pre-breach sediment data for both the white sucker and for the American eel (largemouth bass were not collected from Allendale Pond). The Lyman Mill Pond dioxin TEQ BSAFs for white sucker and American eel remain higher than the corresponding BSAFs for Allendale Pond and Greystone Mill Pond by a factor of approximately 2.5 and 5 times (white sucker) and 2.5 to 3 times (American eel).

For Aroclor-1254 BSAFs (summarized in Figures 23, 24, and 25) the differences in BSAFs between pre-breach and post-breach data directly reflect the higher mean Aroclor-1254 concentrations in the pre-breach data sets. For white sucker, the post-breach Aroclor-1254 BSAF in Allendale Pond (0.597) is lower than the BHHRA BSAF (1.36) and the pre-breach BSAF (2.43). For Lyman Mill Pond, the post-breach BSAF for white sucker (8.17) is slightly lower than the BHHRA BSAF (10.7) and the pre-breach BSAF (12.1). The BSAFs for Lyman Mill Pond are consistently higher (approximately 5 times to 13.6 times higher) than for Allendale Pond as well as for Greystone Mill Pond and Assapumpset Pond for the pre-breach, BHHRA, and post-breach data. For Aroclor-1254 in American eel at Allendale Pond, the post-breach BSAF (0.07) is lower than the BBHRA (0.16) and the pre-breach (0.28) BSAFs. The Aroclor-1254 post-breach BSAF at Lyman Mill Pond (0.52) is slightly lower than the BHHRA BSAF (0.67) and pre-breach BSAF (0.76). The Lyman Mill Aroclor-1254 BSAF for American eel is highest in Lyman Mill Pond among the exposure areas. For largemouth bass, in Lyman Mill Pond, the post-breach Aroclor-1254 BSAF (4.44) is slightly lower than the BHHRA BSAF (5.81) and the pre-breach BSAF (6.56). Lyman Mill Pond has the highest BSAFs among the exposure areas. Largemouth bass could not be collected in Allendale Pond.

Overall, if only post-breach sediment data were used to calculate BSAFs for Allendale Pond and Lyman Mill Pond, it appears the dioxin TEQ BSAFs would change minimally. Only the Allendale BSAF for white sucker and American eel would be increased by a factor of approximately 2.5. For Aroclor-1254, in Allendale Pond, the post-breach BSAF is lower (in contrast to dioxin TEQ) by a factor of about 4 for white sucker and American eel than the pre-breach BSAF. In Lyman Mill Pond, the post-breach BSAF is lower by approximately 33% for white sucker, American eel, and largemouth bass. The BSAF at

Lyman Mill Pond remains the highest among all exposure areas for all three species when the post-breach sediment data are used to calculate the BSAFs. It appears likely that the higher BSAFs for dioxin TEQ and Aroclor-1254 in Lyman Mill Pond could be the result of transport of fish from Allendale Pond into Lyman Mill Pond at the time of the May 2001 Allendale Dam breach.

COMPARISON OF DRAFT BSAFS TO LITERATURE-BASED BSAFS

Question: Is there a substantial difference between the July 2004 preliminary BSAFs calculated for the three species at the six exposure points and published literature BSAF values for those or similar species?

The *Draft Final Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds* (USEPA, September 2000) provides a summary of available information as of the year 2000, concerning BSAFs in freshwater fish species. This document is referred to hereafter as the "reassessment document". Table 4-1 of Volume 4 of the reassessment document summarizes Available Biota to Sediment Accumulation Factors (BSAFs), for dioxin-like compounds. A copy of Table 4-1 is provided in Appendix C (on CD).

The dioxin BSAFs presented in Table 4-1 were developed and reported for the 2,3,7,8-TCDD congener. The dioxin TEQ in sediments and fish at the Centredale site is almost entirely contributed by the 2,3,7,8-TCDD congener. Therefore, the comparison of the BSAF developed for dioxin TEQ at Centredale to the BSAFs derived for the 2,3,7,8-TCDD as reported in the literature is appropriate. Table 10 compares the July 2004 draft preliminary BSAFs for the site to the information provided in the reassessment document. There is a considerable amount of variability in the available literature-based fish BSAFs for 2,3,7,8-TCDD as shown in Figures 26 and 27. The American eel BSAFs have been compared to the BSAF reported by Parkerton (1991) who reported a BSAF of 0.009 for "migratory" fish (eel and striped bass). The American eel BSAFs are reasonably consistent with this published value. The BSAFs for dioxin TEQ for white sucker, brown bullhead, and largemouth bass were compared to field-derived BSAFs reported in the reassessment document for "resident" fish (including brown trout, lake trout, smallmouth bass, white perch, yellow perch, and pike). **The draft preliminary BSAFs for dioxin TEQ for all three species appear to be consistent with the range of available BSAFs.**

Figure 28 compares the site-specific preliminary draft BSAFs for Aroclor-1254 to published BSAF values for Aroclor-1254, Total PCBs, Pentachloro Biphenyls, Hexachloro Biphenyls, and Hexachloro PCB Congeners. Aroclor-1254 is comprised primarily of Pentachloro Biphenyls and Hexachloro Biphenyls. The site-specific BSAFs for white sucker and largemouth bass are generally consistent (perhaps slightly lower) than most of the published values for trout, salmon, perch and bass. The site-specific BSAFs for the migratory American eel are lower than those reported for trout, salmon, perch, and bass. This is not unexpected, given that the eels may not spend sufficient time to approach equilibrium conditions between the sediments and the biota tissue.

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Consistent with that concept, the published BSAFs for migratory species for dioxin TEQ are lower than those for "resident' species.

COMPARISON OF RANGE OF LIKELY PRGS (BASED ON RANGE OF LITERATURE-BASED BSAFS) TO RANGE OF SEDIMENT BACKGROUND CONCENTRATIONS AT GREYSTONE MILL POND

Question: Based on the range of published fish BSAFs for 2,3,7,8-TCDD and Aroclor-1254 (or other PCBs), is it likely that the range of calculated sediment PRGs for 2,3,7,8-TCDD based on a combined fish diet would be lower than the sediment background concentrations as identified in Greystone Mill Pond?

Table 11 summarizes the BSAFs and sediment PRGs (based on fish consumption) for each of the three fish species as well as the combined diet-based sediment PRGs. BSAFs ranged from 0.0043 – 0.60 for the dioxin TEQ for the species evaluated and among the reaches evaluated in the BHHRA. These values are consistent with the range of fish BSAFs (reported in the literature as summarized in Figures 26 and 27 and Table 10. The lowest BSAF values were calculated for American eel (0.004 to 0.022) and the literature reports a BSAF of 0.009 for migratory species such as eel and striped bass. For the largemouth bass and white sucker, BSAFs ranged from 0.04 to 0.60 while the values reported in the literature for resident fish species range from 0.03 to 2.94. The value of 2.94 appears to be quite different from all other reported values in the literature. It appears that an appropriate range of literature values for resident fish would be 0.03 to 0.86. Most of the reported values in the literature fall between 0.03 and 0.20. The site-specific BSAF values fall within that range. The site-specific BSAFs for Allendale Pond are 0.04 for white sucker (no largemouth bass were collected from Allendale Pond) and for Lyman Mill Pond are 0.12 for largemouth bass and 0.26 for white sucker. The previous evaluations have suggested that additional sampling and dioxin TEQ analysis of fish tissue in Lyman Mill Pond might likely result in slightly lower (and possibly no change) fish tissue concentrations and slightly lower BSAFs for white sucker and largemouth bass. The relationship between dioxin TEQ biota tissue concentrations and sediment concentrations, based on existing data, is very consistent among the six exposure areas. Therefore, it is unlikely that refinement of dioxin TEQ BSAFs by additional sampling and analysis would result in substantially different BSAFs for Allendale Pond and Lyman Mill Pond.

The site-specific BSAF values contributed to sediment PRG (combined diet) values, based on a target cancer risk of one in one million, ranging from 0.000001 mg/kg (1 ppt) for Assapumpset Pond to 0.0000064 (6.4 ppt) for Greystone Mill Pond. All of the PRGs that are based on a target cancer risk of one in one million are below the Greystone Mill Pond (background area) mean concentration 0.000034 mg/kg (34 ppt). If the target cancer risk is set at one in ten thousand, the combined diet PRGs ranged from 0.000096 mg/kg (96 ppt) for Assapumpset Pond to 0.000636 mg/kg (636 ppt) for Greystone Mill Pond. All of the combined diet-based sediment PRGs based on cancer risk of one in ten thousand are above the mean sediment concentration of 0.000034 mg/kg (34 ppt) in the background area (Greystone Mill Pond). This suggests that if remedial decisions are

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made based on a target cancer risk of one in ten thousand, the refinement of BSAFs for Allendale Pond and Lyman Mill Pond could have an impact on the practical remedial goals (they would be above the background concentrations and changes in the BSAFs could change the remedial targets). If the remedial decisions are based on a target cancer risk of one in one million, the refinement of the BSAFs for Allendale Pond and Lyman Mill Pond is unlikely to have a significant impact on practical remedial targets (background concentrations would likely be used, since they would be higher than the calculated PRGs).

As shown in Table 11, the Aroclor-1254 BSAFs for American eel range from 0.06 to 0.67 among the five exposure areas sampled for that species. For white sucker and largemouth bass the preliminary draft site-specific BSAFs range from 0.58 to 10.7. The range of fish BSAFs from the literature is 0.52 to 20.8. Most of the published BSAF values are less than 10. The previous evaluations suggest that Aroclor-1254 concentrations in white sucker from Lyman Mill Pond are higher than expected based on the available sediment and fish tissue data for the entire site. Refinement of BSAFs for Aroclor-1254 in Lyman Mill Pond would therefore likely reduce slightly the BSAFs for Lyman Mill Pond.

The site-specific BSAF values contributed to sediment PRG (combined diet) values, based on a target cancer risk of one in one million, ranging from 0.0031 mg/kg (3.1 ppb) for Manton Pond to 0.026 mg/kg (26 ppb) for Assapumpset Pond. At a target cancer risk of one in ten thousand, the range of PRGs is 0.310 mg/kg (310 ppb) to 2.6 mg/kg (2,600 ppb). Also, as shown in Table 11, the Aroclor-1254 sediment PRGs based on a target non-cancer hazard index of 1 range from 0.038 mg/kg (38 ppb) for Manton Pond to 0.32 mg/kg (320 ppb) for Assapumpset Pond. If the target cancer risk is one in one million, the Aroclor-1254 PRG would be based on cancer risk and the PRGs would range from 0.0031 mg/kg (3.1 ppb to 0.026 mg/kg (26 ppb). These PRGs are all below the mean background concentration of 0.15 mg/kg (150 ppb) and therefore the background concentration would be the lowest practical remedial target. If the target cancer risk is one in ten thousand, the Aroclor-1254 PRG would be based on non-cancer risk and would range, among the exposure areas, from 0.038 mg/kg (38 ppb) to 0.320 mg/kg (320 ppb). Some of these PRGs would be below the mean background concentration of 0.150 mg/kg (150 ppb) and others would be below the background mean concentration. The refinement of the BSAF for white sucker and largemouth bass in Lyman Mill Pond would likely result in decreased BSAFs and slightly higher PRGs.

COMPARISON OF SEDIMENT PRGS FOR DIOXIN TEQ AND AROCLOR-1254 TO SEDIMENT QUALITY IN ALLENDALE POND AND LYMAN MILL POND

An evaluation has been conducted to assess the potential impact of resampling and analysis of white sucker in Allendale Pond and Lyman Mill Pond on the sediment remedial requirements in those two ponds. The information provided in Table 11 has been used to identify the likely sediment remedial driver(s) in Allendale Pond and in Lyman Mill Pond. The fish-consumption-based sediment PRGs for Dioxin TEQ and Aroclor-1254 have been compared to the mean sediment concentrations in Allendale

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Pond and Lyman Mill Pond to determine which sediment PRGs would appear to be controlling remedial requirements for the sediments.

For Dioxin TEQ, the calculated combined fish diet sediment PRGs (target cancer risk of 10^{-4}) range from 9.5 x 10^{-5} mg/kg (96 ppt) at Assapumpset Pond to 6.37 x 10^{-4} mg/kg (637 ppt) at Greystone Mill Pond. The arithmetic mean of the Dioxin TEQ sediment PRGs across the six areas evaluated is 3.0 x 10^{-4} mg/kg (300 ppt). The combined fish diet-based Dioxin TEQ sediment PRGs calculated for Allendale Pond and Lyman Mill pond are 4.80 x 10^{-4} mg/kg (480 ppt) and 2.75 x 10^{-4} mg/kg (275 ppt) respectively. As shown in Table 11, the arithmetic mean pre-breach Dioxin TEQ sediment concentrations in Allendale Pond which is 5.990 x 10^{-3} mg/kg (5,990 ppt) and Lyman Mill Pond which is 1.860 x 10^{-3} mg/kg (1,860 ppt) are well above the average sediment PRG for the six areas evaluated which is 3.0 x 10-4 mg/kg (300 ppt) as well as the sediment PRGs calculated for Allendale Pond which is 4.80 x 10^{-4} mg/kg (480 ppt) and Lyman Mill Pond which is 2.75 x 10^{-4} (275 ppt). Using the 3.0 x 10-4 mg/kg (300 ppt) average sediment PRG as a point of reference, the Allendale Pond Dioxin TEQ average sediment concentration would need to be reduced approximately 20-fold (5.99 x 10^{-3} mg/kg/3.0 x 10^{-4} mg/kg) to reach the average sediment PRG. For Lyman Mill Pond, the Dioxin TEQ average sediment concentration would need to be reduced approximately 6-fold (1.86 x 10^{-3} mg/kg/3.0 x 10^{-4} mg/kg) to reach the average sediment PRG.

For Aroclor-1254, the calculated combined fish diet-based sediment PRGs (target cancer risk of 10^{-4} and target hazard quotient of one) range from 0.038 mg/kg (38 ppb) at Manton Pond to 0.320 mg/kg (320 ppb) at Assapumpset Pond. The arithmetic mean of the Aroclor-1254 sediment PRGs across the areas evaluated is 0.160 mg/kg (160 ppb). The combined fish diet-based sediment PRGs calculated for Allendale Pond and Lyman Mill Pond are 0.125 mg/kg (125 ppb) and 0.058 mg/kg (58 ppb) respectively. As shown in Table 11, the arithmetic mean pre-breach Aroclor-1254 sediment concentrations in Allendale Pond which is 1.570 mg/kg (1,570 ppb) and in Lyman Mill Pond which is 0.167 mg/kg (167 ppb) are, respectively, well above and roughly equal to the average sediment PRG for the six areas evaluated. Using the arithmetic mean sediment PRG of 0.160 mg/kg (160 ppb) as a point of reference, the Allendale Pond Aroclor-1254 average sediment concentration would need to be reduced approximately 10-fold (1.570 mg/kg/0.160 mg/kg) but the Lyman Mill Pond Aroclor-1254 pre-breach average sediment concentration is already very similar to the average PRG and would essentially not need to be reduced. The combined pre-breach and post-breach Aroclor-1254 average sediment concentrations (identified in the BHHRA) for Allendale Pond and Lyman Mill Pond are 1.512 mg/kg (1,512 ppb) and 0.271 mg/kg (271 ppb) respectively. Based on these data, the average Aroclor-1254 sediment concentrations in Allendale Pond and Lyman Mill Pond would need to be reduced by 9.5-fold (1.512 mg/kg/0.160 mg/kg) and 1.7-fold (0.271 mg/kg/0.160 mg/kg) respectively to meet the average sediment PRG of 0.160 mg/kg (160 ppb).

Based on this information, it appears that remediation of sediments to meet the Dioxin TEQ PRGs would require concentration reductions of 20-fold and 6-fold at Allendale Pond and Lyman Mill Pond respectively. **Assuming that dioxin sediment**

concentrations and Aroclor-1254 sediment concentrations are similarly distributed within Allendale Pond and Lyman Mill Pond, it appears that remediation of sediments in Allendale pond and especially Lyman Mill Pond to meet, on average, Dioxin TEQ PRGs would also, reduce Aroclor-1254 average sediment concentrations to below the corresponding Aroclor-1254 sediment PRGs. (Reductions in concentrations of only 9.5-fold and 1.7-fold would be required to meet the Aroclor-1254 PRGs.)

The evaluation of fish tissue Aroclor-1254 concentrations, calculated BSAFs for Aroclor-1254, and comparison of calculated Aroclor-1254 BSAFs to literature values had indicated that the Lyman Mill Pond white sucker Aroclor-1254 tissue concentrations and corresponding BSAFs were higher than expected. This resulted in a very low calculated white sucker consumption-based Aroclor-1254 sediment PRG for Lyman Mill Pond (6 ppb). When that value was factored into the calculation of the combined fish diet sediment PRG for Lyman Mill Pond, its effect was to lower the PRG for Lyman Mill Pond. If additional white sucker tissue sampling and analysis were to be conducted to reduce uncertainty in the BSAF and PRG for Lyman Mill Pond, the likely result would be lower white sucker tissue concentrations, a lower BSAF, and a somewhat higher sediment PRG for Aroclor-1254 for Lyman Mill Pond and a somewhat (slightly) higher average combined fish diet-based sediment PRG for the six areas that have been evaluated. This would suggest that additional sampling and analysis of white sucker in Lyman Mill Pond would not have a substantial impact on the previous conclusion: remediation of sediments in Allendale Pond and especially Lyman Mill Pond, to meet, on average, Dioxin TEQ PRGs would also, reduce Aroclor-1254 average sediment concentrations to below the corresponding Aroclor-1254 sediment PRGs. **Therefore, additional sampling and analysis for Aroclor-1254 analysis of white sucker tissue at Lyman Mill Pond would be unlikely to result in any substantial change, based on human health risks, in the sediment remedial requirements for Allendale Pond and Lyman Mill Pond.**

CONCLUSIONS

The 2001 Allendale Dam breach does not appear to have substantially affected sediment quality in Allendale Pond and Lyman Mill Pond.

The post-breach sediment sample locations are not by themselves representative of sediment conditions in the ponds (they do not include "near-shore" locations to the extent that the pre-breach sediment sample locations do.

The combination of pre-breach and post-breach data appears to be representative of conditions in Allendale Pond and Lyman Mill Pond. This combination of data should be the basis of the development of the BSAFs and PRGs for these two exposure points.

The analytical data should be subjected to an outlier analysis prior to the development of the BSAFs and PRGs. Outliers that could have an inordinate amount of impact on mean concentrations used in the calculations should be removed.

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It appears that the white sucker collected from Lyman Mill Pond (the northern tip of Lyman Mill Pond) may actually have been washed into Lyman Mill Pond from Allendale Pond at the time of the Allendale Dam breach. The absence of largemouth bass in Allendale Pond in July 2001 suggests that largemouth bass may also have been washed out of Allendale Pond into Lyman Mill Pond.

Putting the Lyman Mill white sucker and largemouth bass aside, draft preliminary BSAFs for dioxin TEQ and Aroclor-1254 are reasonably consistent among the four exposure points, the background area, and the reference area.

Due to identified uncertainties associated with BSAFs calculated for Lyman Mill Pond (particularly for white sucker), it appears appropriate to derive sediment PRGs based on the BSAFs derived for the exposure areas other than Lyman Mill Pond.

RECOMMENDATIONS

Based upon the evaluation of the pre-breach and post-breach data, an evaluation of fish tissue concentrations, and the literature values for BSAFs for dioxin TEQ and Aroclor-1254, the following recommendations have been developed.

- In order to minimize the impact of the uncertainty with respect to post-breach fish tissue concentrations in Lyman Mill Pond (especially for white sucker), it is recommended that the fish tissue data and corresponding BSAFs for Assapumpset Pond, Greystone Mill Pond, Allendale Pond, Manton Pond, and Dyerville Pond be used in the derivation of sediment PRGs for the Site. Lyman Mill Pond fish tissue and sediment data would not be included in the derivation of fish-consumption-based sediment PRGs.
- Additional sampling and analysis of sediment and fish tissue to reduce uncertainties in Aroclor-1254 BSAFs, particularly for Lyman Mill Pond, is not recommended at this time. It appears that additional sampling and analysis to reduce uncertainties with respect to Lyman Mill Pond fish tissue concentrations (especially for white sucker) and associated BSAFs would have no substantial impact on human health risk-based sediment remedial requirements for Allendale Pond and Lyman Mill Pond (Dioxin TEQ PRGs would appear to determine the extent of required sediment remediation). The BSAFs for Dioxin TEQ and Aroclor-1254 in each of the areas (excluding Aroclor-1254 in Lyman Mill Pond) are reasonably consistent with published literature values for the same and similar fish species.
- Because this analysis concluded that the 2001 Allendale Dam breach does not appear to have substantially affected sediment quality in Allendale Pond and Lyman Mill Pond, no additional sediment sampling to support PRG development is recommended at this time.
- The calculation of BSAFs and sediment PRGs for white sucker and largemouth bass should include an outlier analysis for chemical concentration data in sediments and fish tissue. Outliers should be removed from the data sets prior to calculation of BSAFs and PRGs. Alternatively, geometric mean concentrations of both the organic carbon normalized sediment concentrations and of the lipid normalized fish tissue concentrations could be used in the BSAF calculations in order to minimize the impacts of outliers in the data sets.

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FIGURES

ATTACHMENT A

FIGURES

LEGEND

- Pre-Breach Sediment Sampling Location
- Post-Breach Sediment Sampling Location

SCALE IN FEET:

0 300 600

MAGNETIC

ALLENDALE POND

ALLENDALE DAM

LYMAN MILL POND

LYMAN MILL DAM

ASSAPUMPSET BROOK

WOONASQUATUCKET RIVER

MACTEC

Figure 1
Location of Sediment Samples

Prepared By: KJA
Checked By: MJM

P:/W9-GVT/COE-NAE/BATTELLE/CENTREDALE/TASK25-BCRA/KIGURES/SURFER/PrePos1Breach/PrePostBr8achSD-LOCs.SRF

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LEGEND

- Pre-Breach Sediment Sampling Location
- Post-Breach Sediment Sampling Location

SCALE IN FEET:

0 300 600

NE

1

ALLENDALE POND

ALLENDALE DAM

LYMAN MILL POND

LYMAN MILL DAM

ASSAPUMPSET BROOK

WOONASQUATUCKET RIVER

1ACTEC

Figure 2
Location of Sediment Samples Used for Site-Specific BSAF Calculations

Prepared By: KJA
Checked By: MJM
12/22/04

P:/W9-GVT/COE-NAE/BATTELLE/CENTREDALE/TASK25-BCRA/FIGURES/SURFEFVPrePostBreach/PrePostBreachSD-LOCs-BSAF.:

LEGEND

Pre-Breach Constituent Detected
Symbol Size Proportional to Concentration

Pre-Breach Constituent Not Detected

Post-Breach Constituent Detected
Symbol Size Proportional to Concentration

SCALE IN FEET:

0 300 600

MAGNETIC

Range of Detected Concentrations: 11 to 27,000 *[Jig/Kg*

ALLENDALE POND

ALLENDALE DAM

ASSAPUMPSET BROOK

WOONASQUATUCKET RIVER

LYMAN MILL POND

LYMAN MILL DAM

IACTEC

Figure 3
Aroclor 1254 Concentrations in Sediment

Prepared By: KJA
Checked By: MJM

P:AA/9-GVT/COE-NAE/BATTELLE/CENTREDALE/TASK25-BCRA/FIGURES/SURFER/PrePostBreach/PrePostBreachSD-PCB 1254.S

LEGEND

Pre-Breach Constituent Detected
Symbol Size Proportional to Concentration

Post-Breach Constituent Detected
Symbol Size Proportional to Concentration

SCALE IN FEET:

0 300 600

MAGNETIC

Range of Detected Concentrations: 0.891 to 73,000 pg/g

ALLENDALE POND

ALLENDALE DAM

ASSAPUMPSET BROOK

WOONASQUATUCKET RIVER

LYMAN MILL POND

LYMAN MILL DAM

MACTEC

Figure 4
TEQ Concentrations in Sediment

Prepared By: KJA
Checked By: MJM

P:/W9-GVT/COE-NAE/BATTELLE/CENTREDALEyTASK25-BCRA/FIGURES/SURFER/PrePostBreach/PrePostBreachSD-TEQ.SRF

fMACTEC

Figure 5
HCX Concentrations in Sediment

Prepared By: KJA
Checked By: MJM

P:/W9-GVT/COE-NAE/BATTELLE/CENTREDALE/TASK25-BCRA/FIGURES/SURFER/PrePostBreach/PrePostBreachSD-HCX.SRF

LEGEND

- Pre-Breach Constituent Detected
  Symbol Size Proportional to Concentration
- Pre-Breach Constituent Not Detected
- Post-Breach Constituent Detected
  Symbol Size Proportional to Concentration

SCALE IN FEET:

0 300 600

MAGNETIC

Range of Detected Concentrations: 0.00743 to 3.6 mg/Kg

ALLENDALE POND

ALLENDALE DAM

LYMAN MILL POND

LYMAN MILL DAM

ASSAPUMPSET BROOK

WOONASQUATUCKET RIVER

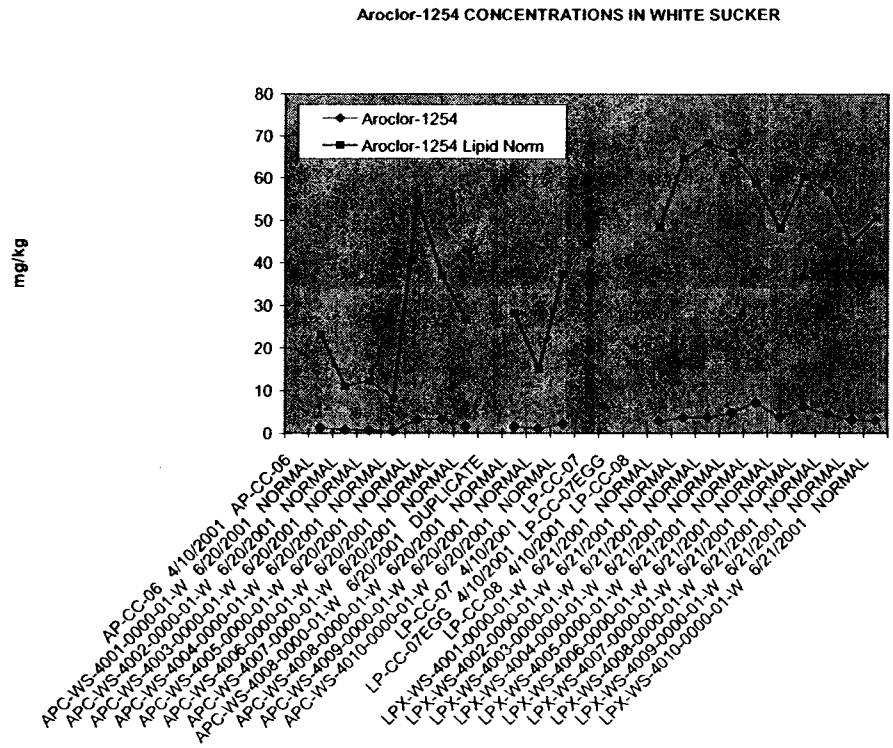
rMACTEC

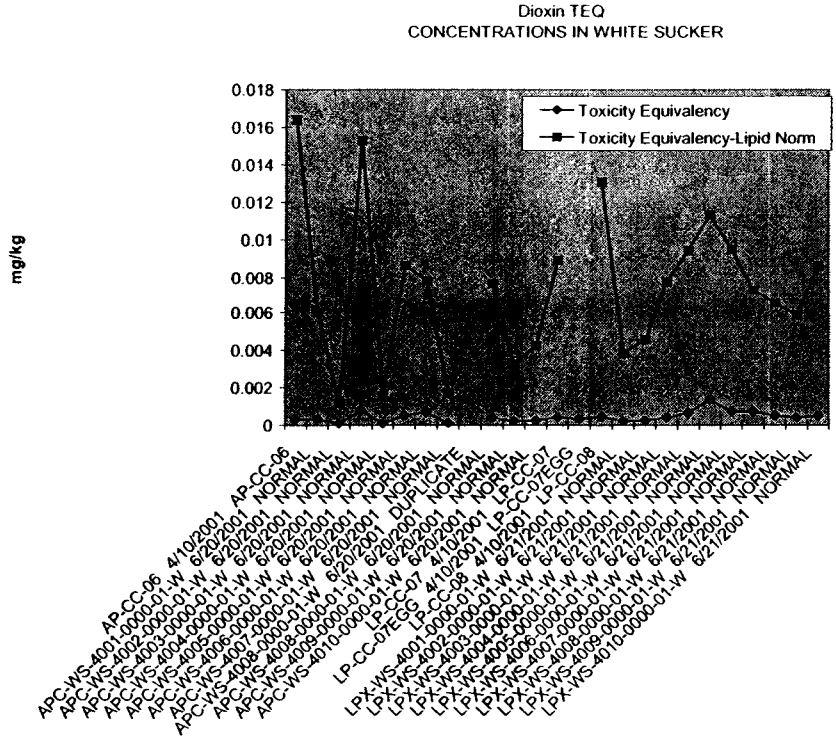
Figure 6
Mercury Concentrations in Sediment

Prepared By: KJA
Checked By: MJM

P:/W9-GVT/COE-NAE/BATTELLE/CENTREDALE/TASK25-BCRA/FIGURES/SURFER/PrePostBreach/PrePostBreachSD-Hg.SRF

Figure 7. Comparison of Allendale Pond and Lyman Mill Pond Fish and Crayfish Tissue Concentrations
Centredale Manor Restoration Project Superfund Site
North Providence, Rhode Island





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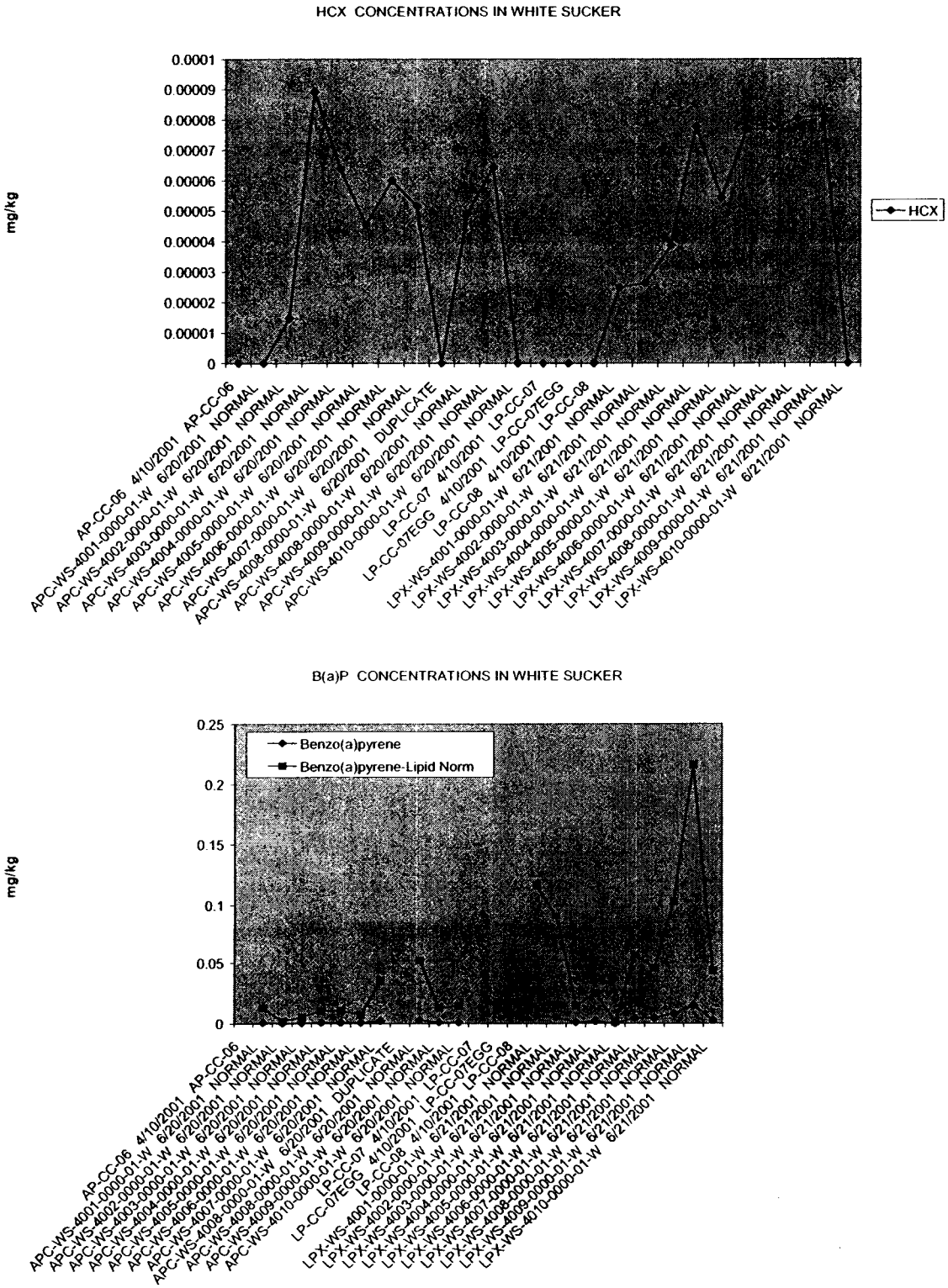

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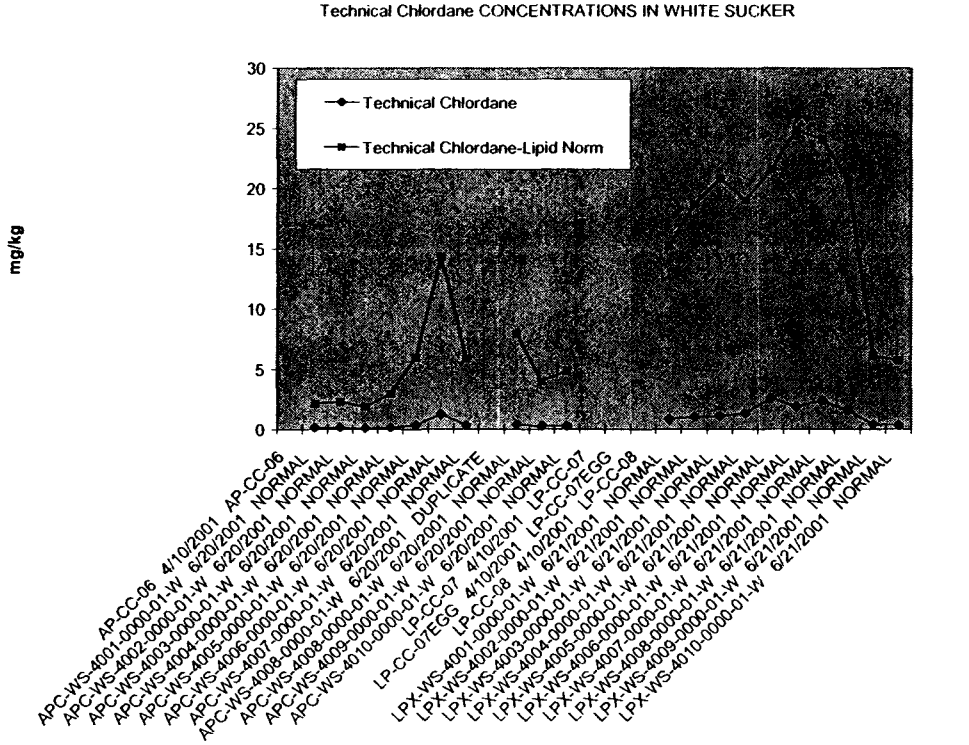

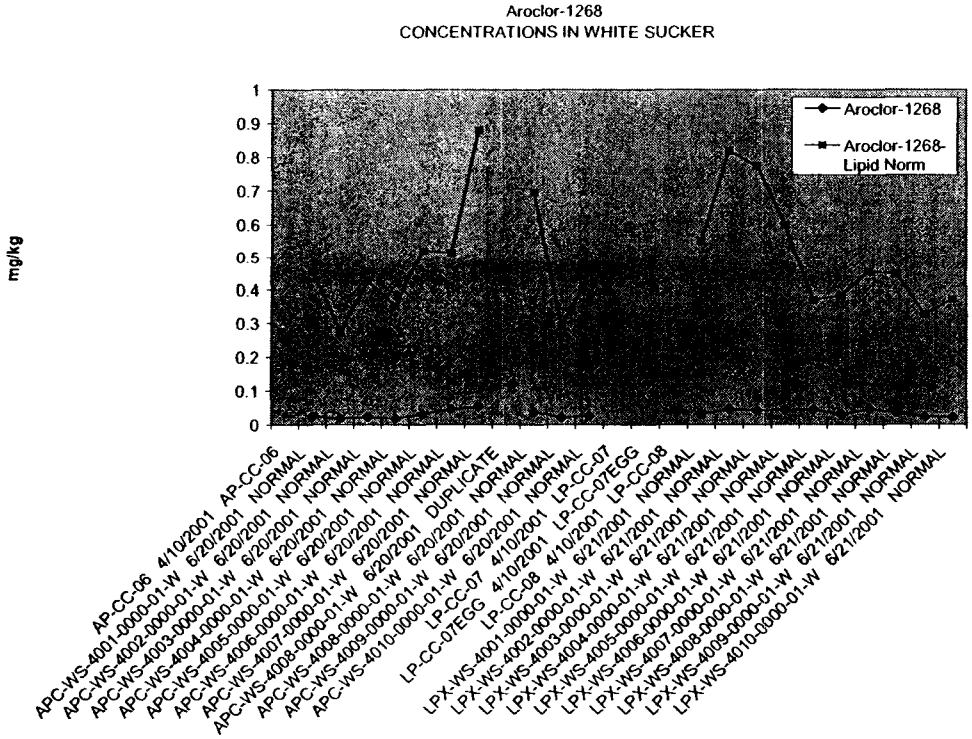

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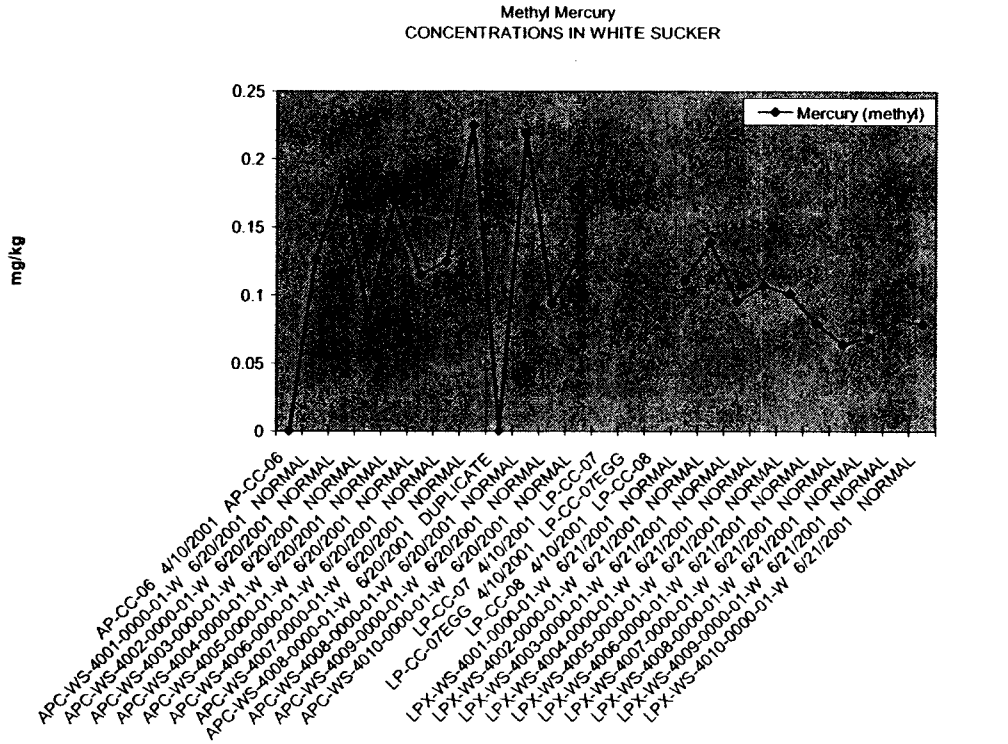

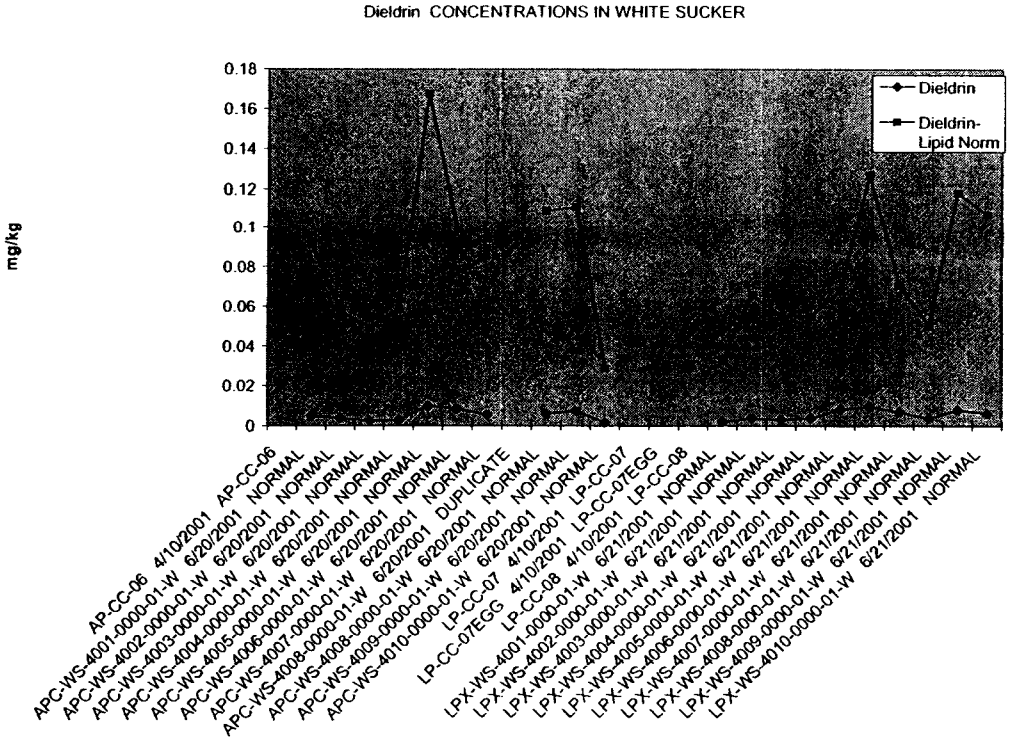

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North Providence, Rhode Island

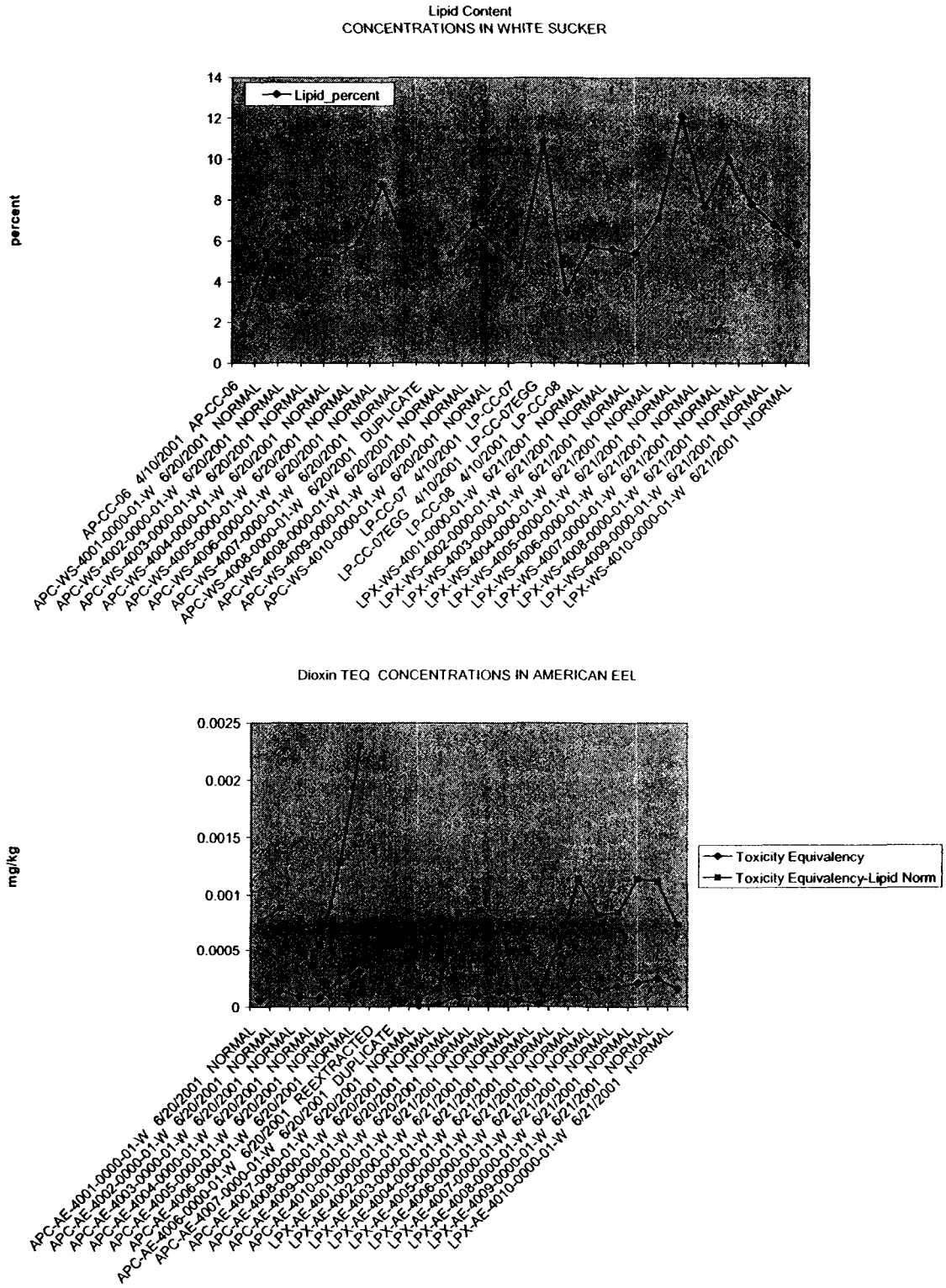

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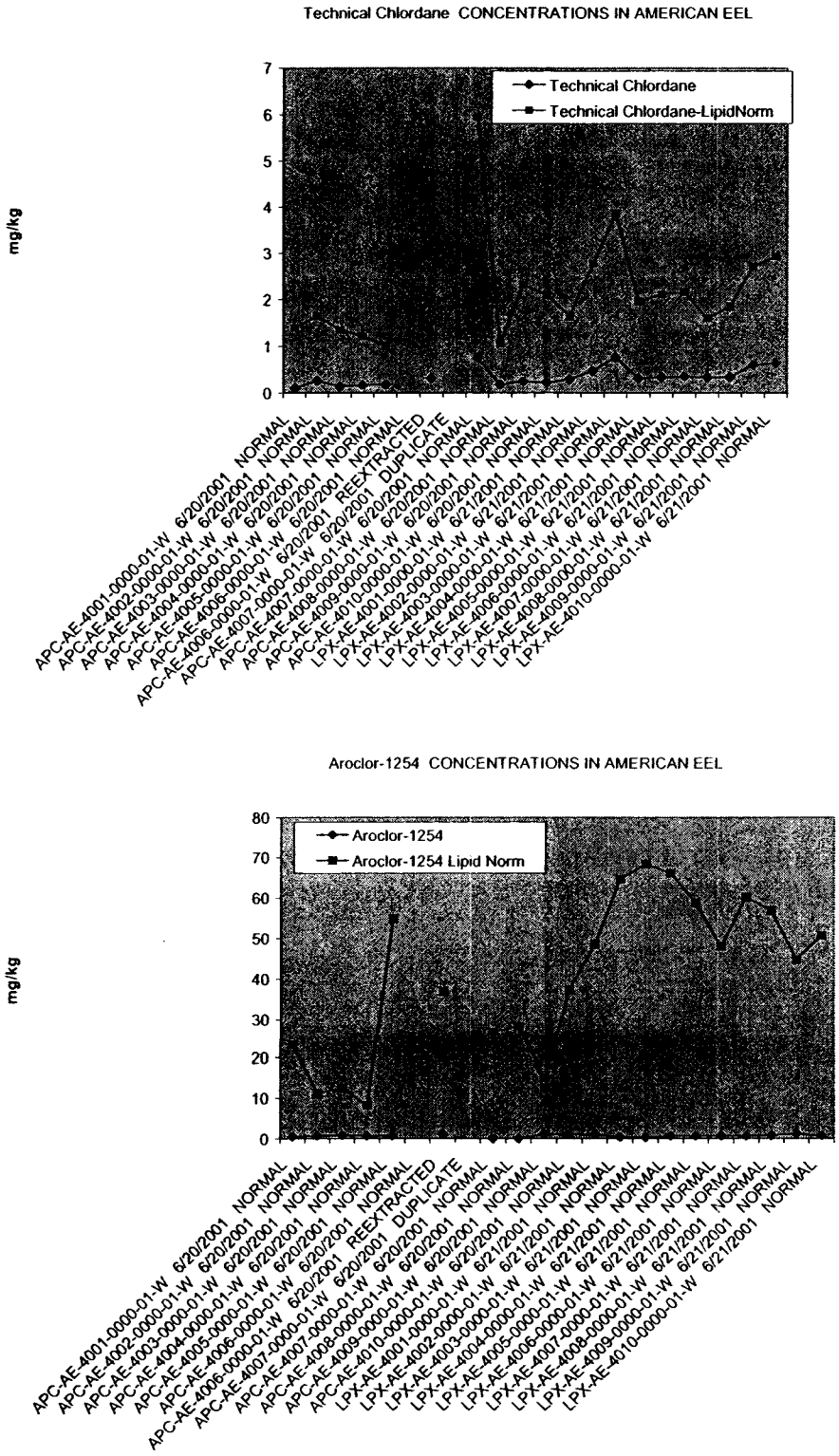
Figure 7. Comparison of Allendale Pond and Lyman Mill Pond Fish and Crayfish Tissue Concentrations
Centredale Manor Restoration Project Superfund Site
North Providence, Rhode Island



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North Providence, Rhode Island

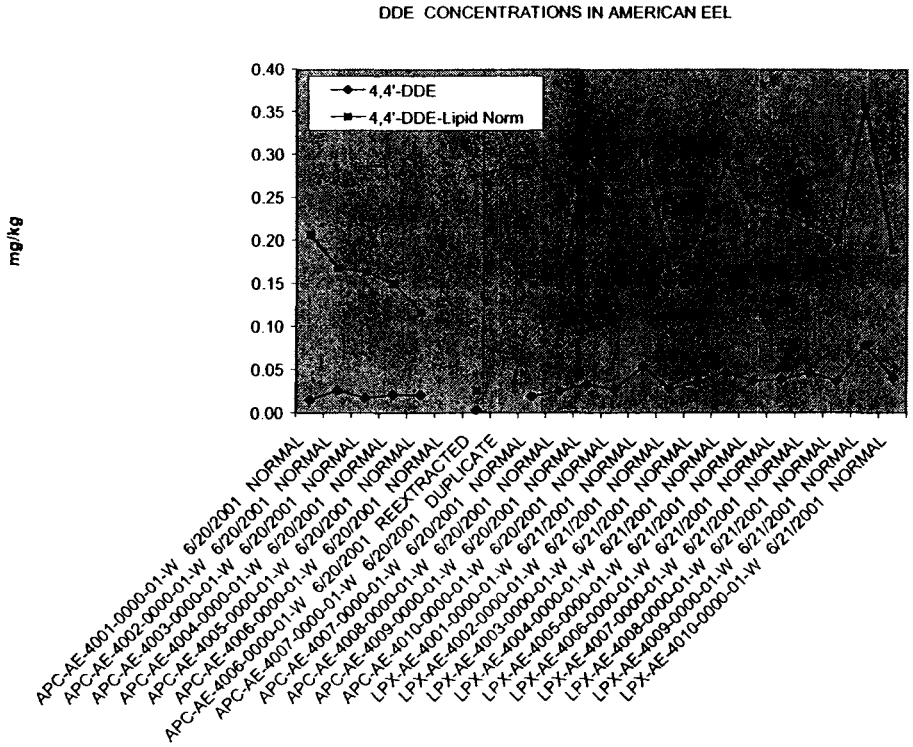

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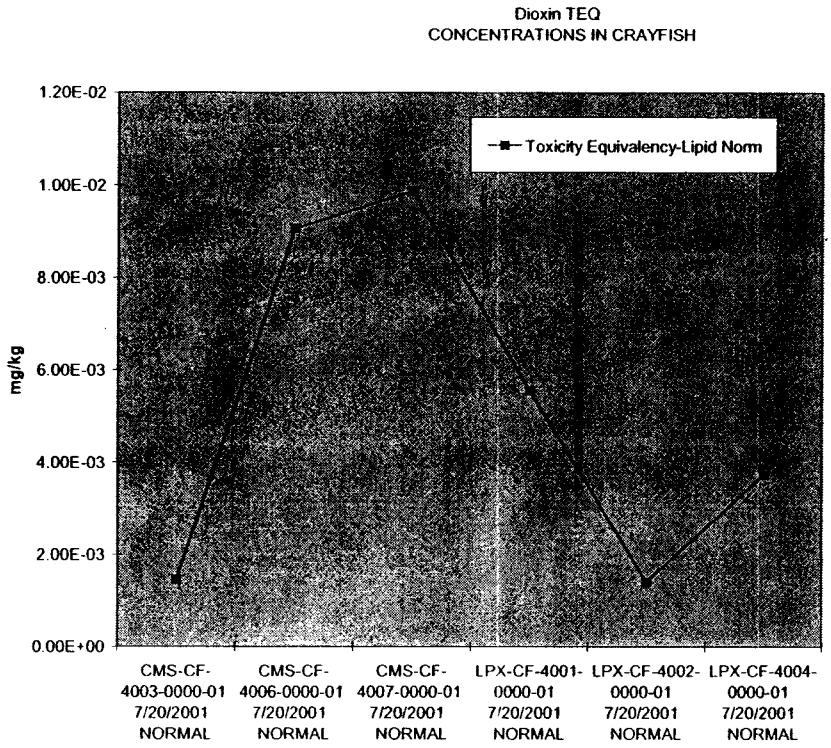
Figure 7. Comparison of Allendale Pond and Lyman Mill Pond Fish and Crayfish Tissue Concentrations
Centredale Manor Restoration Project Superfund Site
North Providence, Rhode Island

CRAYFISH



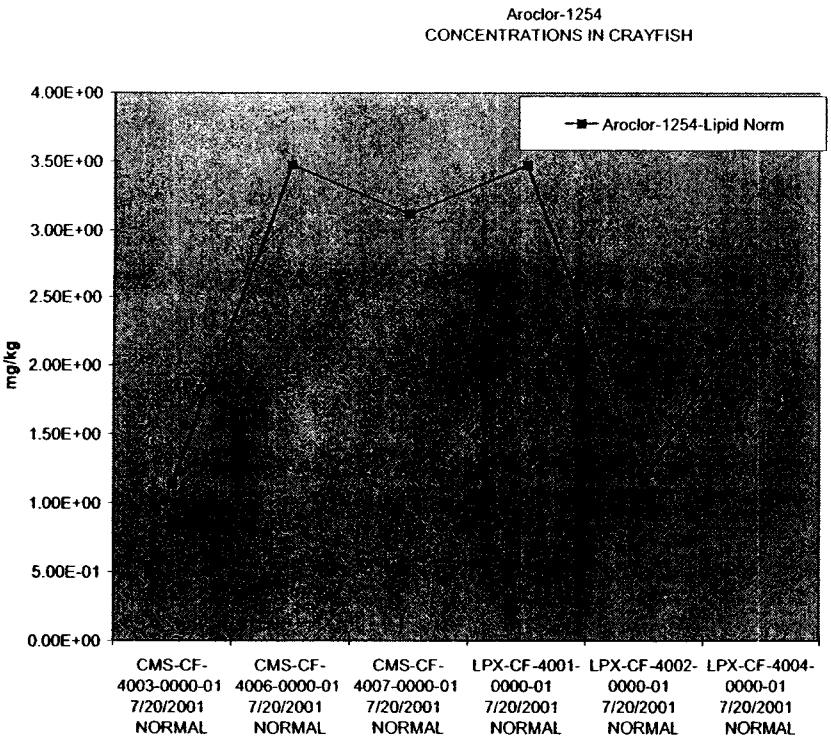
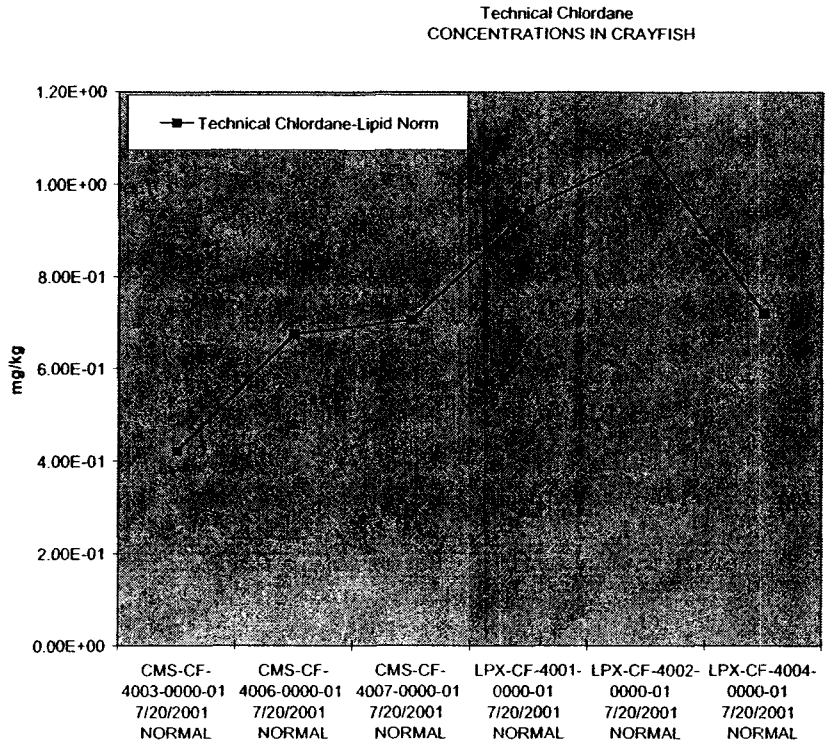
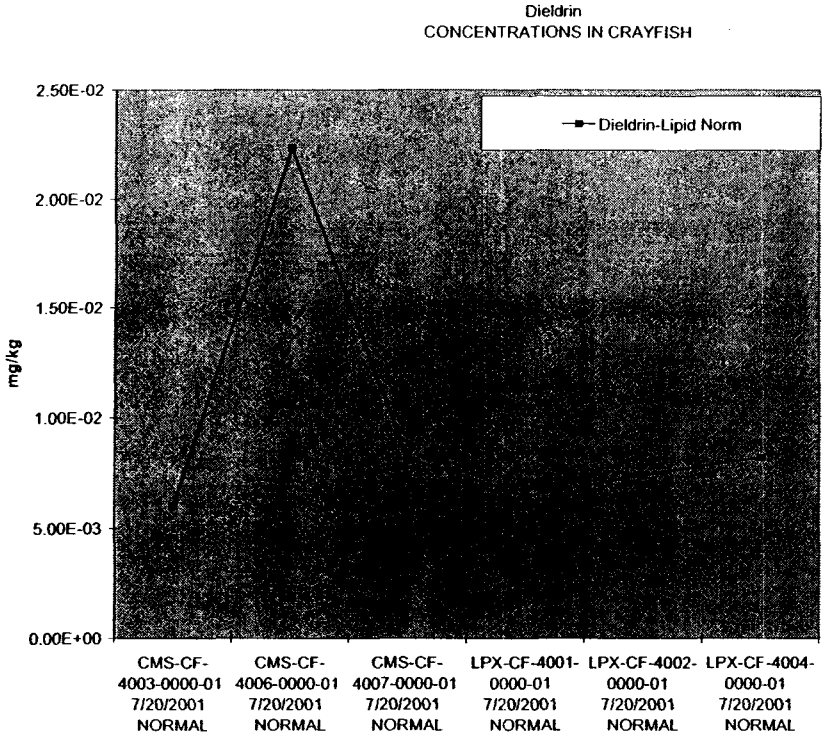


Figure 7. Comparison of Allendale Pond and Lyman Mill Pond Fish and Crayfish Tissue Concentrations
Centredale Manor Restoration Project Superfund Site
North Providence, Rhode Island





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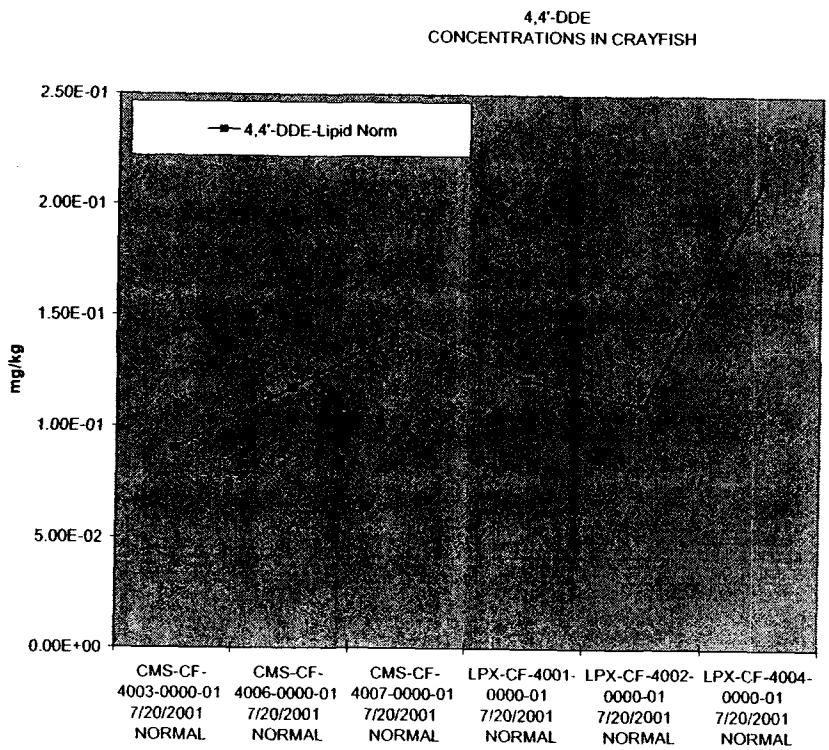
Centredale Manor Restoration Project Superfund Site
North Providence, Rhode Island



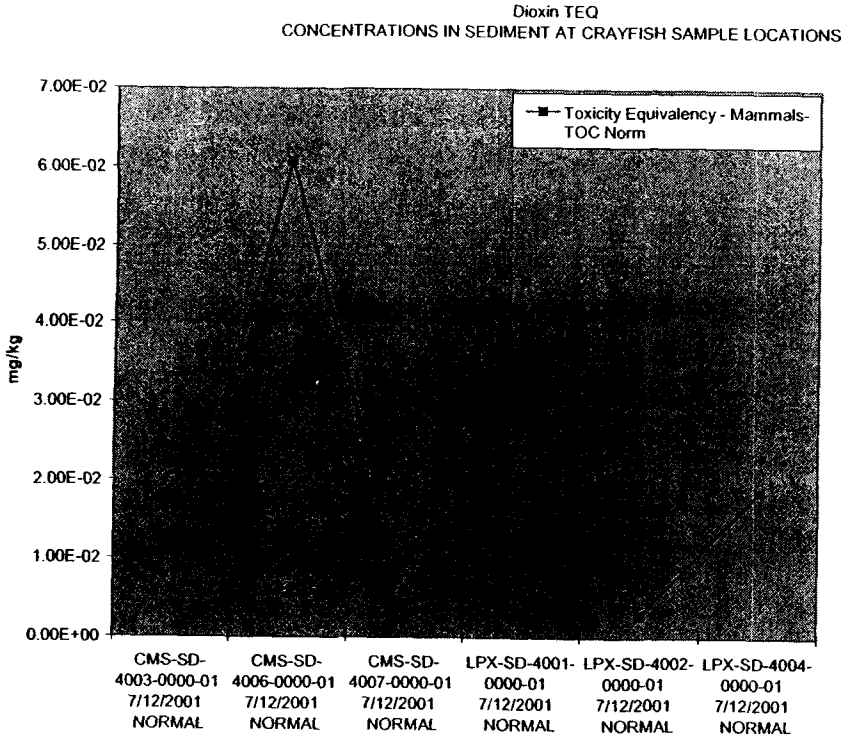


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Figure 7. Comparison of Allendale Pond and Lyman Mill Pond Fish and Crayfish Tissue Concentrations
Centredale Manor Restoration Project Superfund Site
North Providence, Rhode Island

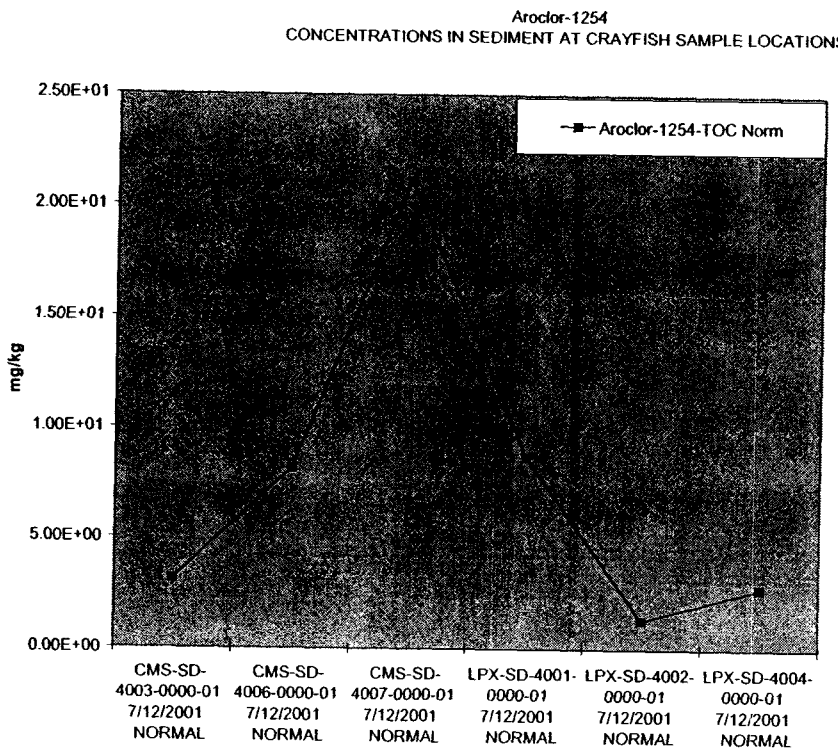

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Figure 8. Lipid-Normalized Tissue concentrations in Crayfish and Organic Carbon-Normalized Sediment Concentrations for Dioxin TEQ in Allendale and Lyman Mill Pond

Centredale Manor Restoration Project Superfund Site

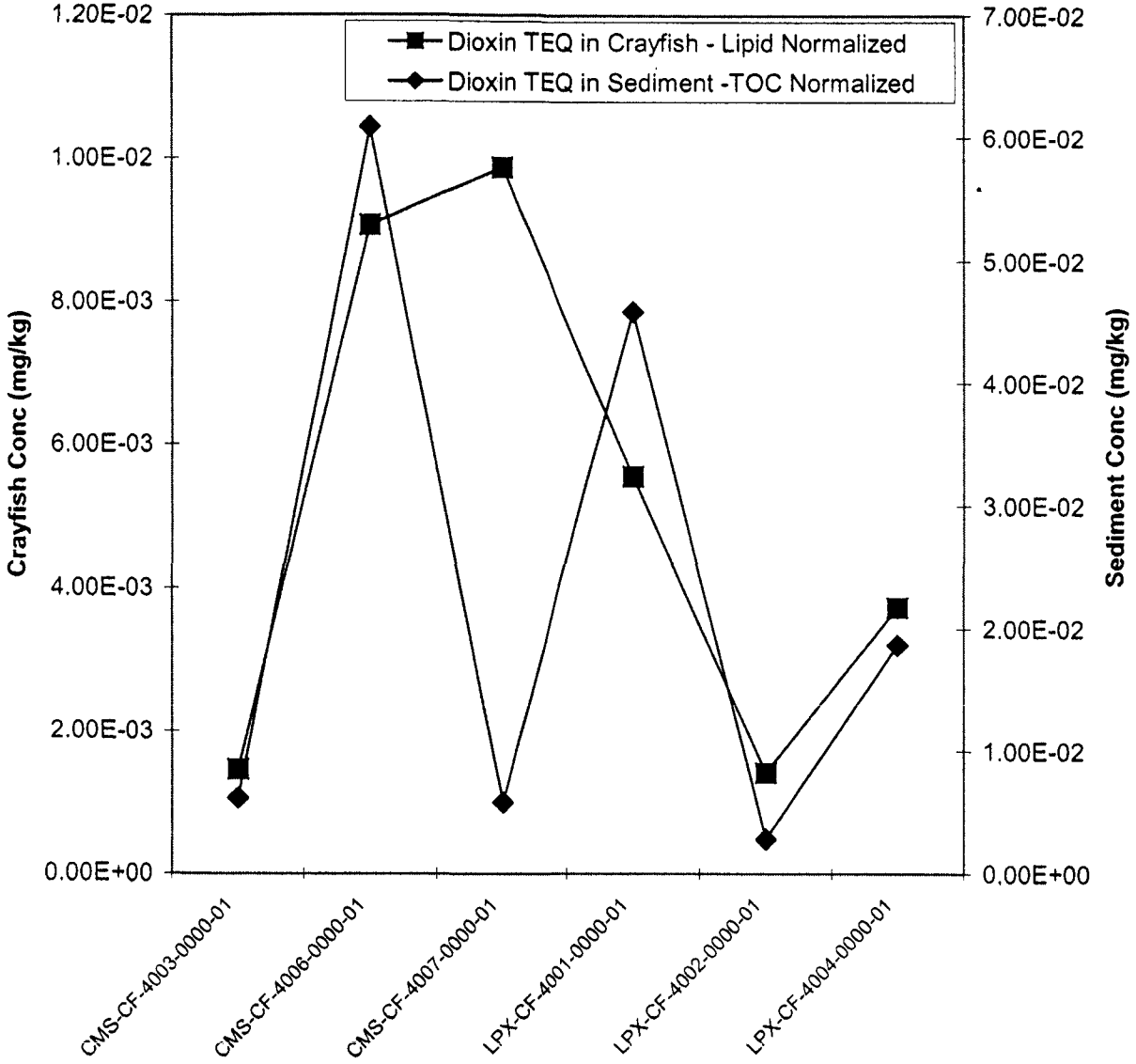


Figure 9. Lipid-Normalized Tissue Concentrations in Crayfish and Organic Carbon-Normalized Sediment Concentrations for Aroclor-1254 in Allendale Pond and Lyman Mill Pond

Centredale Manor Restoration Project Superfund Site

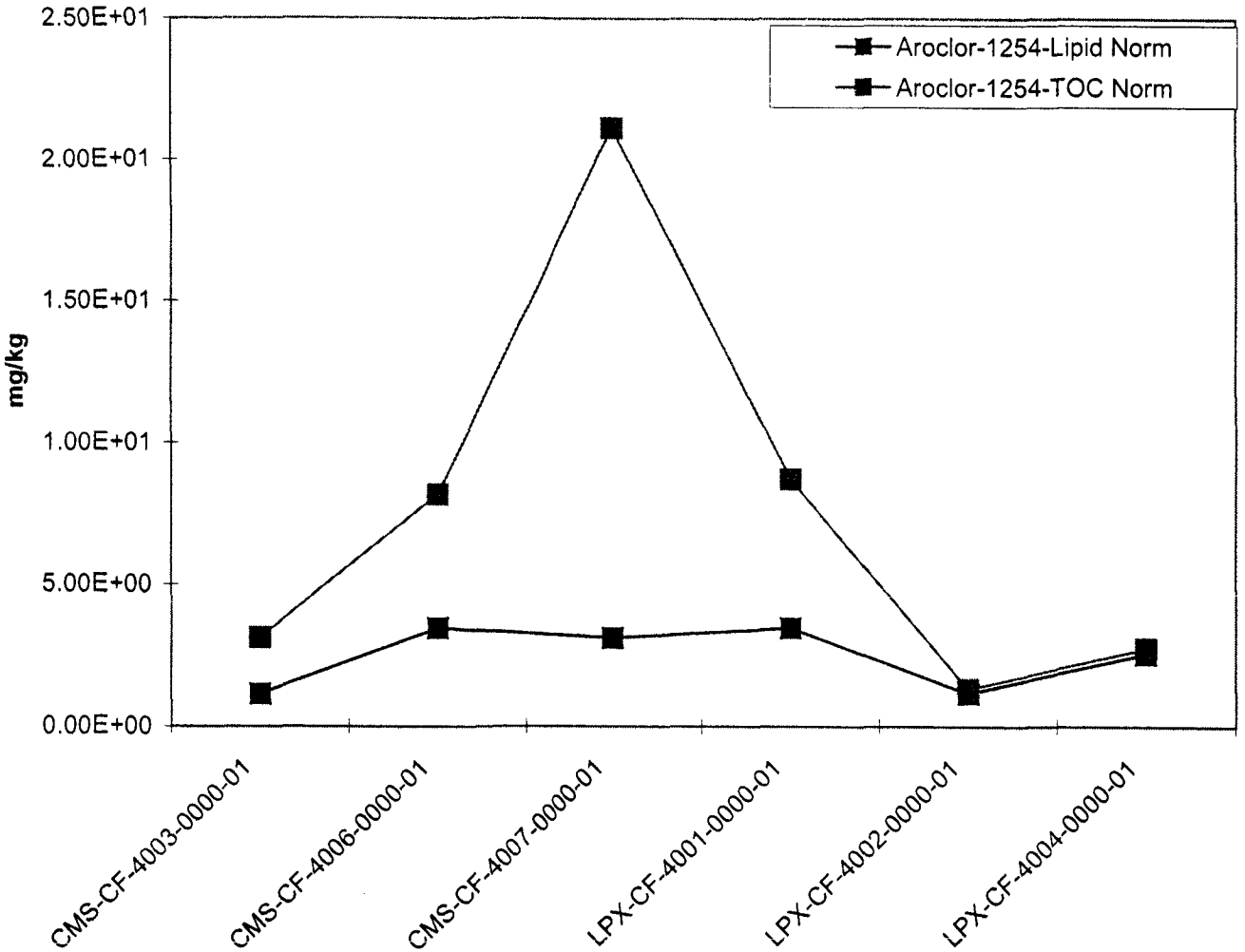
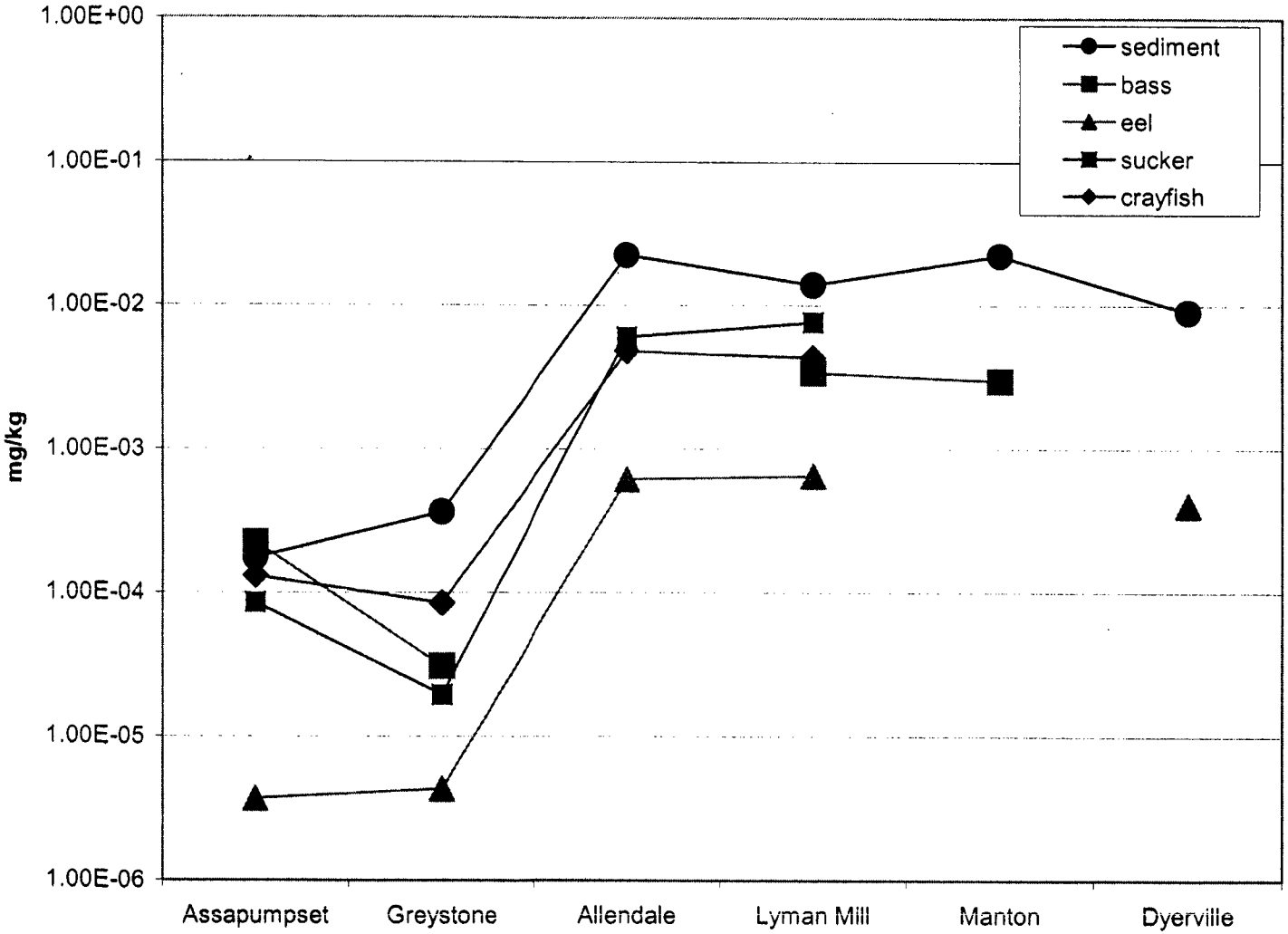


Figure 10. Summary of Carbon-Normalized Sediment and Lipid-Normalized Biota Concentrations of Dioxin TEQ
Centredale Manor Restoration Project Superfund Site



P:\W9-GVT\COE-NAE\Battelle\Centredale\Task27-HH PRGs\Normalized Sed Data - PRE-POST BREACH.xls chtdioxTEQbiotaandSED1

Figure 11. Summary of Carbon-Normalized Sediment and Lipid-Normalized Biota Concentrations of Aroclor-1254
Centredale Manor Restoration Project Superfund Site

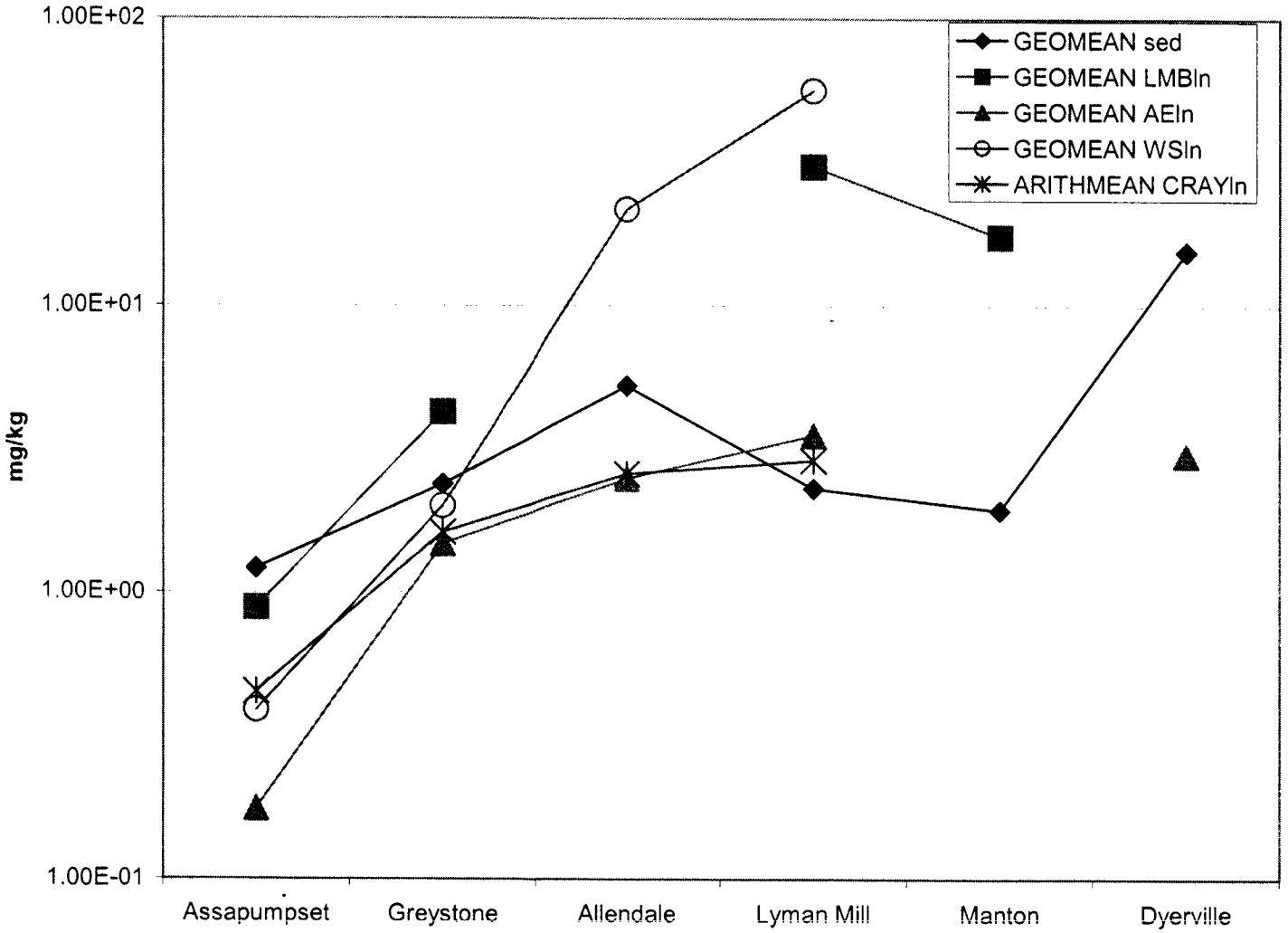


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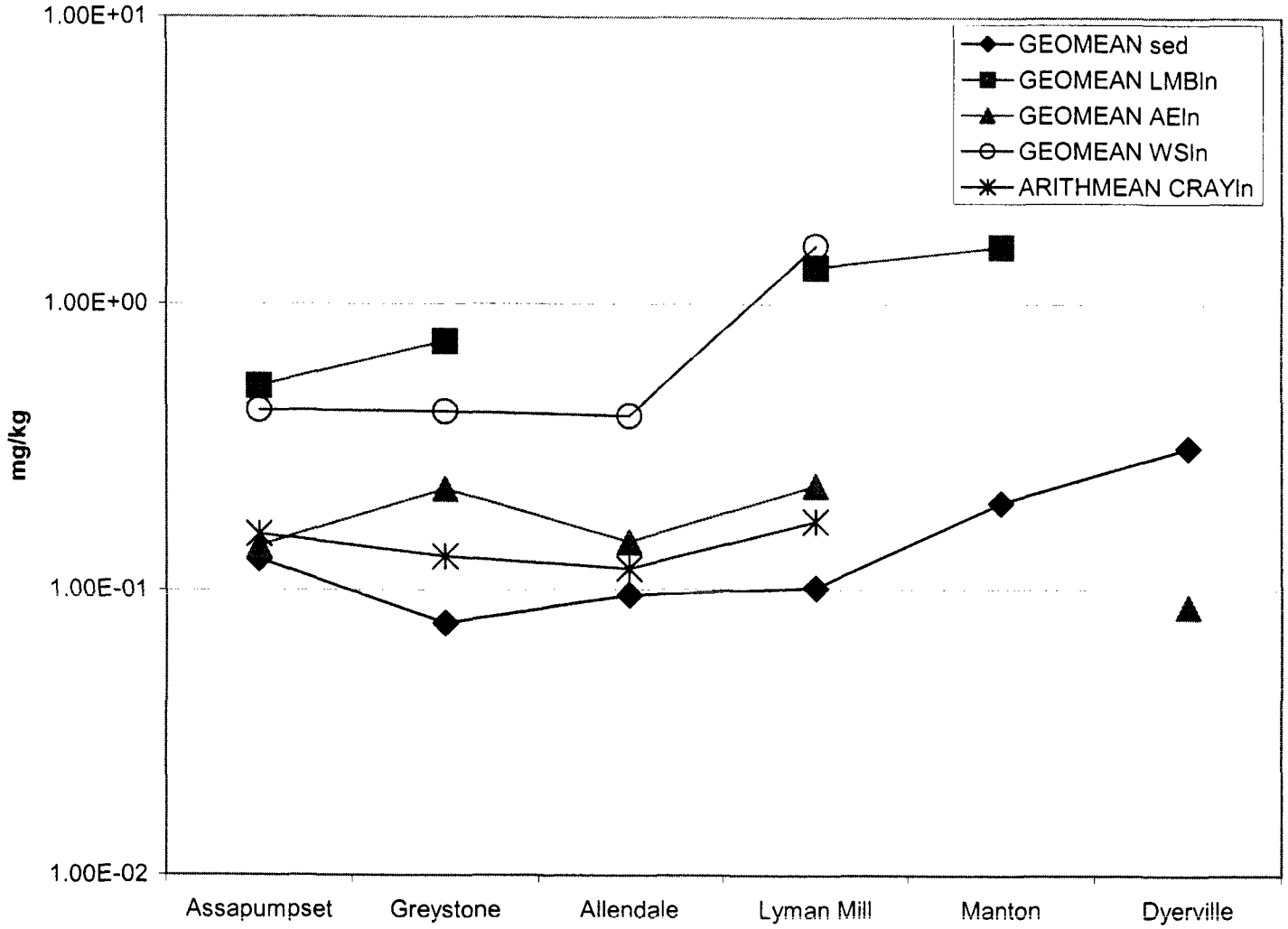
Figure 12. Summary of Carbon-Normalized Sediment and Lipid-Normalized Biota Concentrations of 4,4'-DDE
Centredale Manor Restoration Project Superfund Site



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4/29/2005

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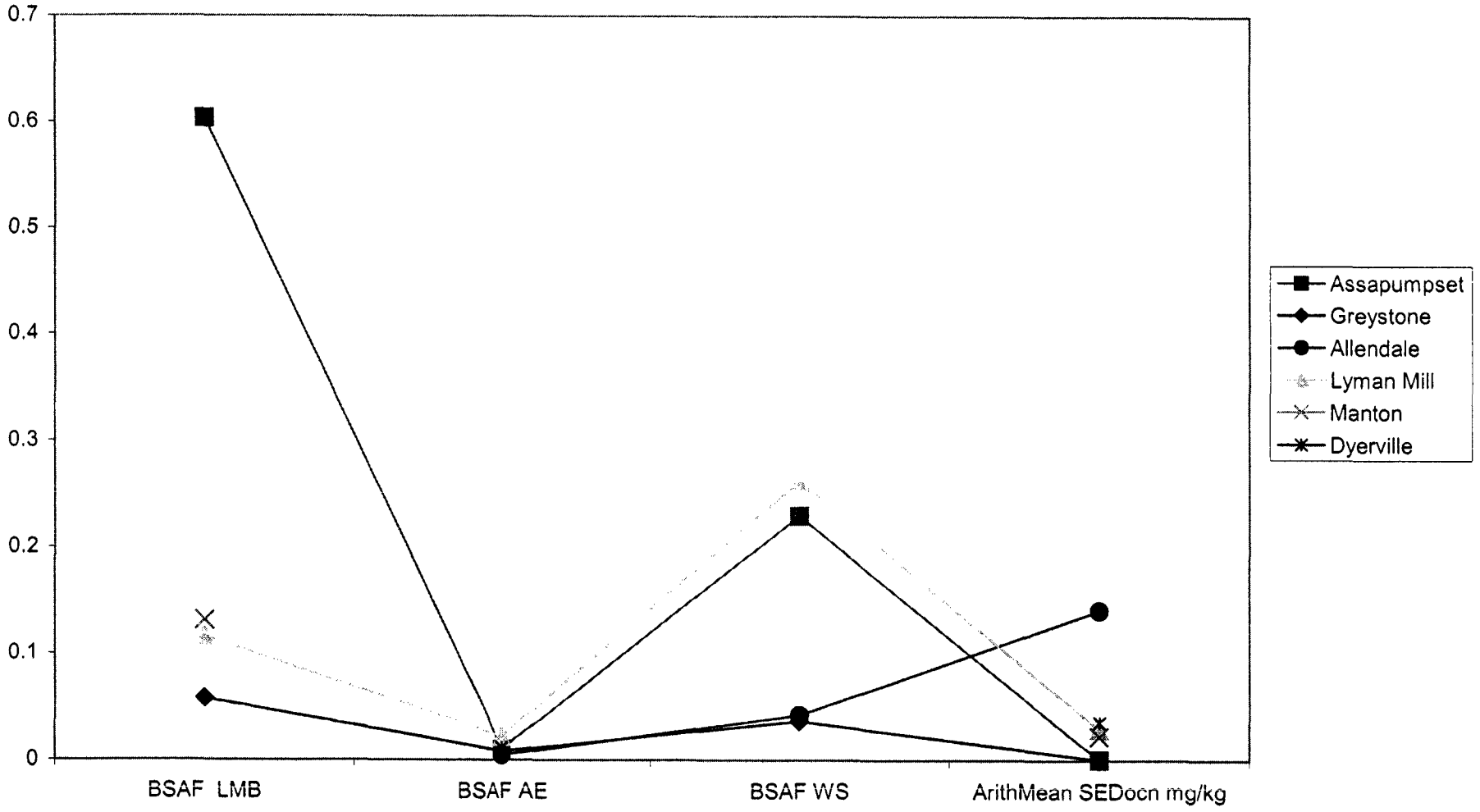
Figure 13. Comparison of July 2004 Preliminary Draft Dioxin TEQ BSAFs for Largemouth Bass, American Eel, and White Sucker at All Exposure Points (BHHRA TOC Data) Centredale Manor Restoration Project Superfund Site



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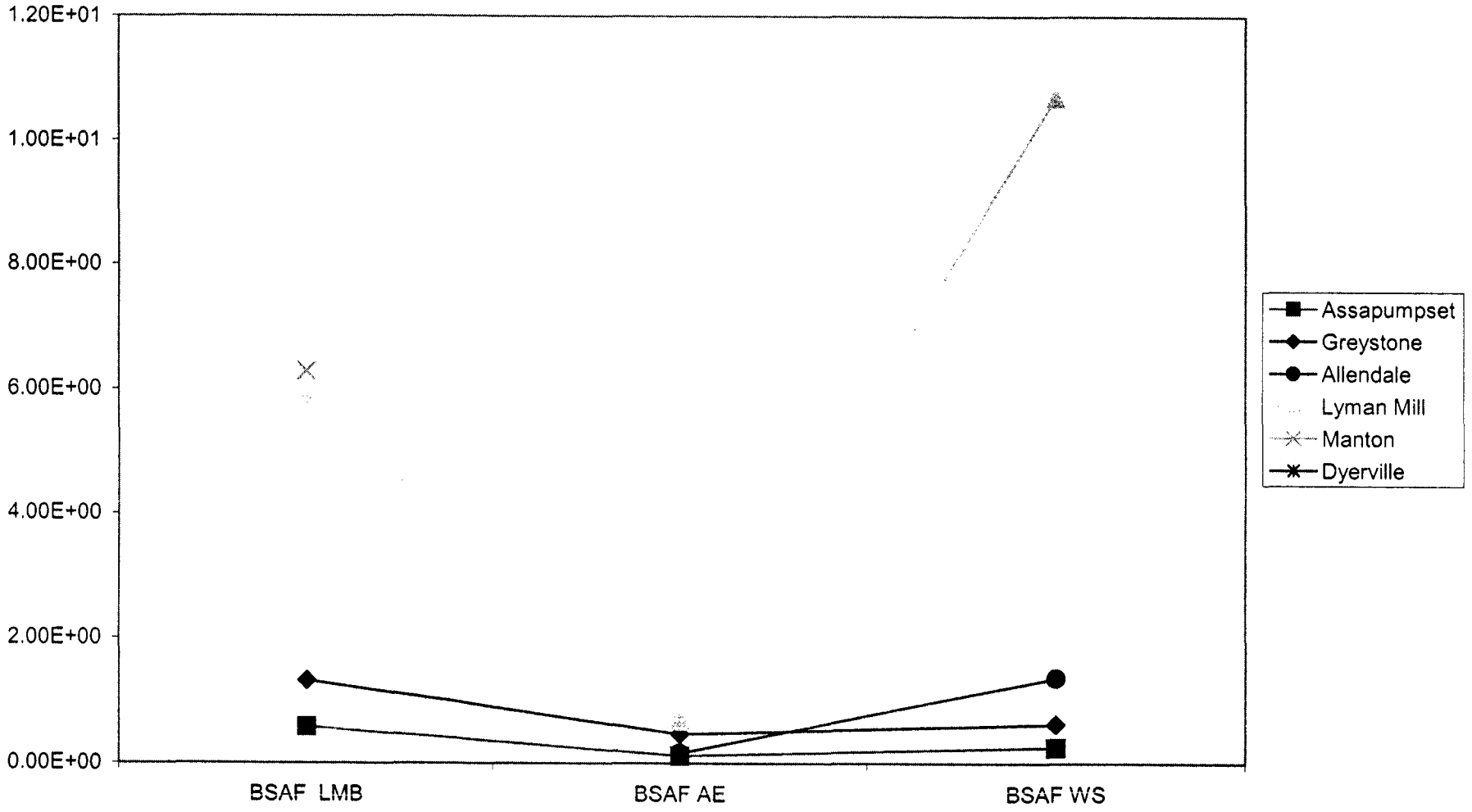
US EPA ARCHIVE DOCUMENT

Figure 14. Comparison of July 2004 Preliminary Draft Aroclor-1254 BSAFs for Largemouth Bass, American Eel, and White Sucker at All Exposure Points (BHHRA TOC Data) Centredale Manor Restoration Project Superfund Site



P:\W9-GVT\COE-NAE\Battelle\Centredale\Task27-HH PRGs\Normalized Sed Data - PRE-POST BREACH.xls 1254BSAFs,spec,point

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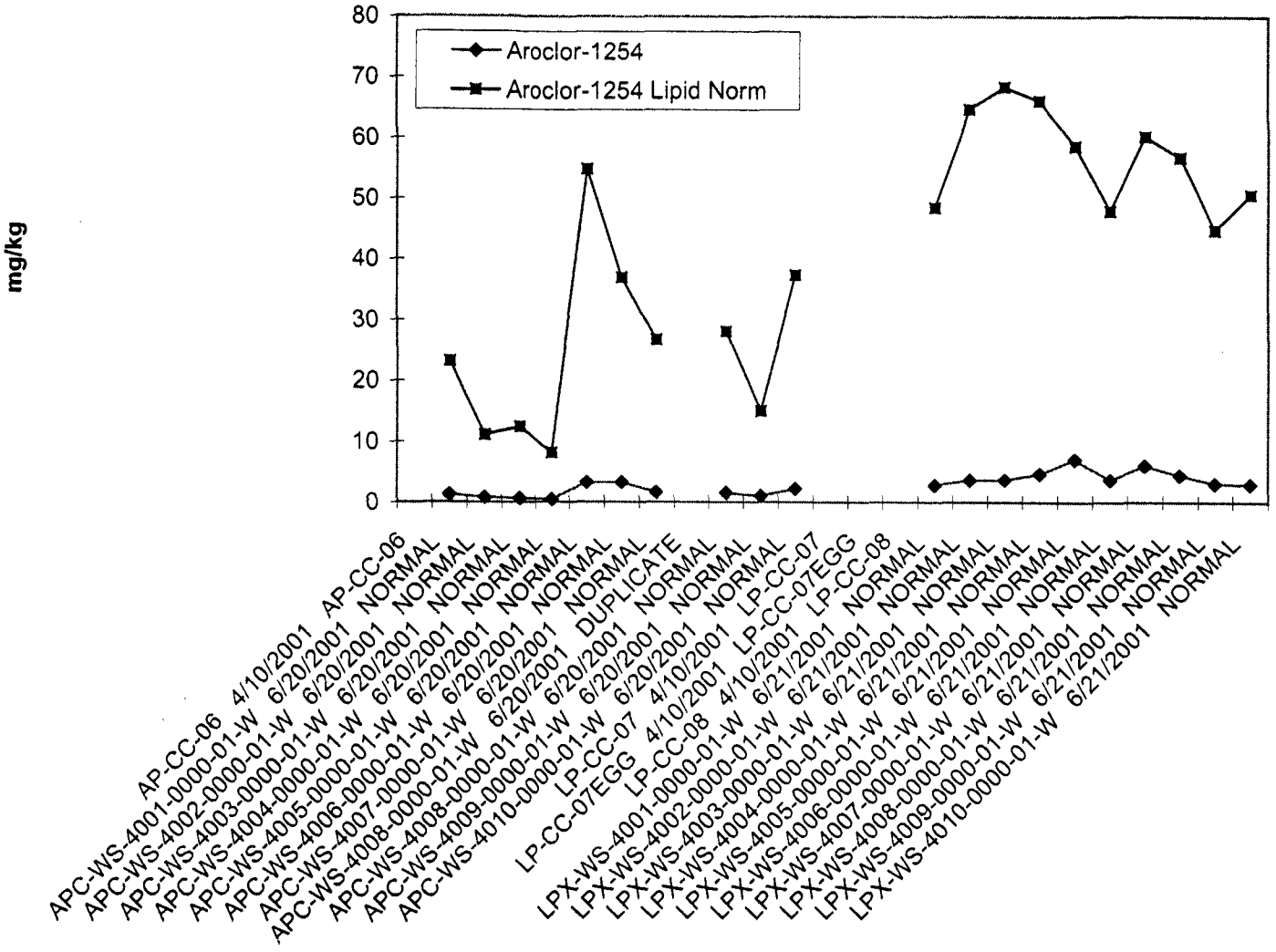
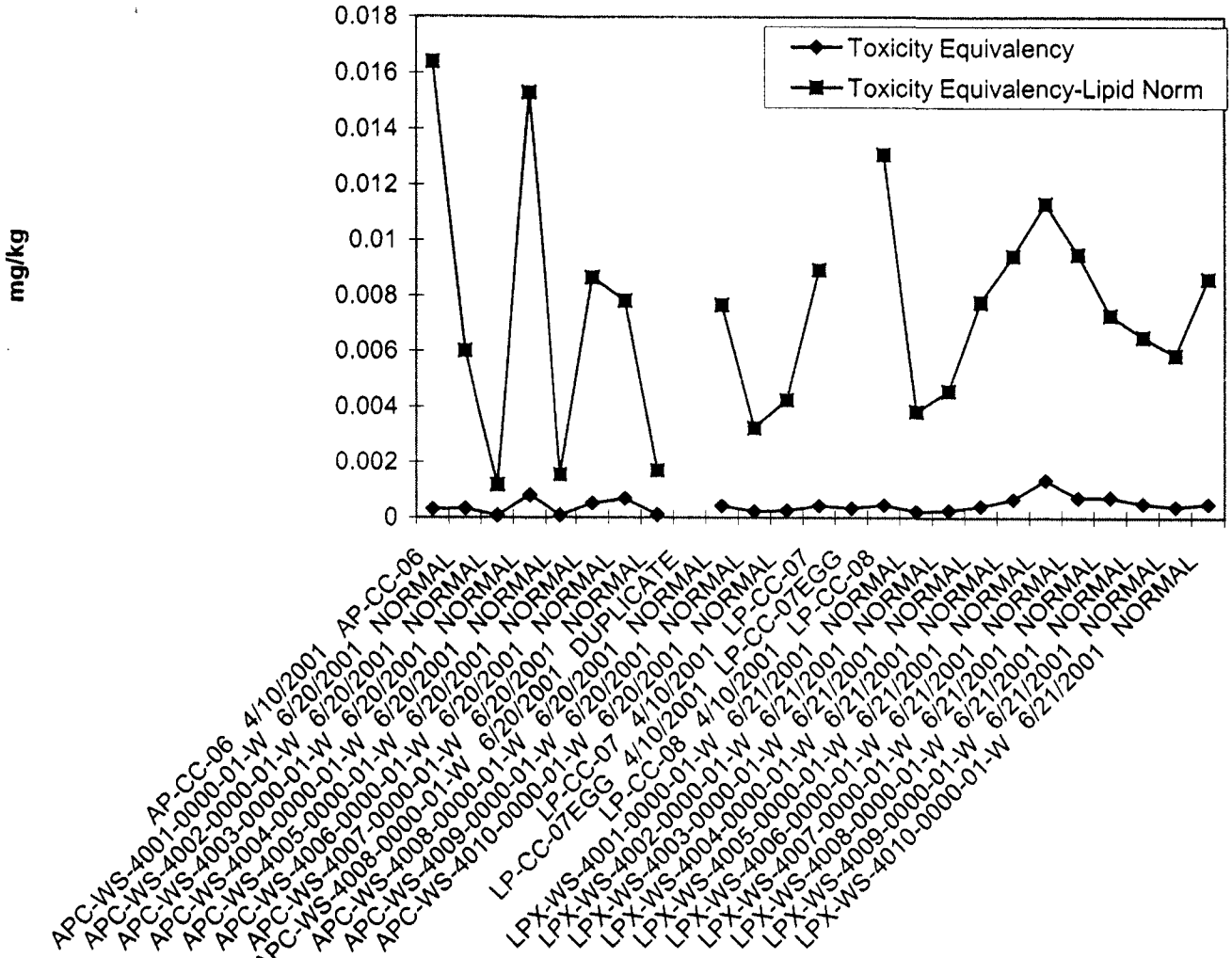
Figure 15. Aroclor-1254 Concentrations (raw and lipid normalized) in White Sucker from Allendale Pond and Lyman Mill Pond
Centredale Manor Restoration Project Superfund Site



US EPA ARCHIVE DOCUMENT

Figure 16. Dioxin TEQ
Concentrations (raw and lipid-normalized) in White Sucker in Allendale Pond and Lyman Mill Pond
Centredale Manor Restoration Project Superfund Site



US EPA ARCHIVE DOCUMENT

Figure 17. Biota Lipid Content by Species and Exposure Area
Centredale Manor Restoration Project Superfund Site

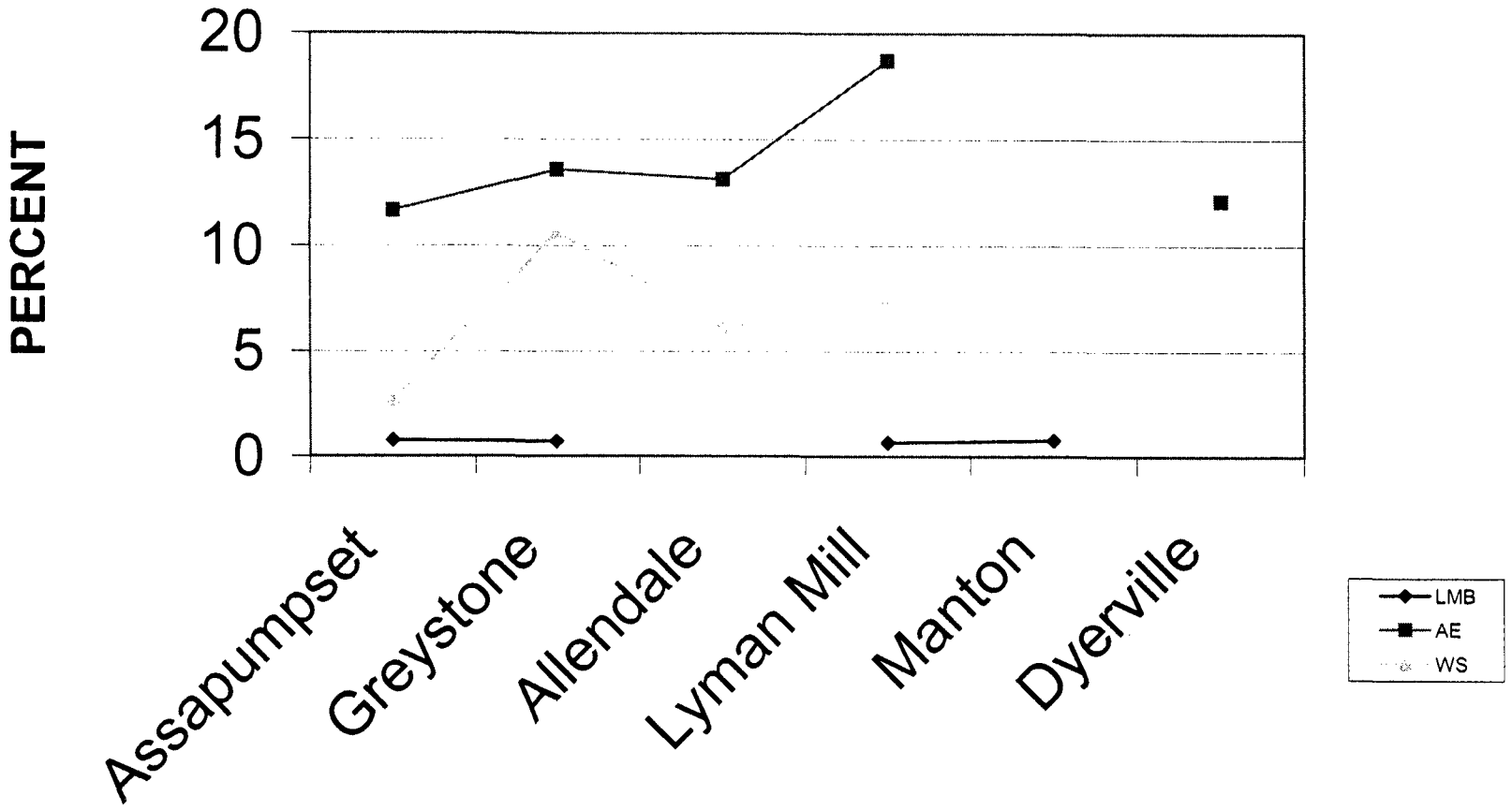


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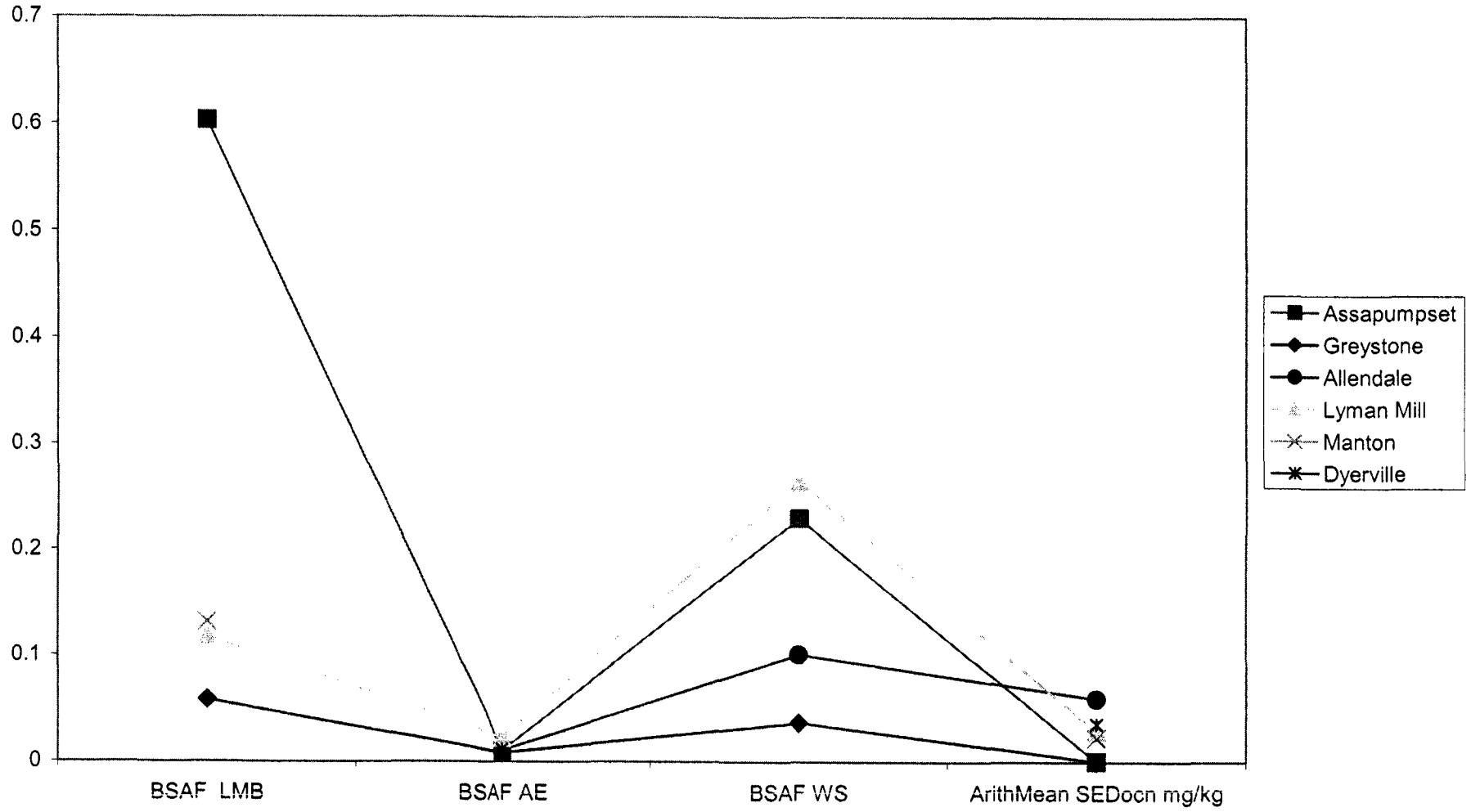
Figure 18. Comparison of Dioxin TEQ BSAFs for Largemouth Bass, American Eel, and White Sucker at All Exposure Points (post-breach data for Allendale and Lyman Mill)
Centredale Manor Restoration Project Superfund Site



P:\W9-GVT\COE-NAE\Battelle\Centredale\Task27-HH PRGs\Normalized Sed Data - PRE-POST BREACH.xls dioxTEQBSAFsPOSTbrea,spec,point

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Figure 19. Comparison of Aroclor-1254 BSAFs for Largemouth Bass, American Eel, and White Sucker at All Exposure Points (post-breach data for Allendale & Lyman Mill) Centredale Manor Restoration Project Superfund Site

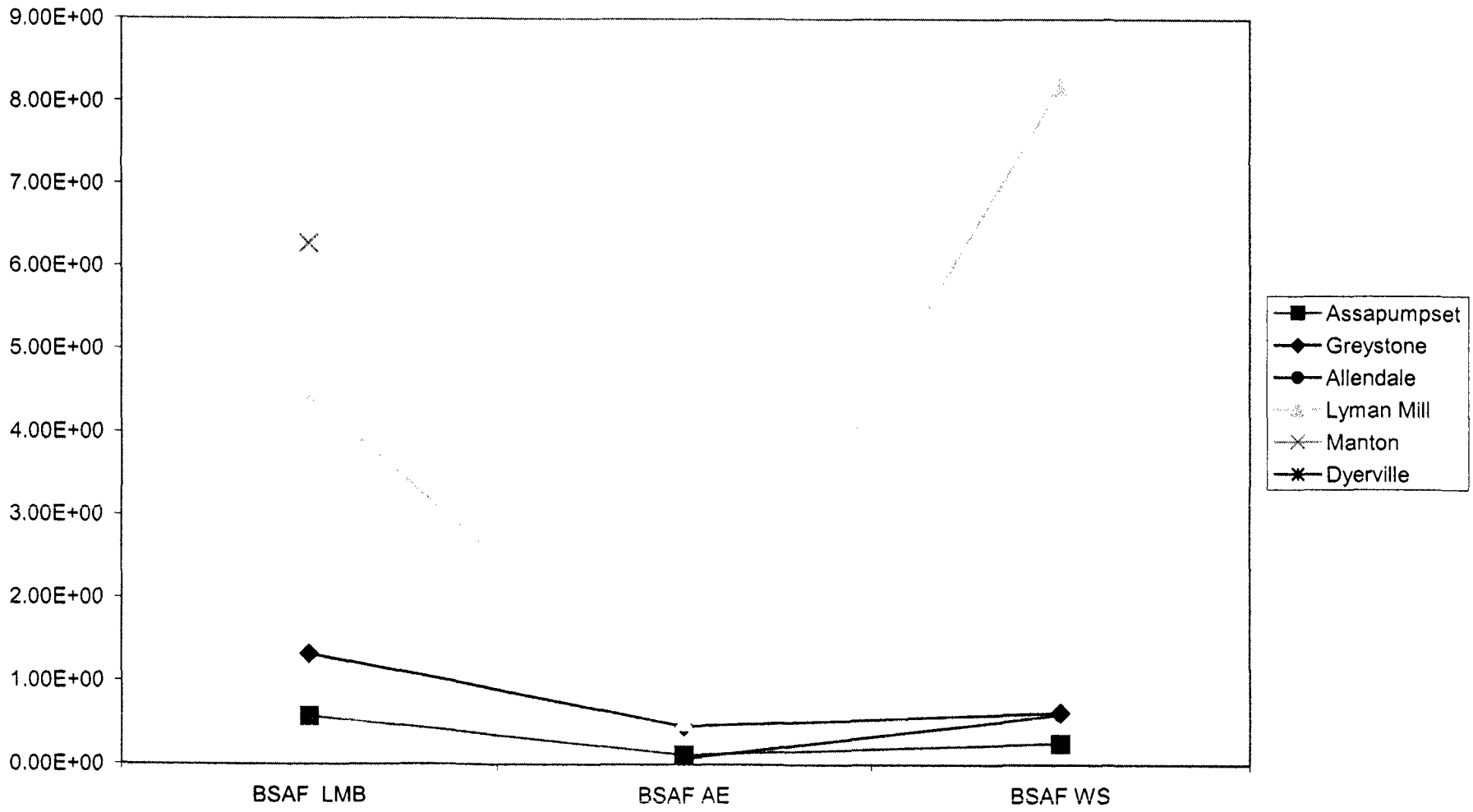

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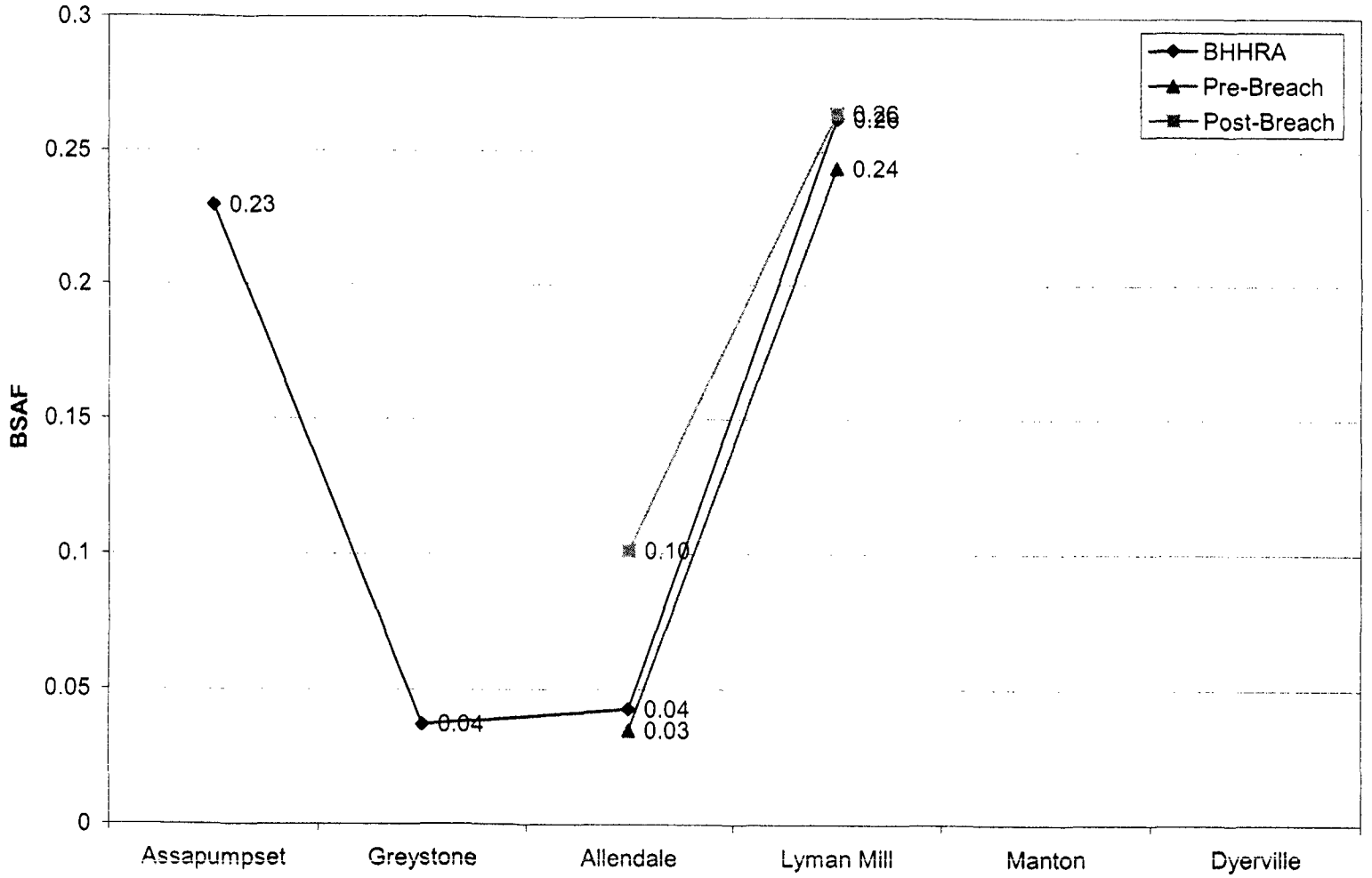
Figure 20. Biota Sediment Accumulation Factors (BSAFs) for Dioxin TEQ in White Sucker/Brown Bullhead - Pre-Breach, Post-Breach, and BHHRA Sediment Data Centredale Manor Restoration Project Superfund Site



P:\W9-GVT\COE-NAE\Battelle\Centredale\Task27-HH PRGs\Normalized Sed Data - PRE-POST BREACH.xls
WS TCDD TEQ

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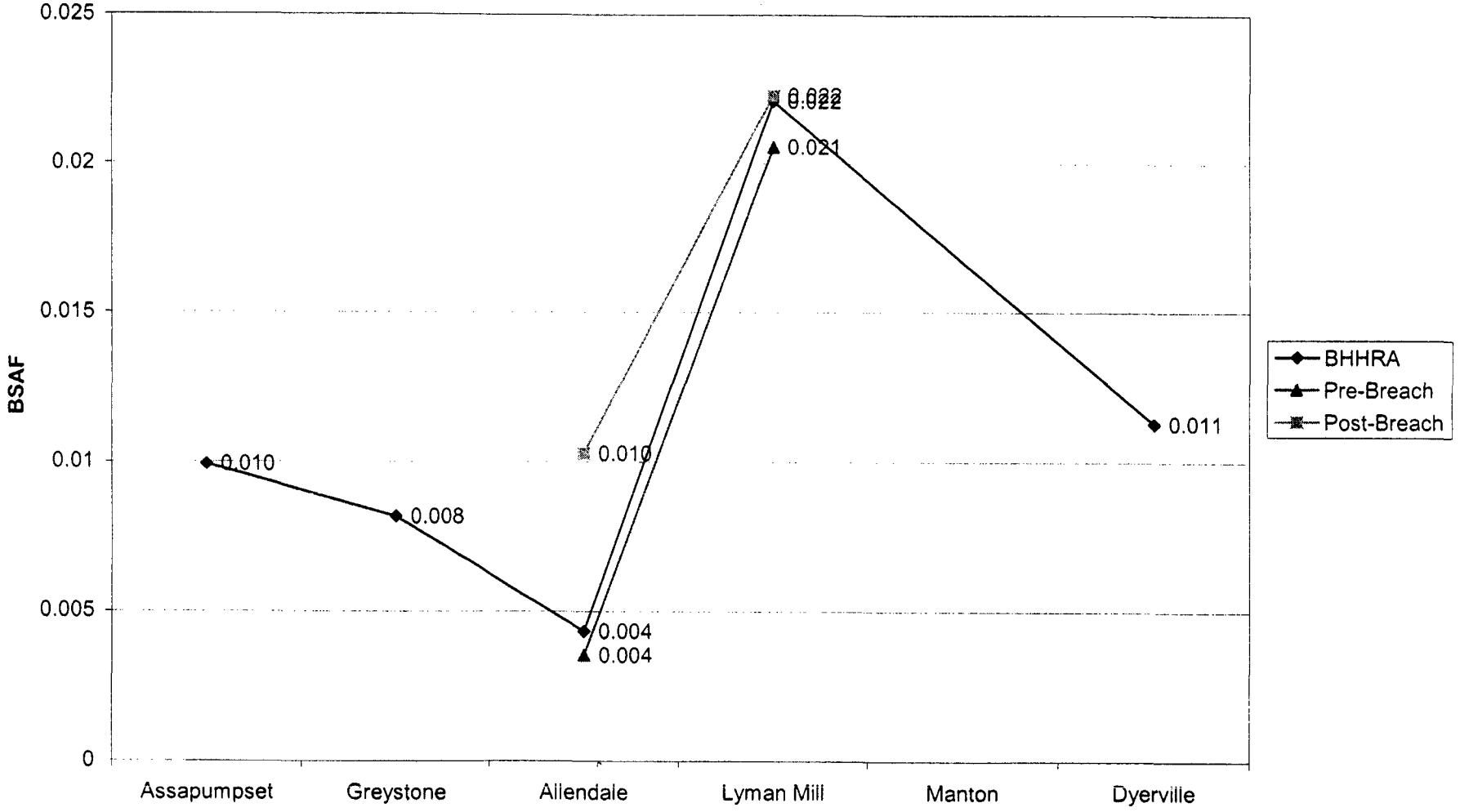
Figure 21. Biota-Sediment Accumulation Factors (BSAFs) for Dioxin TEQ in American Eel - Pre-Reach, Post-Breach, and BHHRA Sediment Data Centredale Manor Restoration Project Superfund Site



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AE TCDD TEQ

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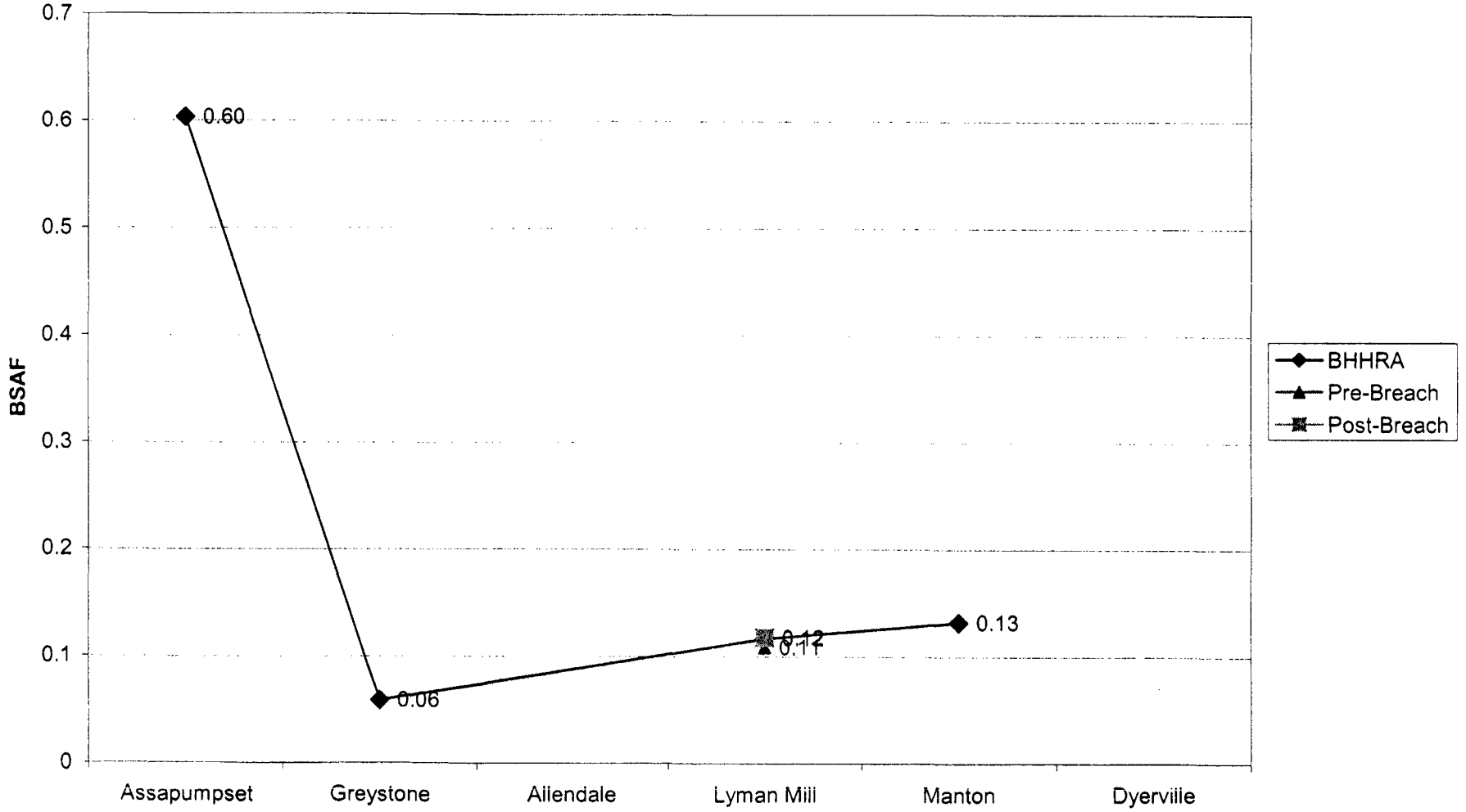
Figure 22. Biota-Sediment Accumulation Factors (BSAFs) for Dioxin TEQ in Largemouth Bass-Pre-Breach, Post-Breach, and BHHRA Sediment Data Centredale Manor Restoration Project Superfund Site



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LMB TCDD TEQ

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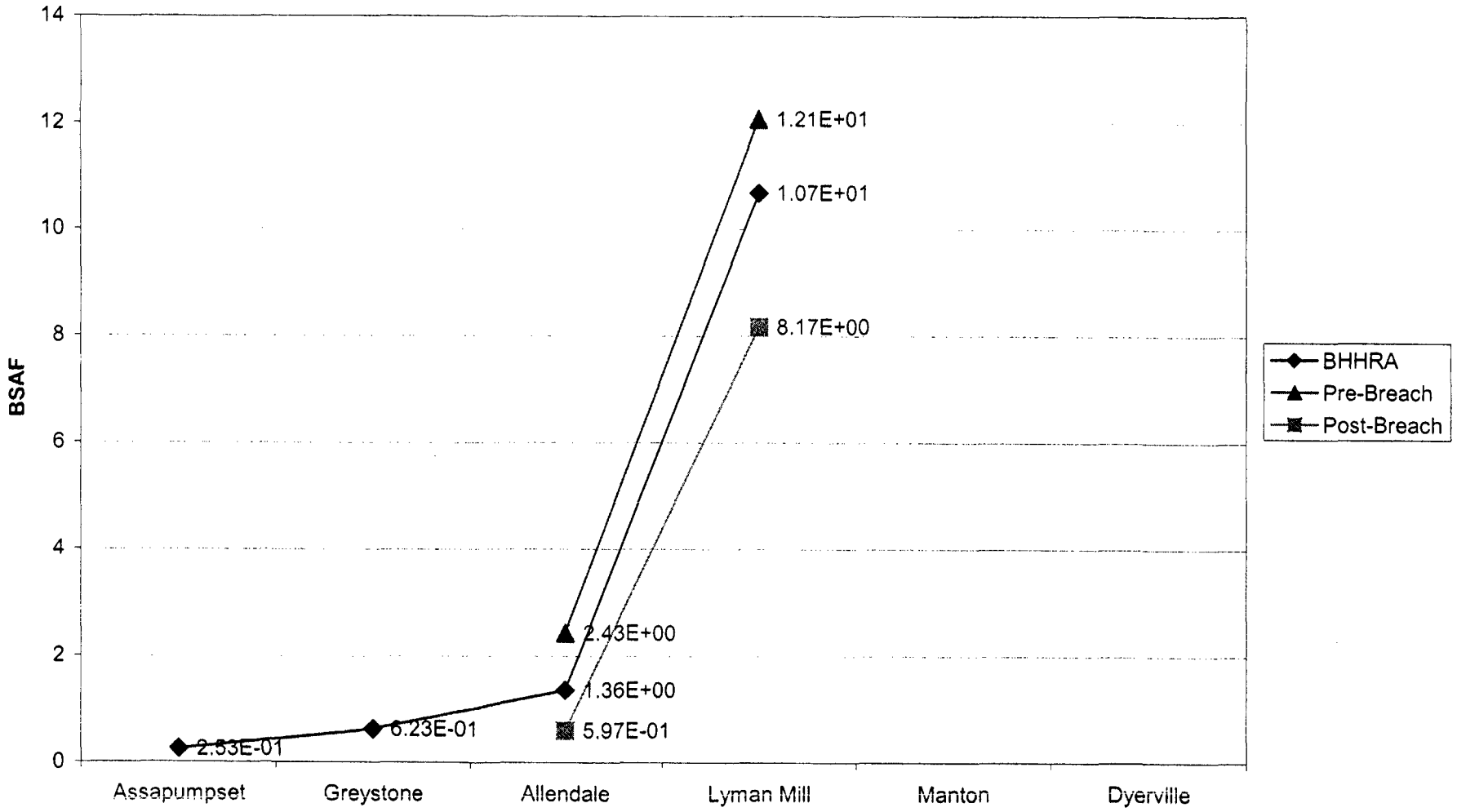
Figure 23. Biota-Sediment Accumulation Factors (BSAFs) for Aroclor-1254 in White Sucker/Brown Bullhead - Pre-Breach, Post-Breach, and BHHRA Sediment Data Centredale Manor Restoration Project Superfund Site



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WS PCB-1254

1/30/2005

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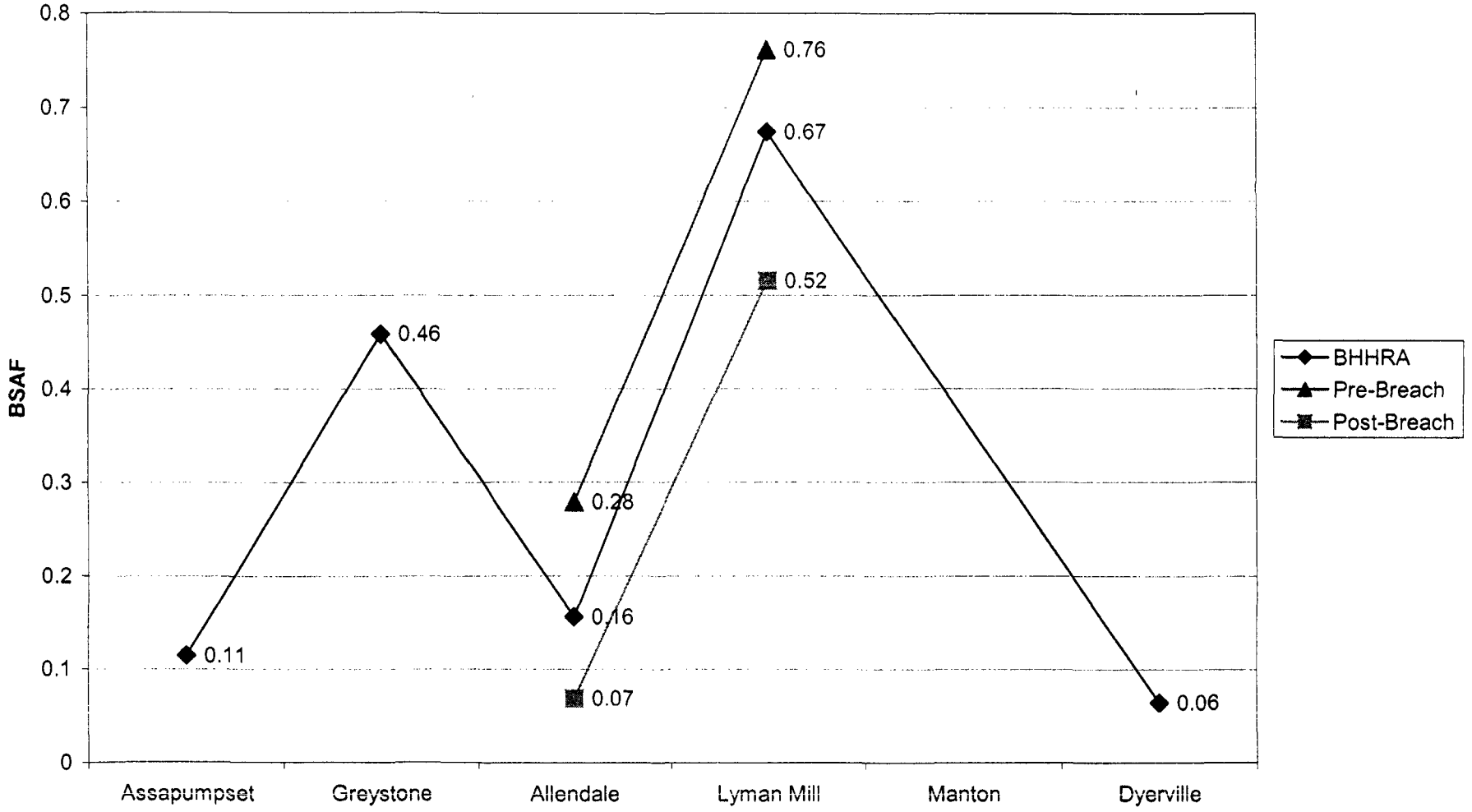
Figure 24. Biota-Sediment Accumiulation Factors (BSAFs) for Aroclor-1254 in American Eel - Pre-Breach, Post-Breach, and BHHRA Sediment Data Centredale Manor Restoration Project Superfund Site



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AE PCB-1254

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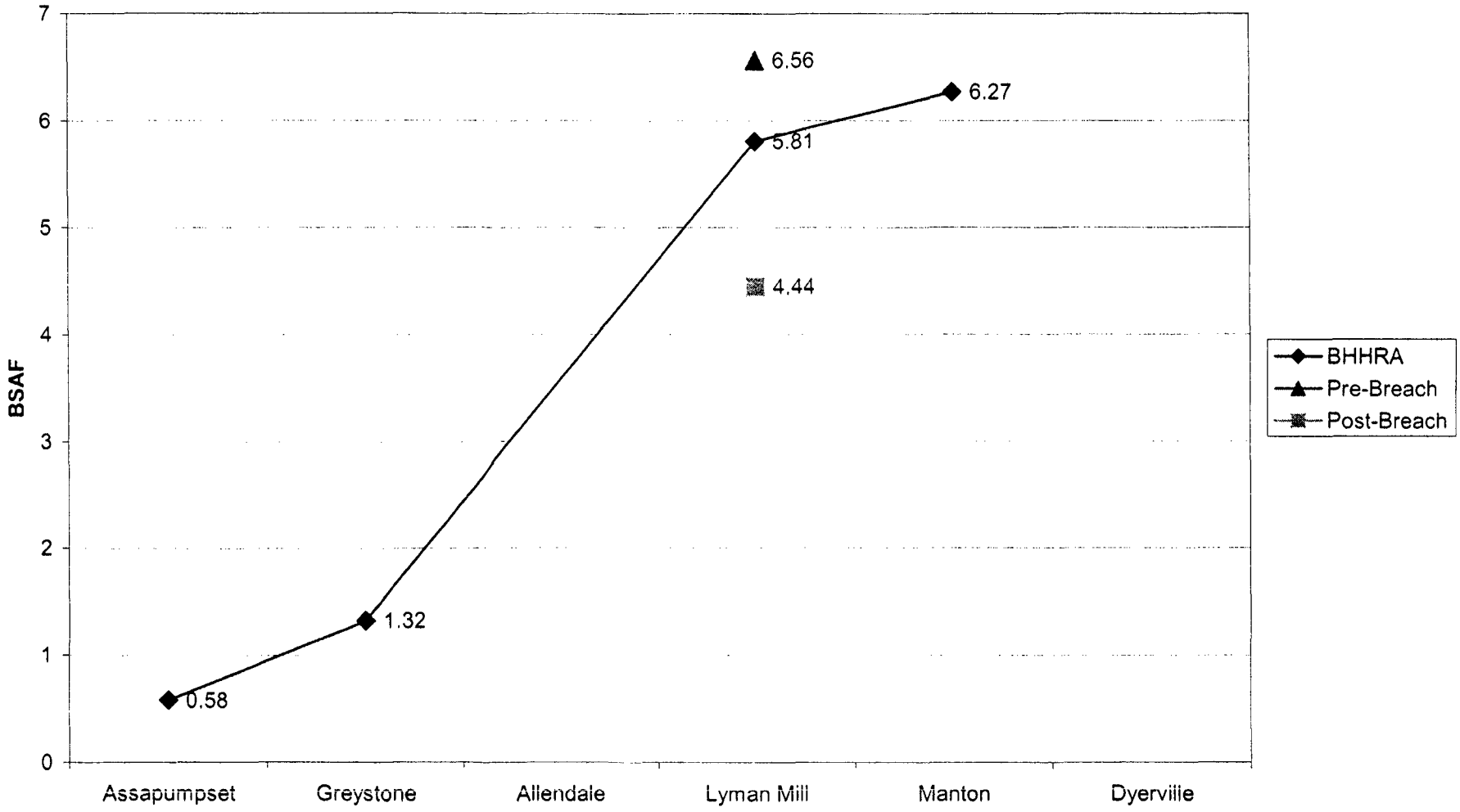
Figure 25. Biota-Sediment Accumulation Factors (BSAFs) for Aroclor-1254 in Largemouth Bass - Pre-Breach, Post-Breach, and BHHRA Sediment Data Centredale Manor Restoration Project Superfund Site



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LMB PCB-1254

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Figure 26. Comparison of Draft Preliminary Site-Specific BSAFs for 2,3,7,8-TCDD TEQ to Literature Values (Migratory Fish) Centredale Manor Restoration Project Superfund Site

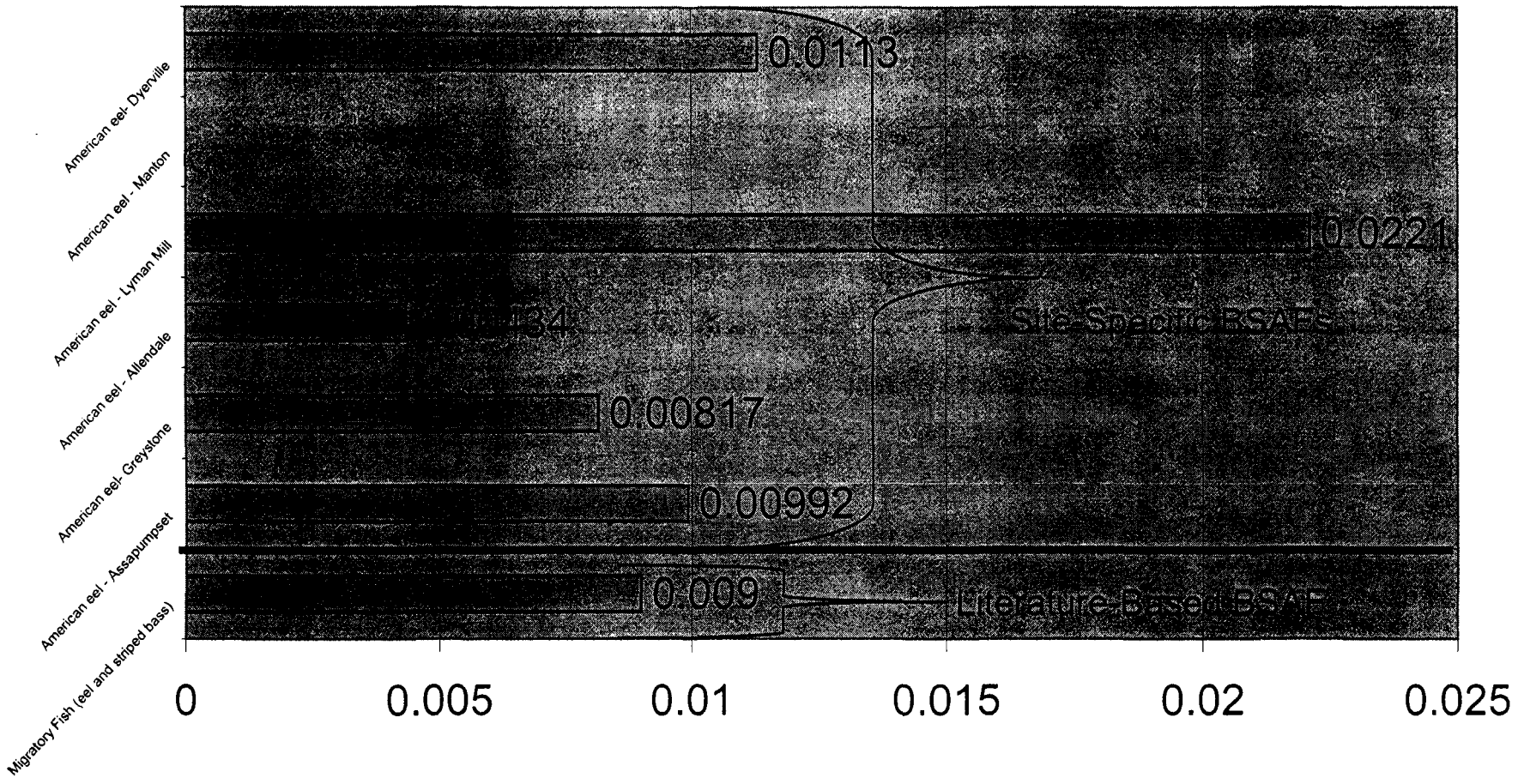

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Figure 27. Comparison of Draft Preliminary Site-Specific BSAFs for 2,3,7,8-TCDD TEQ to Literature Values - Resident Species
Centredale Manor Restoration Project Superfund Site

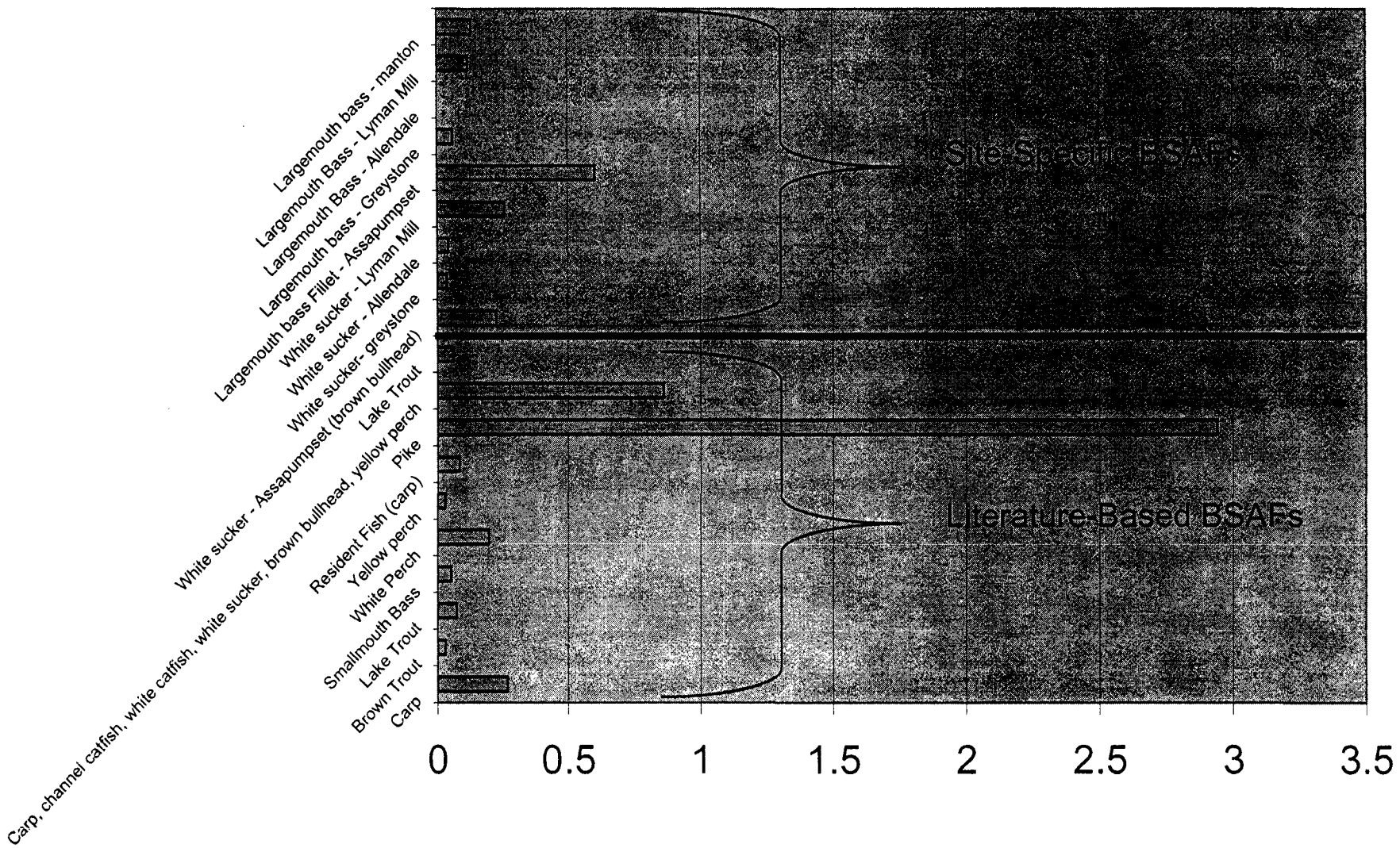
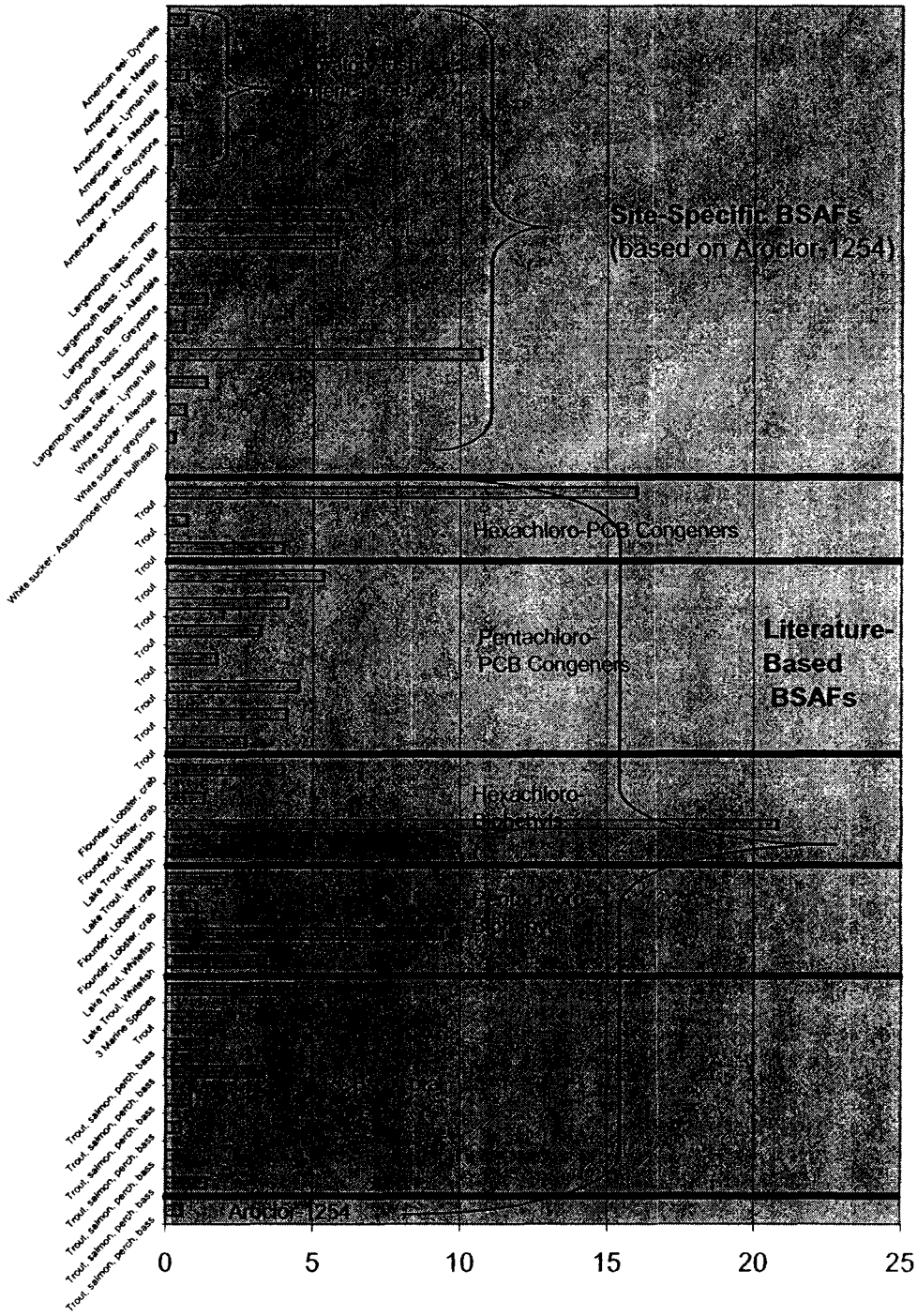


Figure 28. Comparison of Draft Preliminary Site-Specific BSAFs for Aroclor-1254 to Literature Values - All Fish Species
Centredale Manor Restoration Project Superfund Site



TABLES

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ATTACHMENT A

TABLES

Table 1. Sediment Samples Selected for Use in the Pre-Breach/Post-Breach Evaluation
Centredale Manor Restoration Project Superfund Site

TIME PERIOD	Used for BHHRA BSAFs?	Used for Pre Breach BSAFs?	Used for Post-Breach BSAFs?	RIVER REACH	SAMPLE	SAMPLE DATE	DEPTH	LOCATION	Benzo(a)pyrene	4,4'-DDE	alpha-Chlordane	Dieldrin	gamma-Chlordane	Technical Chlordane	Aroclor-1254	Aroclor-1268	HCX	TEQ - Mammals	Mercury	TOC
Pre-Breach				Allendale Pond	APB-BK-2003Y-01	10/21/1999	0 - 0.5 ft bgs	APB-BK-2003	X	X	X	X	X		X		X	X	X	
Pre-Breach				Allendale Pond	APB-BK-2003Z-01	10/21/1999	0 - 0.5 ft bgs	APB-BK-2003	X	X	X	X	X		X			X	X	
Pre-Breach	X	X		Allendale Pond	APB-FP-2028-000.5-01	10/28/1999	0 - 0.5 ft bgs	APB-FP-2028	X	X	X	X	X		X				X	X
Pre-Breach	X	X		Allendale Pond	APB-FP-2031-01	10/28/1999	0 - 0.5 ft bgs	APB-FP-2031	X	X	X	X	X		X				X	X
Pre-Breach	X	X		Allendale Pond	APB-FP-2032-01	10/28/1999	0 - 0.5 ft bgs	APB-FP-2032	X	X	X	X	X		X				X	X
Pre-Breach	X	X		Allendale Pond	APB-FP-2033-000.5-01	10/28/1999	0 - 0.5 ft bgs	APB-FP-2033	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Allendale Pond	APB-SD-2030-01	10/22/1999	0 - 0.5 ft bgs	APB-FP-2030	X	X	X	X	X		X				X	X
Pre-Breach	X	X		Allendale Pond	APB-SD-2034-01	11/3/1999	0 - 0.5 ft bgs	APB-SD-2034	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Allendale Pond	APB-SD-2037-01	10/22/1999	0 - 0.5 ft bgs	APB-SD-2037	X	X	X	X	X		X				X	X
Pre-Breach	X	X		Allendale Pond	APC-SD-2035-000.5-01	11/3/1999	0 - 0.5 ft bgs	APC-SD-2035	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Allendale Pond	CMW-FP-2027-01	10/28/1999	0 - 0.5 ft bgs	CMW-FP-2027	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Allendale Pond	CMW-SD-2016-01	10/26/1999	0 - 0.5 ft bgs	CMW-SD-2016	X	X	X	X	X		X			X	X	X
Pre-Breach	X	X		Allendale Pond	CMW-SD-2023-01	10/27/1999	0 - 0.5 ft bgs	CMW-SD-2023	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Allendale Pond	CMW-SD-2024-01	10/27/1999	0 - 0.5 ft bgs	CMW-SD-2024	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Allendale Pond	CMW-SD-2025-000.5-01	10/28/1999	0 - 0.5 ft bgs	CMW-SD-2025	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Allendale Pond	DAM002-SD	10/23/1998	0 - 0.33 ft bgs	Allendale Dam	X	X	X	X			X	X	X	X	X	X
Pre-Breach	X	X		Allendale Pond	SD-20	9/9/1998	0 - 0.25 ft bgs	SD-20		X					X		X	X		X
Pre-Breach	X	X		Allendale Pond	SD-22	9/9/1998	0 - 0.25 ft bgs	SD-22		X	X	X	X		X		X	X		X
Pre-Breach	X	X		Allendale Pond	SD-23	9/9/1998	0 - 0.25 ft bgs	SD-23		X			X		X		X	X		X
Pre-Breach	X	X		Allendale Pond	SD-24	9/9/1998	0 - 0.25 ft bgs	SD-24		X			X		X		X	X		X
Pre-Breach	X	X		Allendale Pond	SD-25	9/9/1998	0 - 0.25 ft bgs	SD-25		X			X		X		X	X		X
Pre-Breach	X	X		Allendale Pond	SD-26	9/9/1998	0 - 0.5 ft bgs	SD-26		X	X	X			X		X	X		X
Pre-Breach	X	X		Allendale Pond	SD-27	9/9/1998	0 - 0.5 ft bgs	SD-27		X	X	X			X		X	X		X
Pre-Breach	X	X		Allendale Pond	SD-28	9/9/1998	0 - 0.5 ft bgs	SD-28		X	X	X	X		X		X	X		X
Pre-Breach	X	X		Allendale Pond	SD-29	9/9/1998	0 - 0.5 ft bgs	SD-29		X	X	X	X		X		X	X		X
Pre-Breach	X	X		Allendale Pond	WRC-SD-2009-01	11/1/1999	0 - 0.5 ft bgs	WRC-SD-2009	X	X	X	X	X		X			X	X	X
Pre-Breach	X	X		Allendale Pond	WRC-SD-2013-000.5-01	11/1/1999	0 - 0.5 ft bgs	WRC-SD-2013	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Allendale Pond	WRC-SD-2014-01	11/1/1999	0 - 0.5 ft bgs	WRC-SD-2014	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Allendale Pond	WRC-SD-2015-01	11/1/1999	0 - 0.5 ft bgs	WRC-SD-2015	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Allendale Pond	WRL-SD-2039-01	10/25/1999	0 - 0.5 ft bgs	WRL-SD-2039	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Allendale Pond	WRL-SD-2044-000.5-01	11/9/1999	0 - 0.5 ft bgs	WRL-SD-2044	X	X	X	X	X		X		X	X	X	X
Pre-Breach				Allendale Pond	3428-CMS-020	2/17/1999	0 - 0.25 ft bgs	CMS-020									X			
Pre-Breach				Allendale Pond	3428-CMS-022	2/17/1999	0 - 0.25 ft bgs	CMS-022									X			
Pre-Breach				Allendale Pond	3428-CMS-023	2/17/1999	0 - 0.25 ft bgs	CMS-023									X			
Pre-Breach				Allendale Pond	3428-CMS-024	2/17/1999	0 - 0.25 ft bgs	CMS-024									X			
Pre-Breach				Allendale Pond	3428-CMS-025	2/17/1999	0 - 0.25 ft bgs	CMS-025									X			
Pre-Breach				Allendale Pond	3428-CMS-151	2/17/1999	0 - 0.25 ft bgs	CMS-151									X			
Pre-Breach				Allendale Pond	3428-CMS-174	2/17/1999	0 - 0.25 ft bgs	CMS-174									X			
Pre-Breach				Allendale Pond	3428-CMS-175	2/17/1999	0 - 0.25 ft bgs	CMS-175									X			
Pre-Breach				Allendale Pond	3428-CMS-176	2/17/1999	0 - 0.25 ft bgs	CMS-176									X			
Pre-Breach				Allendale Pond	3428-CMS-177	2/17/1999	0 - 0.25 ft bgs	CMS-177									X			
Pre-Breach				Allendale Pond	3428-CMS-179	2/17/1999	0 - 0.25 ft bgs	CMS-179									X			
Pre-Breach				Allendale Pond	3428-CMS-181	2/17/1999	0 - 0.25 ft bgs	CMS-181									X			
Pre-Breach				Allendale Pond	3428-CMS-183	2/17/1999	0 - 0.25 ft bgs	CMS-183									X			
Pre-Breach				Allendale Pond	3428-CMS-186	2/17/1999	0 - 0.25 ft bgs	CMS-186									X			
Pre-Breach				Allendale Pond	3428-CMS-187	2/17/1999	0 - 0.25 ft bgs	CMS-187									X			
Pre-Breach				Allendale Pond	3428-CMS-188	2/17/1999	0 - 0.25 ft bgs	CMS-188									X			
Pre-Breach				Allendale Pond	3428-CMS-190	2/17/1999	0 - 0.25 ft bgs	CMS-190									X			
Pre-Breach				Allendale Pond	3428-CMS-192	2/17/1999	0 - 0.25 ft bgs	CMS-192									X			
Pre-Breach				Allendale Pond	3428-CMS-194	2/17/1999	0 - 0.25 ft bgs	CMS-194									X			
Pre-Breach				Allendale Pond	3428-CMS-195	2/17/1999	0 - 0.25 ft bgs	CMS-195									X			

Table 1. Sediment Samples Selected for Use in the Pre-Breach/Post-Breach Evaluation
Centredale Manor Restoration Project Superfund Site

TIME PERIOD	Used for BHHRA BSAFs?	Used for Pre Breach BSAFs?	Used for Post-Breach BSAFs?	RIVER REACH	SAMPLE	SAMPLE DATE	DEPTH	LOCATION	Benzo(a)pyrene	4,4'-DDE	alpha-Chlordane	Dieldrin	gamma-Chlordane	Technical Chlordane	Aroclor-1254	Aroclor-1268	HCX	TEQ - Mammals	Mercury	TOC
Pre-Breach				Allendale Pond	3428-CMS-196	2/17/1999	0 - 0.25 ft bgs	CMS-196									X			
Pre-Breach				Allendale Pond	3428-CMS-197	2/17/1999	0 - 0.25 ft bgs	CMS-197									X			
Pre-Breach				Allendale Pond	3428-CMS-199	2/17/1999	0 - 0.25 ft bgs	CMS-199									X			
Pre-Breach				Allendale Pond	3428-CMS-200	2/17/1999	0 - 0.25 ft bgs	CMS-200									X			
Pre-Breach				Allendale Pond	3428-CMS-201	2/17/1999	0 - 0.25 ft bgs	CMS-201									X			
Pre-Breach				Allendale Pond	3428-CMS-202	2/17/1999	0 - 0.25 ft bgs	CMS-202									X			
Pre-Breach				Allendale Pond	3428-CMS-203	2/17/1999	0 - 0.25 ft bgs	CMS-203									X			
Pre-Breach				Allendale Pond	3428-CMS-208	2/17/1999	0 - 0.25 ft bgs	CMS-208									X			
Pre-Breach				Allendale Pond	3428-CMS-209	2/17/1999	0 - 0.25 ft bgs	CMS-209									X			
Pre-Breach				Allendale Pond	3428-CMS-210	2/17/1999	0 - 0.25 ft bgs	CMS-210									X			
Pre-Breach				Allendale Pond	3428-CMS-211	2/17/1999	0 - 0.25 ft bgs	CMS-211									X			
Pre-Breach				Allendale Pond	3428-CMS-212	2/17/1999	0 - 0.25 ft bgs	CMS-212									X			
Pre-Breach				Allendale Pond	3428-CMS-213	2/17/1999	0 - 0.25 ft bgs	CMS-213									X			
Pre-Breach				Allendale Pond	3428-CMS-214	2/17/1999	0 - 0.25 ft bgs	CMS-214									X			
Pre-Breach				Allendale Pond	3428-CMS-215	2/17/1999	0 - 0.25 ft bgs	CMS-215									X			
Pre-Breach				Allendale Pond	3428-CMS-216	2/16/1999	0 - 0.25 ft bgs	CMS-216e									X			
Pre-Breach				Allendale Pond	3428-CMS-224	2/16/1999	0 - 0.25 ft bgs	CMS-224									X			
Pre-Breach				Allendale Pond	CMS-021-A	7/14/1999	0 - 1 ft bgs	CMS-021									X			
Pre-Breach				Allendale Pond	CMS-022-A	7/14/1999	0 - 1 ft bgs	CMS-022									X			
Pre-Breach				Allendale Pond	CMS-023-A	7/14/1999	0 - 1 ft bgs	CMS-023									X			
Pre-Breach				Allendale Pond	CMS-024-A	7/14/1999	0 - 1 ft bgs	CMS-024									X			
Pre-Breach				Allendale Pond	CMS-025-A	7/14/1999	0 - 1 ft bgs	CMS-025									X			
Pre-Breach				Allendale Pond	CMS-175-A	6/25/1999	0 - 1 ft bgs	CMS-175							X		X			
Pre-Breach				Allendale Pond	CMS-182-A	7/7/1999	0 - 1 ft bgs	CMS-182									X			
Pre-Breach				Allendale Pond	CMS-186-A	7/6/1999	0 - 1 ft bgs	CMS-186									X			
Pre-Breach				Allendale Pond	CMS-187-A	7/6/1999	0 - 1 ft bgs	CMS-187									X			
Pre-Breach				Allendale Pond	CMS-188-A	7/6/1999	0 - 1 ft bgs	CMS-188									X			
Pre-Breach				Allendale Pond	CMS-192-A	6/30/1999	0 - 1 ft bgs	CMS-192	X	X		X		X	X		X		X	
Pre-Breach				Allendale Pond	CMS-195-A	7/7/1999	0 - 1 ft bgs	CMS-195									X			
Pre-Breach				Allendale Pond	CMS-196-A	7/7/1999	0 - 1 ft bgs	CMS-196									X			
Pre-Breach				Allendale Pond	CMS-200-A	7/7/1999	0 - 1 ft bgs	CMS-200									X			
Pre-Breach				Allendale Pond	CMS-202-A	7/7/1999	0 - 1 ft bgs	CMS-202									X			
Pre-Breach				Allendale Pond	CMS-203-A	7/7/1999	0 - 1 ft bgs	CMS-203									X			
Pre-Breach				Allendale Pond	CMS-204-A	7/7/1999	0 - 1 ft bgs	CMS-204									X			
Pre-Breach				Allendale Pond	CMS-208-A	7/8/1999	0 - 1 ft bgs	CMS-208									X			
Pre-Breach				Allendale Pond	CMS-209-A	7/8/1999	0 - 1 ft bgs	CMS-209									X			
Pre-Breach				Allendale Pond	CMS-210-A	7/12/1999	0 - 1 ft bgs	CMS-210									X			
Pre-Breach				Allendale Pond	CMS-212-A	7/12/1999	0 - 1 ft bgs	CMS-212									X			
Pre-Breach				Allendale Pond	CMS-213-A	7/8/1999	0 - 1 ft bgs	CMS-213									X			
Pre-Breach				Allendale Pond	CMS-214-A	7/12/1999	0 - 1 ft bgs	CMS-214									X			
Pre-Breach				Allendale Pond	CMS-465-A	7/27/1999	0 - 1 ft bgs	CMS-465									X			
Pre-Breach				Allendale Pond	CMS-467-A	7/27/1999	0 - 1 ft bgs	CMS-467									X			
Pre-Breach				Allendale Pond	CMS-470-A	7/27/1999	0 - 1 ft bgs	CMS-470									X			
Pre-Breach				Allendale Pond	CMS-471-A	7/27/1999	0 - 1 ft bgs	CMS-471									X			
Pre-Breach				Allendale Pond	CMS-472-A	7/29/1999	0 - 1 ft bgs	CMS-472									X			
Pre-Breach				Allendale Pond	CMS-477-A	7/29/1999	0 - 1 ft bgs	CMS-477									X			
Pre-Breach				Allendale Pond	CMS-484-A	7/30/1999	0 - 1 ft bgs	CMS-484									X			
Pre-Breach				Allendale Pond	CMS-487-A	7/30/1999	0 - 1 ft bgs	CMS-487									X			
Pre-Breach				Allendale Pond	CMS-489-A	7/30/1999	0 - 1 ft bgs	CMS-489									X			
Pre-Breach				Allendale Pond	CMS-490-A	7/30/1999	0 - 1 ft bgs	CMS-490									X			
Pre-Breach				Allendale Pond	CMS-493-A	7/30/1999	0 - 1 ft bgs	CMS-493									X			

Table 1. Sediment Samples Selected for Use in the Pre-Breach/Post-Breach Evaluation
Centredale Manor Restoration Project Superfund Site

TIME PERIOD	Used for BHHRA BSAFs?	Used for Pre Breach BSAFs?	Used for Post-Breach BSAFs?	RIVER REACH	SAMPLE	SAMPLE DATE	DEPTH	LOCATION	Benzo(a)pyrene	4,4'-DDE	alpha-Chlordane	Dieldrin	gamma-Chlordane	Technical Chlordane	Aroclor-1254	Aroclor-1268	HCX	TEQ - Mammals	Mercury	TOC
Pre-Breach				Allendale Pond	CMS-494-A	8/12/1999	0 - 1 ft bgs	CMS-494										X		
Pre-Breach				Allendale Pond	CMS-495-A	8/12/1999	0 - 1 ft bgs	CMS-495										X		
Pre-Breach				Allendale Pond	CMS-496-A	8/12/1999	0 - 1 ft bgs	CMS-496										X		
Pre-Breach				Allendale Pond	CMS-600-A	9/29/1999	0 - 0.5 ft bgs	CMS-600						X				X		
Pre-Breach				Allendale Pond	CMS-601-A	9/29/1999	0 - 0.5 ft bgs	CMS-601						X				X		
Pre-Breach				Allendale Pond	CMS-603-A	9/30/1999	0 - 0.5 ft bgs	CMS-603						X				X		
Pre-Breach				Allendale Pond	CMS-604-A	10/1/1999	0 - 0.5 ft bgs	CMS-604						X				X		
Pre-Breach				Allendale Pond	CMS-605-A	9/29/1999	0 - 1 ft bgs	CMS-605						X				X		
Pre-Breach				Allendale Pond	CMS-606-A	9/29/1999	0 - 0.5 ft bgs	CMS-606						X				X		
Pre-Breach				Allendale Pond	CMS-608-A	9/29/1999	0 - 0.5 ft bgs	CMS-608						X				X		
Pre-Breach				Allendale Pond	CMS-609-A	9/29/1999	0 - 0.5 ft bgs	CMS-609						X				X		
Pre-Breach				Allendale Pond	CMS-610-A	10/1/1999	0 - 0.5 ft bgs	CMS-610						X				X		
Pre-Breach				Allendale Pond	CMS-612-A	9/30/1999	0 - 0.5 ft bgs	CMS-612						X				X		
Pre-Breach				Allendale Pond	CMS-613-A	9/30/1999	0 - 0.5 ft bgs	CMS-613						X				X		
Pre-Breach				Allendale Pond	CMS-614-A	9/29/1999	0 - 0.5 ft bgs	CMS-614						X				X		
Pre-Breach				Allendale Pond	CMS-615-A	9/29/1999	0 - 1 ft bgs	CMS-615						X				X		
Pre-Breach				Allendale Pond	CMS-616-A	9/29/1999	0 - 0.5 ft bgs	CMS-616						X				X		
Pre-Breach				Allendale Pond	CMS-618-A	10/1/1999	0 - 0.5 ft bgs	CMS-618						X				X		
Pre-Breach				Allendale Pond	CMS-619-A	10/1/1999	0 - 0.5 ft bgs	CMS-619						X				X		
Pre-Breach				Allendale Pond	CMS-620-A	10/1/1999	0 - 0.5 ft bgs	CMS-620						X				X		
Pre-Breach				Allendale Pond	CMS-622-A	10/5/1999	0 - 0.5 ft bgs	CMS-622						X				X		
Pre-Breach				Allendale Pond	CMS-623-A	10/5/1999	0 - 0.5 ft bgs	CMS-623						X				X		
Pre-Breach				Allendale Pond	CMS-625-A	10/1/1999	0 - 0.5 ft bgs	CMS-625						X				X		
Pre-Breach				Allendale Pond	CMS-626-A	10/1/1999	0 - 0.5 ft bgs	CMS-626						X				X		
Pre-Breach				Allendale Pond	CMS-627-A	10/5/1999	0 - 0.5 ft bgs	CMS-627						X				X		
Pre-Breach				Allendale Pond	CMS-628-A	9/29/1999	0 - 1 ft bgs	CMS-628						X				X		
Pre-Breach				Allendale Pond	CMS-630-A	10/1/1999	0 - 0.5 ft bgs	CMS-630						X				X		
Pre-Breach				Allendale Pond	CMS-631-A	10/5/1999	0 - 0.5 ft bgs	CMS-631						X				X		
Pre-Breach				Allendale Pond	CMS-633-A	10/5/1999	0 - 0.5 ft bgs	CMS-633						X				X		
Pre-Breach				Allendale Pond	CMS-634-A	10/5/1999	0 - 0.5 ft bgs	CMS-634						X				X		
Pre-Breach				Allendale Pond	RES-SS-12-239-01	11/16/1999	0 - 1 ft bgs	RES-12-239-01	X	X	X	X	X	X					X	
Pre-Breach				Allendale Pond	RES-SS-12-240-02	11/16/1999	0 - 1 ft bgs	RES-12-240-02									X	X		
Pre-Breach				Allendale Pond	RES-SS-12-550-01	11/16/1999	0 - 1 ft bgs	RES-12-550-01	X	X	X	X	X	X					X	
Pre-Breach				Allendale Pond	RES-SS-12-551-01	11/16/1999	0 - 1 ft bgs	RES-12-551-01	X	X	X	X	X	X					X	
Pre-Breach				Allendale Pond	RES-SS-12-552-01	11/16/1999	0 - 1 ft bgs	RES-12-552-01	X	X	X	X	X	X					X	
Pre-Breach				Allendale Pond	RES-SS-12-554-01	11/16/1999	0 - 1 ft bgs	RES-12-554-01	X	X	X	X	X	X					X	
Pre-Breach				Allendale Pond	RES-SS-14-333-01	11/15/1999	0 - 1 ft bgs	RES-14-333-01	X		X		X	X			X	X		
Pre-Breach				Allendale Pond	RES-SS-14-334-01	11/15/1999	0 - 1 ft bgs	RES-14-334-01	X	X	X	X	X	X			X	X	X	
Pre-Breach				Allendale Pond	RES-SS-14-365-01	11/15/1999	0 - 1 ft bgs	RES-14-365-01	X	X	X	X	X	X			X	X	X	
Pre-Breach				Allendale Pond	RES-SS-14-365-02	11/15/1999	0 - 1 ft bgs	RES-14-365-02									X	X		
Pre-Breach				Allendale Pond	RES-SS-14-365-03	11/15/1999	0 - 1 ft bgs	RES-14-365-03									X	X		
Pre-Breach				Allendale Pond	RES-SS-14-366-01	11/15/1999	0 - 1 ft bgs	RES-14-366-01	X	X	X	X	X	X			X	X	X	
Pre-Breach				Allendale Pond	RES-SS-14-366-02	11/15/1999	0 - 1 ft bgs	RES-14-366-02									X	X		
Pre-Breach				Allendale Pond	RES-SS-14-398-01	11/15/1999	0 - 1 ft bgs	RES-14-398-01	X	X	X	X	X	X					X	
Pre-Breach				Allendale Pond	RES-SS-14-399-01	11/15/1999	0 - 1 ft bgs	RES-14-399-01	X	X	X	X	X	X			X	X	X	
Pre-Breach				Allendale Pond	RES-SS-14-419-01	11/19/1999	0 - 1 ft bgs	RES-14-419-01	X	X	X	X	X	X					X	
Pre-Breach				Allendale Pond	RES-SS-14-420-01	11/19/1999	0 - 1 ft bgs	RES-14-420-01	X	X	X	X	X	X					X	
Pre-Breach				Allendale Pond	RES-SS-14-422-01	12/2/1999	0 - 1 ft bgs	RES-14-422-01	X	X	X	X	X	X			X	X	X	
Pre-Breach				Allendale Pond	RES-SS-14-424-01	12/2/1999	0 - 1 ft bgs	RES-14-424-01	X	X	X	X	X	X			X	X	X	
Pre-Breach				Allendale Pond	RES-SS-14-424-02	12/2/1999	0 - 1 ft bgs	RES-14-424-02									X	X		
Pre-Breach				Allendale Pond	RES-SS-14-425-01	12/2/1999	0 - 1 ft bgs	RES-14-425-01	X	X	X	X	X	X			X	X	X	

Table 1. Sediment Samples Selected for Use in the Pre-Breach/Post-Breach Evaluation
Centredale Manor Restoration Project Superfund Site

TIME PERIOD	Used for BHHRA BSAFs?	Used for Pre Breach BSAFs?	Used for Post-Breach BSAFs?	RIVER REACH	SAMPLE	SAMPLE DATE	DEPTH	LOCATION	Benzo(a)pyrene	4,4'-DDE	alpha-Chlordane	Dieldrin	gamma-Chlordane	Technical Chlordane	Aroclor-1254	Aroclor-1268	HCX	TEQ - Mammals	Mercury	TOC
Pre-Breach				Allendale Pond	RES-SS-14-448-01	11/15/1999	0 - 1 ft bgs	RES-14-448-01	X	X	X		X		X		X	X		
Pre-Breach				Allendale Pond	RES-SS-14-449-01	12/2/1999	0 - 1 ft bgs	RES-14-449-01	X						X		X	X	X	
Pre-Breach				Allendale Pond	RES-SS-14-449-02	12/2/1999	0 - 1 ft bgs	RES-14-449-02									X	X		
Post-Breach	X		X	Allendale Pond	APB-SD-4008-0000-01	7/9/2001	0 - 0.5 ft bgs	APB-SD-4008	X	X	X	X	X	X	X	X			X	X
Post-Breach	X		X	Allendale Pond	APB-SD-4009-0000-01	7/9/2001	0 - 0.5 ft bgs	APB-SD-4009	X	X	X	X	X	X	X	X			X	X
Post-Breach	X		X	Allendale Pond	APB-SD-4010-0000-01	7/10/2001	0 - 0.5 ft bgs	APB-SD-4010	X	X	X	X	X	X	X	X			X	X
Post-Breach	X		X	Allendale Pond	CMS-FP-4001-0000-01	7/18/2001	0 - 0.5 ft bgs	CMS-FP-4001	X	X	X	X	X	X	X	X	X	X	X	X
Post-Breach	X			Allendale Pond	CMS-DU-072001	7/20/2001	0 - 0.5 ft bgs	CMS-FP-4001	X	X	X	X	X	X	X	X	X	X		
Post-Breach	X		X	Allendale Pond	CMS-FP-4002-0000-01	7/18/2001	0 - 0.5 ft bgs	CMS-FP-4002	X	X	X	X	X	X	X	X	X	X	X	X
Post-Breach	X		X	Allendale Pond	CMS-FP-4003-0000-01	7/19/2001	0 - 0.5 ft bgs	CMS-FP-4003	X	X	X	X	X	X	X	X	X	X	X	X
Post-Breach	X		X	Allendale Pond	CMS-FP-4005-0000-01	7/20/2001	0 - 0.5 ft bgs	CMS-FP-4005	X	X	X	X	X	X	X	X	X	X	X	X
Post-Breach	X		X	Allendale Pond	CMS-SD-4003-0000-01	7/12/2001	0 - 0.5 ft bgs	CMS-SD-4003		X	X	X	X	X	X	X	X	X	X	X
Post-Breach	X		X	Allendale Pond	CMS-SD-4006-0000-01	7/12/2001	0 - 0.5 ft bgs	CMS-SD-4006		X	X	X	X	X	X	X	X	X	X	X
Post-Breach	X		X	Allendale Pond	CMS-SD-4007-0000-01	7/12/2001	0 - 0.5 ft bgs	CMS-SD-4007		X	X	X	X	X	X	X	X	X	X	X
Post-Breach			X	Allendale Pond	CMS-SD-4204-0005-0010	5/6/2003	0.05 - 0.1 ft bgs	CMS-SD-4204									X			
Post-Breach			X	Allendale Pond	CMS-SD-4204-0005-01	5/6/2003	0 - 0.5 ft bgs	CMS-SD-4204												X
Post-Breach			X	Allendale Pond	CMS-SD-4204-0055-0060	5/6/2003	0.55 - 0.6 ft bgs	CMS-SD-4204									X			
Post-Breach			X	Allendale Pond	CMS-SD-4204-0510-01	5/6/2003	0.5 - 1 ft bgs	CMS-SD-4204												X
Post-Breach				Allendale Pond	CMS-SD-4205-0005-01	5/6/2003	0 - 0.5 ft bgs	162a												X
Post-Breach				Allendale Pond	CMS-SD-4205-0510-01	5/6/2003	0.5 - 1 ft bgs	162a												X
Post-Breach			X	Allendale Pond	CMS-SD-4206-0005-01	5/6/2003	0 - 0.5 ft bgs	CMS-SD-4206												X
Post-Breach			X	Allendale Pond	CMS-SD-4206-0035-0045	5/6/2003	0.35 - 0.45 ft bgs	CMS-SD-4206									X			
Post-Breach				Allendale Pond	CMS-SD-4206-0510-01	5/6/2003	0.5 - 1 ft bgs	CMS-SD-4206												X
Post-Breach				Allendale Pond	CMS-SD-4207-0005-01	5/6/2003	0 - 0.5 ft bgs	131c												X
Post-Breach				Allendale Pond	CMS-SD-4208-0007-01	5/7/2003	0 - 0.7 ft bgs	131a												X
Post-Breach			X	Allendale Pond	CMS-SD-4209-0005-01	5/7/2003	0 - 0.5 ft bgs	CMS-SD-4209												X
Post-Breach			X	Allendale Pond	CMS-SD-4209-0035-0045	5/7/2003	0.35 - 0.4 ft bgs	CMS-SD-4209									X			
Post-Breach			X	Allendale Pond	CMS-SD-4209-0065-0075	5/7/2003	0.65 - 0.7 ft bgs	CMS-SD-4209									X			
Post-Breach			X	Allendale Pond	CMS-SD-4209-0510-01	5/7/2003	0.5 - 1 ft bgs	CMS-SD-4209												X
Post-Breach			X	Allendale Pond	CMS-SD-4210-0005-01	5/7/2003	0 - 0.5 ft bgs	CMS-SD-4210												X
Post-Breach			X	Allendale Pond	CMS-SD-4210-0030-0040	5/7/2003	0.3 - 0.4 ft bgs	CMS-SD-4210									X			
Post-Breach			X	Allendale Pond	CMS-SD-4210-0080-0090	5/7/2003	0.8 - 0.9 ft bgs	CMS-SD-4210									X			
Post-Breach			X	Allendale Pond	CMS-SD-4210-0510-01	5/7/2003	0.5 - 1 ft bgs	CMS-SD-4210												X
Post-Breach				Allendale Pond	CMS-SD-4211-0005-01	5/7/2003	0 - 0.5 ft bgs	128a												X
Post-Breach				Allendale Pond	CMS-SD-4211-0510-01	5/7/2003	0.5 - 1 ft bgs	128a												X
Post-Breach			X	Allendale Pond	CMS-SD-4212-0000-0010	5/7/2003	0 - 0.1 ft bgs	CMS-SD-4212									X			
Post-Breach			X	Allendale Pond	CMS-SD-4212-0007-01	5/7/2003	0 - 0.7 ft bgs	CMS-SD-4212												X
Post-Breach			X	Allendale Pond	CMS-SD-4212-0055-0065	5/7/2003	0.55 - 0.65 ft bgs	CMS-SD-4212									X			
Post-Breach				Allendale Pond	CMS-SD-4212-0725-01	5/7/2003	0.7 - 2.5 ft bgs	CMS-SD-4212												X
Post-Breach			X	Allendale Pond	CMS-SD-4213-0005-01	5/7/2003	0 - 0.5 ft bgs	CMS-SD-4213												X
Post-Breach			X	Allendale Pond	CMS-SD-4213-0035-0045	5/7/2003	0.35 - 0.45 ft bgs	CMS-SD-4213									X			
Post-Breach			X	Allendale Pond	CMS-SD-4213-0055-0065	5/7/2003	0.55 - 0.65 ft bgs	CMS-SD-4213									X			
Post-Breach			X	Allendale Pond	CMS-SD-4213-0508-01	5/7/2003	0.5 - 0.8 ft bgs	CMS-SD-4213												X
Post-Breach				Allendale Pond	CMS-SD-4213-0825-01	5/7/2003	0.8 - 2.5 ft bgs	CMS-SD-4213												X
Post-Breach				Allendale Pond	CMS-SD-4214-0005-01	5/7/2003	0 - 0.5 ft bgs	123a												X
Post-Breach				Allendale Pond	CMS-SD-4214-0511-01	5/7/2003	0.5 - 1.1 ft bgs	123a												X
Post-Breach				Allendale Pond	CMS-SD-4215-0012-01	5/7/2003	0 - 1.2 ft bgs	128d												X
Post-Breach				Allendale Pond	CMS-SD-4216-0020-01	5/7/2003	0 - 2 ft bgs	138a												X
Post-Breach				Allendale Pond	CMS-SD-4217-0004-01	5/7/2003	0 - 0.4 ft bgs	136b												X
Post-Breach				Allendale Pond	CMS-SD-4217-0409-01	5/7/2003	0.4 - 0.9 ft bgs	136b												X
Post-Breach				Allendale Pond	CMS-SD-4217-0913-01	5/7/2003	0.9 - 1.3 ft bgs	136b												X

Table 1. Sediment Samples Selected for Use in the Pre-Breach/Post-Breach Evaluation
Centredale Manor Restoration Project Superfund Site

TIME PERIOD	Used for BHHRA BSAFs?	Used for Pre Breach BSAFs?	Used for Post-Breach BSAFs?	RIVER REACH	SAMPLE	SAMPLE DATE	DEPTH	LOCATION	Benzo(a)pyrene	4,4'-DDE	alpha-Chlordane	Dieldrin	gamma-Chlordane	Technical Chlordane	Aroclor-1254	Aroclor-1268	HCX	TEQ - Mammals	Mercury	TOC
Post-Breach			X	Allendale Pond	CMS-SD-4218-0010-01	5/7/2003	0 - 1 ft bgs	CMS-SD-4218												X
Post-Breach			X	Allendale Pond	CMS-SD-4218-0035-0045	5/7/2003	0.35 - 0.45 ft bgs	CMS-SD-4218									X			
Post-Breach			X	Allendale Pond	CMS-SD-4218-0070-0080	5/7/2003	0.7 - 0.8 ft bgs	CMS-SD-4218									X			
Post-Breach			X	Allendale Pond	CMS-SD-4219-0010-01	5/7/2003	0 - 1 ft bgs	CMS-SD-4219												X
Post-Breach			X	Allendale Pond	CMS-SD-4219-0035-0045	5/7/2003	0.35 - 0.45 ft bgs	CMS-SD-4219									X			
Post-Breach			X	Allendale Pond	CMS-SD-4219-0075-0085	5/7/2003	0.75 - 0.85 ft bgs	CMS-SD-4219									X			
Post-Breach			X	Allendale Pond	CMS-SD-4220-0006-01	5/7/2003	0 - 0.6 ft bgs	CMS-SD-4220												X
Post-Breach			X	Allendale Pond	CMS-SD-4220-0030-0040	5/7/2003	0.3 - 0.4 ft bgs	CMS-SD-4220									X			
Post-Breach			X	Allendale Pond	CMS-SD-4220-0060-0070	5/7/2003	0.6 - 0.7 ft bgs	CMS-SD-4220									X			
Post-Breach			X	Allendale Pond	CMS-SD-4220-0609-01	5/7/2003	0.6 - 0.9 ft bgs	CMS-SD-4220												X
Post-Breach				Allendale Pond	CMS-SD-4220-0921-01	5/7/2003	0.9 - 2.1 ft bgs	CMS-SD-4220												X
Post-Breach				Allendale Pond	CMS-SD-4221-0006-01	5/8/2003	0 - 0.6 ft bgs	167a												X
Post-Breach				Allendale Pond	CMS-SD-4221-0626-01	5/8/2003	0.6 - 2.6 ft bgs	167a												X
Post-Breach			X	Allendale Pond	CMS-SD-4222-0007-01	5/8/2003	0 - 0.7 ft bgs	CMS-SD-4222												X
Post-Breach			X	Allendale Pond	CMS-SD-4222-0025-0035	5/8/2003	0.25 - 0.35 ft bgs	CMS-SD-4222									X			
Post-Breach			X	Allendale Pond	CMS-SD-4222-0085-0095	5/8/2003	0.85 - 0.95 ft bgs	CMS-SD-4222									X			
Post-Breach			X	Allendale Pond	CMS-SD-4222-0710-01	5/8/2003	0.7 - 1 ft bgs	CMS-SD-4222												X
Post-Breach				Allendale Pond	CMS-SD-4223-0004-01	5/8/2003	0 - 0.4 ft bgs	120b												X
Pre-Breach	X	X		Lyman Mill Pond	DAM003-SD	10/23/1998	0 - 0.33 ft bgs	Lymansville Dam	X	X	X	X	X		X	X	X	X	X	X
Pre-Breach				Lyman Mill Pond	LPX-BK-2006X-01	10/21/1999	0 - 0.5 ft bgs	LPX-BK-2006	X								X	X	X	
Pre-Breach				Lyman Mill Pond	LPX-BK-2006Y-01	10/21/1999	0 - 0.5 ft bgs	LPX-BK-2006	X	X	X	X	X		X			X	X	
Pre-Breach				Lyman Mill Pond	LPX-BK-2006Z-01	10/21/1999	0 - 0.5 ft bgs	LPX-BK-2006	X	X	X	X	X		X			X	X	
Pre-Breach				Lyman Mill Pond	LPX-BK-2008X-01	10/21/1999	0 - 0.5 ft bgs	LPX-BK-2008	X	X	X	X	X		X		X	X	X	
Pre-Breach				Lyman Mill Pond	LPX-BK-2008Y-01	10/21/1999	0 - 0.5 ft bgs	LPX-BK-2008	X	X	X	X	X		X			X	X	
Pre-Breach				Lyman Mill Pond	LPX-BK-2008Z-01	10/21/1999	0 - 0.5 ft bgs	LPX-BK-2008	X	X	X	X	X		X			X	X	
Pre-Breach	X	X		Lyman Mill Pond	LPX-SD-2045-01	11/8/1999	0 - 0.5 ft bgs	LPX-SD-2045	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Lyman Mill Pond	LPX-SD-2046-000.5-01	11/8/1999	0 - 0.5 ft bgs	LPX-SD-2046	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Lyman Mill Pond	LPX-SD-2047-01	11/8/1999	0 - 0.5 ft bgs	LPX-SD-2047	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Lyman Mill Pond	LPX-SD-2049-01	11/5/1999	0 - 0.5 ft bgs	LPX-SD-2049	X	X	X	X	X		X			X	X	X
Pre-Breach	X	X		Lyman Mill Pond	LPX-SD-2050-01	11/5/1999	0 - 0.5 ft bgs	LPX-SD-2050	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Lyman Mill Pond	LPX-SD-2051-01	11/4/1999	0 - 0.5 ft bgs	LPX-SD-2051	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Lyman Mill Pond	LPX-SD-2052-000.5-01	11/4/1999	0 - 0.5 ft bgs	LPX-SD-2052	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Lyman Mill Pond	SD-10	9/9/1998	0 - 0.5 ft bgs	SD-10	X	X	X	X			X		X	X		X
Pre-Breach	X	X		Lyman Mill Pond	SD-11	9/9/1998	0 - 1 ft bgs	SD-11	X	X	X	X	X		X		X	X		X
Pre-Breach	X	X		Lyman Mill Pond	SD-12	9/9/1998	0 - 1 ft bgs	SD-12	X	X	X	X	X		X		X	X		X
Pre-Breach	X	X		Lyman Mill Pond	SD-13	9/9/1998	0 - 1 ft bgs	SD-13	X	X	X	X	X		X		X	X		X
Pre-Breach	X	X		Lyman Mill Pond	SD-14	9/9/1998	0 - 0.5 ft bgs	SD-14	X	X	X	X	X		X		X	X		X
Pre-Breach	X	X		Lyman Mill Pond	SD-15	9/9/1998	0 - 0.5 ft bgs	SD-15		X	X	X	X		X		X	X		X
Pre-Breach	X	X		Lyman Mill Pond	SD-16	9/9/1998	0 - 0.5 ft bgs	SD-16		X	X	X			X		X	X		X
Pre-Breach	X	X		Lyman Mill Pond	SD-17	9/9/1998	0 - 0.5 ft bgs	SD-17		X	X	X	X		X		X	X		X
Pre-Breach	X	X		Lyman Mill Pond	SD-18	9/9/1998	0 - 0.25 ft bgs	SD-18		X	X	X	X		X		X	X		X
Pre-Breach	X	X		Lyman Mill Pond	SD-19	9/9/1998	0 - 0.25 ft bgs	SD-19		X	X	X	X		X		X	X		X
Pre-Breach				Lyman Mill Pond	WRL-BK-2004X-01	10/21/1999	0 - 0.5 ft bgs	WRL-BK-2004	X	X	X	X	X		X		X	X	X	
Pre-Breach				Lyman Mill Pond	WRL-BK-2004Y-01	10/21/1999	0 - 0.5 ft bgs	WRL-BK-2004	X								X	X		
Pre-Breach				Lyman Mill Pond	WRL-BK-2004Z-01	10/21/1999	0 - 0.5 ft bgs	WRL-BK-2004	X	X	X	X	X		X		X	X	X	
Pre-Breach				Lyman Mill Pond	WRL-BK-2005X-01	10/21/1999	0 - 0.5 ft bgs	WRL-BK-2005	X	X	X	X	X		X		X	X	X	
Pre-Breach				Lyman Mill Pond	WRL-BK-2005Y-01	10/21/1999	0 - 0.5 ft bgs	WRL-BK-2005	X	X	X	X	X		X		X	X	X	
Pre-Breach				Lyman Mill Pond	WRL-BK-2005Z-01	10/21/1999	0 - 0.5 ft bgs	WRL-BK-2005	X	X	X	X	X		X			X	X	
Pre-Breach	X	X		Lyman Mill Pond	WRL-SD-2041-01	10/25/1999	0 - 0.5 ft bgs	WRL-SD-2041	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Lyman Mill Pond	WRL-SD-2042-01	11/2/1999	0 - 0.5 ft bgs	WRL-SD-2042	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Lyman Mill Pond	WRL-SD-2043-01	11/8/1999	0 - 0.5 ft bgs	WRL-SD-2043	X	X	X	X	X		X		X	X	X	X

Table 1. Sediment Samples Selected for Use in the Pre-Breach/Post-Breach Evaluation
Centredale Manor Restoration Project Superfund Site

TIME PERIOD	Used for BHHRA BSAFs?	Used for Pre Breach BSAFs?	Used for Post-Breach BSAFs?	RIVER REACH	SAMPLE	SAMPLE DATE	DEPTH	LOCATION	Benzo(a)pyrene	4,4'-DDE	alpha-Chlordane	Dieldrin	gamma-Chlordane	Technical Chlordane	Aroclor-1254	Aroclor-1268	HCX	TEQ - Mammals	Mercury	TOC
Pre-Breach				Lyman Mill Pond	WRM-SD-2054-01	12/2/1999	0 - 0.5 ft bgs	WRM-SD-2054	X	X	X	X	X		X		X	X	X	
Pre-Breach	X	X		Lyman Mill Pond	WRM-SD-2055-01	9/20/2000	0 - 0.5 ft bgs	WRM-SD-2055	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Lyman Mill Pond	WRM-SD-2057-01	9/20/2000	0 - 0.5 ft bgs	WRM-SD-2057	X	X	X	X	X		X		X	X	X	X
Pre-Breach	X	X		Lyman Mill Pond	WRM-SD-2062-01	9/19/2000	0 - 0.5 ft bgs	WRM-SD-2062	X	X	X	X	X		X			X	X	X
Post-Breach				Lyman Mill	LPX-SD-2045B-02	7/25/2001	0 - 0.3 ft bgs	LPX-SD-2045B	X	X	X	X	X		X			X	X	
Post-Breach				Lyman Mill	LPX-SD-2072-01	7/25/2001	0 - 0.5 ft bgs	LPX-SD-2072	X	X	X	X	X		X			X	X	
Post-Breach	X		X	Lyman Mill	LPX-SD-4001-0000-01	7/12/2001	0 - 0.5 ft bgs	LPX-SD-4001		X	X	X	X	X	X	X	X	X	X	X
Post-Breach	X		X	Lyman Mill	LPX-SD-4002-0000-01	7/12/2001	0 - 0.5 ft bgs	LPX-SD-4002		X	X	X	X	X	X	X	X	X	X	X
Post-Breach	X		X	Lyman Mill	LPX-SD-4004-0000-01	7/12/2001	0 - 0.5 ft bgs	LPX-SD-4004		X	X	X	X	X	X	X	X	X	X	X
Post-Breach	X		X	Lyman Mill	LPX-SD-4011-0000-01	7/10/2001	0 - 0.5 ft bgs	LPX-SD-4011	X	X	X	X	X	X	X	X		X	X	X
Post-Breach	X		X	Lyman Mill	LPX-SD-4012-0000-01	7/10/2001	0 - 0.5 ft bgs	LPX-SD-4012	X	X	X	X	X	X	X	X		X	X	X
Post-Breach	X		X	Lyman Mill	LPX-SD-4013-0000-01	7/10/2001	0 - 0.5 ft bgs	LPX-SD-4013	X	X	X	X	X	X	X	X		X	X	X
Post-Breach	X		X	Lyman Mill	LPX-SD-071601-A	7/16/2001	0 - 0.5 ft bgs	LPX-SD-4013	X	X	X	X	X	X	X	X	X	X	X	X
Post-Breach			X	Lyman Mill	LPX-SD-4201-0010-01	5/8/2003	0 - 1 ft bgs	LPX-SD-4201												X
Post-Breach			X	Lyman Mill	LPX-SD-4201-0035-0045	5/8/2003	0.35 - 0.45 ft bgs	LPX-SD-4201										X		
Post-Breach			X	Lyman Mill	LPX-SD-4201-0095-0105	5/8/2003	0.95 - 1.05 ft bgs	LPX-SD-4201										X		
Post-Breach				Lyman Mill	LPX-SD-4202-0005-01	5/8/2003	0 - 0.5 ft bgs	188b												X
Post-Breach				Lyman Mill	LPX-SD-4203-0012-01	5/8/2003	0 - 1.2 ft bgs	188c												X
Post-Breach				Lyman Mill	LPX-SD-4204-0018-01	5/8/2003	0 - 1.8 ft bgs	179a												X
Post-Breach				Lyman Mill	LPX-SD-4205-0015-01	5/8/2003	0 - 1.5 ft bgs	199a												X
Post-Breach				Lyman Mill	LPX-SD-4206-0009-01	5/8/2003	0 - 0.9 ft bgs	206a												X
Post-Breach			X	Lyman Mill	LPX-SD-4207-0000-0010	5/8/2003	0 - 0.1 ft bgs	LPX-SD-4207										X		
Post-Breach			X	Lyman Mill	LPX-SD-4207-0009-01	5/8/2003	0 - 0.9 ft bgs	LPX-SD-4207												X
Post-Breach				Lyman Mill	LPX-SD-4207-0920-01	5/8/2003	0.9 - 2 ft bgs	LPX-SD-4207												X
Post-Breach			X	Lyman Mill	LPX-SD-4208-0000-0010	5/9/2003	0 - 0.1 ft bgs	LPX-SD-4208										X		
Post-Breach			X	Lyman Mill	LPX-SD-4208-0011-01	5/9/2003	0 - 1.1 ft bgs	LPX-SD-4208												X
Post-Breach			X	Lyman Mill	LPX-SD-4209-0000-0010	5/9/2003	0 - 0.1 ft bgs	LPX-SD-4209										X		
Post-Breach			X	Lyman Mill	LPX-SD-4209-0008-01	5/9/2003	0 - 0.8 ft bgs	LPX-SD-4209												X
Post-Breach				Lyman Mill	LPX-SD-4209-0812-01	5/9/2003	0.8 - 1.2 ft bgs	LPX-SD-4209												X
Post-Breach				Lyman Mill	LPX-SD-4210-0015-01	5/9/2003	0 - 1.5 ft bgs	193a												X
Post-Breach				Lyman Mill	WRL-SD-2041-02	7/24/2001	0 - 0.2 ft bgs	WRL-SD-2041	X	X	X	X	X		X			X	X	
Post-Breach				Lyman Mill	WRL-SD-DUP01-02	7/24/2001	0 - 0.2 ft bgs	WRL-SD-2041	X	X	X	X	X		X			X	X	
Post-Breach				Lyman Mill	WRL-SD-2042-02	7/24/2001	0 - 0.3 ft bgs	WRL-SD-2042	X	X	X	X	X		X			X	X	
Post-Breach				Lyman Mill	WRL-SD-2043-02	7/25/2001	0 - 0.2 ft bgs	WRL-SD-2043	X	X	X	X	X		X			X	X	
Post-Breach				Lyman Mill	WRL-SD-2071-01	7/24/2001	0 - 0.2 ft bgs	WRL-SD-2071	X	X	X	X	X		X			X	X	
Post-Breach	X		X	Lyman Mill	WRL-SD-4005-0000-01	7/12/2001	0 - 0.5 ft bgs	WRL-SD-4005		X	X	X	X	X	X	X	X	X	X	X
Post-Breach				Lyman Mill	WRL-SD-071201-A	7/12/2001	0 - 0.5 ft bgs	WRL-SD-4005											X	

Table 2. Comparison of TOC-Normalized Pre-Breach and Post-Breach Sediment Data for Key Analytes for Allendale Pond Reach and Lyman Mill Pond Reach Centredale Manor Restoration Project Superfund Site

		PRE BREACH				POST BREACH					
PARAMETER	Units	Frequency of Detection		Maximum Detect	Arithmetic Mean	GeoMean	Frequency of Detection		Maximum Detect	Arithmetic Mean	GeoMean	Ratio of Post-Mean and Pre-Mean	Post-Breach Mean Higher or Lower?
Allendale Reach													
Benzo(a)pyrene	MG/KG	18	20	203.592814	48.47715985	23.09906961	7	7	107.501538	71.37899916	64.84365108	1.47	HIGHER
4,4'-DDD	MG/KG	4	24	0.59011164	0.232739061	0.080381215	10	10	1.3516129	0.30982949	0.135983405	1.33	HIGHER
4,4'-DDE	MG/KG	10	29	1.01364522	0.185835652	0.078734906	10	10	1.29354839	0.262153312	0.166868515	1.41	HIGHER
4,4'-DDT	MG/KG	3	25	0.50359712	0.241046234	0.086063244	6	10	0.48794788	0.10867923	0.053993674	0.45	LOWER
alpha-Chlordane	MG/KG	15	25	0.86124402	0.222512569	0.105966389	10	10	0.84250765	0.351603514	0.262410165	1.58	HIGHER
Dieldrin	MG/KG	7	25	2.33918129	0.372419132	0.133898491	10	10	9.11048387	1.035972085	0.18252257	2.78	HIGHER
gamma-Chlordane	MG/KG	20	25	0.87719298	0.220241056	0.10749208	3	10	0.13932584	0.036671847	0.022372067	0.17	LOWER
Technical Chlordane	MG/KG						10	10	32.7806452	10.80358851	9.178736355	NA	NA
Aroclor-1254	MG/KG	26	29	47.9616307	8.890733808	3.788174409	10	10	258.990323	36.20494068	13.45368703	4.07	HIGHER
Aroclor-1268	MG/KG	1	1	1.57894737	1.578947368	1.578947368	10	10	3.25483871	1.34904314	1.130916885	0.85	LOWER
Aroclor, Total	MG/KG	26	29	57.793765	9.576210294	4.296950035	10	10	262.245161	37.55402348	15.24353005	3.92	HIGHER
Toxicity Equivalency (PCB) - Mammals	MG/KG	2	2	1.4737E-06	1.47368E-06	1.47368E-06							
HCX	MG/KG	19	22	9.84853801	0.770284302	0.046295249	7	7	2.53949064	0.718001509	0.432641489	0.93	LOWER
2,3,7,8-TCDD	MG/KG	22	24	3.08550186	0.172108292	0.018860843	26	26	0.37520206	0.058752949	0.029795626	0.34	LOWER
Dioxin TEQ - Mammals	MG/KG	24	24	3.08921933	0.172943201	0.023038103	26	26	0.37638908	0.059516283	0.032045719	0.34	LOWER
Mercury	MG/KG	27	39	96	5.670767363	0.962000152	10	10	1.08	0.490088	0.321353177	0.09	LOWER
Mercury (methyl)	MG/KG						10	10	0.00285	0.0008042	0.000556435	NA	NA
Total Organic Carbon	MG/KG	29	29	202000	72320	40563.03442	10	10	103500	64130	57630.20255	0.89	LOWER
Lyman Mill Reach													
Benzo(a)pyrene	MG/KG	16	19	414.141414	49.02705845	17.43177903	5	5	59.5238095	37.22076145	33.09004892	0.76	LOWER
4,4'-DDD	MG/KG	6	24	0.67885117	0.267566384	0.081483431	9	9	0.63936306	0.291957615	0.242955798	1.09	HIGHER
4,4'-DDE	MG/KG	12	24	0.62663185	0.201763833	0.086343334	7	9	0.4677707	0.206613448	0.153732397	1.02	HIGHER
4,4'-DDT	MG/KG	3	23	0.62992126	0.238111064	0.07378282	8	9	0.47619048	0.135611953	0.089944357	0.57	LOWER
alpha-Chlordane	MG/KG	14	24	2.90023202	0.374131131	0.086002085	9	9	1.23899648	0.540836712	0.424519253	1.45	HIGHER
Dieldrin	MG/KG	2	24	0.5511811	0.204171564	0.068071434	7	9	0.12057762	0.067815224	0.064455652	0.33	LOWER
gamma-Chlordane	MG/KG	13	22	2.4361949	0.397318188	0.104202308	4	9	0.69188119	0.207422462	0.048748017	0.52	LOWER
Technical Chlordane	MG/KG						7	7	19.478257	12.20269687	11.5796811	NA	NA
Aroclor-1254	MG/KG	14	24	28.7206266	4.649423619	1.806827407	9	9	20.0274257	6.868238058	4.360463011	1.48	HIGHER
Aroclor-1268	MG/KG	1	1	0.97849462	0.978494624	0.978494624	7	7	3.99732484	1.294413763	0.834874869	1.32	HIGHER
Aroclor, Total	MG/KG	14	21	12.8064516	5.589939642	2.36246634	7	7	21.9014851	8.794253229	5.185650279	1.57	HIGHER
Toxicity Equivalency (PCB) - Mammals	MG/KG	1	1	1.6129E-06	1.6129E-06	1.6129E-06	2	2	0.0005713	0.000457635	0.000443294	283.73	HIGHER
HCX	MG/KG	15	22	1.81570338	0.178235503	0.042187948	4	4	1.03564349	0.511492209	0.295174132	2.87	HIGHER
2,3,7,8-TCDD	MG/KG	23	24	0.09902507	0.030689384	0.012306342	11	11	0.08533584	0.028456139	0.013272579	0.93	LOWER
Dioxin TEQ - Mammals	MG/KG	24	24	0.09986072	0.031319742	0.013661889	11	11	0.08660414	0.028882459	0.013849578	0.92	LOWER
Mercury	MG/KG	22	26	7.84946237	2.344130385	0.67141981	11	12	0.946	0.4027025	0.248228568	0.17	LOWER
Mercury (methyl)	MG/KG						7	7	0.00959	0.002074143	0.000931338	NA	NA
Total Organic Carbon	MG/KG	24	24	229000	66662.91667	37422.19836	9	9	169600	96488.88889	92348.40327	1.45	HIGHER

Prepared By: MJM
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Table 3. Comparison of Pre-Breach and Post-Breach Sediment Data (only samples with TOC data) for Key Analytes in Allendale Pond Reach and Lyman Mill Pond Reach

Centredale Manor Restoration Project Superfund Site

		PRE BREACH							POST BREACH							
PARAMETER	Units	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Ratio of Post-Mean and Pre-Mean	Post-Breach Mean Higher or Lower?
Allendale Reach																	
Benzo(a)pyrene	MG/KG	18	20	4.8	4.9	0.084	5.4	1.6492	7	7			1.17966	7.23658	4.26409	2.59	HIGHER
4,4'-DDD	MG/KG	4	24	0.0038	0.011	0.0037	0.016	0.003314583	10	10			0.00002	0.02083	0.014082	4.25	HIGHER
4,4'-DDE	MG/KG	10	29	0.0038	0.005	0.00038	0.031	0.004901034	10	10			0.00262	0.01904	0.011118	2.27	HIGHER
4,4'-DDT	MG/KG	3	25	0.0038	0.011	0.0049	0.021	0.003544	6	10	0.00084	0.00254	0.00276	0.02996	0.0070555	1.99	HIGHER
alpha-Chlordane	MG/KG	15	25	0.0021	0.0026	0.0012	0.034	0.006202	10	10			0.00237	0.0551	0.021458	3.46	HIGHER
Dieldrin	MG/KG	7	25	0.0038	0.011	0.011	0.047	0.008506	10	10			0.00389	0.11297	0.01972	2.32	HIGHER
gamma-Chlordane	MG/KG	20	25	0.0021	0.0026	0.0024	0.019	0.006914	3	10	0.00084	0.00254	0.00324	0.00744	0.0020545	0.30	LOWER
Technical Chlordane	MG/KG								10	10			0.2814	0.85181	0.564222	NA	NA
Aroclor-1254	MG/KG	26	29	0.04	0.049	0.033	2	0.286224138	10	10			0.17209	3.21148	1.040359	3.63	HIGHER
Aroclor-1268	MG/KG	1	1			0.12	0.12	0.12	10	10			0.03393	0.15642	0.075167	0.63	LOWER
Aroclor, Total	MG/KG	26	29	0.081	0.099	0.033	2.41	0.315793103	10	10			0.27386	3.25184	1.115529	3.53	HIGHER
Toxicity Equivalency (PCB) - Mammals	MG/KG	2	2			1.12E-07	1.12E-07	0.000000112								NA	NA
HCX	MG/KG	19	22	0.00026132	0.0026367	0.00000194	0.364758	0.041544956	7	7			0.01080543	0.1356088	0.042467659	1.02	HIGHER
2,3,7,8-TCDD	MG/KG	22	24	0.0000012	0.00000213	0.0000063	0.0100508	0.003140557	26	26			0.00004892	0.05282845	0.006087558	1.94	HIGHER
Dioxin TEQ - Mammals	MG/KG	24	24			0.00000287	0.0101	0.003178078	26	26			0.00015122	0.05299558	0.006164002	1.94	HIGHER
Mercury	MG/KG	27	39	0.02	0.32	0.02	3.6	0.461282051	10	10			0.00988	1.08	0.490088	1.06	HIGHER
Mercury (methyl)	MG/KG								10	10			0.000196	0.00285	0.0008042	NA	NA
Total Organic Carbon	MG/KG	29	29			1120	202000	72320	46	46			8800	215400	81254.34783	1.12	HIGHER
																NA	NA
Lyman Mill Reach																NA	NA
Benzo(a)pyrene	MG/KG	16	19	0.41	2.5	0.11	3.9	1.269210526	6	6			1.094	6.17711	3.19624	2.52	HIGHER
4,4'-DDD	MG/KG	6	24	0.0037	0.01	0.0014	0.052	0.005310417	10	10			0.00642	0.05019	0.028895	5.44	HIGHER
4,4'-DDE	MG/KG	12	24	0.004	0.0058	0.00031	0.048	0.006312917	8	10	0.006	0.007	0.00496	0.04293	0.022371	3.54	HIGHER
4,4'-DDT	MG/KG	3	23	0.0037	0.027	0.0016	0.0023	0.00303913	9	10	0.00239	0.00239	0.00596	0.032	0.0104915	3.45	HIGHER
alpha-Chlordane	MG/KG	14	24	0.002	0.003	0.00021	0.04	0.006750417	10	10			0.009	0.14075	0.05576	8.26	HIGHER
Dieldrin	MG/KG	2	24	0.0022	0.01	0.0014	0.0086	0.002791667	8	10	0.006	0.007	0.0061	0.01002	0.006346	2.27	HIGHER
gamma-Chlordane	MG/KG	13	22	0.0021	0.003	0.0028	0.021	0.005834091	5	10	0.0014	0.00269	0.014	0.06988	0.022204	3.81	HIGHER
Technical Chlordane	MG/KG								8	8			0.70121	2.21273	1.25137625	NA	NA
Aroclor-1254	MG/KG	14	24	0.039	0.066	0.023	2.2	0.210291667	10	10			0.12451	2.04782	0.76667	3.65	HIGHER
Aroclor-1268	MG/KG	1	1			0.091	0.091	0.091	8	8			0.03699	0.31379	0.12874125	1.41	HIGHER
Aroclor, Total	MG/KG	14	21	0.079	0.13	0.023	1.191	0.164380952	8	8			0.16242	2.237	1.0120775	6.16	HIGHER
Toxicity Equivalency (PCB) - Mammals	MG/KG	1	1			0.00000015	0.00000015	0.00000015	2	2			0.0000345	0.0000649	0.0000497	331.33	HIGHER
HCX	MG/KG	15	22	0.00037783	0.005036	0.000254	0.1665	0.010927317	4	4			0.00374363	0.1176491	0.053564748	4.90	HIGHER
2,3,7,8-TCDD	MG/KG	23	24	0.0000007	0.0000007	0.0000064	0.00798702	0.002447933	11	11			0.00001285	0.00747542	0.002478215	1.01	HIGHER
Dioxin TEQ - Mammals	MG/KG	24	24			8.91E-07	0.00803	0.002480541	11	11			1.3808E-05	0.00758652	0.002515684	1.01	HIGHER
Mercury	MG/KG	22	26	0.02	0.28	0.04	0.73	0.235576923	11	12	0.16	0.16	0.00743	0.946	0.4027025	1.71	HIGHER
Mercury (methyl)	MG/KG								7	7			0.000259	0.00959	0.002074143	NA	NA
Total Organic Carbon	MG/KG	24	24			1010	229000	66662.91667	21	21			1800	169600	88638.09524	1.33	HIGHER

Prepared By: MJM
Checked By: KJA

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Table 4. List of Fish Tissue Samples Considered in this Evaluation
Centredale Manor Restoration Project Superfund Site

EXPOSURE POINT	SPECIES	SAMPLE IDENTIFIER	DATE SAMPLED
ASSAPUMPSET POND	AMERICAN EEL	RAB-AE-5001-0000-01-W	6/26/2001
	AMERICAN EEL	RAB-AE-5002-0000-01-W	6/26/2001
	AMERICAN EEL	RAB-AE-5003-0000-01-W	6/26/2001
	AMERICAN EEL	RAB-AE-5004-0000-01-W	6/27/2001
	AMERICAN EEL	RAB-AE-5005-0000-01-W	6/27/2001
	AMERICAN EEL	RAB-AE-5006-0000-01-W	7/2/2001
GREYSTONE MILL POND	AMERICAN EEL	GMP-AE-5002-0000-01-W	6/22/2001
	AMERICAN EEL	GMP-AE-5003-0000-01-W	6/22/2001
	AMERICAN EEL	GMP-AE-5004-0000-01-W	6/22/2001
	AMERICAN EEL	GMP-AE-5005-0000-01-W	6/22/2001
	AMERICAN EEL	GMP-AE-5006-0000-01-W	6/22/2001
	AMERICAN EEL	GMP-AE-5007-0000-01-W	6/22/2001
	AMERICAN EEL	GMP-AE-5008-0000-01-W	6/22/2001
	AMERICAN EEL	GMP-AE-5009-0000-01-W	6/22/2001
	AMERICAN EEL	GMP-AE-5010-0000-01-W	6/25/2001
ALLENDALE POND	AMERICAN EEL	APC-AE-4001-0000-01-W	6/20/2001
	AMERICAN EEL	APC-AE-4002-0000-01-W	6/20/2001
	AMERICAN EEL	APC-AE-4003-0000-01-W	6/20/2001
	AMERICAN EEL	APC-AE-4004-0000-01-W	6/20/2001
	AMERICAN EEL	APC-AE-4005-0000-01-W	6/20/2001
	AMERICAN EEL	APC-AE-4006-0000-01-W	6/20/2001
	AMERICAN EEL	APC-AE-4007-0000-01-W	6/20/2001
	AMERICAN EEL	APC-AE-4008-0000-01-W	6/20/2001
	AMERICAN EEL	APC-AE-4009-0000-01-W	6/20/2001
	AMERICAN EEL	APC-AE-4010-0000-01-W	6/20/2001
LYMAN MILL POND	AMERICAN EEL	LPX-AE-4001-0000-01-W	6/21/2001
	AMERICAN EEL	LPX-AE-4002-0000-01-W	6/21/2001
	AMERICAN EEL	LPX-AE-4003-0000-01-W	6/21/2001
	AMERICAN EEL	LPX-AE-4004-0000-01-W	6/21/2001
	AMERICAN EEL	LPX-AE-4005-0000-01-W	6/21/2001
	AMERICAN EEL	LPX-AE-4006-0000-01-W	6/21/2001
	AMERICAN EEL	LPX-AE-4007-0000-01-W	6/21/2001
	AMERICAN EEL	LPX-AE-4008-0000-01-W	6/21/2001
	AMERICAN EEL	LPX-AE-4009-0000-01-W	6/21/2001
	AMERICAN EEL	LPX-AE-4010-0000-01-W	6/21/2001
DYERVILLE POND	AMERICAN EEL	DYP-AE-5001-0000-01-W	7/2/2001
	AMERICAN EEL	DYP-AE-5002-0000-01-W	7/2/2001
	AMERICAN EEL	DYP-AE-5003-0000-01-W	7/2/2001
	AMERICAN EEL	GMP-AE-5001-0000-01-W	6/22/2001
ASSAPUMPSET POND	BROWN BULLHEAD	RAB-BB-5001-0000-01-W	6/26/2001
	BROWN BULLHEAD	RAB-BB-5002-0000-01-W	6/26/2001
	BROWN BULLHEAD	RAB-BB-5003-0000-01-W	7/2/2001
GREYSTONE MILL POND	WHITE SUCKER	GMP-WS-5001-0000-01-W	6/22/2001
	WHITE SUCKER	GMP-WS-5002-0000-01-W	6/22/2001
	WHITE SUCKER	GMP-WS-5003-0000-01-W	6/22/2001
	WHITE SUCKER	GMP-WS-5004-0000-01-W	6/22/2001
	WHITE SUCKER	GMP-WS-5005-0000-01-W	6/22/2001
	WHITE SUCKER	GMP-WS-5006-0000-01-W	6/22/2001
	WHITE SUCKER	GMP-WS-5007-0000-01-W	6/22/2001
	WHITE SUCKER	GMP-WS-5008-0000-01-W	6/22/2001
	WHITE SUCKER	GMP-WS-5009-0000-01-W	6/22/2001
	WHITE SUCKER	GMP-WS-5010-0000-01-W	6/22/2001

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Table 4. List of Fish Tissue Samples Considered in this Evaluation
Centredale Manor Restoration Project Superfund Site

EXPOSURE POINT	SPECIES	SAMPLE IDENTIFIER	DATE SAMPLED
ALLENDALE POND	WHITE SUCKER	AP-CC-06	4/10/2001
	WHITE SUCKER	APC-WS-4001-0000-01-W	6/20/2001
	WHITE SUCKER	APC-WS-4002-0000-01-W	6/20/2001
	WHITE SUCKER	APC-WS-4003-0000-01-W	6/20/2001
	WHITE SUCKER	APC-WS-4004-0000-01-W	6/20/2001
	WHITE SUCKER	APC-WS-4005-0000-01-W	6/20/2001
	WHITE SUCKER	APC-WS-4006-0000-01-W	6/20/2001
	WHITE SUCKER	APC-WS-4007-0000-01-W	6/20/2001
	WHITE SUCKER	APC-WS-4008-0000-01-W	6/20/2001
	WHITE SUCKER	APC-WS-4009-0000-01-W	6/20/2001
	WHITE SUCKER	APC-WS-4010-0000-01-W	6/20/2001
	FALL FISH	AP-SC-01, AP-SC-02, AP-SC-03	4/10/2001
	FALL FISH	AP-SC-04, AP-SC-05	4/10/2001
LYMAN MILL POND	WHITE SUCKER	LP-CC-07	4/10/2001
	WHITE SUCKER	LP-CC-08	4/10/2001
	WHITE SUCKER	LPX-WS-4001-0000-01-W	6/21/2001
	WHITE SUCKER	LPX-WS-4002-0000-01-W	6/21/2001
	WHITE SUCKER	LPX-WS-4003-0000-01-W	6/21/2001
	WHITE SUCKER	LPX-WS-4004-0000-01-W	6/21/2001
	WHITE SUCKER	LPX-WS-4005-0000-01-W	6/21/2001
	WHITE SUCKER	LPX-WS-4006-0000-01-W	6/21/2001
	WHITE SUCKER	LPX-WS-4007-0000-01-W	6/21/2001
	WHITE SUCKER	LPX-WS-4008-0000-01-W	6/21/2001
	WHITE SUCKER	LPX-WS-4009-0000-01-W	6/21/2001
	WHITE SUCKER	LPX-WS-4010-0000-01-W	6/21/2001
ASSAPUMPSET POND	LARGEMOUTH BASS FILLET	RAB-LB-5001-0000-01-F	6/26/2001
	LARGEMOUTH BASS FILLET	RAB-LB-5002-0000-01-F	6/26/2001
	LARGEMOUTH BASS FILLET	RAB-LB-5003-0000-01-F	6/27/2001
	LARGEMOUTH BASS FILLET	RAB-LB-5004-0000-01-F	6/27/2001
GREYSTONE MILL POND	LARGEMOUTH BASS FILLET	GMP-LB-5001-0000-01-F	6/22/2001
	LARGEMOUTH BASS FILLET	GMP-LB-5002-0000-01-F	6/22/2001
	LARGEMOUTH BASS FILLET	GMP-LB-5003-0000-01-F	6/25/2001
	LARGEMOUTH BASS FILLET	GMP-LB-5004-0000-01-F	6/25/2001
	LARGEMOUTH BASS FILLET	GMP-LB-5005-0000-01-F	6/25/2001
	LARGEMOUTH BASS FILLET	GMP-LB-5006-0000-01-F	6/25/2001
	LARGEMOUTH BASS FILLET	GMP-LB-5007-0000-01-F	6/25/2001
	LARGEMOUTH BASS FILLET	GMP-LB-5008-0000-01-F	6/25/2001
	LARGEMOUTH BASS FILLET	GMP-LB-5009-0000-01-F	6/25/2001
	LARGEMOUTH BASS FILLET	GMP-LB-5010-0000-01-F	6/25/2001
LYMAN MILL POND	LARGEMOUTH BASS FILLET	LPX-LB-4001-0000-01-F	6/21/2001
	LARGEMOUTH BASS FILLET	LPX-LB-4002-0000-01-F	6/21/2001
	LARGEMOUTH BASS FILLET	LPX-LB-4003-0000-01-F	6/21/2001
	LARGEMOUTH BASS FILLET	LPX-LB-4004-0000-01-F	6/21/2001
	LARGEMOUTH BASS FILLET	LPX-LB-4005-0000-01-F	6/21/2001
	LARGEMOUTH BASS FILLET	LPX-LB-4006-0000-01-F	6/21/2001
	LARGEMOUTH BASS FILLET	LPX-LB-4007-0000-01-F	6/21/2001
	LARGEMOUTH BASS FILLET	LPX-LB-4008-0000-01-F	6/21/2001
	LARGEMOUTH BASS FILLET	LPX-LB-4009-0000-01-F	6/26/2001
	LARGEMOUTH BASS FILLET	LPX-LB-4010-0000-01-F	6/26/2001
MANTON POND	LARGEMOUTH BASS FILLET	MAP-LB-4001-0000-01-F	6/27/2001
	LARGEMOUTH BASS FILLET	MAP-LB-4002-0000-01-F	6/27/2001
	LARGEMOUTH BASS FILLET	MAP-LB-4003-0000-01-F	6/27/2001

Brown Bullhead and Fall Fish used as surrogates for White Sucker

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Table 4. List of Fish Tissue Samples Considered in this Evaluation
Centredale Manor Restoration Project Superfund Site

EXPOSURE POINT	SPECIES	SAMPLE IDENTIFIER	DATE SAMPLED
		Prepared By:	KJA
		Checked By:	MJM

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Table 5. Summary of Lipid Normalized Fish Tissue Concentrations
Centredale Manor Restoration Project Superfund Site

Species	Chemical of Concern	Mean Lipid-Normalized Tissue Concentrations (mg/kg lipid)					
		Assapumpset	Greystone	Allendale	Lyman Mill	Manton	Dyerville
White Sucker	Dioxin TEQ	9.56E-05	2.22E-05	8.77E-03	8.07E-03	Not collected	Not collected
	Aroclor-1254	0.408422159	2.20522529	25.40220095	56.6974666	Not collected	Not collected
	Aroclor-1268	0.408422159	0.58433069	0.485376685	0.50957023	Not collected	Not collected
	Technical chlordane	4.084287046	2.96375409	5.237756535	17.6888276	Not collected	Not collected
	Dieldrin	3.27E-02	4.30E-02	8.66E-02	7.51E-02	Not collected	Not collected
	Methyl mercury	7.75E-02	0.1926	0.14735	0.09271	Not collected	Not collected
	Benzo(a)pyrene	0.184680475	1.17E-02	1.63E-02	7.16E-02	Not collected	Not collected
American Eel	Dioxin TEQ	4.12E-06	4.85E-06	8.50E-04	7.52E-04	Not collected	4.23E-04
	Aroclor-1254	0.223234922	1.65745516	5.461652792	3.76252141	Not collected	3.063248662
	Aroclor-1268	0.097876741	0.8221784	0.11783182	0.04368056	Not collected	7.79E-02
	Technical chlordane	1.04721867	6.88E-03	2.050677619	2.36430165	Not collected	2.569378229
	Dieldrin	1.07E-02	2.42E-02	5.65E-02	4.22E-02	Not collected	0.070646425
	Methyl mercury	8.89E-02	0.08248	0.13361	0.03667	Not collected	0.117
	Benzo(a)pyrene	6.18E-03	1.02E-02	0.005387141	5.44E-03	Not collected	7.79E-03
Largemouth Bass	Dioxin TEQ	2.62E-04	3.22E-05	Not collected	4.10E-03	3.59E-03	Not collected
	Aroclor-1254	nd	5.39900394	Not collected	42.954933	20.89069166	Not collected
	Aroclor-1268	nd	4.43651263	Not collected	2.56381789	7.203060856	Not collected
	Technical chlordane	nd	4.50619443	Not collected	6.65599101	7.219676661	Not collected
	Dieldrin	nd	4.70E-02	Not collected	0.10236775	9.41E-02	Not collected
	Methyl mercury	0.27225	0.3976	Not collected	0.23636	0.148566667	Not collected
	Benzo(a)pyrene	0.108774952	7.53E-02	Not collected	0.12668646	0.090720137	Not collected

Shading indicates the highest mean among the exposure points
Brown Bullhead was collected in place of White Sucker in Assapumpset

Prepared By:	MJM
Checked By:	KJA

Table 6. Summary of Lipid Content in Fish Samples and Organic Carbon Content of Sediments
Centredale Manor Restoration Project Superfund Site

Fish Species	Location	Arithmetic Mean Percent Lipid	
American Eel	Allendale	13.1	%
American Eel	Assapumpset	11.7	%
American Eel	Dyerville	12.1	%
American Eel	Greystone	13.6	%
American Eel	Lyman Mill	18.71	%
Largemouth Bass Fillet	Assapumpset	0.76	%
Largemouth Bass Fillet	Greystone	0.69	%
Largemouth Bass Fillet	Lyman Mill	0.64	%
Largemouth Bass Fillet	Manton	0.76	%
White Sucker	Allendale	6.12	%
White Sucker	Greystone	10.65	%
White Sucker	Lyman Mill	7.39	%
Brown Bullhead	Assapumpset	2.64	%

Location	Arithmetic Mean Percent Organic Carbon	
Allendale	6.26	%
Assapumpset	3.20	%
Greystone	7.36	%
Lyman Mill	7.10	%
Manton	2.70	%
Dyerville	2.26	%

Prepared By:	MJM
Checked By:	KJA

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Table 7. Summary of Normalized Data for Paired Crayfish Tissue and Sediment Samples from Allendale Pond and Lyman Mill Pond
Centredale Manor Restoration Project Superfund Site

ANALYTE (all concetrations are lipid normalized, mg/kg)	CMS-CF-4003-0000-01 7/20/2001	CMS-CF-4006-0000-01 7/20/2001	CMS-CF-4007-0000-01 7/20/2001	Mean Allendale Crayfish	LPX-CF-4001-0000-01 7/20/2001	LPX-CF-4002-0000-01 7/20/2001	LPX-CF-4004-0000-01 7/20/2001	Mean Lyman Crayfish
Dioxin TEQ - Mammals	0.0015	0.0091	0.0099	0.0068	0.0056	0.0014	0.0037	0.0036
Mercury (methyl)	0.0261	0.0144	0.0271	0.0225	0.0215	0.0083	0.0131	0.0143
Technical Chlordane	0.4223	0.6763	0.7060	0.6015	0.9462	1.0742	0.7205	0.9136
beta-BHC	0.0121	0.0131	0.0163	0.0138	0.0129	0.0148	0.0164	0.0147
delta-BHC	0.0121	0.0131	0.0163	0.0138	0.0129	0.0148	0.0164	0.0147
gamma-BHC	0.0121	0.0131	0.0163	0.0138	0.0129	0.0148	0.0164	0.0147
Heptachlor	0.0121	0.0131	0.0163	0.0138	0.0129	0.0086	0.0164	0.0126
Aldrin	0.0121	0.0131	0.0163	0.0138	0.0129	0.0148	0.0164	0.0147
Heptachlor Epoxide	0.0121	0.0131	0.0163	0.0138	0.0129	0.0148	0.0164	0.0147
Endosulfan I	0.0121	0.0131	0.0163	0.0138	0.0129	0.0148	0.0164	0.0147
Dieldrin-Lipid Norm	0.0060	0.0223	0.0082	0.0122	0.0065	0.0074	0.0082	0.0074
4,4'-DDE	0.0901	0.1175	0.1451	0.1176	0.1214	0.1098	0.2100	0.1471
Aroclor-1254	1.1452	3.4749	3.1185	2.5795	3.4724	1.1602	2.5524	2.3950
Aroclor-1268	0.1516	0.2615	0.2378	0.2170	0.2662	0.0984	0.2035	0.1894
Aroclor, Total	1.2971	3.7364	3.3562	2.7966	3.7386	1.2586	2.7555	2.5842

ANALYTE (all concentrations are organic carbon-normalized, mg/kg)	CMS-SD-4003-0000-01 7/12/2001	CMS-SD-4006-0000-01 7/12/2001	CMS-SD-4007-0000-01 7/12/2001	Mean Allendale Sediment	LPX-SD-4001-0000-01 7/12/2001	LPX-SD-4002-0000-01 7/12/2001	LPX-SD-4004-0000-01 7/12/2001	Mean Lyman Mill Sediment
Dioxin TEQ - Mammals	0.0061	0.0609	0.0058	0.0243	0.0459	0.0028	0.0187	0.0224
Mercury (methyl)	0.0007	0.0004	0.0016	0.0009	0.0021	0.0011	0.0004	0.0012
Technical Chlordane	5.4348	9.2567	4.0548	6.2488	6.9911	17.0287	19.4783	14.4994
beta-BHC	0.0117	0.0165	0.0115	0.0132	0.0119	0.0093	0.0118	0.0110
delta-BHC	0.0117	0.0165	0.0115	0.0132	0.0119	0.0093	0.0118	0.0110
gamma-BHC	0.0234	0.0165	0.0115	0.0171	0.0119	0.0093	0.0118	0.0110
Heptachlor	0.0117	0.0165	0.0115	0.0132	0.0119	0.0093	0.0118	0.0110
Aldrin	0.0117	0.0165	0.0115	0.0132	0.0119	0.0093	0.0118	0.0110
Heptachlor Epoxide	0.0117	0.0165	0.0115	0.0132	0.0119	0.0093	0.0118	0.0110
Endosulfan I	0.0117	0.0165	0.0115	0.0132	0.0119	0.0093	0.0118	0.0110
Dieldrin	0.0991	0.0848	0.0561	0.0800	0.0705	0.0651	0.0693	0.0683
4,4'-DDE	0.0475	0.1713	0.1965	0.1385	0.2078	0.1864	0.2508	0.2150
Aroclor-1254	3.1232	8.1772	21.1231	10.8078	8.7127	1.3106	2.7492	4.2575
Aroclor-1268	1.8470	1.7551	1.1159	1.5726	1.6131	0.3991	0.4145	0.8089
Aroclor, Total	4.9702	9.9322	22.2389	12.3805	10.3257	1.7097	3.1637	5.0664

Table 8. Biota Sediment Accumulation Factors for White Sucker, American Eel, and Largemouth Bass at All Exposure Points (based on sediment samples collected through August 2001)
Centredale Manor Restoration Project Superfund Site

Benzo(a)pyrene

Exposure Area	Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Assapumpset	4	5	1.27E+02	4.28E+01	3.14E+03	131.0%	2.44E+01	1.01E-01	2.35E-03	5.95E-03	1.39E-04	NS	NE	7.82E-02	1.83E-03	1.44E-03
Greystone	8	9	4.19E+01	1.99E+01	2.40E+02	78.0%	1.57E+01	6.85E-02	3.45E-03	7.71E-03	3.88E-04	1.07E-02	5.41E-04	NS	NE	1.46E-03
Allendale	45	48	2.04E+02	5.44E+01	2.65E+03	94.6%	3.02E+01	NS	NE	5.22E-03	9.60E-05	1.14E-02	2.09E-04	NS	NE	1.52E-04
Lyman Mill	34	40	4.14E+02	4.66E+01	6.87E+03	178.0%	1.99E+01	7.88E-02	1.69E-03	4.14E-03	8.90E-05	4.40E-02	9.45E-04	NS	NE	9.09E-04
Manton	3	3	1.14E+01	9.39E+00	3.28E+00	19.3%	9.27E+00	8.89E-02	9.48E-03	NS	NE	NS	NE	NS	NE	9.48E-03
Dyerville	3	3	2.30E+02	1.25E+02	9.50E+03	78.1%	9.71E+01	NS	NE	7.77E-03	6.23E-05	NS	NE	NS	NE	6.23E-05

4,4'-DDE

Exposure Area	Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Assapumpset	2	6	3.77E-01	1.57E-01	1.58E-02	80.1%	1.29E-01	5.17E-01	3.29E+00	1.43E-01	9.10E-01	NS	NE	4.26E-01	2.72E+00	2.31E+00
Greystone	4	12	2.62E-01	1.02E-01	6.84E-03	80.8%	7.64E-02	7.40E-01	7.23E+00	2.26E-01	2.20E+00	4.20E-01	4.10E+00	NS	NE	4.51E+00
Allendale	29	58	1.29E+00	2.05E-01	9.07E-02	146.7%	9.55E-02	NS	NE	1.46E-01	7.13E-01	4.05E-01	1.97E+00	NS	NE	1.34E+00
Lyman Mill	20	44	1.01E+00	2.03E-01	5.93E-02	119.9%	1.01E-01	1.34E+00	6.60E+00	2.31E-01	1.14E+00	1.60E+00	7.87E+00	NS	NE	5.20E+00
Manton	0	3	6.17E-01	2.99E-01	8.24E-02	96.1%	2.01E-01	1.59E+00	5.32E+00	NS	NE	NS	NE	NS	NE	5.32E+00
Dyerville	2	3	1.48E+00	6.28E-01	5.66E-01	119.7%	3.14E-01	NS	NE	8.70E-02	1.38E-01	NS	NE	NS	NE	1.38E-01

Aroclor-1254

Exposure Area	Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Assapumpset	3	6	3.77E+00	1.53E+00	1.67E+00	84.3%	1.21E+00	8.83E-01	5.76E-01	1.76E-01	1.15E-01	NS	NE	3.88E-01	2.53E-01	3.14E-01
Greystone	10	12	7.93E+00	3.22E+00	7.35E+00	84.3%	2.39E+00	4.26E+00	1.32E+00	1.48E+00	4.59E-01	2.00E+00	6.23E-01	NS	NE	8.02E-01
Allendale	84	88	2.59E+02	1.59E+01	1.72E+03	260.9%	5.24E+00	NS	NE	2.48E+00	1.56E-01	2.16E+01	1.36E+00	NS	NE	7.58E-01
Lyman Mill	30	46	2.87E+01	5.25E+00	4.81E+01	131.9%	2.30E+00	3.05E+01	5.81E+00	3.54E+00	6.74E-01	5.61E+01	1.07E+01	NS	NE	5.72E+00
Manton	0	3	5.56E+00	2.77E+00	6.43E+00	91.6%	1.93E+00	1.74E+01	6.27E+00	NS	NE	NS	NE	NS	NE	6.27E+00
Dyerville	2	3	1.11E+02	4.68E+01	3.28E+03	122.3%	1.55E+01	NS	NE	3.01E+00	6.43E-02	NS	NE	NS	NE	6.43E-02

Aroclor-1268

Exposure Area	Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Assapumpset	2	2	9.69E-01	5.36E-01	3.75E-01	114.4%	3.15E-01	8.83E-01	1.65E+00	9.39E-02	1.75E-01	NS	NE	3.88E-01	7.24E-01	8.49E-01
Greystone	4	4	2.06E+00	1.69E+00	1.76E-01	24.8%	1.64E+00	3.25E+00	1.93E+00	7.25E-01	4.30E-01	4.91E-01	2.91E-01	NS	NE	8.83E-01
Allendale	11	11	3.25E+00	1.37E+00	6.51E-01	58.9%	1.17E+00	NS	NE	7.99E-02	5.83E-02	4.57E-01	3.34E-01	NS	NE	1.96E-01
Lyman Mill	8	8	4.00E+00	1.25E+00	1.58E+00	100.3%	8.52E-01	1.45E+00	1.15E+00	4.34E-02	3.46E-02	4.86E-01	3.87E-01	NS	NE	5.25E-01
Manton	0	0	NA	NA	NA	NA	NA	4.70E+00	NE	NS	NE	NS	NE	NS	NE	NE
Dyerville	1	1	2.61E+00	2.61E+00		0.0%	2.61E+00	NS	NE	7.77E-02	2.98E-02	NS	NE	NS	NE	2.98E-02

Table 8. Biota Sediment Accumulation Factors for White Sucker, American Eel, and Largemouth Bass at All Exposure Points (based on sediment samples collected through August 2001)
Centredale Manor Restoration Project Superfund Site

Dieldrin

Exposure Area	Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Assapumpset	2	6	3.77E-01	1.25E-01	2.14E-02	116.8%	7.19E-02	7.09E-02	5.66E-01	1.04E-02	8.34E-02	NS	NE	3.11E-02	2.48E-01	2.99E-01
Greystone	4	12	1.04E-01	6.00E-02	1.21E-03	57.8%	5.13E-02	4.33E-02	7.22E-01	2.29E-02	3.81E-01	1.68E-02	2.79E-01	NS	NE	4.61E-01
Allendale	19	53	9.11E+00	5.62E-01	2.46E+00	279.3%	1.46E-01	NS	NE	3.80E-02	6.76E-02	7.79E-02	1.39E-01	NS	NE	1.03E-01
Lyman Mill	12	44	1.98E+00	1.67E-01	1.42E-01	225.9%	6.71E-02	7.63E-02	4.57E-01	4.18E-02	2.51E-01	6.94E-02	4.16E-01	NS	NE	3.74E-01
Manton	0	3	6.17E-01	2.99E-01	8.24E-02	96.1%	2.01E-01	9.07E-02	3.04E-01	NS	NE	NS	NE	NS	NE	3.04E-01
Dyerville	1	3	1.48E+00	7.52E-01	4.69E-01	91.1%	4.91E-01	NS	NE	6.89E-02	9.17E-02	NS	NE	NS	NE	9.17E-02

Technical Chlordane

Exposure Area	Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Assapumpset	2	2	3.55E+00	2.49E+00	2.23E+00	60.0%	2.26E+00	8.83E+00	3.54E+00	1.03E+00	4.14E-01	NS	NE	3.88E+00	1.56E+00	1.84E+00
Greystone	4	4	1.12E+01	7.06E+00	9.56E+00	43.8%	6.60E+00	2.97E+00	4.21E-01	6.16E-03	8.72E-04	2.84E+00	4.02E-01	NS	NE	2.74E-01
Allendale	10	11	3.28E+01	1.08E+01	6.55E+01	74.9%	9.18E+00	NS	NE	1.76E+00	1.63E-01	4.31E+00	3.99E-01	NS	NE	2.81E-01
Lyman Mill	7	7	1.95E+01	1.22E+01	1.93E+01	36.0%	1.16E+01	5.02E+00	4.12E-01	2.28E+00	1.87E-01	1.59E+01	1.31E+00	NS	NE	6.35E-01
Manton	0	0	NA	NA	NA	NA	NA	7.09E+00	NE	NS	NE	NS	NE	NS	NE	NE
Dyerville	0	0	NA	NA	NA	NA	NA	NS	NE	2.52E+00	NE	NS	NE	NS	NE	NE

Mercury (methyl)

Exposure Area	Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Assapumpset	2	2	1.94E-02	1.27E-02	8.97E-05	74.6%	1.08E-02	2.61E-01	2.05E+01	8.23E-02	6.48E+00	NS	NE	6.51E-02	5.13E+00	1.07E+01
Greystone	4	4	7.01E-03	4.36E-03	6.60E-06	58.9%	3.51E-03	3.55E-01	8.15E+01	6.12E-02	1.40E+01	1.84E-01	4.21E+01	NS	NE	4.59E+01
Allendale	10	10	3.68E-02	1.25E-02	1.06E-04	82.1%	9.66E-03	NS	NE	9.82E-02	7.83E+00	1.40E-01	1.12E+01	NS	NE	9.49E+00
Lyman Mill	7	7	1.15E-01	2.34E-02	1.69E-03	175.9%	9.06E-03	2.08E-01	8.89E+00	3.44E-02	1.47E+00	9.04E-02	3.87E+00	NS	NE	4.74E+00
Manton	0	0	NA	NA	NA	NA	NA	1.25E-01	NE	NS	NE	NS	NE	NS	NE	NE
Dyerville	0	0	NA	NA	NA	NA	NA	NS	NE	1.17E-01	NE	NS	NE	NS	NE	NE

Toxicity Equivalency (PCB) - Mammals

Exposure Area	Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Assapumpset	0	0	NA	NA	NA	NA	NA	NA	NE	NA	NE	NS	NE	NA	NE	NE
Greystone	1	1	1.24E-03	1.24E-03			1.24E-03	1.14E-03	9.24E-01	6.16E-03	4.97E+00	2.67E-04	2.15E-01	NS	NE	2.04E+00
Allendale	2	2	1.47E-06	1.47E-06	0.00E+00	0.00E+00	1.47E-06	NS	NE	3.26E-04	2.21E+02	1.23E-03	8.35E+02	NS	NE	5.28E+02
Lyman Mill	3	3	5.71E-04	3.06E-04	8.22E-08	93.8%	6.82E-05	6.00E-04	1.96E+00	1.48E-04	4.85E-01	1.54E-03	5.03E+00	NS	NE	2.49E+00
Manton	0	0	NA	NA	NA	NA	NA	NA	NE	NS	NE	NS	NE	NS	NE	NE
Dyerville	1	1	5.50E-07	5.50E-07		0.00E+00	5.50E-07	NS	NE	1.86E-04	3.38E+02	NS	NE	NS	NE	3.38E+02

Table 8. Biota Sediment Accumulation Factors for White Sucker, American Eel, and Largemouth Bass at All Exposure Points (based on sediment samples collected through August 2001)
Centredale Manor Restoration Project Superfund Site

Dioxin TEQ - Mammals

Exposure Area	Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Assapumpset	5	5	1.16E-03	3.72E-04	2.82E-07	142.9%	1.74E-04	2.24E-04	6.03E-01	3.69E-06	9.92E-03	NS	NE	8.53E-05	2.29E-01	2.81E-01
Greystone	11	11	1.64E-03	5.28E-04	3.17E-07	106.6%	3.63E-04	3.10E-05	5.86E-02	4.32E-06	8.17E-03	1.96E-05	3.70E-02	NS	NE	3.46E-02
Allendale	147	147	3.089219331	0.141020687	0.302256574	389.9%	2.24E-02	NS	NE	6.12E-04	4.34E-03	6.01E-03	4.27E-02	NS	NE	2.35E-02
Lyman Mill	46	46	9.99E-02	2.91E-02	9.44E-04	105.5%	1.39E-02	3.40E-03	1.17E-01	6.44E-04	2.21E-02	7.63E-03	2.62E-01	NS	NE	1.34E-01
Manton	3	3	2.72E-02	2.26E-02	2.83E-05	23.5%	2.22E-02	2.98E-03	1.32E-01	NS	NE	NS	NE	NS	NE	1.32E-01
Dyerville	3	3	9.93E-02	3.59E-02	3.02E-03	153.1%	9.00E-03	NS	NE	4.05E-04	1.13E-02	NS	NE	NS	NE	1.13E-02

NS - not sampled
NE - not evaluated
NA - not analyzed
ArithMean = arithmetic mean
SEDocn = organic carbon-normalized concentration in sediment
LMBln = lipid-normalized
BSAFLMB = biota/sediment accumulation factor for largemouth bass
GeoMean = geometric mean
BSAFAE = biota/sediment accumulation factor for American eel
AEln = lipid-normalized concentration in American eel
WSln = lipid-normalized concentration in white sucker
BSAFWS = biota/sediment accumulation factor for white sucker
BBln = lipid-normalized concentratoin in brown bullhead
BSAFCD = arithmetic mean of BSAFs for species comprising combined diet
PRGcd = Preliminary remediation goal for sediment based on combined diet
mg/kg = milligrams per kilogram

Prepared By:	KJA
Checked By:	MJM

Table 9. Worksheet for Derivation of Biota-Sediment Accumulation Factors (pre-breach, BHHRA, and post-breach data for Allendale and Lyman Mill Pond)

Centredale Manor Restoration Project Superfund Site
North Providence, Rhode Island

Benzo(a)pyrene

Exposure Area		Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Assapumpset	BHHRA	4	5	1.27E+02	4.28E+01	3.14E+03	7.33E+01	2.44E+01	1.01E-01	2.35E-03	5.95E-03	1.39E-04	NS	NE	7.82E-02	1.83E-03	1.44E-03
Greystone	BHHRA	8	9	4.19E+01	1.99E+01	2.40E+02	1.21E+01	1.57E+01	6.85E-02	3.45E-03	7.71E-03	3.88E-04	1.07E-02	5.41E-04	NS	NE	1.46E-03
Allendale	BHHRA	45	48	2.04E+02	5.44E+01	2.65E+03	4.87E+01	3.02E+01	NS		5.22E-03	9.60E-05	1.14E-02	2.09E-04	NS	NE	1.52E-04
Lyman Mill	BHHRA	34	40	4.14E+02	4.66E+01	6.87E+03	1.48E+02	1.99E+01	7.88E-02	1.69E-03	4.14E-03	8.90E-05	4.40E-02	9.45E-04	NS	NE	9.09E-04
Manton	BHHRA	3	3	1.14E+01	9.39E+00	3.28E+00	3.49E-01	9.27E+00	8.89E-02	9.48E-03	NS	NE	NS	NE	NS	NE	9.48E-03
Dyerville	BHHRA	3	3	2.30E+02	1.25E+02	9.50E+03	7.61E+01	9.71E+01	NS		7.77E-03	6.23E-05	NS	NE	NS	NE	6.23E-05
Allendale	Pre-Breach	38	41	2.04E+02	4.85E+01	3.21E+03	6.63E+01	2.31E+01	NS		5.22E-03	1.08E-04	1.14E-02	2.35E-04	NS	NE	1.71E-04
Lyman Mill	Pre-Breach	26	32	4.14E+02	4.90E+01	8.68E+03	1.77E+02	1.74E+01	7.88E-02	1.61E-03	4.14E-03	8.45E-05	4.40E-02	8.98E-04	NS	NE	8.63E-04
Allendale	Post-Breach	7	7	1.08E+02	7.14E+01	8.70E+02	1.22E+01	6.48E+01	NS		5.22E-03	7.32E-05	1.14E-02	1.59E-04	NS	NE	1.16E-04
Lyman Mill	Post-Breach	9	9	5.95E+01	3.72E+01	3.30E+02	8.87E+00	3.31E+01	7.88E-02	2.12E-03	4.14E-03	1.11E-04	4.40E-02	1.18E-03	NS	NE	1.14E-03

4,4'-DDE

Exposure Area		Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Allendale	BHHRA	29	58	1.29E+00	2.05E-01	9.07E-02	146.66%	9.55E-02	NS	NE	1.46E-01	7.13E-01	4.05E-01	1.97E+00	NS	NE	1.34E+00
	Pre-Breach	19	48	1.01E+00	1.86E-01	7.82E-02	150.52%	7.87E-02	NS	NE	1.46E-01	7.88E-01	4.05E-01	2.18E+00	NS	NE	1.48E+00
	Post-Breach	10	10	1.29E+00	2.62E-01	1.35E-01	140.12%	1.67E-01	NS	NE	1.46E-01	5.58E-01	4.05E-01	1.55E+00	NS	NE	1.05E+00
Lyman Mill	BHHRA	20	44	1.01E+00	2.03E-01	5.93E-02	119.89%	1.01E-01	1.34E+00	6.60E+00	2.31E-01	1.14E+00	1.60E+00	7.87E+00	NS	NE	5.20E+00
	Pre-Breach	13	35	1.01E+00	2.02E-01	7.42E-02	135.00%	8.63E-02	1.34E+00	6.65E+00	2.31E-01	1.14E+00	1.60E+00	7.92E+00	NS	NE	5.24E+00
	Post-Breach	8	10	4.68E-01	2.07E-01	2.38E-02	74.68%	1.54E-01	1.34E+00	6.49E+00	2.31E-01	1.12E+00	1.60E+00	7.74E+00	NS	NE	5.11E+00

Aroclor-1254

Exposure Area		Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Assapumpset	BHHRA	3	6	3.77E+00	1.53E+00	1.67E+00	84.27%	1.21E+00	8.83E-01	5.76E-01	1.76E-01	1.15E-01	NS	2.53E-01	3.88E-01	2.53E-01	2.99E-01
Greystone	BHHRA	10	12	7.93E+00	3.22E+00	7.35E+00	84.28%	2.39E+00	4.26E+00	1.32E+00	1.48E+00	4.59E-01	2.00E+00	6.23E-01	NS	NE	8.02E-01
Allendale	BHHRA	84	88	2.59E+02	1.59E+01	1.72E+03	260.85%	5.24E+00	NS		2.48E+00	1.56E-01	2.16E+01	1.36E+00	NS	NE	7.58E-01
Lyman Mill	BHHRA	30	46	2.87E+01	5.25E+00	4.81E+01	131.93%	2.30E+00	3.05E+01	5.81E+00	3.54E+00	6.74E-01	5.61E+01	1.07E+01	NS	NE	5.72E+00
Manton	BHHRA	0	3	5.56E+00	2.77E+00	6.43E+00	91.63%	1.93E+00	1.74E+01	6.27E+00	NS		NS		NS	NE	6.27E+00
Dyerville	BHHRA	2	3	1.11E+02	4.68E+01	3.28E+03	122.26%	1.55E+01	NS		3.01E+00	6.43E-02	NS		NS	NE	6.43E-02
Allendale	Pre-Breach	74	78	4.80E+01	8.89E+00	1.52E+02	138.86%	3.79E+00	NS		2.48E+00	2.79E-01	2.16E+01	2.43E+00	NS	NE	1.36E+00
Lyman Mill	Pre-Breach	19	35	2.87E+01	4.65E+00	4.89E+01	150.35%	1.81E+00	3.05E+01	6.56E+00	3.54E+00	7.61E-01	5.61E+01	1.21E+01	NS	NE	6.47E+00
Allendale	Post-Breach	10	10	2.59E+02	3.62E+01	6.17E+03	216.91%	1.35E+01	NS		2.48E+00	6.85E-02	2.16E+01	5.97E-01	NS	NE	3.33E-01
Lyman Mill	Post-Breach	12	12	2.00E+01	6.87E+00	4.77E+01	100.57%	4.36E+00	3.05E+01	4.44E+00	3.54E+00	5.15E-01	5.61E+01	8.17E+00	NS	NE	4.38E+00

Table 9. Worksheet for Derivation of Biota-Sediment Accumulation Factors (pre-breach, BHHRA, and post-breach data for Allendale and Lyman Mill Pond)

Centredale Manor Restoration Project Superfund Site
North Providence, Rhode Island

Aroclor-1268

Exposure Area		Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Allendale	BHHRA	11	11	3.25E+00	1.37E+00	6.51E-01	58.90%	1.17E+00	NS	NE	7.99E-02	5.83E-02	4.57E-01	3.34E-01	NS	NE	1.96E-01
	Pre-Breach	1	1	1.58E+00	1.58E+00			1.58E+00	NS	NE	7.99E-02	5.06E-02	4.57E-01	2.89E-01	NS	NE	1.70E-01
	Post-Breach	10	10	3.25E+00	1.35E+00	7.18E-01	62.82%	1.13E+00	NS	NE	7.99E-02	5.92E-02	4.57E-01	3.39E-01	NS	NE	1.99E-01
Lyman Mill	BHHRA	8	8	4.00E+00	1.25E+00	1.58E+00	100.26%	8.52E-01	1.45E+00	1.15E+00	4.34E-02	3.46E-02	4.86E-01	3.87E-01	NS	NE	5.25E-01
	Pre-Breach	1	1	9.78E-01	9.78E-01			9.78E-01	1.45E+00	1.48E+00	4.34E-02	4.43E-02	4.86E-01	4.96E-01	NS	NE	6.73E-01
	Post-Breach	8	8	4.00E+00	1.29E+00	1.83E+00	104.58%	8.35E-01	1.45E+00	1.12E+00	4.34E-02	3.35E-02	4.86E-01	3.75E-01	NS	NE	5.09E-01

Dieldrin

Exposure Area		Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Allendale	BHHRA	19	53	9.11E+00	5.62E-01	2.46E+00	279.33%	1.46E-01	NS	NE	3.80E-02	6.76E-02	7.79E-02	1.39E-01	NS	NE	1.03E-01
	Pre-Breach	9	43	2.34E+00	3.72E-01	3.40E-01	156.48%	1.34E-01	NS	NE	3.80E-02	1.02E-01	7.79E-02	2.09E-01	NS	NE	1.56E-01
	Post-Breach	10	10	9.11E+00	1.04E+00	8.06E+00	273.96%	1.83E-01	NS	NE	3.80E-02	3.67E-02	7.79E-02	7.52E-02	NS	NE	5.59E-02
Lyman Mill	BHHRA	12	44	1.98E+00	1.67E-01	1.42E-01	225.87%	6.71E-02	7.63E-02	4.57E-01	4.18E-02	2.51E-01	6.94E-02	4.16E-01	NS	NE	3.74E-01
	Pre-Breach	5	35	1.98E+00	2.04E-01	1.92E-01	214.86%	6.81E-02	7.63E-02	3.74E-01	4.18E-02	2.05E-01	6.94E-02	3.40E-01	NS	NE	3.06E-01
	Post-Breach	8	10	1.21E-01	6.78E-02	5.66E-04	35.07%	6.45E-02	7.63E-02	1.13E+00	4.18E-02	6.17E-01	6.94E-02	1.02E+00	NS	NE	9.22E-01

Technical Chlordane

Exposure Area		Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Allendale	BHHRA	10	11	3.28E+01	1.08E+01	6.55E+01	74.93%	9.18E+00	NS	NE	1.76E+00	1.63E-01	4.31E+00	3.99E-01	NS	NE	2.81E-01
	Pre-Breach	0	1	no toc					NS	NE	1.76E+00	#DIV/0!	4.31E+00	#DIV/0!	NS	NE	#DIV/0!
	Post-Breach	10	10	3.28E+01	1.08E+01	6.55E+01	74.93%	9.18E+00	NS	NE	1.76E+00	1.63E-01	4.31E+00	3.99E-01	NS	NE	2.81E-01
Lyman Mill	BHHRA	7	7	1.95E+01	1.22E+01	1.93E+01	35.99%	1.16E+01	5.02E+00	4.12E-01	2.28E+00	1.87E-01	1.59E+01	1.31E+00	NS	NE	6.35E-01
	Pre-Breach	NA	NA	NA	NA	NA	NA	NA	5.02E+00	NE	2.28E+00	NE	1.59E+01	NE	NS	NE	NE
	Post-Breach	8	8	1.95E+01	1.22E+01	1.93E+01	35.99%	1.16E+01	5.02E+00	4.12E-01	2.28E+00	1.87E-01	1.59E+01	1.31E+00	NS	NE	6.35E-01

Mercury (methyl)

Exposure Area		Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Allendale	BHHRA	10	10	2.85E-03	8.04E-04	6.85E-07	102.89%	5.56E-04	NS	NE	9.82E-02	1.22E+02	1.40E-01	1.74E+02	NS	NE	1.48E+02
	Pre-Breach	NA	NA	NA	NA	NA	NA	NA	NS	NE	9.82E-02	#VALUE!	1.40E-01	#VALUE!	NS	NE	#VALUE!
	Post-Breach	10	10	2.85E-03	8.04E-04	6.85E-07	102.89%	5.56E-04	NS	NE	9.82E-02	1.22E+02	1.40E-01	1.74E+02	NS	NE	1.48E+02
Lyman Mill	BHHRA	7	7	9.59E-03	2.07E-03	1.14E-05	162.74%	9.31E-04	2.08E-01	1.00E+02	3.44E-02	1.66E+01	9.04E-02	4.36E+01	NS	NE	5.34E+01
	Pre-Breach	NA	NA	NA	NA	NA	NA	NA	2.08E-01	NE	3.44E-02	NE	9.04E-02	NE	NS	NE	NE
	Post-Breach	7	7	9.59E-03	2.07E-03	1.14E-05	162.74%	9.31E-04	2.08E-01	1.00E+02	3.44E-02	1.66E+01	9.04E-02	4.36E+01	NS	NE	5.34E+01

Table 9. Worksheet for Derivation of Biota-Sediment Accumulation Factors (pre-breach, BHHRA, and post-breach data for Allendale and Lyman Mill Pond)

Centredale Manor Restoration Project Superfund Site
North Providence, Rhode Island

Toxicity Equivalency (PCB) - Mammals

Exposure Area		Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Assapumpset	BHHRA	0	0	NA	NA	NA	NA	NA	NA		NA		NS		NA	NE	NE
Greystone	BHHRA	1	1	1.24E-03	1.24E-03			1.24E-03	1.14E-03	9.24E-01	6.16E-03	4.97E+00	2.67E-04	2.15E-01	NS	NE	2.04E+00
Allendale	BHHRA	2	2	1.47E-06	1.47E-06	0.00E+00	0.00%	1.47E-06	NS		3.26E-04	2.21E+02	1.23E-03	8.35E+02	NS	NE	5.28E+02
Lyman Mill	BHHRA	3	3	5.71E-04	3.06E-04	8.22E-08	93.83%	6.82E-05	6.00E-04	1.96E+00	1.48E-04	4.85E-01	1.54E-03	5.03E+00	NS	NE	2.49E+00
Manton	BHHRA	0	0	NA	NA	NA	NA	NA	NA		NS		NS		NS	NE	NE
Dyerville	BHHRA	1	1	5.50E-07	5.50E-07		0.00%	5.50E-07	NS		1.86E-04	3.38E+02	NS		NS	NE	3.38E+02
Allendale	Pre-Breach	2	2	1.47E-06	1.47E-06	0.00E+00	0.00%	1.47E-06	NS		3.26E-04	2.21E+02	1.23E-03	8.35E+02	NS	NE	5.28E+02
Lyman Mill	Pre-Breach	1	1	no toc					6.00E-04		1.48E-04		1.54E-03		NS	NE	#DIV/0!
Allendale	Post-Breach	NA	NA	NA	NA	NA	NA	NA	NS		3.26E-04		1.23E-03		NS	NE	#DIV/0!
Lyman Mill	Post-Breach	2	2	5.71E-04	4.58E-04	2.58E-08	35.13%	4.43E-04	6.00E-04	1.31E+00	1.48E-04	3.24E-01	1.54E-03	3.36E+00	NS	NE	1.67E+00

Dioxin TEQ - Mammals

Exposure Area		Frequency of Detection		Maximum Detect SEDocn mg/kg	ArithMean SEDocn mg/kg	Variance SEDocn mg/kg	Coefficient of Variation	GeoMean SEDocn mg/kg	GeoMean LMBln mg/kg	BSAF LMB	GeoMean AEln mg/kg	BSAF AE	GeoMean WSln mg/kg	BSAF WS	GeoMean BBln mg/kg	BSAF BB	ArithMean BSAF CD
Assapumpset	BHHRA	5	5	1.16E-03	3.72E-04	2.82E-07	142.94%	1.74E-04	2.24E-04	6.03E-01	3.69E-06	9.92E-03	NS	2.29E-01	8.53E-05	2.29E-01	2.68E-01
Greystone	BHHRA	11	11	1.64E-03	5.28E-04	3.17E-07	106.58%	3.63E-04	3.10E-05	5.86E-02	4.32E-06	8.17E-03	1.96E-05	3.70E-02	NS		3.46E-02
Allendale	BHHRA	147	147	3.09E+00	1.41E-01	3.02E-01	389.86%	2.24E-02	NS		6.12E-04	4.34E-03	6.01E-03	4.27E-02	NS		2.35E-02
Lyman Mill	BHHRA	46	46	9.99E-02	2.91E-02	9.44E-04	105.48%	1.39E-02	3.40E-03	1.17E-01	6.44E-04	2.21E-02	7.63E-03	2.62E-01	NS		1.34E-01
Manton	BHHRA	3	3	2.72E-02	2.26E-02	2.83E-05	23.55%	2.22E-02	2.98E-03	1.32E-01	NS		NS		NS		1.32E-01
Dyerville	BHHRA	3	3	9.93E-02	3.59E-02	3.02E-03	153.12%	9.00E-03	NS		4.05E-04	1.13E-02	NS		NS		1.13E-02
Allendale	Pre-Breach	142	142	3.09E+00	1.73E-01	3.89E-01	360.80%	2.30E-02	NS		6.12E-04	3.54E-03	6.01E-03	3.48E-02	NS		1.92E-02
Lyman Mill	Pre-Breach	37	37	9.99E-02	3.13E-02	1.12E-03	106.68%	1.37E-02	3.40E-03	1.08E-01	6.44E-04	2.06E-02	7.63E-03	2.44E-01	NS		1.24E-01
Allendale	Post-Breach	26	26	3.76E-01	5.95E-02	5.81E-03	128.09%	3.20E-02	NS		6.12E-04	1.03E-02	6.01E-03	1.01E-01	NS		5.57E-02
Lyman Mill	Post-Breach	11	11	8.66E-02	2.89E-02	7.00E-04	91.61%	1.38E-02	3.40E-03	1.18E-01	6.44E-04	2.23E-02	7.63E-03	2.64E-01	NS		1.35E-01

Prepared By:	KJA
Checked By:	MJM

NS - not sampled
NE - not evaluated
NA - not analyzed
ArithMean = arithmetic mean
SEDocn = organic carbon-normalized concentration in sediment
LMBln = lipid-normalized
BSAFLMB = biota/sediment accumulation factor for largemouth bass
GeoMean = geometric mean
BSAFAE = biota/sediment accumulation factor for American eel
AEln = lipid-normalized concentration in American eel
WSln = lipid-normalized concentration in white sucker
BSAFWS = biota/sediment accumulation factor for white sucker
BBln = lipid-normalized concentratoin in brown bullhead
BSAFCD = arithmetic mean of BSAFs for species comprising combined diet
PRGcd = Preliminary remediation goal for sediment based on combined diet
mg/kg = milligrams per kilogram

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Table 10. Comparison of Site-Specific Biota-Sediment Accumulation Factors (BSAFs) for Dioxin TEQ and Aroclor-1254 to Literature Values
Centredale Manor Restoration Project Superfund Site

SPECIES	DIOXIN (2,3,7,7,8-TCDD) TEQ BSAF	LOCATION	SOURCE	SPECIES	AROCLOR-1254 BSAF	CHEMICAL SPECIES TESTED	LOCATION	SOURCE	NOTES
LITERATURE VALUES FOR RESIDENT SPECIES									
Carp (LAB STUDY)	0.27	Lab	Kuehl, 1987	Species	BSAF				
Brown Trout	0.03	Lake Ontario	USEPA, 1990	Trout, salmon, perch, bass	0.58	Aroclor-1254	Lake Ontario	USEPA, 1990	
Lake Trout	0.07	Lake Ontario	USEPA, 1990	Trout, salmon, perch, bass	1.4	total PCBs	Lake Ontario	USEPA, 1990	
Smallmouth Bass	0.05	Lake Ontario	USEPA, 1990	Trout, salmon, perch, bass	0.77	total PCBs	Lake Ontario	USEPA, 1990	
White Perch	0.2	Lake Ontario	USEPA, 1990	Trout, salmon, perch, bass	0.52	total PCBs	Lake Ontario	USEPA, 1990	
Yellow perch	0.03	Lake Ontario	USEPA, 1990	Trout, salmon, perch, bass	0.86	total PCBs	Lake Ontario	USEPA, 1990	
Resident Fish (carp)	0.081	Passaic River	Parkerton, 1991	Trout, salmon, perch, bass	3.35	total PCBs	Lake Ontario	USEPA, 1990	
Pike	2.94	Lake Vanern	Kjeller et al, 1990	Trout, salmon, perch, bass	1.42	total PCBs	Lake Ontario	USEPA, 1990	
Carp, channel catfish, white catfish, white sucker, brown bullhead, yellow perch	0.86	Multiple Locations	Connecticut DEP, 1992	Trout	1.85	total PCBs	Lake Ontario	USEPA, 1995	
Lake Trout	0.059	Lake Ontario	USEPA, 1995 (1990 recalculation)	3 Marine Species	4.4	total PCBs	Rio de La Plata (marine)	Parkerton et al, 1993	
				Lake Trout, Whitefish	3.4-9.4	pentachloro biphenyls	Siskiwit Lake	Parkerton et al, 1993	
				Lake Trout, Whitefish	9.4	pentachloro biphenyls			
				Flounder, Lobster, crab	1.05-2.08	pentachloro biphenyls	New Bedford Harbor	Parkerton et al, 1993	
				Flounder, Lobster, crab	2.08	pentachloro biphenyls			
				Lake Trout, Whitefish	2.9-20.8	hexachloro biphenyls	Siskiwit Lake	Parkerton et al, 1993	
				Lake Trout, Whitefish	20.8	hexachloro biphenyls			
				Flounder, Lobster, crab	1.29-4.00	hexachloro biphenyls	New Bedford Harbor	Parkerton et al, 1993	
				Flounder, Lobster, crab	4	hexachloro biphenyls			
				Trout	2.7	PCB-105	Lake Ontario	USEPA, 1995	pentachloro biphenyl
				Trout	4.09	PCB-118	Lake Ontario	USEPA, 1995	pentachloro biphenyl
				Trout	4.49	PCB-105	Lake Ontario	USEPA, 1995	pentachloro biphenyl
				Trout	1.72	PCB-118	Lake Ontario	USEPA, 1995	pentachloro biphenyl
				Trout	3.21	PCB-126	Lake Ontario	USEPA, 1995	pentachloro biphenyl
				Trout	4.12	PCB-105	Green Bay, WI	USEPA, 1995	pentachloro biphenyl
				Trout	5.35	PCB-118	Green Bay, WI	USEPA, 1995	pentachloro biphenyl
				Trout	3.97	PCB-156	Lake Ontario	USEPA, 1995	hexachloro biphenyl
				Trout	0.69	PCB-167	Lake Ontario	USEPA, 1995	hexachloro biphenyl
				Trout	16	PCB-167	Green Bay, WI	USEPA, 1995	hexachloro biphenyl
CALCULATED SITE-SPECIFIC VALUES FOR RESIDENT SPECIES FOR CENTREDALE MANOR									
White sucker - Assapumpset Pond (brown bullhead)	0.229			White sucker - Assapumpset Pond (brown bullhead)	0.253				
White sucker- Greystone Mill Pond	0.037			White sucker- Greystone Pond	0.623				
White sucker - Allendale Pond	0.0427			White sucker - Allendale Pond	1.36				
White sucker - Lyman Mill Pond	0.262			White sucker - Lyman Mill Pond	10.7				
Largemouth bass Fillet - Assapumpset Pond	0.603			Largemouth bass Fillet - Assapumpset Pond	0.576				
Largemouth bass - Greystone Mill Pond	0.0586			Largemouth bass - Greystone Pond	1.32				
Largemouth Bass - Allendale Pond	None Collected			Largemouth Bass - Allendale Pond	None Collected				
Largemouth Bass - Lyman Mill Pond	0.117			Largemouth Bass - Lyman Mill Pond	5.81				
Largemouth bass - Manton Pond	0.132			Largemouth bass - Manton Pond	6.27				
LITERATURE VALUES FOR MIGRATORY SPECIES									
Migratory Fish (eel and striped bass)	0.009	Passaic River	Parkerton, 1991						
CALCULATED SITE-SPECIFIC VALUES FOR MIGRATORY SPECIES FOR CENTREDALE MANOR									
American eel - Assapumpset Pond	0.00992			American eel - Assapumpset	0.115				
American eel- Greystone Pond	0.00817			American eel- Greystone	0.459				
American eel - Allendale Pond	0.00434			American eel - Allendale	0.156				
American eel - Lyman Mill Pond	0.0221			American eel - Lyman Mill	0.674				
American eel - Manton Pond	None Collected			American eel - Manton	None Collected				
American eel- Dyerville Pond	0.0113			American eel- Dyerville	0.643				

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Table 11. Evaluation of July 2004 Preliminary Draft BSAFs with Respect to Background for Dioxin TEQ and Aroclor-1254

Centredale Manor Restoration Project Superfund Site

				PRG FOR SPECIES WITH HIGHEST RISK						PRG FOR COMBINED DIET		
	LMB	LMB	LMB	WS/BB	WS/BB	WS/BB	AE	AE	AE	ALL SPECIES	ALL SPECIES	ALL SPECIES
DIOXIN TEQ	BSAF	SED PRG ($ELCR=10^{-4}$) (mg/kg)	SED PRG ($ELCR=10^{-6}$) (mg/kg)	BSAF	SED PRG ($ELCR=10^{-4}$) (mg/kg)	SED PRG ($ELCR=10^{-6}$) (mg/kg)	BSAF	SED PRG ($ELCR=10^{-4}$) (mg/kg)	SED PRG ($ELCR=10^{-6}$) (mg/kg)	MEAN BSAF	SED PRG ($ELCR=10^{-4}$) (mg/kg)	MEAN SED PRG ($ELCR=10^{-6}$) (mg/kg)
Assapumpset	0.60	5.00E-05	5.00E-07	0.23	3.80E-05	3.80E-07	0.010	2.00E-04	2.00E-06		9.60E-05	9.60E-07
Greystone	0.06	1.30E-03	1.30E-05	0.04	1.30E-04	1.30E-06	0.008	4.80E-04	4.80E-06		6.37E-04	6.37E-06
Allendale	NE	NE	NE	0.04	1.70E-04	1.70E-06	0.004	7.90E-04	7.90E-06		4.80E-04	4.80E-06
Lyman	0.12	6.80E-04	6.80E-06	0.26	2.60E-05	2.60E-07	0.022	1.20E-04	1.20E-06		2.75E-04	2.75E-06
Manton	0.13	1.90E-04	1.90E-06	NE	NE	NE	NE	NE	NE		1.90E-04	1.90E-06
Dyerville	NE	NE	NE	NE	NE	NE	0.011	1.20E-04	1.20E-06		1.20E-04	1.20E-06
	MEAN:	**5.55E-04**	**5.55E-06**	**MEAN:**	**9.10E-05**	**9.10E-07**	**MEAN:**	**3.42E-04**	**3.42E-06**	**MEAN:**	**3.00E-04**	**3.00E-06**

	LMB	LMB	LMB	WS/BB	WS/BB	WS/BB	AE	AE	AE	ALL SPECIES	ALL SPECIES	ALL SPECIES
AROCLOR-1254	BSAF	SED PRG ($ELCR=10^{-4}$) (mg/kg)	SED PRG ($ELCR=10^{-6}$) (mg/kg)	BSAF	SED PRG ($ELCR=10^{-4}$) (mg/kg)	SED PRG ($ELCR=10^{-6}$) (mg/kg)	BSAF	SED PRG ($ELCR=10^{-4}$) (mg/kg)	SED PRG ($ELCR=10^{-6}$) (mg/kg)	MEAN BSAF	SED PRG ($ELCR=10^{-4}$) (mg/kg)	MEAN SED PRG ($ELCR=10^{-6}$) (mg/kg)
Assapumpset	0.58	3.90E+00	0.039	0.25	2.60E+00	0.026	0.12	1.30E+00	0.013	0.315	2.60E+00	0.026
Greystone	1.32	4.30E+00	0.043	0.62	6.00E-01	0.006	0.46	6.40E-01	0.0064		1.85E+00	0.018
Allendale	NE	NE	NE	1.36	4.10E-01	0.0041	0.16	1.70E+00	0.017		1.06E+00	0.011
Lyman	5.81	1.00E+00	0.01	10.70	4.90E-02	0.00049	0.67	3.00E-01	0.003		4.50E-01	0.004
Manton	6.27	3.10E-01	0.0031	NE	NE	NE	NE	NE	NE		3.10E-01	0.003
Dyerville	NE	NE	NE	NE	NE	NE	0.06	1.60E+00	0.016		1.60E+00	0.016
	MEAN:	**2.38E+00**	**0.024**	**MEAN:**	**9.15E-01**	**0.009**	**MEAN:**	**1.11E+00**	**0.011**	**MEAN:**	**1.31E+00**	**0.013**

	LMB		LMB	WS/BB		WS/BB	AE		AE	ALL SPECIES		ALL SPECIES
AROCLOR-1254	BSAF		SED PRG (HI=1) (mg/kg)	BSAF		SED PRG (HI=1) (mg/kg)	BSAF		SED PRG (HI=1) (mg/kg)	MEAN BSAF		MEAN SED PRG (HI=1) (mg/kg)
Assapumpset	0.58		0.48	0.25		0.32	0.12		0.16			0.320
Greystone	1.32		0.54	0.62		0.074	0.46		0.079			0.231
Allendale	NE		NE	1.36		0.05	0.16		0.2			0.125
Lyman	5.81		0.13	10.70		0.006	0.67		0.037			0.058
Manton	6.27		0.038	NE		NE	NE		NE			0.038
Dyerville	NE		NE	NE		NE	0.06		0.19			0.190
	MEAN:		**0.297**	**MEAN:**		**0.113**	**MEAN:**		**0.133**	**MEAN:**		**0.160**

Prepared by:	MJM
Checked by:	KJA

LMB = largemouth bass
WS = white sucker
BB = brown bullhead
AE = American eel

P:\W9-GVT\COE-NAE\Battelle\Centredale\Task27-HH PRGs\PRG CalculationsrevJuly8.xls diox1254view

BSAF = biota/sediment accumulation factor
PRG = preliminary remediation goal
ELCR = excess lifetime cancer risk
HI = hazard index

APPENDIX A

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APPENDIX A

SORTED SEDIMENT DATA USED IN THE EVALUATION OF THE IMPACT OF THE 2001 ALLENDALE DAM BREACH ON BSAFS IN ALLENDALE POND AND LYMAN MILL POND

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APPENDIX B

APPENDIX B

EVALUATION OF RAW SEDIMENT DATA (NOT CARBON NORMALIZED)

INTRODUCTION

This appendix documents the comparison and evaluation of raw sediment data (not organic carbon normalized) for pre-breach and post-breach conditions at Allendale pond and Lyman Mill Pond. While this information does provide perspective, it is the organic carbon-normalized sediment data (discussed in Attachment A) that have a direct bearing on the calculation of BSAFs and sediment PRGs. Therefore, the detailed discussion of organic carbon-normalized sediment data is presented in the main body of this technical report (Attachment A) and the discussion of the raw sediment data is presented in this appendix.

Analytical Data for Sediment Samples Used in Calculating Direct Contact Sediment Exposures in the BHHRA (only a subset of these data were used in deriving the July 2004 preliminary draft BSAFs and PRGs)

Table B-1 presents a comparison of the pre-breach, post-breach, and BHHRA sediment data summaries (all data, not only those samples with TOC data) for Allendale Pond. Table B-2 presents a comparison of the pre-breach, post-breach, and BHHRA data summaries (all data, not only those samples with TOC data) for Lyman Mill Pond.

Table B-3 is a summary of the comparisons of RAW (not carbon-normalized) pre-breach, post-breach, and BHHRA data for a select group of analytes for Allendale Pond and separately for Lyman Mill Pond. The information in this table has been used, with other information, to evaluate if the May 2001 breach of the Allendale Dam likely resulted in any substantial changes in sediment quality in Allendale Pond Reach and Lyman Mill Pond Reach. Figures 3, 4, 5, and 6 show in plan view the raw concentrations in pre-breach and post-breach sediment samples (those that were used in the BHHRA or for which data became available after the BHHRA was completed) in Allendale Pond and Lyman Mill Pond for Aroclor-1254, dioxin TEQ, HCX, and mercury respectively.

The following observations can be made based on information presented in Table B-3:

- The mean concentration of dioxin TEQ (the largest cancer risk contributor) is consistent among the three data sets for both Allendale Pond and Lyman Mill Pond. This suggests that the 2001 dam breach did not have a substantial affect on the mean concentrations of dioxin TEQ in the sediments of these two reaches.
- The post-breach mean concentration of Aroclor-1254 (the largest non-cancer risk contributor) in sediments of Allendale Pond (1.04 mg/kg) is roughly 50% lower than the corresponding pre-breach mean (1.57 mg/kg). The post-breach mean concentration of Aroclor-1254 in sediments of Lyman Mill Pond (0.72 mg/kg) is roughly four times the corresponding pre-breach mean (0.17 mg/kg) and approximately 3 times the BHHRA mean (0.27 mg/kg). This information suggests a potential impact of the breach (possibly transport of higher concentration sediments from upstream of the Allendale Dam to Lyman Mill Pond).

However as shown in Figure 3, the Allendale Pond pre-breach mean concentration is affected (elevated) by a group of co-located samples (CMS-606A, CMS-605A, CMS-619A, CMS-616A, and CMS-608A) with higher concentrations (7.3 mg/kg to 27 mg/kg) than is reported for the post-breach data (maximum concentration 3.211 mg/kg). None of the post-breach sediment samples was collected from this area where the highest pre-breach samples were collected. **Therefore, it appears that the lower mean Aroclor-1254 concentration in the post-breach data for Allendale Pond is an artifact of the locations of the post-breach samples (the area of highest concentrations was not sampled in the post-breach sampling events).** If the five samples identified above are not included in the calculation of mean concentrations (so that the area is not represented in either the pre-breach or post-breach data sets) in Allendale Pond, the pre-breach mean (0.789 mg/kg) is actually very similar (somewhat lower than the post-breach mean of 1.04 mg/kg). This would suggest that concentrations in Allendale Pond did not decrease substantially (if at all) as the result of the dam breach.

A review of the Lyman Mill Pond Aroclor-1254 pre-breach and post-breach data indicates that the post-breach concentrations are approximately 50% higher on average than the pre-breach concentrations. As shown in Table B-3 and in Figure B-1, the pre-breach data set contains numerous non-detects while the post-breach data set contains no non-detects. As shown on Figure 3, the pre-breach and post-breach samples in general are not co-located. There are several pre-breach samples that were collected in the narrow channel between Allendale Dam and Lyman Mill Pond and at the shoreline of Lyman Mill Pond, many of which had no Aroclor-1254 detected. The post-breach data set does not include samples in those areas of Lyman Mill Pond reach. Most of the post-breach samples were collected from locations somewhat removed from the shoreline and not in the narrow channel between Allendale Dam and Lyman Mill Pond. It appears that differences in the spatial distribution of pre-breach and post-breach sediment samples in Lyman Mill Pond could be responsible for the apparently higher concentrations of Aroclor-1254 in the post-breach samples. In other words, it not clear that the 2001 dam breach had a substantial impact on sediment quality in Lyman Mill Pond.

- The post-breach mean concentration of HCX (a Site-related constituent, but an insignificant risk contributor) in sediments of Allendale Pond (0.043 mg/kg) is roughly twice the corresponding pre-breach mean (0.022 mg/kg). The post-breach mean concentration of HCX in sediments of Lyman Mill Pond (0.054 mg/kg) is roughly eight times the corresponding pre-breach mean (0.0.0067mg/kg) and approximately four times the BHHRA mean (0.0135 mg/kg). The post-breach HCX data for Lyman Mill Pond consists of only four samples. Higher sediment concentrations in both Allendale Pond and Lyman Mill Pond would not appear to be associated with the 2001 breach of the Allendale Dam. The difference is also probably attributable to spatial distribution of sampling locations.

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- Figure B-2 compares pre-breach and post-breach sediment data and the BHHRA data (dioxin TEQ, Aroclor-1254, Aroclor-1268, HCX, technical chlordane, and mercury) for Allendale Pond and for Lyman Mill Pond. Figure B-3 compares, using a more viewable scale than is used in Figure B-2, the pre-breach and post-breach sediment data and the BHHRA data for HCX and dioxin TEQ.

As shown in Table B-3 and Figure B-2, there is variability in sediment quality data for the Site-related substances (e.g., dioxin TEQ, Arochlor-1254, HCX) and non-Site related substances such as mercury and benzo(a)pyrene. An important question is whether there are consistent trends among Site-related substances that suggest that post-breach sediment concentrations are substantially different from either the pre-breach sediment concentrations or the "BHHRA" sediment concentrations. This question is important because the draft BSAFs that have been calculated have been based on the sediment data that were utilized in the BHHRA and the fish data collected after the breach.

As can be seen in Figures B-2 and B-3, the pre-breach sediment concentrations (mean) in Allendale Pond of Aroclor-1254, Aroclor-1268, HCX, dioxin TEQ, and mercury are all greater then the pre-breach mean concentrations in Lyman Mill Pond. This suggests that the 2001 breach of the dam could have resulted in the transport of more highly contaminated sediments from Allendale Pond to Lyman Mill Pond. If this had occurred, it might be expected that contaminant concentrations in sediments of Lyman Mill Pond might therefore be higher in the post-breach data than in the pre-breach data.

For Lyman Mill Pond, the post-breach concentrations are higher (but in some cases only slightly) than the corresponding pre-breach concentrations for Aroclor-1254 (factor of four), Aroclor-1268 (by a factor of less than 0.5), HCX (by a factor of approximately eight), dioxin TEQ (almost no difference), and mercury (by a factor of approximately two). These differences in Lyman Mill Pond might potentially be explained by transport of more highly contaminated sediments from Allendale Pond to Lyman Mill Pond.

Despite the apparently higher (compared to pre-breach conditions) post-breach sediment concentrations in Lyman Mill Pond for Aroclor-1254, Aroclor-1268, HCX, dioxin TEQ, and mercury, even considering only post-breach data, the mean sediment concentrations of most of those analytes (Aroclor-1268 and HCX are exceptions) remain greater in Allendale Pond than in Lyman Mill Pond.

For Allendale Pond, post-breach sediment concentrations (mean) of technical chlordane, HCX, dioxin TEQ (only slightly), and mercury are higher than the corresponding pre-breach sediment data for Allendale (this is not suggestive of large-scale transport of highly contaminated sediments out of that reach). In Allendale Pond, the post-breach concentrations of Aroclor-1254 and Aroclor-1268 are lower than the corresponding pre-breach concentrations (this is suggestive that sediments contaminated with high concentrations of these two analytes were transported out of Allendale Pond, but it seems unlikely that sediment transport out of Allendale Pond would reduce the Allendale Pond sediment concentrations for the two Aroclors but not for dioxin TEQ, HCX, and mercury. Therefore, it does not appear that sediment transport from Allendale Pond to Lyman Mill

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Pond at the time of the 2001 dam breach would explain the apparent differences in sediment quality in Allendale Pond between pre-breach and post-breach data.

Analytical Data for Sediment Samples Used in Calculating BSAFs

Table B-4 compares pre-breach, post-breach, and BHHRA sediment data (only samples with TOC data) for the same select group of analytes as shown in Table B-3 for Allendale Pond and separately for Lyman Mill Pond. The sediment samples summarized in Table B-4 are the sediment data that would be used, in the derivation of BSAFs, to identify the organic carbon-normalized contaminant sediment concentrations. The data associated with those samples is referred to here as the "BSAF data set". The raw dioxin TEQ and Aroclor-1254 sediment concentrations for the BSAF data set are shown in plan view in Figures B-4 and B-5 respectively. In Table B-4, the data set identified as the BHHRA Data were used previously to develop draft BSAFs and PRGs for sediment (based on consumption of fish). It should be noted that for the 2003 sediment samples from Allendale Pond and Lyman Mill Pond that were analyzed for dioxins and furans, if there is a reported TOC concentration, it has been used in calculating organic carbon normalized sediment data for the purposes of calculating post-breach BSAFs. In addition, there are many 2003 sediment samples that were analyzed for dioxins and furans for which TOC data are not available, but for which there is TOC data at the same sample location, but a slightly different depth interval than the sample analyzed for dioxins and furans. In those cases, the TOC result from the nearest sample depth has been "paired" with each 2003 sediment sample that was analyzed for dioxins and furans in order to establish organic carbon normalized dioxin TEQ concentrations to be used in calculating post-breach BSAFs. Table 1 identifies the dioxin and TOC samples that have been "paired" for this purpose.

As shown in Table B-4 and summarized in Figure B-6 and in Figure B-7, the mean dioxin TEQ concentrations (raw data) in Allendale Pond are 0.0031 mg/kg in the pre-breach data, 0.0061 mg/kg in the post-breach data, and 0.0029 mg/kg in the BHHRA data. In Allendale Pond, the post-breach mean is higher (approximately 2 times) than the pre-breach and BHHRA means. For Lyman Mill Pond, the mean dioxin TEQ concentrations are 0.00245 in the pre-breach data, 0.0025 in the post-breach data, and 0.0023 mg/kg in the BHHRA data. For Lyman Mill Pond, the dioxin TEQ is essentially unchanged among the pre-breach, post-breach, and BHHRA sediment data sets.

Table B-4 presents arithmetic mean concentrations of all available samples with TOC data. There has been no attempt to provide an area-weighted average concentration for each pond (multiple samples collected at different depths within the top 12 inches of sediment have not been averaged). The post-breach Aroclor-1254 sediment concentrations for Allendale Pond (1.04 mg/kg) and Lyman Mill Pond (0.77 mg/kg) are approximately 3.6 times and 3.6 times higher, respectively, than the pre-breach mean concentrations at Allendale Pond (0.29 mg/kg) and Lyman Mill Pond (0.21 mg/kg). For HCX, the post-breach concentrations in Allendale Pond (0.042 mg/kg) and Lyman Mill Pond (0.053 mg/kg) are approximately equal and 4.9 times the corresponding pre-breach mean concentrations of 0.042 mg/kg and 0.0109 mg/kg respectively. The dieldrin post-

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breach mean concentrations in Allendale Pond (0.019 mg/kg) and Lyman Mill Pond (0.0085 mg/kg) are approximately 2.2 times and 2.2 times the corresponding pre-breach mean concentrations of 0.006 mg/kg and 0.0027 mg/kg respectively. For 4,4'-DDE, the post-breach mean concentrations in Allendale Pond (0.011 mg/kg) and Lyman Mill pond (0.022 mg/kg) are approximately 2.2 times and 3.5 times the corresponding Allendale Pond and Lyman Mill Pond mean concentrations of 0.0049 mg/kg and 0.0063 mg/kg. Benzo(a)pyrene post-breach mean concentrations for Allendale Pond (4.26 mg/kg) and Lyman Mill Pond (3.20 mg/kg) are also approximately 2.6 times and 1.7 times the pre-breach concentrations of 1.65 mg/kg and 1.27 mg/kg respectively. Post-breach mercury mean concentrations in sediment of Allendale Pond (0.490 mg/kg) and Lyman Mill Pond (0.402 mg/kg) are approximately equal to and 1.7 times the corresponding pre-breach concentrations of 0.461 mg/kg and 0.235 mg/kg. The overall higher concentrations in the post-breach data are not explained solely by differences in organic carbon content of the sediments. The organic carbon content of the post-breach sediment samples from Allendale Pond (6.41 %) and Lyman Mill Pond (10.38 %) are lower (0.9 times) and 1.6 times the corresponding pre-breach concentrations of 7.2 % and 6.7 %.

The post-breach mean concentration for Allendale Pond of HCX is approximately equal to the BHHRA mean concentration and the post-breach mean concentration of dioxin TEQ in Allendale Pond is approximately 2 times the pre-breach and BHHRA mean concentrations. In Lyman Mill Pond, the post-breach mean concentrations of HCX is higher than the corresponding pre-breach mean, while the post-breach dioxin TEQ mean concentration is consistent with both the pre-breach and BHHRA mean concentrations. In both Allendale Pond and Lyman Mill Pond, the post-breach mean concentrations of benzo(a)pyrene, 4,4'-DDE, dieldrin, Aroclor-1254, and mercury are higher than the corresponding pre-breach and BHHRA mean concentrations.

The following observations are not consistent with a physical model that postulates that the breach of the dam resulted in transport of highly contaminated sediments from Allendale Pond to Lyman Mill Pond:

- There are overall higher sediment concentrations of benzo(a)pyrene, 4,4'-DDE, dieldrin, Aroclor-1254, and mercury in both Allendale Pond and Lyman Mill Pond for the post-breach BSAF data set;
- The post-breach dioxin TEQ mean concentration in Allendale Pond is approximately two times the pre-breach mean concentration;
- The post-breach dioxin TEQ mean concentration in Lyman Mill Pond is consistent with the pre-breach mean concentration.

That sediment flushing concept suggests that post-breach concentrations would be lower or perhaps be equal to pre-breach concentrations in Allendale Pond while post-breach concentrations in Lyman Mill Pond would be expected to be greater than the corresponding pre-breach concentrations. It appears that the observation of generally higher concentrations of contaminants in the post-breach BSAF data set for both Allendale Pond and Lyman Mill Pond is not the direct result of sediment transport from Allendale Pond to Lyman Mill Pond at the time of and shortly after the May 2001 breach.

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If the post-breach data are representative of sediments that affect concentrations in the fish collected in 2001 and therefore were considered as the basis of the BSAFs and PRGs, it would appear that the overall higher post-breach concentrations would result in lower BSAFs (by a factor of approximately 50%) and higher PRGs (by a factor of approximately 2-fold) for dioxin TEQ (except a slight change only in Lyman Mill Pond), Aroclor-1254, benzo(a)pyrene, 4,4'-DDE, and dieldrin for Allendale Pond compared to the calculated values based on data collected through the summer of 2001 (BHHRA data set). The change in BSAFs and PRGs would be somewhat muted (slightly reduced) in Lyman Mill Pond by the higher average post-breach TOC content in that pond (10.4 %) compared to the BHHRA content (7.7 %) as shown in Table B-4. For Lyman Mill Pond, the BSAFs based on post-breach sediment data might be lower by a factor of approximately 33% and the PRGs might be approximately 1.5 times those calculated using the BHHRA sediment data. The result of the higher TOC content is lower organic carbon-normalized sediment concentrations, which would increase the BSAF if the fish tissue concentrations are unchanged.

To provide some perspective on the spatial distribution of pre-breach and post-breach sediment samples that are included in the "BSAF data set", Figure B-6 shows the location of the pre-breach and post-breach samples for which both dioxin TEQ data and TOC data are available. In that figure, the pre-breach samples are represented by solid blue square symbols and the post-breach samples are represented by open green square symbols. The size of the symbols shows the relative concentrations of dioxin TEQ among the samples. As shown in that figure, there is not a large number of pre-breach and post-breach samples that are co-located, so there is some uncertainty with direct comparisons of pre-breach and post-breach data. Also, there are substantially fewer samples in the Allendale Pond "BSAF data set" than there are in the overall sediment data set for Allendale Pond. As a result, the "BSAF data set" does not characterize the spatial distribution of dioxin TEQ sediment concentrations in Allendale Pond as well as the overall sediment data set does (as shown in Figure 4). The contrast between the spatial distribution of dioxin TEQ samples and associated concentrations as shown in the two figures is striking. Upon inspection of the two figures, it appears the concentrations of dioxin TEQ in the Allendale Pond pre-breach "BSAF data set" are lower than in the Allendale Pond "overall data set". In fact, as shown in Tables B-3 and B-4, the dioxin TEQ mean concentration in the pre-breach "BSAF data set" (0.00318 mg/kg) is approximately one half the corresponding pre-breach mean in the "overall data set" (0.00599 mg/kg). This relationship appears to hold also for the other predominant human health risk driver, Aroclor-1254. The mean concentration in the pre-breach "BSAF data set" (0.286 mg/kg) is approximately one fifth the corresponding pre-breach mean in the "overall data set" (1.572 mg/kg). The pre-breach mean concentration of Aroclor-1254 in the "overall data set" is strongly influenced by several samples with the highest Aroclor-1254 concentrations reported to date in Allendale Pond. The pre-breach "BSAF data set" does not contain corresponding samples for that area of elevated concentrations as reported in the "overall data set".

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In summary, the review and evaluation of the pre-breach, post-breach, and BBHRA sediment data (all samples including those without TOC data) leads to the following conclusions:

- There is little indication that the May 2001 breach of the Allendale Dam has affected the magnitude of dioxin TEQ (the predominant cancer risk contributor for the fish consumption pathway) concentrations in the sediments of Allendale Pond and Lyman Mill Pond. **Note: using only samples with TOC analytical data, it appears that Allendale Pond post-breach dioxin TEQ concentrations are roughly twice those in the pre-breach data set, but the Lyman Mill Pond post-breach and pre-breach concentrations are very consistent.**
- There is some limited indication, based on the "overall data set", that the post-breach Aroclor-1254 (the predominant non-cancer risk contributor for the fish consumption pathway) concentrations in sediments are lower (mean is approximately 40% lower) in Allendale Pond and higher in Lyman Mill Pond than the pre-breach concentrations. However, the lower mean concentration in the post-breach data for Allendale Pond appears to be an artifact of the spatial distribution of the post-breach samples, none of which was collected in the area of Allendale Pond that exhibited the highest pre-breach concentrations of Aroclor-1254. The higher mean concentration of Aroclor-1254 in post-breach sediments (0.72 mg/kg) in Lyman Mill Pond compared to the pre-breach mean concentration (0.17 mg/kg) appears to be explained by a much higher frequency of detection (detected in all ten samples) in the post-breach data than in the pre-breach data (19 detections in 35 samples). However, the locations of several of the pre-breach non-detects (such as locations SD-12, SD-13,.SD-14, SD-15, LPX-SD-2049-01) were not sampled in the post-breach sampling activities. Most of the non-detects were reported for samples collected very close to or at the shoreline. It appears that the higher mean concentration in the post-breach data at Lyman Mill may be due, at least in part, to the different spatial distributions of the pre-breach and post-breach sediment samples. The maximum concentrations in the two data sets are almost identical (2.2 mg/kg in the pre-breach data and 2.0 mg/kg in the post-breach data).

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APPENDIX B

EVALUATION OF RAW SEDIMENT DATA (NOT CARBON NORMALIZED)

FIGURES

APPENDIX B

FIGURES

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Figure B-1. Comparison of Pre-Breach and Post-Breach Sediment Concentrations of Aroclor-1254 in Lyman Mill Pond (all data, not limited to samples with TOC data)

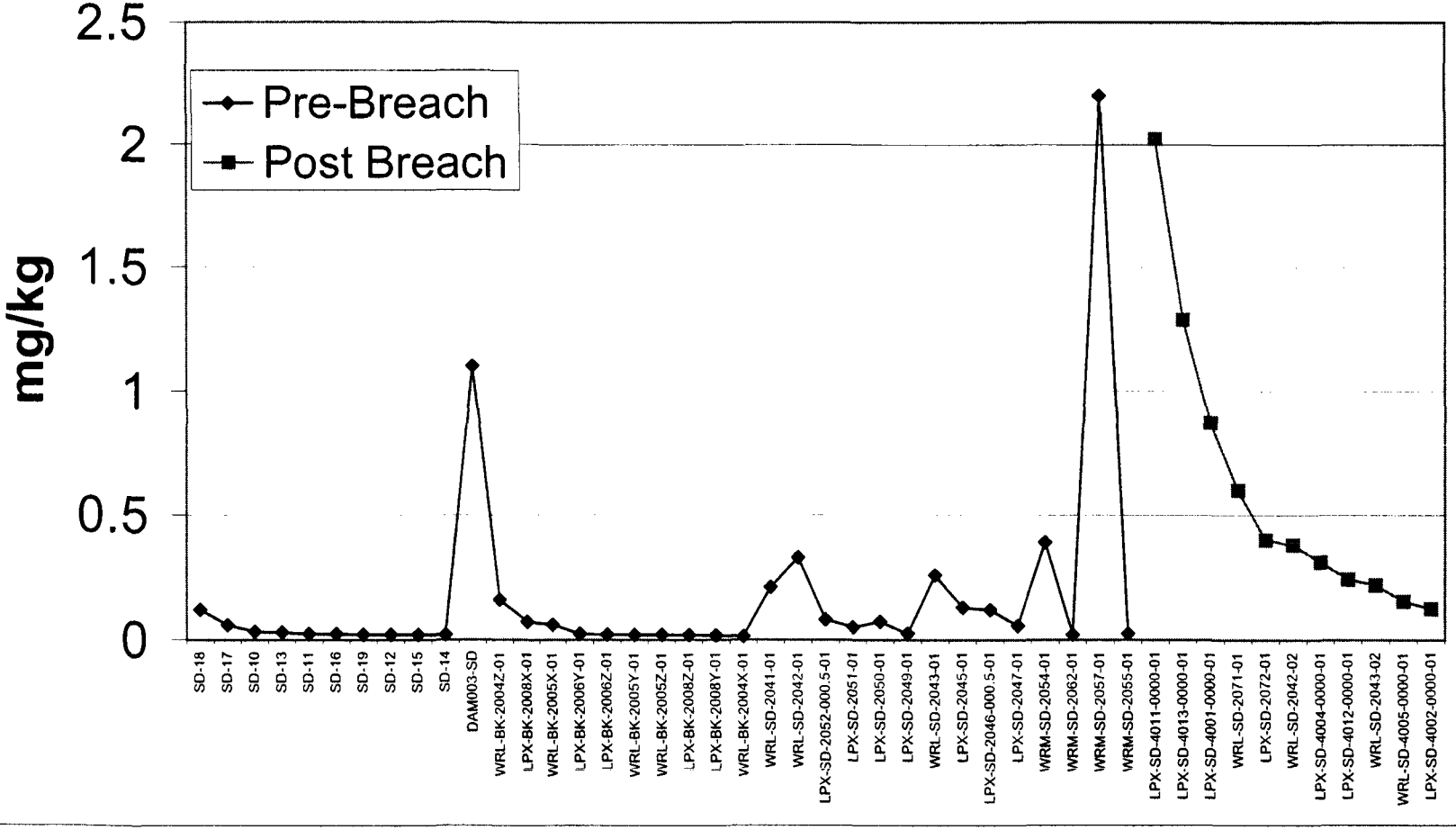

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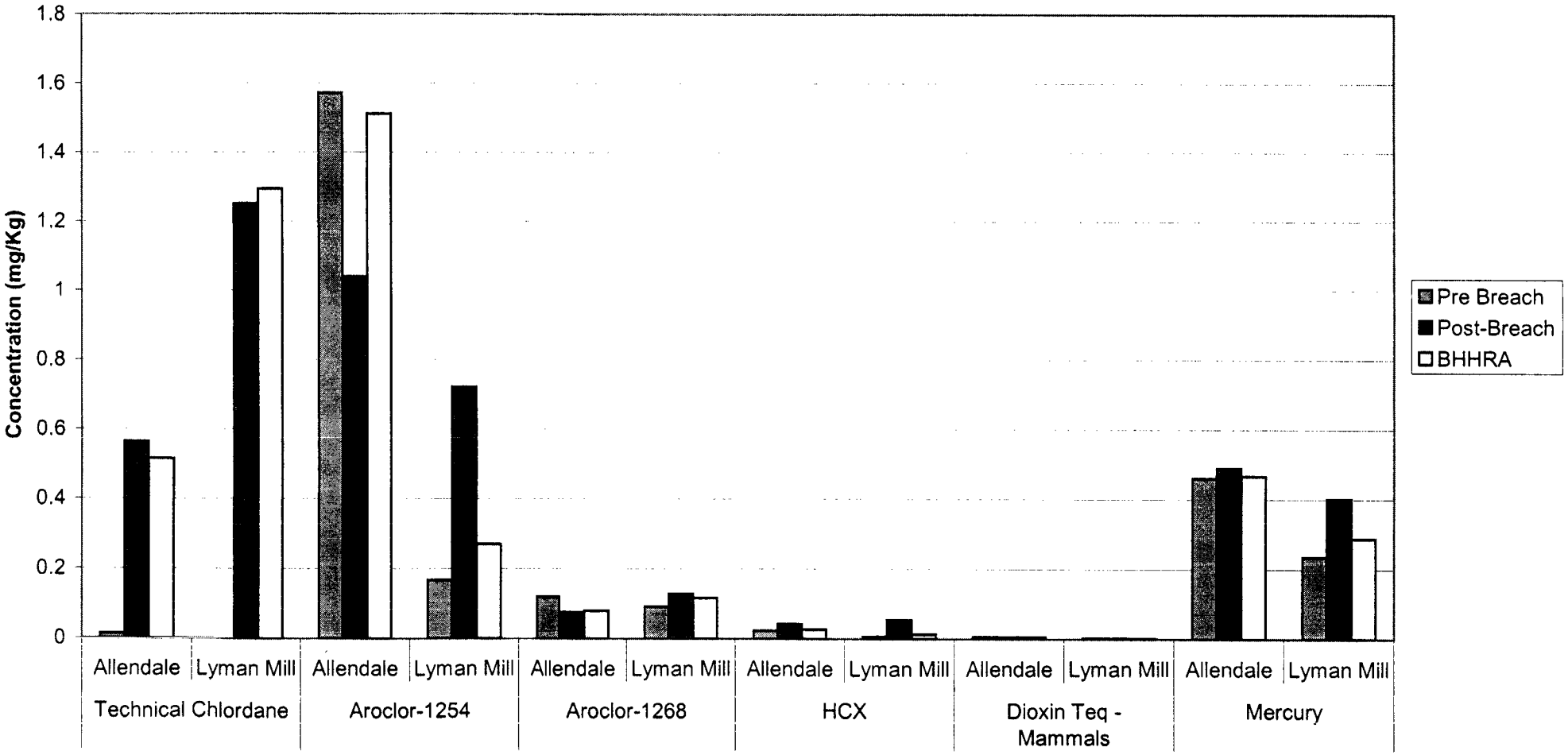
Figure B-2. Comparison of Pre-Breach, Post-Breach, and BHHRA Sediment Data for Key Chemical Parameters in Allendale Pond and Lyman Mill Pond
Centredale Manor Resoration Project Superfund Site
North Providence, Rhode Island



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2002-2003 Data Summaries.xls, CHART

1/30/2005

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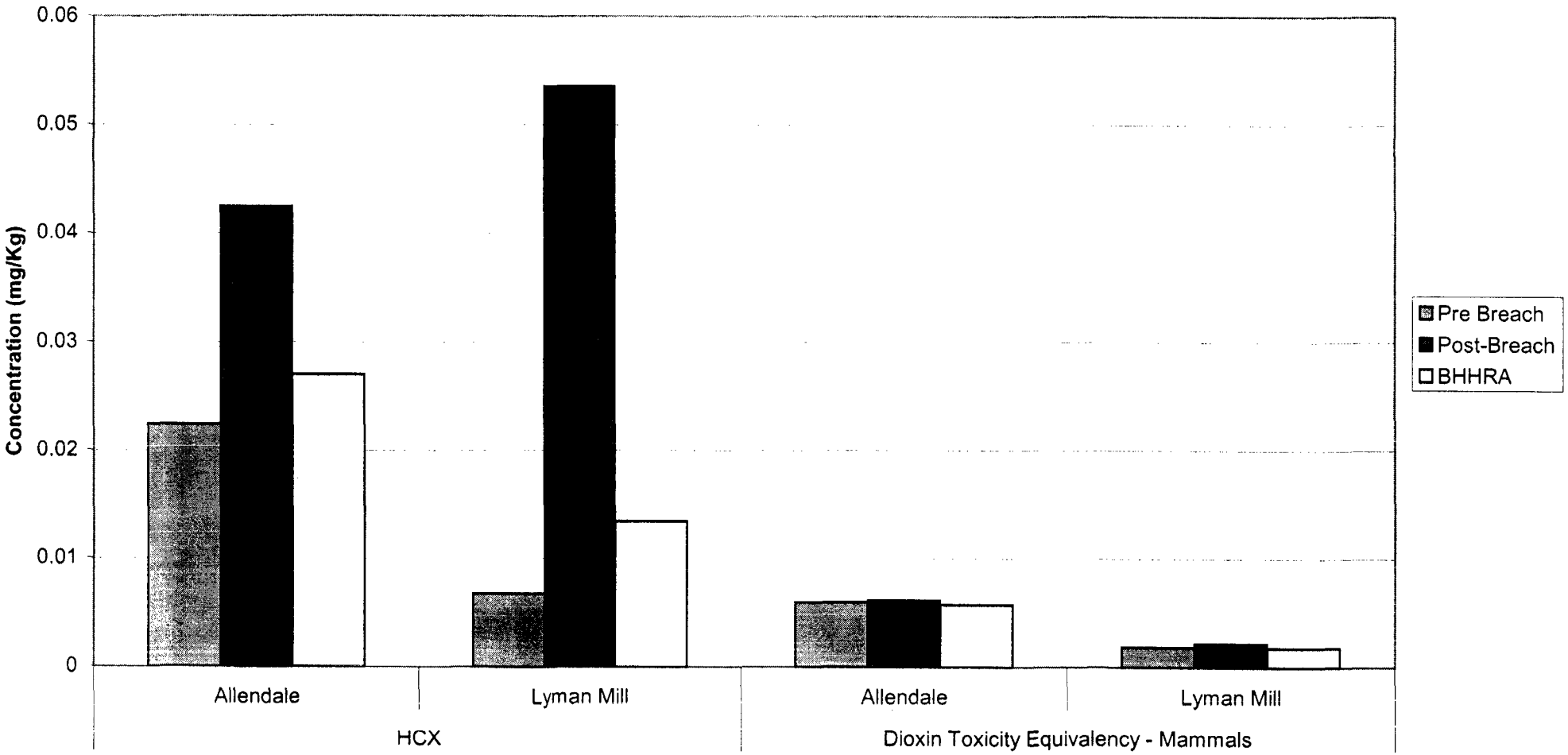
Figure B-3. Comparison of Pre-Breach, Post-Breach, and BHHRA Sediment Data for HCX and Dioxin TEQ
Centredale Manor Restoration Project Superfund Site
North Providence, Rhode island



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2002-2003 Data Summaries.xls, CHART TEQ

1/30/2005

LEGEND

Pre-Breach Constituent Detected
Symbol Size Proportional to Concentration

Post-Breach Constituent Detected
Symbol Size Proportional to Concentration

SCALE IN FEET:

0 300 600

MAGNETIC

Range of Detected Concentrations: 0.891 to 73,000 pg/g

ALLEN DALE POND

ALLENDALE DAM

ASSAPUMPSET BROOK

WOONASQUATUCKET RIVER

LYMAN MILL POND

LYMAN MILL DAM

MACTEC

Figure B-4
TEQ Concentrations in Sediment
(only Samples with Associated Organic Carbon)

Prepared By: KJA
Checked By: MJM
12/20/04

P:/W9-GVT/COE-NAE/BATTELLE/CENTREDALE/TASK25-BCRA/FIGURES/SURFER/PrePostBreach/PrePostBreachSD-TEQ-TOC.SRF

LEGEND

- Pre-Breach Constituent Detected
  Symbol Size Proportional to Concentration
- Pre-Breach Constituent Not Detected
- Post-Breach Constituent Detected
  Symbol Size Proportional to Concentration

SCALE IN FEET:

0 300 600

MAGNETIC

Range of Detected Concentrations: 11 **to** 27,000 pg/Kg

ALLENDALE POND

ALLENDALE DAM

LYMAN MILL POND

LYMAN MILL DAM

ASSAPUMPSET BROOK

WOONASQUATUCKET RIVER

MACTEC

Figure B-5
Aroclor 1254 Concentrations in Sediment
(only Samples with Associated Organic Carbon)

Prepared By: KJA
Checked By: MJM

P:/W9-GVT/COE-NAE/BATTELLE/CENTREDALE/TASK25-BCFWFIGURES/SURFER/PrePostBreach/PrePostBreachSD-PCB1254-T

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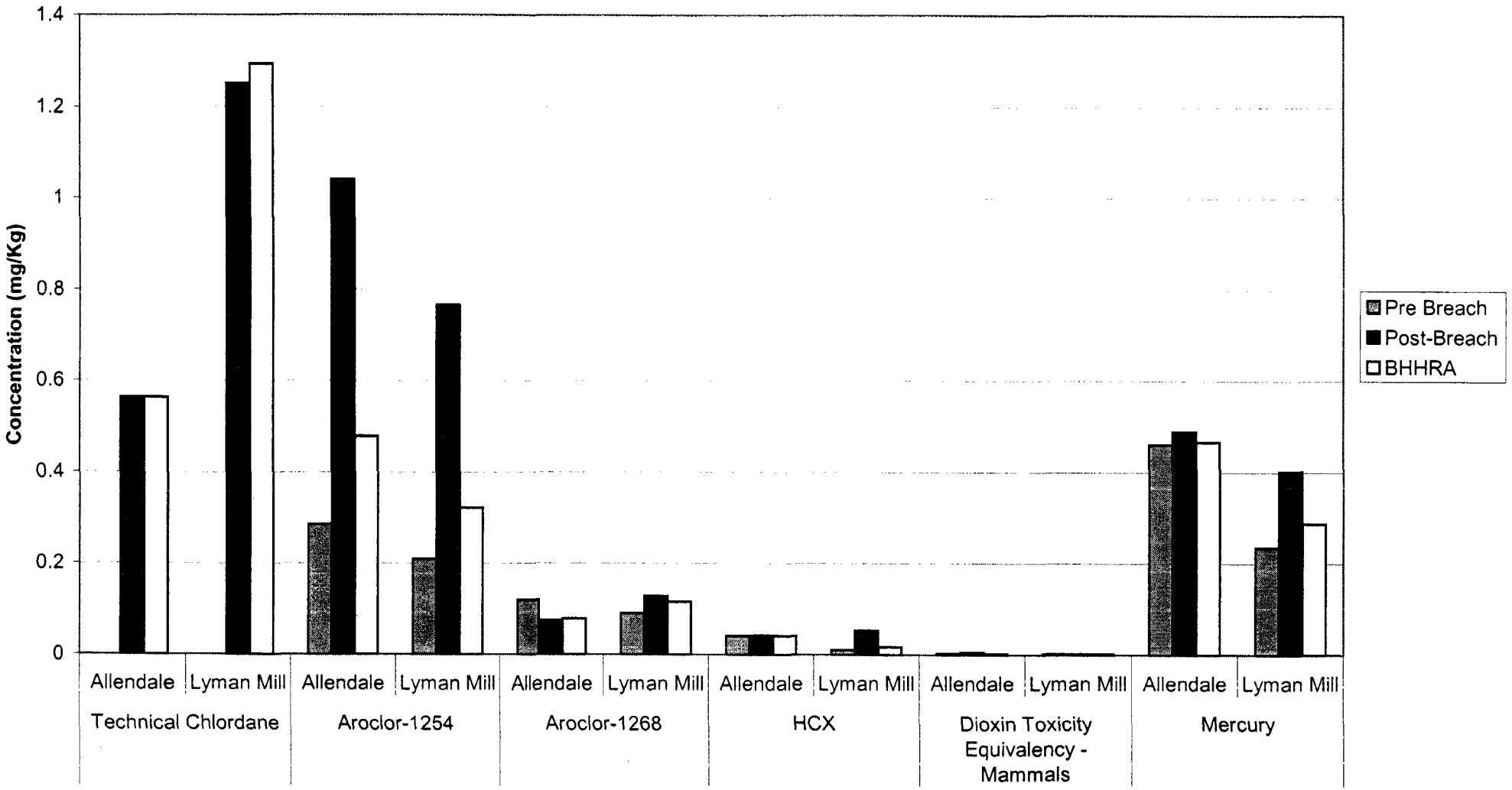
Figure B-6. Comparison of Pre-Breach, Post-Breach, and BHHRA Sediment Data (only samples with TOC data)



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2002-2003 Data Summariesver2.xls, CHARTtocsampsonly

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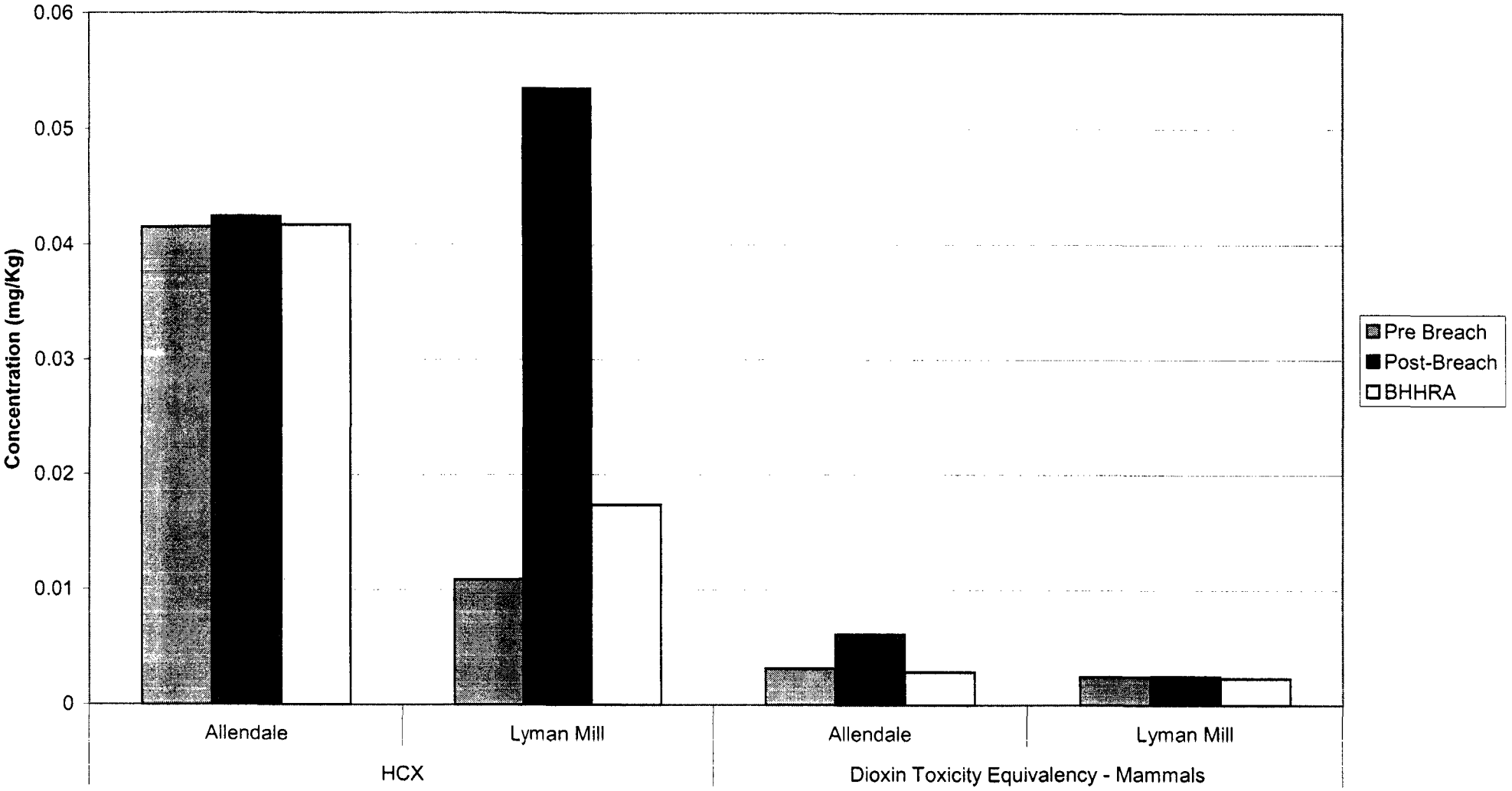
US EPA ARCHIVE DOCUMENT

Figure B-7. Comparison of Pre-Breach, Post-Breach, and BHHRA Sediment Concentrations (only samples with TOC data)



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2002-2003 Data Summariesver2.xls, CHART TEQtocsampsonl

1/30/2005

TABLES

APPENDIX B

TABLES

Table B-1. Comparison of Pre-Breach, Post-Breach and BHHRA Sediment Data for Allendale Pond Reach
Centredale Manor Restoration Project Superfund Site

	PRE BREACH						POST BREACH						BASELINE HUMAN HEALTH RISK ASSESSMENT DATA					
PARAMETER	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean
Volatile Organics (mg/Kg)																					
1,1,1,2-Tetrachloroethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
1,1,1-Trichloroethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
1,1,2,2-Tetrachloroethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
1,1,2-Trichloroethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
1,1-Dichloroethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
1,1-Dichloroethene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
1,1-Dichloropropene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
1,2,3-Trichlorobenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
1,2,3-Trichloropropane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
1,2,4-Trichlorobenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
1,2,4-Trimethylbenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
1,2-Dibromo-3-chloropropane	0	1	0.047	0.047			0.0235								0	1	0.047	0.047			0.0235
1,2-Dibromoethane	0	1	0.047	0.047			0.0235								0	1	0.047	0.047			0.0235
1,2-Dichlorobenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
1,2-Dichloroethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
1,2-Dichloropropane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
1,3,5-Trimethylbenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
1,3-Dichlorobenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
1,3-Dichloropropane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
1,4-Dichlorobenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
2-Chlorotoluene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
4-Chlorotoluene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Benzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Bromobenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Bromochloromethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Bromodichloromethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
Bromoform	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Bromomethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
Carbon Tetrachloride	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
Chlorobenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Chloroethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
Chloroform	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
Chloromethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
cis-1,2-Dichloroethene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
cis-1,3-Dichloropropene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Dibromochloromethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Dibromomethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Dichlorodifluoromethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
Ethylbenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Hexachlorobutadiene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Isopropylbenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
m&p-Xylene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Methylene Chloride	0	1	0.047	0.047			0.0235								0	1	0.047	0.047			0.0235
Naphthalene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
n-Butylbenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
n-Propylbenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
o-Xylene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
p-Isopropyltoluene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
sec-Butylbenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Styrene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
tert-Butylbenzene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Tetrachloroethene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Toluene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Total Xylenes	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
trans-1,2-Dichloroethene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
trans-1,3-Dichloropropene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Trichloroethene	0	1	0.024	0.024			0.012								0	1	0.024	0.024			0.012
Trichlorofluoromethane	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
Vinyl Chloride	0	1	0.024	0.024			0.012								0	1	0.024	0.024			1.20E-02
Semivolatile Organics (mg/Kg)																					
1,1'-Biphenyl	0	15	0.52	8.8			2.149	7	7			0.03103	0.08503	4.78E-02	7	22	0.52	8.8	0.03103	0.08503	1.480445
1,2,4-Trichlorobenzene	0	22	0.48	9.6			1.710682								0	22	0.48	9.6			1.710682
1,2-Dichlorobenzene	0	22	0.48	9.6			1.710682								0	22	0.48	9.6			1.710682
1,3-Dichlorobenzene	0	22	0.48	9.6			1.710682								0	22	0.48	9.6			1.710682

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Table B-1. *Comparison of Pre-Breach, Post-Breach and BHHRA Sediment Data for Allendale Pond Reach*
Centredale Manor Restoration Project Superfund Site

	PRE BREACH						POST BREACH						BASELINE HUMAN HEALTH RISK ASSESSMENT DATA					
PARAMETER	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean
1,4-Dichlorobenzene	0	22	0.48	9.6			1.710682								0	22	0.48	9.6			1.710682
2,2'-oxybis(1-Chloropropane)	0	36	0.48	9.6			1.926944								0	36	0.48	9.6			1.926944
2,4,5-Trichlorophenol	0	37	1	24			4.677027	1	6	2.3	3.7	0.08	0.08	1.296667	1	43	1	24	0.08	0.08	4.205349
2,4,6-Trichlorophenol	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
2,4-Dichlorophenol	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
2,4-Dimethylphenol	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
2,4-Dinitrophenol	0	27	1.2	22			4.807407	0	6	1.7	3.7			1.425	0	33	1.2	22			4.192424
2,4-Dinitrotoluene	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
2,6-Dinitrotoluene	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
2-Chloronaphthalene	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
2-Chlorophenol	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
2-Methylnaphthalene	0	37	0.48	9.6			1.888378	7	7			0.06688	0.13608	0.099253	7	44	0.48	9.6	0.06688	0.13608	1.603745
2-Methylphenol	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
2-Nitroaniline	0	37	1.2	24			4.731081								0	37	1.2	24			4.731081
2-Nitrophenol	0	37	0.48	9.6			1.888378	0	6	0.32	0.72			0.276667	0	43	0.32	9.6			1.663488
3,3'-Dichlorobenzidine	0	37	0.48	9.6			1.942432								0	37	0.48	9.6			1.942432
3+4-Methylphenols	0	1	1	1			0.5								0	1	1	1			0.5
3-Nitroaniline	0	37	1.2	24			4.731081								0	37	1.2	24			4.731081
4,6-Dinitro-2-methylphenol	0	37	1.2	24			4.731081								0	37	1.2	24			4.731081
4-Bromophenyl-phenylether	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
4-Chloro-3-methylphenol	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
4-Chloroaniline	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
4-Chlorophenyl-phenylether	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
4-Methylphenol	0	36	0.48	9.6			1.926944	2	7	0.45	0.72	0.47	0.83	0.4	2	43	0.45	9.6	0.47	0.83	1.678372
4-Nitroaniline	0	37	1.2	24			4.731081								0	37	1.2	24			4.731081
4-Nitrophenol	0	30	1.2	22			4.73	0	6	1.7	3.7			1.425	0	36	1.2	22			4.179167
Acenaphthene	7	38	0.48	9.6	0.17	1.2	1.670263	7	7			0.11384	0.41646	0.287007	14	45	0.48	9.6	0.11384	1.2	1.45509
Acenaphthylene	5	39	0.48	9.6	0.17	0.97	1.812436	7	7			0.08966	0.33061	0.236583	12	46	0.48	9.6	0.08966	0.97	1.572632
Acetophenone	0	15	0.52	8.8			2.149								0	15	0.52	8.8			2.149
Anthracene	19	40	0.48	9.6	0.06	1.8	1.335	7	7			0.36998	0.93332	0.685433	26	47	0.48	9.6	0.06	1.8	1.238256
Atrazine	0	15	0.52	8.8			2.149								0	15	0.52	8.8			2.149
Benzaldehyde	2	15	0.52	8.8	0.15	0.18	1.887667	7	7			0.04089	0.34935	0.163414	9	22	0.52	8.8	0.04089	0.34935	1.339041
Benzo(a)anthracene	36	41	0.52	4.9	0.11	8.4	1.928537	7	7			1.49994	6.00746	3.866746	43	48	0.52	4.9	0.11	8.4	2.211192
Benzo(a)pyrene	38	41	2.1	4.9	0.064	9.2	1.973854	7	7			1.17966	7.23658	4.26409	45	48	2.1	4.9	0.064	9.2	2.307846
Benzo(b)fluoranthene	38	41	0.52	2.1	0.099	9.5	2.323146	7	7			1.58889	8.57607	5.271646	45	48	0.52	2.1	0.099	9.5	2.753136
Benzo(g,h,i)perylene	26	41	0.48	4.9	0.056	7	1.744537	7	7			0.86989	5.91509	3.562457	33	48	0.48	4.9	0.056	7	2.00965
Benzo(k)fluoranthene	39	41	0.52	2.1	0.13	9.2	2.189756	7	7			1.45618	7.78867	4.787274	46	48	0.52	2.1	0.13	9.2	2.568561
Benzoic acid	0	1	5	5			2.5								0	1	5	5			2.5
Benzyl Alcohol	0	1	1	1			0.5								0	1	1	1			0.5
Bis(2-Chloroethoxy)methane	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
Bis(2-Chloroethyl)ether	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
bis-(2-chloroisopropyl)ether	0	1	1	1			0.5								0	1	1	1			0.5
bis(2-Ethylhexyl)phthalate	15	40	0.52	13	0.16	12	2.3135	7	7			0.9	6.4	2.028571	22	47	0.52	13	0.16	12	2.271064
Butylbenzylphthalate	6	38	0.48	9.6	0.094	0.51	1.755763	7	7			0.087	0.37	0.246714	13	45	0.48	9.6	0.087	0.51	1.521022
Caprolactam	0	15	0.52	8.8			2.149								0	15	0.52	8.8			2.149
Carbazole	12	38	0.48	9.6	0.077	1.8	1.643579	7	7			0.11	1.6	0.84	19	45	0.48	9.6	0.077	1.8	1.518578
Chrysene	40	41	2.1	2.1	0.072	11	2.509805	7	7			2.08132	9.13577	5.683069	47	48	2.1	2.1	0.072	11	2.972573
Dibenzo(a,h)anthracene	19	40	0.48	9.6	0.077	2.6	1.501175	7	7			0.19626	1.39446	0.850949	26	47	0.48	9.6	0.077	2.6	1.404333
Dibenzofuran	2	37	0.48	9.6	0.12	0.64	1.830541	7	7			0.1185	0.25503	0.206314	9	44	0.48	9.6	0.1185	0.64	1.572141
Diethylphthalate	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
Dimethylphthalate	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
Di-n-Butylphthalate	2	37	0.48	9.6	0.064	0.61	1.845919	5	6	0.45	0.45	0.071	0.15	0.119167	7	43	0.45	9.6	0.064	0.61	1.604977
Di-n-octylphthalate	0	38	0.48	9.6			1.932105	3	6	0.45	0.6	0.072	0.16	0.192833	3	44	0.45	9.6	0.072	0.16	1.694932
Fluoranthene	40	41	2.1	2.1	0.064	20	4.310341	7	7			5.09793	16.43555	10.28515	47	48	2.1	2.1	0.064	20	5.181667
Fluorene	9	38	0.48	9.6	0.2	0.93	1.636053	7	7			0.21494	0.46577	0.378101	16	45	0.48	9.6	0.2	0.93	1.440371
Hexachlorobenzene	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
Hexachlorobutadiene	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
Hexachlorocyclopentadiene	0	37	0.48	9.6			1.942432								0	37	0.48	9.6			1.942432
Hexachloroethane	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
Indeno(1,2,3-cd)pyrene	36	41	0.52	4.9	0.069	6.8	1.591439	7	7			0.83042	6.51613	3.862043	43	48	0.52	4.9	0.069	6.8	1.922569
Isophorone	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
Naphthalene	1	38	0.48	9.6	0.11	0.11	1.841579	7	7			0.09897	0.18126	0.130723	8	45	0.48	9.6	0.09897	0.18126	1.575446
Nitrobenzene	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
N-Nitroso-di-n-propylamine	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378
N-Nitroso-diphenylamine	0	37	0.48	9.6			1.888378								0	37	0.48	9.6			1.888378

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Table B-1. Comparison of Pre-Breach, Post-Breach and BHHRA Sediment Data for Allendale Pond Reach
Centredale Manor Restoration Project Superfund Site

	PRE BREACH							POST BREACH						BASELINE HUMAN HEALTH RISK ASSESSMENT DATA						
PARAMETER	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean
Pentachlorophenol	1	38	1.2	24	18	18	5.080263	0	6	1.7	3.7			1.425	1	44	1.2	24	18	18	4.581818
Phenanthrene	34	40	0.52	8.4	0.13	12	2.53975	7	7			2.42987	7.31577	4.944739	41	47	0.52	8.4	0.13	12	2.89794
Phenol	0	37	0.48	9.6			1.888378	0	6	0.32	0.72			0.276667	0	43	0.32	9.6			1.663488
Pyrene	39	41	2.1	4.1	0.09	16	3.759512	7	7			3.95464	12.72081	8.182091	46	48	2.1	4.1	0.09	16	4.404472
Pesticides (mg/Kg)																					
4,4'-DDD	8	42	0.0037	0.011	0.0037	0.023	0.004104	10	10			0.00002	0.02083	0.014082	18	52	0.0037	0.011	0.00002	0.023	0.006023
4,4'-DDE	19	48	0.0037	0.0096	0.00038	0.2	0.017053	10	10			0.00262	0.01904	0.011118	29	58	0.0037	0.0096	0.00038	0.2	0.016029
4,4'-DDT	10	44	0.0038	0.011	0.0049	0.021	0.004355	6	10	0.00084	0.00254	0.00276	0.02996	0.007056	16	54	0.00084	0.011	0.00276	0.02996	0.004855
Aldrin	0	43	0	0.0055			0.001362	0	10	0.00084	0.00254			0.000775	0	52	0.00084	0.0055			0.001275
alpha-BHC	0	43	0	0.0055			0.001362	0	10	0.00084	0.00254			0.000775	0	52	0.00084	0.0055			0.001275
alpha-Chlordane	26	44	0.0019	0.0049	0.0012	0.062	0.008931	10	10			0.00237	0.0551	0.021458	36	54	0.0019	0.0049	0.0012	0.062	0.011251
beta-BHC	1	40	0	0.0053	0.0026	0.0026	0.001376	0	10	0.00084	0.00254			0.000775	1	49	0.00084	0.0053	0.0026	0.0026	0.001282
delta-BHC	1	44	0	0.0055	0.0024	0.0024	0.001385	0	10	0.00084	0.00254			0.000775	1	53	0.00084	0.0055	0.0024	0.0024	0.001296
Dieldrin	9	43	0.0038	0.011	0.0063	0.047	0.006535	10	10			0.00389	0.11297	0.01972	19	53	0.0038	0.011	0.00389	0.11297	0.009023
Endosulfan I	0	43	0	0.0055			0.001362	0	10	0.00084	0.00254			0.000775	0	52	0.00084	0.0055			0.001275
Endosulfan II	16	45	0	0.011	0.0041	0.44	0.044494	0	10	0.00084	0.00254			0.000775	16	54	0.00084	0.011	0.0041	0.44	0.037222
Endosulfan Sulfate	1	41	0	0.0096	0.0018	0.0018	0.002522	3	10	0.00084	0.00254	0.00677	0.00902	0.00292	4	50	0.00084	0.0096	0.0018	0.00902	0.002652
Endrin	4	43	0	0.011	0.0057	0.028	0.00366	0	10	0.00084	0.00254			0.000775	4	52	0.00084	0.011	0.0057	0.028	0.003176
Endrin Aldehyde	4	43	0	0.0096	0.00077	0.011	0.002759	0	10	0.00084	0.00254			0.000775	4	52	0.00084	0.0096	0.00077	0.011	0.00243
Endrin Ketone	4	43	0.0037	0.011	0.015	0.034	0.004543	1	10	0.00084	0.00254	0.00129	0.00129	0.000839	5	53	0.00084	0.011	0.00129	0.034	0.003844
gamma-BHC	0	43	0	0.0055			0.001362	2	10	0.00129	0.00254	0.0003	0.00129	0.000827	2	52	0.00129	0.0055	0.0003	0.00129	0.001285
gamma-Chlordane	32	45	0	0.0049	0.0024	0.074	0.01115	3	10	0.00084	0.00254	0.00324	0.00744	0.002055	35	54	0.00084	0.0049	0.0024	0.074	0.009672
Heptachlor	1	43	0	0.0055	0.0044	0.0044	0.001419	3	10	0.00084	0.00254	0.00053	0.00288	0.001186	4	52	0.00084	0.0055	0.00053	0.0044	0.001401
Heptachlor Epoxide	1	41	0	0.0053	0.0038	0.0038	0.001398	0	10	0.00084	0.00254			0.000775	1	50	0.00084	0.0053	0.0038	0.0038	0.001301
Methoxychlor	9	47	0	0.049	0.0035	0.035	0.012768	0	10	0.00084	0.00254			0.000775	9	56	0.00084	0.049	0.0035	0.035	0.010854
Technical Chlordane	0	2	0	0.053			0.01325	10	10			0.2814	0.85181	0.564222	10	11	0.053	0.053	0.2814	0.85181	0.515338
Toxaphene	0	43	0	0.55			0.132442	0	10	0.02099	0.06345			0.019359	0	52	0.02099	0.55			0.113242
Aroclor-1016	0	71	0	7.6			0.198908	0	10	0.0105	0.03172			0.009679	0	80	0.0105	7.6			0.177741
Aroclor-1221	0	71	0	7.6			0.205859	0	10	0.0105	0.03172			0.009679	0	80	0.0105	7.6			0.18391
Aroclor-1232	0	71	0	7.6			0.259451	0	10	0.0105	0.03172			0.009679	0	80	0.0105	7.6			0.231472
Aroclor-1242	1	72	0	7.6	0.19	0.19	0.212674	0	10	0.0105	0.03172			0.009679	1	81	0.0105	7.6	0.19	0.19	0.190238
Aroclor-1248	6	71	0	13	0.016	0.14	0.284775	0	10	0.0105	0.03172			0.009679	6	80	0.0105	13	0.016	0.14	0.253947
Aroclor-1254	74	78	0.038	0.049	0.011	27	1.571929	10	10			0.17209	3.21148	1.040359	84	88	0.038	0.049	0.011	27	1.511524
Aroclor-1260	2	71	0	7.6	0.03	0.27	0.222486	0	10	0.0105	0.03172			0.009679	2	80	0.0105	7.6	0.03	0.27	0.198666
Aroclor-1262	0	1	0	0			0														
Aroclor-1268	1	1			0.12	0.12	0.12	10	10			0.03393	0.15642	0.075167	11	11			0.03393	0.15642	0.079243
Aroclor, Total	74	78	0.077	0.099	0.011	27	1.585994	10	10			0.27386	3.25184	1.115529	84	88	0.077	0.099	0.011	27	1.532532
PCB Congeners (mg/Kg)																					
3,3',4,4'-Tetrachlorobiphenyl (77)	2	2			0.00112	0.00112	0.00112								2	2			0.00112	0.00112	0.00112
3,3',4,4',5-Pentachlorobiphenyl (126)	0	1	0	0			0														
Toxicity Equivalency (PCB) - Mammals	2	2			1.12E-07	1.12E-07	1.12E-07								2	2			1.12E-07	1.12E-07	1.12E-07
Toxicity Equivalency (PCB) - Birds	2	2			0.000056	0.000056	0.000056								2	2			0.000056	0.000056	0.000056
Toxicity Equivalency (PCB) - Fish	2	2			1.12E-07	1.12E-07	1.12E-07								2	2			1.12E-07	1.12E-07	1.12E-07
Herbicides (mg/Kg)																					
2,4,5-TP (Silvex)	0	1	0.063	0.063			0.0315								0	1	0.063	0.063			0.0315
2,4-D	0	1	0.25	0.25			0.125								0	1	0.25	0.25			0.125
2,4,5-T	0	1	0.063	0.063			0.0315								0	1	0.063	0.063			0.0315
2,4-DB	0	1	0.25	0.25			0.125								0	1	0.25	0.25			0.125
Dalapon	0	1	0.13	0.13			0.065								0	1	0.13	0.13			0.065
Dicamba	0	1	0.13	0.13			0.065								0	1	0.13	0.13			0.065
Dichlorprop	0	1	0.25	0.25			0.125								0	1	0.25	0.25			0.125
Dinoseb	0	1	0.038	0.038			0.019								0	1	0.038	0.038			0.019
MCPA	0	1	25	25			12.5								0	1	25	25			12.5
MCPP	0	1	25	25			12.5								0	1	25	25			12.5
HCX	35	41	0	0.002637	1.47E-06	0.364758	0.02245	7	7			0.010805	0.135609	0.042468	42	45	0.000261	0.002637	1.47E-06	0.364758	0.02706
Dioxin/Furans (mg/Kg)																					
2,3,7,8-TCDD	137	140	5.1E-07	2.13E-06	8.8E-07	0.073	0.005963	26	26			4.89E-05	0.052828	0.006088	146	149	5.1E-07	2.13E-06	8.8E-07	0.073	0.005722
1,2,3,7,8-PeCDD	44	54	5E-07	4.2E-06	4.1E-07	0.000187	1.67E-05	25	26	9.3E-07	9.3E-07	1.51E-06	0.000042	1.25E-05	50	61	5E-07	4.2E-06	4.1E-07	0.000187	1.53E-05
1,2,3,4,7,8-HxCDD	48	55	2E-07	3.8E-06	5E-07	8.45E-05	1.61E-05	20	26	1.36E-06	1.81E-05	1.67E-06	4.93E-05	1.65E-05	55	62	2E-07	3.8E-06	5E-07	8.45E-05	1.52E-05
1,2,3,6,7,8-HxCDD	51	54	6.7E-07	2.64E-06	6.1E-07	0.000212	4.49E-05	25	26	6.88E-06	6.88E-06	3.22E-06	0.000125	5.46E-05	58	61	6.7E-07	2.64E-06	6.1E-07	0.000212	4.34E-05
1,2,3,7,8,9-HxCDD	52	55	4.7E-07	2.21E-06	9E-07	0.000202	4.37E-05	23	26	6.91E-06	2.74E-05	4.88E-06	0.000159	5.59E-05	59	62	4.7E-07	2.21E-06	9E-07	0.000202	4.2E-05
1,2,3,4,6,7,8-HpCDD	50	55	0.000004	0.000117	9.8E-06	0.00327	0.000795	26	26			6.58E-05	0.003141	0.001151	57	62	0.000004	0.000117	9.8E-06	0.00327	0.000781
OCDD	51	55	4.88E-05	0.000747	3.29E-05	0.01594	0.004554	26	26			0.00049	0.021472	0.00808	58	62	4.88E-05	0.000747	3.29E-05	0.01594	0.004584
2,3,7,8-TCDF	52	55	1.17E-06	3.1E-06	4.41E-07	0.000184	3.24E-05	26	26			4.96E-06	0.000239	5.61E-05	59	62	1.17E-06	3.1E-06	4.41E-07	0.000184	3.02E-05
1,2,3,7,8-PeCDF	45	51	1E-07	1.76E-06	5.57E-07	5.85E-05	1.07E-05	24	26	9.9E-07	4.57E-06	1.24E-06	8.34E-05	1.36E-05	50	58	1E-07	4.57E-06	5.57E-07	5.85E-05	9.65E-06

US EPA ARCHIVE DOCUMENT

Table B-1. Comparison of Pre-Breach, Post-Breach and BHHRA Sediment Data for Allendale Pond Reach
Centredale Manor Restoration Project Superfund Site

	PRE BREACH							POST BREACH							BASELINE HUMAN HEALTH RISK ASSESSMENT DATA						
PARAMETER	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean
2,3,4,7,8-PeCDF	49	55	1.76E-06	0.000003	5.7E-07	0.000111	1.91E-05	22	26	1.82E-06	1.58E-05	2.39E-06	9.45E-05	2.3E-05	56	62	1.76E-06	0.000003	5.7E-07	0.000111	1.75E-05
1,2,3,4,7,8-HxCDF	48	52	6E-07	2.4E-06	6E-07	7.36E-05	2.59E-05	25	26	4.79E-06	4.79E-06	4.7E-06	0.000284	6.22E-05	55	59	6E-07	2.4E-06	6E-07	7.36E-05	2.47E-05
1,2,3,6,7,8-HxCDF	51	54	9.8E-07	1.7E-06	3.3E-07	0.000068	2.05E-05	25	26	4.51E-06	4.51E-06	3.69E-06	0.000244	5.55E-05	58	61	9.8E-07	1.7E-06	3.3E-07	0.000068	1.96E-05
2,3,4,6,7,8-HxCDF	48	54	4E-07	2.3E-06	6.6E-07	6.01E-05	2.05E-05	20	26	4.3E-06	2.84E-05	2.25E-06	9.17E-05	2.37E-05	55	61	4E-07	2.3E-06	6.6E-07	6.01E-05	1.91E-05
1,2,3,7,8,9-HxCDF	27	46	2E-07	3.8E-06	3.66E-07	4.63E-05	5.41E-06	7	26	2.9E-07	5.46E-05	1.1E-07	9.93E-06	2.24E-06	27	53	2E-07	1.24E-05	3.66E-07	4.63E-05	4.91E-06
1,2,3,4,6,7,8-HpCDF	50	52	3.8E-06	8.13E-06	0.000006	0.000684	0.000219	26	26			3.61E-05	0.002914	0.000636	57	59	3.8E-06	8.13E-06	0.000006	0.000684	0.000214
1,2,3,4,7,8,9-HpCDF	46	54	3E-07	7.45E-06	5.3E-07	5.88E-05	1.34E-05	22	26	5.69E-06	2.29E-05	1.2E-06	0.000101	2.52E-05	53	61	3E-07	7.45E-06	5.3E-07	5.88E-05	1.29E-05
OCDF	46	52	2.4E-06	0.000582	7.1E-06	0.001158	0.000323	25	26	9.19E-05	9.19E-05	3.1E-05	0.002403	0.000731	53	59	2.4E-06	0.000582	7.1E-06	0.001158	0.000332
Total TCDD	43	45	5.1E-07	4.2E-06	3.4E-06	0.0455	0.004069	7	7			0.000328	0.004718	0.00189	50	52	5.1E-07	4.2E-06	3.4E-06	0.0455	0.003775
Total PeCDD	43	45	3.66E-06	4.55E-06	1.4E-06	0.00102	0.000124	7	7			6.69E-06	2.28E-05	1.54E-05	50	52	3.66E-06	4.55E-06	1.4E-06	0.00102	0.000109
Total HxCDD	41	45	7.7E-06	2.39E-05	8.6E-06	0.00165	0.000355	7	7			4.38E-05	0.000353	0.000195	48	52	7.7E-06	2.39E-05	8.6E-06	0.00165	0.000333
Total HpCDD	44	45	8.4E-06	8.4E-06	1.95E-05	0.00563	0.001479	7	7			0.000201	0.002424	0.001273	51	52	8.4E-06	8.4E-06	1.95E-05	0.00563	0.001451
Total TCDF	44	45	1.33E-05	1.33E-05	6.1E-06	0.0034	0.000611	7	7			1.41E-05	0.000111	4.77E-05	51	52	1.33E-05	1.33E-05	6.1E-06	0.0034	0.000535
Total PeCDF	43	45	1.55E-05	1.87E-05	8.8E-06	0.00318	0.000491	7	7			9.59E-05	0.00027	0.00019	50	52	1.55E-05	1.87E-05	8.8E-06	0.00318	0.00045
Total HxCDF	45	45			1.36E-05	0.00125	0.000458	7	7			9.95E-05	0.000258	0.000208	52	52			1.36E-05	0.00125	0.000424
Total HpCDF	45	45			5.4E-06	0.00134	0.000481	7	7			0.00013	0.000705	0.000398	52	52			5.4E-06	0.00134	0.000469
PCDD/Fs	51	55	2.86E-05	0.000394	0.000057	0.0683	0.011729								51	55	2.86E-05	0.000394	0.000057	0.0683	0.011729
Dioxin Toxicity Equivalency (TEQ)								7	7			0.000337	0.00476	0.001927	7	7			0.000337	0.00476	0.001927
Dioxin TEQ - Mammals	140	140			1.17E-06	0.073	0.005986	26	26			0.000151	0.052996	0.006164	149	149			1.17E-06	0.073	0.005745
Dioxin TEQ - Birds	141	141			1.17E-06	0.073	0.005954	7	7			0.000344	0.00477	0.001932	150	150			1.17E-06	0.073	0.005718
Dioxin TEQ - Fish	141	141			1.17E-06	0.073	0.00594	7	7			0.000336	0.00475	0.001918	150	150			1.17E-06	0.073	0.005704
Inorganics (mg/Kg)																					
Aluminum	41	41			1640	19100	9409.268	10	10			5759	22168	12617.1	51	51			1640	22168	10038.25
Antimony	19	41	0.45	11	1.1	13.7	2.803659	5	10	0.0566	0.315	0.199	0.522	0.21428	24	51	0.0566	11	0.199	13.7	2.295937
Arsenic	38	41	0.69	10.6	1	18	6.11122	10	10			1.4	11.2	4.702	48	51	0.69	10.6	1	18	5.834902
Barium	38	41	15.7	41.5	12.4	320	133.8561	10	10			39.5	292	153.16	48	51	15.7	41.5	12.4	320	137.6412
Beryllium	32	40	0.13	0.55	0.23	4.2	1.359625	10	10			0.441	4.12	1.8627	42	50	0.13	0.55	0.23	4.2	1.46024
Cadmium	21	39	0.06	3	0.17	5.2	1.074359	9	10	0.16	0.16	0.368	4.93	1.7599	30	49	0.06	3	0.17	5.2	1.214265
Calcium	40	41	447	447	383	7620	2118.183								40	41	447	447	383	7620	2118.183
Chromium	41	41			8.5	536	144.161	10	10			74.5	186	131.49	51	51			8.5	536	141.6765
Cobalt	38	41	3.7	7.2	1.5	23.4	6.769512	10	10			2.69	16.5	8.644	48	51	3.7	7.2	1.5	23.4	7.137059
Copper	41	41			9.1	419	128.9585	10	10			11.6	171	78.93	51	51			9.1	419	119.149
Iron	41	41			5560	52400	17560.98	10	10			10358	30051	19768.4	51	51			5560	52400	17993.8
Lead	41	41			22.7	1090	342.4195	10	10			191	477	272.4	51	51			22.7	1090	328.6902
Magnesium	41	41			497	4820	2068.78								41	41			497	4820	2068.78
Manganese	41	41			104	1340	336.7805	10	10			180	1966	813.3	51	51			104	1966	430.2157
Mercury	27	39	0.02	0.32	0.02	3.6	0.461282	10	10			0.00988	1.08	0.490088	37	49	0.02	0.32	0.00988	3.6	0.467161
Mercury (methyl)								10	10			0.000196	0.00285	0.000804	10	10			0.000196	0.00285	0.000804
Molybdenum	1	1			8.2	8.2	8.2	10	10			1.24	29.6	13.705	11	11			1.24	29.6	13.20455
Nickel	39	41	9.7	14.6	4.8	92.5	26.15976	10	10			0.883	94.6	28.9593	49	51	9.7	14.6	0.883	94.6	26.70869
Potassium	40	40			341	2130	776.4								40	40			341	2130	776.4
Selenium	11	39	0.61	10.6	0.58	3.8	1.237308	2	10	0.245	0.597	0.806	0.986	0.38245	13	49	0.245	10.6	0.58	3.8	1.062847
Silver	27	41	0.35	5	0.47	14.6	3.20622	10	10			0.359	2.44	1.0921	37	51	0.35	5	0.359	14.6	2.791686
Sodium	25	40	19.9	311	34.4	845	187.6388								25	40	19.9	311	34.4	845	187.6388
Thallium	4	39	0.35	627	0.47	6.8	9.057692	10	10			0.168	0.541	0.3423	14	49	0.35	627	0.168	6.8	7.279041
Vanadium	41	41			5.1	89.3	35.28537	10	10			17.4	56.4	40.04	51	51			5.1	89.3	36.21765
Zinc	40	41	29.2	29.2	61.2	1550	306.4366	10	10			91.1	2088	547.81	50	51	29.2	29.2	61.2	2088	353.7647
Cyanide	1	1			2.4	2.4	2.4								1	1			2.4	2.4	2.4
AVS/SEM (umol/g))																					
Cadmium	14	18	0.00101	0.00215	0.00376	0.04149	0.012306	5	6	0.00142	0.00142	0.00463	0.0439	0.01849	19	24	0.00101	0.00215	0.00376	0.0439	0.013852
Copper	19	19			0.21942	5.61336	1.839552	6	6			0.0338	1.75	0.874133	25	25			0.0338	5.61336	1.607851
Lead	19	19			0.06919	3.23622	1.325831	6	6			0.017	3.29	1.5465	25	25			0.017	3.29	1.378792
Mercury	3	19	0.00003	0.00017	0.00005	0.0022	0.000171	6	6			1.76E-05	0.000315	9.59E-05	9	25	0.00003	0.00017	1.76E-05	0.0022	0.000153
Nickel	19	19			0.08334	2.92605	1.069377	6	6			0.015	1.6	0.607583	25	25			0.015	2.92605	0.958546
Zinc	19	19			0.25048	22.36	5.104742	4	6	0.0411	1.01	8.43	25	11.52593	23	25	0.0411	1.01	0.25048	25	6.645826
Simultaneously Extracted Metal	19	19			1.451245	28.642	9.351159	6	6			0.08706	30.1725	14.57263	25	25			0.08706	30.1725	10.60431
Acid Volatile Sulfide	15	19	0.04436	0.12164	0.15919	29.58	6.61883	6	6			0.048	44.8	11.99133	21	25	0.04436	0.12164	0.048	44.8	7.908231
SEM/AVS	19	19			0.15	253	33.61632	6	6			0.67	5.1	1.943333	25	25			0.15	253	26.0148
Wet Chemistry																					
Total Organic Carbon **(mg/Kg)**	29	29			1120	202000	72320								29	29			1120	202000	72320
Total Organic Carbon **(%)**								46	46			0.88	21.54	8.125435	10	10			1.24	10.35	6.413
% Water **(%)**								10	10			38	330	140.2	10	10			38	330	140.2
Solids, Percent **(%)**								7	7			23.8	77	49.42857	7	7			23.8	77	49.42857

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Table B-2. Comparison of Pre-Breach, Post-Breach and BHHRA Sediment Data for Lyman Mill Pond Reach
Centredale Manor Restoration Project Superfund Site

	PRE BREACH						POST BREACH						BASELINE HUMAN HEALTH RISK ASSESSMENT DATA					
PARAMETER	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean
Semivolatile Organics (mg/Kg)																					
1,1'-Biphenyl	0	4	0.4	0.99			0.385	4	6	5.6	6.9	0.03545	0.05587	1.07185	3	9	0.4	6.9	0.03545	0.05587	0.88054556
1,2,4-Trichlorobenzene	0	27	0.36	4.9			0.97814815								0	27	0.36	4.9			0.97814815
1,2-Dichlorobenzene	0	27	0.36	4.9			0.97814815								0	27	0.36	4.9			0.97814815
1,3-Dichlorobenzene	0	27	0.36	4.9			0.97814815								0	27	0.36	4.9			0.97814815
1,4-Dichlorobenzene	0	27	0.36	4.9			0.97814815								0	27	0.36	4.9			0.97814815
2,2'-oxybis(1-Chloropropane)	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
2,4,5-Trichlorophenol	0	31	0.91	12			2.25709677	0	3	2.6	17			5.6	0	34	0.91	17			2.55205882
2,4,6-Trichlorophenol	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
2,4-Dichlorophenol	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
2,4-Dimethylphenol	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
2,4-Dinitrophenol	0	19	0.98	12			2.03894737	0	3	2.6	17			5.6	0	22	0.98	17			2.52454545
2,4-Dinitrotoluene	1	31	0.36	4.9	1.2	1.2	0.92435484	0	2	5.6	6.9			3.125	1	33	0.36	6.9	1.2	1.2	1.05772727
2,6-Dinitrotoluene	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
2-Chloronaphthalene	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
2-Chlorophenol	1	31	0.36	4.9	1.8	1.8	0.94370968	0	2	5.6	6.9			3.125	1	33	0.36	6.9	1.8	1.8	1.07590909
2-Methylnaphthalene	1	31	0.36	4.9	0.1	0.1	0.88887097	4	6	5.6	6.9	0.06558	0.09848	1.09655667	4	36	0.36	6.9	0.06558	0.1	0.9460875
2-Methylphenol	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
2-Nitroaniline	0	31	0.91	12			2.25709677	0	2	14	17			7.75	0	33	0.91	17			2.59
2-Nitrophenol	0	31	0.36	4.9			0.9016129	0	3	0.5	6.9			2.16666667	0	34	0.36	6.9			1.01323529
3,3'-Dichlorobenzidine	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
3-Nitroaniline	0	31	0.91	12			2.25709677	0	2	14	17			7.75	0	33	0.91	17			2.59
4,6-Dinitro-2-methylphenol	0	31	0.91	12			2.25709677	0	2	14	17			7.75	0	33	0.91	17			2.59
4-Bromophenyl-phenylether	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
4-Chloro-3-methylphenol	1	31	0.36	4.9	2.2	2.2	0.9566129	0	2	5.6	6.9			3.125	1	33	0.36	6.9	2.2	2.2	1.0880303
4-Chloroaniline	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
4-Chlorophenyl-phenylether	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
4-Methylphenol	0	31	0.36	4.9			0.9016129	0	3	0.5	6.9			2.16666667	0	34	0.36	6.9			1.01323529
4-Nitroaniline	0	31	0.91	12			2.25709677	0	2	14	17			7.75	0	33	0.91	17			2.59
4-Nitrophenol	1	29	0.91	12	2.2	2.2	2.13172414	0	3	2.6	17			5.6	1	32	0.91	17	2.2	2.2	2.456875
Acenaphthene	6	32	0.36	4.9	0.048	1.8	0.9096875	6	8	5.6	6.9	0.05386	0.32721	0.88472625	11	39	0.36	6.9	0.048	1.8	0.92553077
Acenaphthylene	4	32	0.36	4.9	0.13	0.28	0.8575	7	9	5.6	6.9	0.093	0.42856	0.87477889	10	40	0.36	6.9	0.093	0.42856	0.87617275
Acetophenone	0	4	0.4	0.99			0.385	0	2	5.6	6.9			3.125	0	6	0.4	6.9			1.29833333
Anthracene	9	32	0.36	4.9	0.075	1.4	0.86828125	9	9			0.15	1.1242	0.44422667	17	40	0.36	4.9	0.075	1.4	0.78585275
Atrazine	0	4	0.4	0.99			0.385	0	2	5.6	6.9			3.125	0	6	0.4	6.9			1.29833333
Benzaldehyde	2	4	0.4	0.7	0.12	0.17	0.21	7	9	5.6	6.9	0.078	0.37	0.89917	8	12	0.4	6.9	0.078	0.37	0.71951167
Benzo(a)anthracene	25	32	0.36	3.9	0.059	5.5	1.076	9	9			0.99749	5.42747	2.55856778	33	40	0.36	3.9	0.059	5.5	1.39420475
Benzo(a)pyrene	26	32	0.36	3.9	0.045	3.9	0.96671875	9	9			1.094	6.17711	2.88638222	34	40	0.36	3.9	0.045	6.17711	1.3665735
Benzo(b)fluoranthene	26	32	0.36	3.9	0.076	13	1.534125	9	9			1.78165	7.48175	4.25760222	34	40	0.36	3.9	0.076	13	2.1142945
Benzo(g,h,i)perylene	19	32	0.36	4.9	0.043	3.8	0.9091875	9	9			0.99	4.85176	2.60333667	27	40	0.36	4.9	0.043	4.85176	1.2598185
Benzo(k)fluoranthene	26	32	0.36	3.9	0.045	3.5	0.78659375	9	9			0.65	7.30225	2.35179444	34	40	0.36	3.9	0.045	7.30225	1.09620375
Bis(2-Chloroethoxy)methane	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
Bis(2-Chloroethyl)ether	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
bis(2-Ethylhexyl)phthalate	26	31	0.92	3.9	0.043	50	2.40822581	6	8	5.6	6.9	0.91	7.9	3.3075	32	39	0.92	6.9	0.043	50	2.59269231
Butylbenzylphthalate	3	31	0.36	4.9	0.064	0.13	0.88474194	8	8			0.17	1.2	0.505	11	39	0.36	4.9	0.064	1.2	0.80684615
Caprolactam	0	4	0.4	0.99			0.385	0	2	5.6	6.9			3.125	0	6	0.4	6.9			1.29833333
Carbazole	6	31	0.36	4.9	0.08	0.85	0.9016129	8	8			0.11	0.66	0.39625	14	39	0.36	4.9	0.08	0.85	0.79794872
Chrysene	27	32	0.41	3.9	0.048	4.4	1.14484375	9	9			1.48144	8.9397	3.61396444	35	40	0.41	3.9	0.048	8.9397	1.66003275
Dibenzo(a,h)anthracene	9	32	0.36	4.9	0.078	0.92	0.818375	9	9			0.24	1.0694	0.58105889	17	40	0.36	4.9	0.078	1.0694	0.77331475
Dibenzofuran	5	31	0.36	4.9	0.027	0.31	0.87087097	6	8	5.6	6.9	0.07563	0.27301	0.87675625	10	38	0.36	6.9	0.027	0.31	0.89242026
Diethylphthalate	0	31	0.36	4.9			0.9016129	0	4	1.3	6.9			1.925	0	35	0.36	6.9			1.01857143
Dimethylphthalate	0	31	0.36	4.9			0.9016129	1	3	5.6	6.9	0.18	0.18	2.14333333	1	34	0.36	6.9	0.18	0.18	1.01117647
Di-n-Butylphthalate	4	31	0.36	4.9	0.047	1.8	0.92374194	2	7	1.3	6.9	0.13	0.29	1.26	6	38	0.36	6.9	0.047	1.8	0.98568421
Di-n-octylphthalate	1	31	0.36	4.9	0.14	0.14	0.89983871	2	4	5.6	6.9	0.31	0.4	1.74	3	35	0.36	6.9	0.14	0.4	0.99585714
Fluoranthene	30	32	1.8	2.5	0.039	9.5	1.8193125	9	9			2.8	16.763	6.04019889	38	40	1.8	2.5	0.039	16.763	2.7086275
Fluorene	6	32	0.36	4.9	0.071	0.66	0.87659375	7	9	5.6	6.9	0.099	0.67084	0.87891111	12	40	0.36	6.9	0.071	0.67084	0.8942195
Hexachlorobenzene	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
Hexachlorobutadiene	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
Hexachlorocyclopentadiene	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
Hexachloroethane	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
Indeno(1,2,3-cd)pyrene	23	32	0.36	3.9	0.06	3.9	0.8705	9	9			1.3	5.25309	2.83491667	31	40	0.36	3.9	0.06	5.25309	1.279584
Isophorone	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
Naphthalene	3	32	0.36	4.9	0.067	0.16	0.85303125	4	6	5.6	6.9	0.08292	0.18514	1.12708833	6	37	0.36	6.9	0.067	0.18514	0.91749243
Nitrobenzene	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
N-Nitroso-di-n-propylamine	1	31	0.36	4.9	1.4	1.4	0.93080645	0	2	5.6	6.9			3.125	1	33	0.36	6.9	1.4	1.4	1.06378788

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Table B-2. Comparison of Pre-Breach, Post-Breach and BHHRA Sediment Data for Lyman Mill Pond Reach
Centredale Manor Restoration Project Superfund Site

	PRE BREACH							POST BREACH							BASELINE HUMAN HEALTH RISK ASSESSMENT DATA						
PARAMETER	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean
N-Nitroso-diphenylamine	0	31	0.36	4.9			0.9016129	0	2	5.6	6.9			3.125	0	33	0.36	6.9			1.03636364
Pentachlorophenol	1	31	0.91	12	1.4	1.4	2.26193548	0	3	2.6	17			5.6	1	34	0.91	17	1.4	1.4	2.55647059
Phenanthrene	25	32	0.36	3.9	0.069	5.6	1.14325	9	9			0.94	8.37861	2.92157222	33	40	0.36	3.9	0.069	8.37861	1.531667
Phenol	1	31	0.36	4.9	1.9	1.9	0.94693548	0	3	0.5	6.9			2.16666667	1	34	0.36	6.9	1.9	1.9	1.05455882
Pyrene	27	32	0.36	3.9	0.11	7.1	1.69015625	9	9			1.8	13.14306	5.07637889	35	40	0.36	3.9	0.11	13.14306	2.4018
Pesticides (mg/Kg)																					
4,4'-DDD	6	35	0.0031	0.01	0.0014	0.052	0.00431429	10	10			0.00642	0.05019	0.028895	15	44	0.0031	0.01	0.0014	0.052	0.00925477
4,4'-DDE	13	35	0.0031	0.0069	0.00031	0.048	0.00508457	8	10	0.006	0.007	0.00496	0.04293	0.022371	20	44	0.0031	0.007	0.00031	0.048	0.00825568
4,4'-DDT	5	35	0	0.027	0.0016	0.0055	0.00285714	11	12	0.00239	0.00239	0.00596	0.039	0.01390958	15	45	0.00239	0.027	0.0016	0.039	0.00578678
Aldrin	1	35	0	0.0053	0.00058	0.00058	0.00122943	0	10	0.0014	0.004			0.001295	1	43	0.0014	0.0053	0.00058	0.00058	0.00126872
alpha-BHC	0	35	0	0.0053			0.00124286	0	10	0.0014	0.004			0.001295	0	43	0.0014	0.0053			0.00127965
alpha-Chlordane	14	35	0.0016	0.0035	0.00021	0.04	0.00497457	13	13			0.009	0.14075	0.04596923	26	47	0.0016	0.0035	0.00021	0.14075	0.01553426
beta-BHC	0	34	0	0.0066			0.00131324	0	10	0.0014	0.004			0.001295	0	42	0.0014	0.0066			0.0013375
delta-BHC	0	35	0	0.0053			0.00124286	0	8	0.0014	0.00302			0.00118125	0	41	0.0014	0.0053			0.00125671
Dieldrin	5	35	0.0022	0.01	0.0014	0.017	0.00316429	8	10	0.006	0.007	0.0061	0.01002	0.006346	12	44	0.0022	0.01	0.0014	0.017	0.00380773
Endosulfan I	0	35	0	0.02			0.0015	0	8	0.0014	0.00302			0.00118125	0	41	0.0014	0.02			0.00147622
Endosulfan II	8	35	0	0.01	0.0061	0.017	0.00427429	0	10	0.0014	0.007			0.001595	8	43	0.0014	0.01	0.0061	0.017	0.00381686
Endosulfan Sulfate	2	34	0	0.039	0.0017	0.0023	0.00282206	1	10	0.00177	0.007	0.01055	0.01055	0.00258	3	42	0.00177	0.039	0.0017	0.01055	0.00286488
Endrin	2	35	0	0.027	0.0014	0.0056	0.00279857	0	10	0.0014	0.007			0.001595	2	43	0.0014	0.027	0.0014	0.0056	0.0026157
Endrin Aldehyde	0	35	0	0.01			0.00238857	0	8	0.0014	0.00302			0.00118125	0	41	0.0014	0.01			0.00223476
Endrin Ketone	0	33	0	0.027			0.00270909	0	8	0.0014	0.00302			0.00118125	0	39	0.0014	0.027			0.00249808
gamma-BHC	0	34	0	0.0053			0.00124853	1	10	0.0014	0.00302	0.006	0.006	0.001695	1	42	0.0014	0.0053	0.006	0.006	0.00138036
gamma-Chlordane	13	33	0.0016	0.0035	0.0028	0.021	0.00425606	8	13	0.0014	0.00269	0.014	0.06988	0.02515692	20	45	0.0014	0.0035	0.0028	0.06988	0.00893244
Heptachlor	2	35	0	0.0053	0.00043	0.00062	0.00119429	0	10	0.0014	0.004			0.001295	2	43	0.0014	0.0053	0.00043	0.00062	0.00124012
Heptachlor Epoxide	0	33	0	0.02			0.00152879	2	10	0.0014	0.00302	0.003	0.006	0.001845	2	41	0.0014	0.02	0.003	0.006	0.00164573
Methoxychlor	2	34	0	0.053	0.0027	0.0053	0.01177941	0	10	0.0014	0.035			0.004095	2	42	0.0014	0.053	0.0027	0.0053	0.01047679
Technical Chlordane	0	1	0	0			0	8	8			0.70121	2.21273	1.25137625	7	7			0.70121	2.21273	1.29366857
Toxaphene	0	35	0	0.53			0.12285714	0	10	0.03496	0.35			0.0551325	0	43	0.03496	0.53			0.11199186
Aroclor-1016	0	35	0	0.1			0.02388571	0	10	0.01748	0.071			0.0181665	0	43	0.01748	0.1			0.02325174
Aroclor-1221	0	35	0	0.21			0.0485	0	10	0.01748	0.071			0.0181665	0	43	0.01748	0.21			0.04328663
Aroclor-1232	0	35	0	0.1			0.02388571	0	10	0.01748	0.14			0.0243165	0	43	0.01748	0.14			0.02468198
Aroclor-1242	0	35	0	0.1			0.02388571	0	10	0.01748	0.071			0.0181665	0	43	0.01748	0.1			0.02325174
Aroclor-1248	7	35	0	0.1	0.016	0.052	0.02584286	0	10	0.01748	0.071			0.0181665	7	43	0.01748	0.1	0.016	0.052	0.02484477
Aroclor-1254	19	35	0.036	0.066	0.013	2.2	0.1675	12	12			0.12451	2.04782	0.722225	30	46	0.036	0.066	0.013	2.2	0.27133435
Aroclor-1260	5	35	0	0.1	0.029	0.043	0.02507143	0	10	0.01748	0.071			0.0181665	5	43	0.01748	0.1	0.029	0.043	0.02421686
Aroclor-1262	0	1	0	0			0														
Aroclor-1268	1	1			0.091	0.091	0.091	8	8			0.03699	0.31379	0.12874125	8	8			0.03699	0.31379	0.1164675
Aroclor, Total	19	32	0.073	0.13	0.013	1.191	0.13726563	8	8			0.16242	2.237	1.0120775	26	39	0.073	0.13	0.013	2.21205	0.26287487
PCB Congeners (mg/Kg)																					
2-Monochlorobiphenyl (1)								2	2			0.001065	0.001068	0.00106685	2	2			0.001065	0.001068	0.00106685
4-Chlorobiphenyl (3)								2	2			0.002093	0.002371	0.00223193	2	2			0.002093	0.002371	0.00223193
2,2'-Dichlorobiphenyl (4)								2	2			0.001137	0.002133	0.00163534	2	2			0.001137	0.002133	0.00163534
2,3-Dichlorobiphenyl (5)								1	1			0.000252	0.000252	0.00025153	1	1			0.000252	0.000252	0.00025153
2,3'-Dichlorobiphenyl (6)								2	2			0.000235	0.001457	0.00084624	2	2			0.000235	0.001457	0.00084624
2,4-Dichlorobiphenyl (7)								2	2			0.000241	0.000571	0.00040585	2	2			0.000241	0.000571	0.00040585
2,4'-Dichlorobiphenyl (8)								2	2			0.007312	0.011111	0.00921139	2	2			0.007312	0.011111	0.00921139
2,5-Dichlorobiphenyl (9)								2	2			0.000372	0.000729	0.00055072	2	2			0.000372	0.000729	0.00055072
2,6-Dichlorobiphenyl (10)								2	2			7.65E-05	0.000123	0.00009988	2	2			7.65E-05	0.000123	0.00009988
3,4-Dichlorobiphenyl (12)								2	2			0.001145	0.002277	0.00171101	2	2			0.001145	0.002277	0.00171101
2,2',3'-Trichlorobiphenyl (16)								2	2			0.0027	0.006125	0.00441275	2	2			0.0027	0.006125	0.00441275
2,2',4-Trichlorobiphenyl (17)								2	2			0.002659	0.006358	0.00450827	2	2			0.002659	0.006358	0.00450827
2,2',5-Trichlorobiphenyl (18)								2	2			0.002595	0.004573	0.00358401	2	2			0.002595	0.004573	0.00358401
2,2',6-Trichlorobiphenyl (19)								2	2			0.00057	0.001269	0.00091942	2	2			0.00057	0.001269	0.00091942
2,3,3'-Trichlorobiphenyl (20)								2	2			0.013964	0.037973	0.02596842	2	2			0.013964	0.037973	0.02596842
2,3,4'-Trichlorobiphenyl (22)								2	2			0.004404	0.009826	0.00711527	2	2			0.004404	0.009826	0.00711527
2,3,6-Trichlorobiphenyl (24)								2	2			0.001709	0.003898	0.00280367	2	2			0.001709	0.003898	0.00280367
2,3',4-Trichlorobiphenyl (25)								2	2			0.000671	0.001872	0.00127131	2	2			0.000671	0.001872	0.00127131
2,3',5-Trichlorobiphenyl (26)								2	2			0.001276	0.004241	0.00275838	2	2			0.001276	0.004241	0.00275838
2,4',5-Trichlorobiphenyl (31)								2	2			0.006853	0.018044	0.01244846	2	2			0.006853	0.018044	0.01244846
2,4',6-Trichlorobiphenyl (32)								2	2			0.001819	0.003101	0.00245973	2	2			0.001819	0.003101	0.00245973
2,2',3,3'-Tetrachlorobiphenyl (40)								2	2			0.019761	0.020137	0.01994901	2	2			0.019761	0.020137	0.01994901
2,2',3,4'-Tetrachlorobiphenyl (42)								2	2			0.005246	0.009605	0.00742528	2	2			0.005246	0.009605	0.00742528
2,2',3,5-Tetrachlorobiphenyl (43)								2	2			0.000848	0.024681	0.01276451	2	2			0.000848	0.024681	0.01276451
2,2',3,5'-Tetrachlorobiphenyl (44)								2	2			0.018113	0.033916	0.02601432	2	2			0.018113	0.033916	0.02601432
2,2',3,6-Tetrachlorobiphenyl (45)								2	2			0.002197	0.004445	0.00332104	2	2			0.002197	0.004445	0.00332104

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Table B-2. Comparison of Pre-Breach, Post-Breach and BHHRA Sediment Data for Lyman Mill Pond Reach
Centredale Manor Restoration Project Superfund Site

	PRE BREACH						POST BREACH						BASELINE HUMAN HEALTH RISK ASSESSMENT DATA					
PARAMETER	Frequency of Detection	Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection	Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection	Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean
2,2',3,6'-Tetrachlorobiphenyl (46)							2	2		0.001072	0.001739	0.00140555	2	2		0.001072	0.001739	0.00140555
2,2',4,5-Tetrachlorobiphenyl (48)							2	2		0.001978	0.004955	0.00346664	2	2		0.001978	0.004955	0.00346664
2,2',4,5'-Tetrachlorobiphenyl (49)							2	2		0.00942	0.020135	0.01477716	2	2		0.00942	0.020135	0.01477716
2,2',4,6-Tetrachlorobiphenyl (50)							2	2		0.002873	0.004113	0.00349307	2	2		0.002873	0.004113	0.00349307
2,3,3',4'-Tetrachlorobiphenyl (56)							2	2		0.00965	0.012997	0.0113233	2	2		0.00965	0.012997	0.0113233
2,3,3',6-Tetrachlorobiphenyl (59)							2	2		0.001225	0.002636	0.00193026	2	2		0.001225	0.002636	0.00193026
2,3,4,4'-Tetrachlorobiphenyl (60)							2	2		0.000415	0.003697	0.00205595	2	2		0.000415	0.003697	0.00205595
2,3,4,5-Tetrachlorobiphenyl (61)							2	2		0.027017	0.053782	0.0403993	2	2		0.027017	0.053782	0.0403993
2,3,4',5-Tetrachlorobiphenyl (63)							2	2		0.000286	0.00073	0.00050787	2	2		0.000286	0.00073	0.00050787
2,3,4',6-Tetrachlorobiphenyl (64)							2	2		0.006863	0.012599	0.00973089	2	2		0.006863	0.012599	0.00973089
2,3',4,4'-Tetrachlorobiphenyl (66)							2	2		0.024809	0.037842	0.03132573	2	2		0.024809	0.037842	0.03132573
3,3',4,4'-Tetrachlorobiphenyl (77)	1	1		0.0015	0.0015	0.0015	2	2		0.001964	0.003623	0.00279347	3	3		0.0015	0.003623	0.00236231
3,4,4',5-Tetrachlorobiphenyl (81)							0	1	0.000167		0.000167	0.00008339	0	1	0.000167		0.000167	0.00008339
2,2',3,3',4-Pentachlorobiphenyl (82)							2	2		0.008527	0.013638	0.01108275	2	2		0.008527	0.013638	0.01108275
2,2',3,3',5-Pentachlorobiphenyl (83)							2	2		0.01752	0.038598	0.02805927	2	2		0.01752	0.038598	0.02805927
2,2',3,3',6-Pentachlorobiphenyl (84)							2	2		0.020416	0.025485	0.02295059	2	2		0.020416	0.025485	0.02295059
2,2',3,4,4'-Pentachlorobiphenyl (85)							2	2		0.007248	0.012874	0.01006085	2	2		0.007248	0.012874	0.01006085
2,2',3,4,5-Pentachlorobiphenyl (86)							2	2		0.040317	0.06708	0.05369829	2	2		0.040317	0.06708	0.05369829
2,2',3,4,6-Pentachlorobiphenyl (88)							2	2		0.007988	0.011013	0.00950085	2	2		0.007988	0.011013	0.00950085
2,2',3,4,6'-Pentachlorobiphenyl (89)							0	1	0.000167		0.000167	0.00008339	0	1	0.000167		0.000167	0.00008339
2,2',3,4',5-Pentachlorobiphenyl (90)							2	2		0.039073	0.07068	0.05487633	2	2		0.039073	0.07068	0.05487633
2,2',3,5,5'-Pentachlorobiphenyl (92)							2	2		0.007869	0.01415	0.01100952	2	2		0.007869	0.01415	0.01100952
2,2',3,5,6-Pentachlorobiphenyl (93)							2	2		0.0473	0.065584	0.05644175	2	2		0.0473	0.065584	0.05644175
2,3,3',4,4'-Pentachlorobiphenyl (105)							2	2		0.010593	0.021789	0.01619103	2	2		0.010593	0.021789	0.01619103
2,3,3',4,5-Pentachlorobiphenyl (106)							2	2		0.003342	0.00742	0.005381	2	2		0.003342	0.00742	0.005381
2,3,3',4',5'-Pentachlorobiphenyl (108)							2	2		0.001294	0.002916	0.00210523	2	2		0.001294	0.002916	0.00210523
2,3,3',4',6-Pentachlorobiphenyl (110)							2	2		0.076047	0.111898	0.09397273	2	2		0.076047	0.111898	0.09397273
2,3,4,4',5-Pentachlorobiphenyl (114)							1	1		0.001135	0.001135	0.00113496	1	1		0.001135	0.001135	0.00113496
2,3',4,4',5-Pentachlorobiphenyl (118)							2	2		0.042483	0.08928	0.06588165	2	2		0.042483	0.08928	0.06588165
3,3',4,4',5-Pentachlorobiphenyl (126)	0	1	0	0		0	1	2	0.000334	0.000573	0.000573	0.00037	1	2	0.000334	0.000573	0.000573	0.00037
2,2',3,3',4,4'-Hexachlorobiphenyl (128)							2	2		0.01039	0.023359	0.01687453	2	2		0.01039	0.023359	0.01687453
2,2',3,3',4,5-Hexachlorobiphenyl (129)							2	2		0.043097	0.108332	0.07571472	2	2		0.043097	0.108332	0.07571472
2,2',3,3',4,5'-Hexachlorobiphenyl (130)							2	2		0.003186	0.00876	0.00597311	2	2		0.003186	0.00876	0.00597311
2,2',3,3',4,6-Hexachlorobiphenyl (131)							2	2		0.000671	0.001744	0.00120782	2	2		0.000671	0.001744	0.00120782
2,2',3,3',4,6'-Hexachlorobiphenyl (132)							1	2	0.000167	0.023573	0.023573	0.01182834	1	2	0.000167	0.023573	0.023573	0.01182834
2,2',3,3',5,6-Hexachlorobiphenyl (134)							2	2		0.003622	0.007757	0.00568948	2	2		0.003622	0.007757	0.00568948
2,2',3,3',5,6'-Hexachlorobiphenyl (135)							2	2		0.011183	0.028202	0.01969245	2	2		0.011183	0.028202	0.01969245
2,2',3,3',6,6'-Hexachlorobiphenyl (136)							2	2		0.008823	0.016387	0.01260514	2	2		0.008823	0.016387	0.01260514
2,2',3,4,4',5-Hexachlorobiphenyl (137)							2	2		0.004897	0.01371	0.00930373	2	2		0.004897	0.01371	0.00930373
2,2',3,4,5,5'-Hexachlorobiphenyl (141)							2	2		0.003965	0.013189	0.00857683	2	2		0.003965	0.013189	0.00857683
2,2',3,4,5',6-Hexachlorobiphenyl (144)							0	1	0.000167		0.000167	0.00008339	0	1	0.000167		0.000167	0.00008339
2,2',3,4',5,5'-Hexachlorobiphenyl (146)							2	2		0.001765	0.006308	0.00403672	2	2		0.001765	0.006308	0.00403672
2,2',3,4',5,6-Hexachlorobiphenyl (147)							2	2		0.029267	0.068787	0.04902742	2	2		0.029267	0.068787	0.04902742
2,2',4,4',5,5'-Hexachlorobiphenyl (153)							2	2		0.010748	0.041478	0.02611298	2	2		0.010748	0.041478	0.02611298
2,3,3',4,4',5-Hexachlorobiphenyl (156)							2	2		0.004042	0.009773	0.00690763	2	2		0.004042	0.009773	0.00690763
2,3,3',4,4',6-Hexachlorobiphenyl (158)							1	2	6.67E-05	0.00306	0.00306	0.00154689	1	2	6.67E-05	0.00306	0.00306	0.00154689
2,3',4,4',5,5'-Hexachlorobiphenyl (167)							2	2		0.001738	0.003694	0.00271615	2	2		0.001738	0.003694	0.00271615
3,3',4,4',5,5'-Hexachlorobiphenyl (169)	0	1	0	0		0	0	1	0.000167		0.000167	0.00008339	0	1	0.000167		0.000167	0.00008339
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)							2	2		0.010837	0.016263	0.01354989	2	2		0.010837	0.016263	0.01354989
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)							2	2		0.003289	0.005126	0.00420725	2	2		0.003289	0.005126	0.00420725
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)							2	2		0.000813	0.001273	0.00104298	2	2		0.000813	0.001273	0.00104298
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)							2	2		0.014489	0.016213	0.01535123	2	2		0.014489	0.016213	0.01535123
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)							1	1		0.000403	0.000403	0.00040333	1	1		0.000403	0.000403	0.00040333
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)							2	2		0.001285	0.001951	0.00161805	2	2		0.001285	0.001951	0.00161805
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)							2	2		0.005357	0.007451	0.00640376	2	2		0.005357	0.007451	0.00640376
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)							2	2		0.00112	0.00216	0.00163992	2	2		0.00112	0.00216	0.00163992
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)							2	2		0.006715	0.013526	0.01012019	2	2		0.006715	0.013526	0.01012019
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)							0	1	0.000334		0.000334	0.00016679	0	1	0.000334		0.000334	0.00016679
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)							2	2		0.0022	0.004828	0.00351409	2	2		0.0022	0.004828	0.00351409
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)							0	1	0.000334		0.000334	0.00016679	0	1	0.000334		0.000334	0.00016679
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)							2	2		0.000365	0.000811	0.00058798	2	2		0.000365	0.000811	0.00058798
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)							2	2		0.004837	0.008827	0.00683198	2	2		0.004837	0.008827	0.00683198
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)							2	2		0.0002	0.000412	0.00030579	2	2		0.0002	0.000412	0.00030579
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)							2	2		0.001219	0.002289	0.00175421	2	2		0.001219	0.002289	0.00175421
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)							2	2		0.000166	0.000371	0.00026828	2	2		0.000166	0.000371	0.00026828

US EPA ARCHIVE DOCUMENT

Table B-2. Comparison of Pre-Breach, Post-Breach and BHHRA Sediment Data for Lyman Mill Pond Reach
Centredale Manor Restoration Project Superfund Site

	PRE BREACH						POST BREACH						BASELINE HUMAN HEALTH RISK ASSESSMENT DATA					
PARAMETER	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)								2	2			0.001969	0.003773	0.00287087	2	2			0.001969	0.003773	0.00287087
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)								2	2			0.001279	0.001586	0.0014324	2	2			0.001279	0.001586	0.0014324
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)								2	2			0.001681	0.002886	0.00228358	2	2			0.001681	0.002886	0.00228358
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)								2	2			6.09E-05	6.43E-05	6.2615E-05	2	2			6.09E-05	6.43E-05	6.2615E-05
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)								2	2			0.007423	0.015078	0.01125038	2	2			0.007423	0.015078	0.01125038
2,2',3,3',4,5,5',6'-Octachlorobiphenyl (199)								2	2			0.00045	0.00107	0.00076018	2	2			0.00045	0.00107	0.00076018
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)								2	2			0.000582	0.000722	0.00065156	2	2			0.000582	0.000722	0.00065156
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)								2	2			0.001929	0.004956	0.00344235	2	2			0.001929	0.004956	0.00344235
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)								2	2			0.000106	0.000221	0.00016324	2	2			0.000106	0.000221	0.00016324
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl								2	2			0.010153	0.022969	0.01656127	2	2			0.010153	0.022969	0.01656127
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl								2	2			0.000606	0.001701	0.00115314	2	2			0.000606	0.001701	0.00115314
Decachlorobiphenyl (209)								2	2			0.011855	0.028499	0.02017675	2	2			0.011855	0.028499	0.02017675
PCB Congeners, Total								2	2			0.812949	1.415882	1.11441564	2	2			0.812949	1.415882	1.11441564
Dioxin/Furans (mg/Kg)																					
Toxicity Equivalency (PCB)								2	2			0.000017	6.49E-05	0.00004095	2	2			0.000017	6.49E-05	0.00004095
Toxicity Equivalency (PCB) - Mammals	1	1			1.5E-07	1.5E-07	0.00000015	2	2			3.45E-05	6.49E-05	0.0000497	3	3			1.5E-07	6.49E-05	3.3183E-05
Toxicity Equivalency (PCB) - Birds	1	1			0.000075	0.000075	0.000075	2	2			0.000157	0.00021	0.0001835	3	3			0.000075	0.00021	0.00014733
Toxicity Equivalency (PCB) - Fish	1	1			1.5E-07	1.5E-07	0.00000015	2	2			1.87E-06	3.36E-06	2.615E-06	3	3			1.5E-07	3.36E-06	1.7933E-06
HCX	23	36	0	0.005036	1.46E-06	0.1665	0.00675545	4	4			0.003744	0.117649	0.05356475	27	34	0.000378	0.005036	1.46E-06	0.1665	0.01345457
2,3,7,8-TCDD	36	37	7E-07	7E-07	5.9E-07	0.007987	0.00183514	14	14			1.29E-05	0.007475	0.0021566	45	46	7E-07	7E-07	5.9E-07	0.007987	0.00176825
1,2,3,7,8-PeCDD	27	37	0	1.93E-06	5.5E-07	3.92E-05	6.0114E-06	14	14			6.6E-07	4.05E-05	8.2579E-06	36	45	1E-07	1.93E-06	5.5E-07	3.92E-05	5.7447E-06
1,2,3,4,7,8-HxCDD	28	37	2E-07	2.6E-06	3.8E-07	0.000031	7.0012E-06	10	14	9.7E-07	1.89E-05	2.4E-06	3.04E-05	7.5389E-06	37	46	2E-07	2.6E-06	3.8E-07	0.000031	6.7427E-06
1,2,3,6,7,8-HxCDD	31	35	4.7E-07	2.4E-06	1.3E-06	8.36E-05	2.0883E-05	13	14	1.02E-06	1.02E-06	0.000007	0.000104	3.1471E-05	40	44	4.7E-07	2.4E-06	1.3E-06	8.36E-05	2.0948E-05
1,2,3,7,8,9-HxCDD	33	37	0	2.5E-06	4.8E-07	9.59E-05	1.9976E-05	11	14	2.03E-06	4.84E-05	6.9E-06	0.0001	2.6645E-05	42	45	1.07E-06	2.5E-06	4.8E-07	9.59E-05	2.0034E-05
1,2,3,4,6,7,8-HpCDD	26	37	9.2E-07	0.00022	9.3E-06	0.00183	0.00040713	13	14	5.24E-06	5.24E-06	0.00012	0.002427	0.00072122	35	46	9.2E-07	0.00022	9.3E-06	0.00183	0.0004193
OCDD	27	37	9.1E-06	0.001576	1.88E-05	0.0118	0.00242471	13	14	7.49E-05	7.49E-05	0.000772	0.018864	0.00540675	36	46	9.1E-06	0.001576	1.88E-05	0.0118	0.00261443
2,3,7,8-TCDF	30	37	0	0.000002	7E-07	7.13E-05	1.833E-05	14	14			1.99E-06	0.000106	1.7568E-05	39	45	4.8E-07	0.000002	7E-07	7.13E-05	1.6646E-05
1,2,3,7,8-PeCDF	29	34	0	0.000001	2.2E-07	2.42E-05	6.7422E-06	12	14	3E-07	9E-07	1.3E-06	1.37E-05	4.9136E-06	36	42	3E-07	0.000001	2.2E-07	2.42E-05	6.2063E-06
2,3,4,7,8-PeCDF	29	37	0	2.33E-06	6.4E-07	2.41E-05	7.5642E-06	10	14	1.58E-06	1.17E-05	2.2E-06	3.31E-05	6.4621E-06	37	45	3E-07	4.91E-06	6.4E-07	2.41E-05	7.054E-06
1,2,3,4,7,8-HxCDF	29	33	0	1.6E-06	1.4E-06	5.65E-05	1.9701E-05	13	14	1.77E-06	1.77E-06	4.6E-06	5.83E-05	1.7488E-05	38	41	7.6E-07	1.6E-06	1.4E-06	5.65E-05	1.8404E-05
1,2,3,6,7,8-HxCDF	30	33	0	5.2E-07	6.4E-07	4.54E-05	1.2338E-05	11	14	1.36E-06	2.72E-05	4.5E-06	5.64E-05	1.4356E-05	39	41	2.8E-07	5.2E-07	6.4E-07	4.54E-05	1.212E-05
2,3,4,6,7,8-HxCDF	30	33	0	1.6E-06	2E-07	4.96E-05	1.3643E-05	10	14	1.36E-06	3.02E-05	3.56E-06	1.83E-05	0.00000867	39	41	4.5E-07	1.6E-06	2E-07	4.96E-05	1.2748E-05
1,2,3,7,8,9-HxCDF	14	27	1E-07	2.5E-06	1.8E-07	9.77E-06	1.4259E-06	3	14	1.7E-07	9.04E-06	6.2E-07	1.9E-06	1.0675E-06	16	36	1E-07	9.04E-06	1.8E-07	9.77E-06	1.3733E-06
1,2,3,4,6,7,8-HpCDF	32	37	5.7E-07	3.13E-06	3.2E-06	0.000575	0.00014785	13	14	3.97E-06	3.97E-06	4.43E-05	0.000588	0.0002196	41	46	5.7E-07	3.13E-06	3.2E-06	0.000575	0.00014476
1,2,3,4,7,8,9-HpCDF	25	37	0	5.25E-06	2.9E-07	3.22E-05	6.9811E-06	10	14	1.13E-06	2.22E-05	2.7E-06	2.65E-05	8.3521E-06	34	45	2E-07	5.25E-06	2.9E-07	3.22E-05	7.0844E-06
OCDF	24	36	1.1E-06	0.000311	1.18E-05	0.000904	0.00021997	13	14	0.000004	0.000004	6.94E-05	0.001313	0.0003996	33	45	1.1E-06	0.000311	1.18E-05	0.000904	0.00022734
Total TCDD	26	26			3.4E-06	0.00784	0.00206472	9	9			0.000216	0.004557	0.00151504	35	35			3.4E-06	0.00784	0.00192337
Total PeCDD	22	26	0	2.53E-05	1.8E-06	0.000209	4.9462E-05	9	9			1.07E-05	5.29E-05	2.3864E-05	31	34	1.8E-06	2.53E-05	1.8E-06	0.000209	4.4141E-05
Total HxCDD	23	26	2.5E-06	2.16E-05	0.000005	0.000739	0.00020322	9	9			5.18E-05	0.000424	0.00014825	32	35	2.5E-06	2.16E-05	0.000005	0.000739	0.00018909
Total HpCDD	24	26	4.6E-06	7.7E-06	1.67E-05	0.00371	0.0009898	9	9			0.000233	0.003345	0.00109113	33	35	4.6E-06	7.7E-06	1.67E-05	0.00371	0.00101585
Total TCDF	26	26			3.6E-06	0.0013	0.00026137	9	9			1.05E-05	0.00031	0.00016235	35	35			3.6E-06	0.0013	0.00023591
Total PeCDF	26	26			1.4E-06	0.00103	0.00025208	9	9			5.19E-05	0.000314	0.00018081	35	35			1.4E-06	0.00103	0.00023375
Total HxCDF	25	26	1.6E-06	1.6E-06	2.1E-06	0.000875	0.00029186	9	9			8.64E-05	0.000333	0.0001995	34	35	1.6E-06	1.6E-06	2.1E-06	0.000875	0.00026811
Total HpCDF	25	26	3.6E-06	3.6E-06	1.4E-06	0.00128	0.00037432	9	9			9.66E-05	0.000711	0.00028978	34	35	3.6E-06	3.6E-06	1.4E-06	0.00128	0.00035258
Toxicity Equivalency	3	3			1.63E-05	0.000716	0.00045643	4	4			0.000266	0.0046	0.00193825	7	7			1.63E-05	0.0046	0.00130319
PCDD/Fs	25	34	2.51E-05	0.000831	2.33E-05	0.0246	0.00565633								25	34	2.51E-05	0.000831	2.33E-05	0.0246	0.00565633
2,4,6,8-TCDT	0	1	0	0			0														
Dioxin TEQ - Mammals	37	37			8.91E-07	0.00803	0.00186207	14	14			1.38E-05	0.007587	0.00218904	46	46			8.91E-07	0.00803	0.00179391
Dioxin TEQ - Birds	37	37			1.42E-06	0.00808	0.00187764	9	9			0.000255	0.00462	0.00152267	46	46			1.42E-06	0.00808	0.00180819
Dioxin TEQ - Fish	37	37			9.78E-07	0.00805	0.00185783	9	9			0.000249	0.0046	0.00151356	46	46			9.78E-07	0.00805	0.00179047
Inorganics (mg/Kg)																					
Aluminum	27	27			1690	18300	8142.96296	12	12			4320	27773	14767.0833	39	39			1690	27773	10181.1538
Antimony	16	27	0.58	10	0.66	5.3	1.69888889	3	11	0.0818	1.4	0.0443	1.6	0.40210909	19	38	0.0818	10	0.0443	5.3	1.32350526
Arsenic	26	27	35	35	1.2	10	5.38518519	11	12	2	2	2	13.2	4.8725	37	39	2	35	1.2	13.2	5.2274359
Barium	27	27			10	342	105.818519	12	12			56.5	380	184.641667	39	39			10	380	130.071795
Beryllium	26	27	0.11	0.11	0.19	4.3	1.32648148	12	12			0.56	4.36	2.33191667	38	39	0.11	0.11	0.19	4.36	1.63584615
Cadmium	15	26	0.06	0.51	0.17	23.9	2.15846154	11	12	0.82	0.82	0.415	4.65	2.08491667	26	38	0.06	0.82	0.17	23.9	2.13523684
Calcium	27	27			158	5860	2074.77778	5	5			1640	5430	3214	32	32			158	5860	2252.78125
Chromium	27	27			2.8	310	82.0185185	12	12			43.2	259	136.858333	39	39			2.8	310	98.8923077
Cobalt	14	27	1.2	6.2	3.1	17.4	6.66666667	12	12			1.5	26.6	10.3483333	26	39	1.2	6.2	1.5	26.6	7.79948718
Copper	26	27	5.6	5.6	6.6	1110	118.144444	12	12			21.7	244	98.7833333	38	39	5.6	5.6	6.6	1110	112.187179
Iron	27	27			4890	31300	13664.4444	12	12			9640	41293	22775.25	39	39			4890	41293	16467.7692
Lead	27	27			17.8	721	211.585185	12	12			39	613	289.658333	39	39			17.8	721	235.607692
Magnesium	27	27			358	3620	1632.59259	5	5			1200	2590	2092	32	32			358	3620	1704.375
Manganese	27	27			44.1	1970	479.762963	12	12			276	1655	719.5	39	39			44.1	1970	553.528205

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Table B-2. Comparison of Pre-Breach, Post-Breach and BHHRA Sediment Data for Lyman Mill Pond Reach
Centredale Manor Restoration Project Superfund Site

	PRE BREACH							POST BREACH							BASELINE HUMAN HEALTH RISK ASSESSMENT DATA						
PARAMETER	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean
Mercury	22	26	0.02	0.28	0.04	0.73	0.23557692	11	12	0.16	0.16	0.00743	0.946	0.4027025	33	38	0.02	0.28	0.00743	0.946	0.28835342
Mercury (methyl)								7	7			0.000259	0.00959	0.00207414	7	7			0.000259	0.00959	0.00207414
Molybdenum								7	7			1.6	13.4	6.45	7	7			1.6	13.4	6.45
Nickel	14	27	2.8	16.3	6.5	187	35.8185185	12	12			2.14	62.2	26.0866667	26	39	2.8	16.3	2.14	187	32.8241026
Potassium	26	26			224	1980	816.153846	5	5			603	1350	1013.6	31	31			224	1980	848
Selenium	6	26	0.47	10	0.97	2.9	0.97288462	8	12	0.456	0.88	0.773	1.8	0.92308333	14	38	0.456	10	0.773	2.9	0.95715789
Silver	9	27	0.63	5.6	1.6	12.7	3.35351852	10	12	0.41	1.2	0.364	4.31	1.81908333	19	39	0.41	5.6	0.364	12.7	2.88138462
Sodium	5	26	16.6	480	17.4	415	107.407692	5	5			133	434	255.2	10	31	16.6	480	17.4	434	131.245161
Thallium	2	26	0.42	10	0.59	0.78	0.59519231	7	12	0.76	1.9	0.0543	0.883	0.540025	9	38	0.42	10	0.0543	0.883	0.57777105
Vanadium	27	27			7.9	56.1	31.1074074	12	12			15.8	91.7	45.425	39	39			7.9	91.7	35.5128205
Zinc	26	27	30.8	30.8	32.9	1050	313.737037	12	12			125	1662	564.333333	38	39	30.8	30.8	32.9	1662	390.84359
AVS/SEM (umol/g)																					
Cadmium	13	13			0.00089	0.16	0.03071923	6	7	0.00142	0.00142	0.000852	0.0281	0.01412314	19	20	0.00142	0.00142	0.000852	0.16	0.0249106
Copper	13	13			0.076	15.3	2.70244692	7	7			0.339	1.45	0.915	20	20			0.076	15.3	2.0768405
Lead	13	13			0.088	3.597	1.39816154	7	7			0.355	2.84	1.66214286	20	20			0.088	3.597	1.490555
Mercury	1	11	0.00005	0.00018	0.0001	0.0001	5.2273E-05	7	7			0.000037	0.000132	8.1314E-05	8	18	0.00005	0.00018	0.000037	0.000132	6.3567E-05
Nickel	12	13	0.051	0.051	0.55212	4.52961	1.32494154	7	7			0.0363	1.05	0.43247143	19	20	0.051	0.051	0.0363	4.52961	1.012577
Zinc	12	13	0.61	0.61	0.52646	17.4	7.75983462	5	7	0.7	4.74	6.05	19.8	8.68428571	17	20	0.61	4.74	0.52646	19.8	8.0833925
Simultaneously Extracted Metal	23	23			0.49539	33.86	12.8753026	7	7			1.08101	23.3751	11.7080231	20	20			0.49539	33.86	12.6882756
Acid Volatile Sulfide	11	13	0.07518	1	0.2971	73.03	15.5156238	7	7			0.2	11.3	7.67142857	18	20	0.07518	1	0.2	73.03	12.7701555
SEM/AVS	13	13			0.34	44.9	6.49461538	7	7			0.52	6.3	2.48857143	20	20			0.34	44.9	5.0925
Wet Chemistry																					
Total Organic Carbon **(mg/Kg)**	24	24			1010	229000	66662.9167								24	24			1010	229000	66662.9167
Total Organic Carbon **(%)**								21	21			0.18	16.96	8.86380952	9	9			7.85	16.96	10.3877778
% Water **(%)**								7	7			128	635	343.714286	7	7			128	635	343.714286
Solids, Percent **(%)**								3	3			14.3	32.8	21.9666667	3	3			14.3	32.8	21.9666667

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Table B-3. Comparison of Pre-Breach, Post-Breach and BHHRA Sediment Data (Key Analytes) for Allendale Pond Reach and Lyman Mill Pond Reach
Centredale Manor Restoration Project Superfund Site

		PRE BREACH							POST BREACH							BASELINE HUMAN HEALTH RISK ASSESSMENT DATA						
PARAMETER	Units	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean
Allendale Reach																						
Benzo(a)pyrene	MG/KG	38	41	2.1	4.9	0.064	9.2	1.973853659	7	7			1.17966	7.23658	4.26409	45	48	2.1	4.9	0.064	9.2	2.307846458
4,4'-DDD	MG/KG	8	42	0.0037	0.011	0.0037	0.023	0.004103571	10	10			0.00002	0.02083	0.014082	18	52	0.0037	0.011	0.00002	0.023	0.0060225
4,4'-DDE	MG/KG	19	48	0.0037	0.0096	0.00038	0.2	0.017052708	10	10			0.00262	0.01904	0.011118	29	58	0.0037	0.0096	0.00038	0.2	0.016029483
4,4'-DDT	MG/KG	10	44	0.0038	0.011	0.0049	0.021	0.004354545	6	10	0.00084	0.00254	0.00276	0.02996	0.0070555	16	54	0.00084	0.011	0.00276	0.02996	0.004854722
alpha-Chlordane	MG/KG	26	44	0.0019	0.0049	0.0012	0.062	0.008930682	10	10			0.00237	0.0551	0.021458	36	54	0.0019	0.0049	0.0012	0.062	0.011250556
Dieldrin	MG/KG	9	43	0.0038	0.011	0.0063	0.047	0.006534884	10	10			0.00389	0.11297	0.01972	19	53	0.0038	0.011	0.00389	0.11297	0.009022642
Technical Chlordane	MG/KG	0	2	0	0.053			0.01325	10	10			0.2814	0.85181	0.564222	10	11	0.053	0.053	0.2814	0.85181	0.515338182
Aroclor-1254	MG/KG	74	78	0.038	0.049	0.011	27	1.571929487	10	10			0.17209	3.21148	1.040359	84	88	0.038	0.049	0.011	27	1.51152375
Aroclor-1268	MG/KG	1	1			0.12	0.12	0.12	10	10			0.03393	0.15642	0.075167	11	11			0.03393	0.15642	0.079242727
Aroclor, Total	MG/KG	74	78	0.077	0.099	0.011	27	1.58599359	10	10			0.27386	3.25184	1.145529	84	88	0.077	0.099	0.011	27	1.532531705
Toxicity Equivalency (PCB) - Mammals	MG/KG	2	2			0.000000112	0.000000112	0.000000112								2	2			0.000000112	0.000000112	0.000000112
HCX	MG/KG	35	41	0	0.0026367	0.00000147	0.364758	0.022449625	7	7			0.01080543	0.1356088	0.042467659	42	45	0.00026132	0.0026367	0.00000147	0.364758	0.027060183
2,3,7,8-TCDD	MG/KG	137	140	0.00000051	0.00000213	0.00000088	0.073	0.005963221	26	26			0.00004892	0.05282845	0.006087558	146	149	0.00000051	0.00000213	0.00000088	0.073	0.0057222
Dioxin Teq - Mammals	MG/KG	140	140			0.00000117	0.073	0.005985685	26	26			0.000151221	0.052995583	0.006164002	149	149			0.00000117	0.073	0.005744845
Mercury	MG/KG	27	39	0.02	0.32	0.02	3.6	0.461282051	10	10			0.00988	1.08	0.490088	37	49	0.02	0.32	0.00988	3.6	0.467160816
Mercury (methyl)	MG/KG								10	10			0.000196	0.00285	0.0008042	10	10			0.000196	0.00285	0.0008042
Total Organic Carbon	MG/KG	29	29			1120	202000	72320								29	29			1120	202000	72320
Total Organic Carbon	percent								46	46			0.88	21.54	8.125434783	10	10			1.24	10.35	6.413
Lyman Mill Reach																						
Benzo(a)pyrene	MG/KG	26	32	0.36	3.9	0.045	3.9	0.96671875	9	9			1.094	6.17711	2.886382222	34	40	0.36	3.9	0.045	6.17711	1.3665735
4,4'-DDD	MG/KG	6	35	0.0031	0.01	0.0014	0.052	0.004314286	10	10			0.00642	0.05019	0.028895	15	44	0.0031	0.01	0.0014	0.052	0.009254773
4,4'-DDE	MG/KG	13	35	0.0031	0.0069	0.00031	0.048	0.005084571	8	10	0.006	0.007	0.00496	0.04293	0.022371	20	44	0.0031	0.007	0.00031	0.048	0.008255682
4,4'-DDT	MG/KG	5	35	0	0.027	0.0016	0.0055	0.002857143	11	12	0.00239	0.00239	0.00596	0.039	0.013909583	15	45	0.00239	0.027	0.0016	0.039	0.005786778
alpha-Chlordane	MG/KG	14	35	0.0016	0.0035	0.00021	0.04	0.004974571	13	13			0.009	0.14075	0.045969231	26	47	0.0016	0.0035	0.00021	0.14075	0.015534255
Dieldrin	MG/KG	5	35	0.0022	0.01	0.0014	0.017	0.003164286	8	10	0.006	0.007	0.0061	0.01002	0.006346	12	44	0.0022	0.01	0.0014	0.017	0.003807727
Technical Chlordane	MG/KG	0	1	0	0			0	8	8			0.70121	2.21273	1.25137625	7	7			0.70121	2.21273	1.293668571
Aroclor-1254	MG/KG	19	35	0.036	0.066	0.013	2.2	0.1675	12	12			0.12451	2.04782	0.722225	30	46	0.036	0.066	0.013	2.2	0.271334348
Aroclor-1268	MG/KG	1	1			0.091	0.091	0.091	8	8			0.03699	0.31379	0.12874125	8	8			0.03699	0.31379	0.1164675
Aroclor, Total	MG/KG	19	32	0.073	0.13	0.013	1.191	0.137265625	8	8			0.16242	2.237	1.0120775	26	39	0.073	0.13	0.013	2.21205	0.262874872
Toxicity Equivalency (PCB) - Mammals	MG/KG	1	1			0.00000015	0.00000015	0.00000015	2	2			0.0000345	0.0000649	0.0000497	3	3			0.00000015	0.0000649	3.31833E-05
HCX	MG/KG	23	36	0	0.005036	0.00000146	0.1665	0.006755452	4	4			0.00374363	0.1176491	0.053564748	27	34	0.00037783	0.005036	0.00000146	0.1665	0.013454567
2,3,7,8-TCDD	MG/KG	36	37	0.0000007	0.0000007	0.00000059	0.00798702	0.001835138	14	14			0.00001285	0.00747542	0.002156597	45	46	0.0000007	0.0000007	0.00000059	0.00798702	0.00176825
Dioxin TEQ - Mammals	MG/KG	37	37			0.000000891	0.00803	0.001862074	14	14			0.000013808	0.007586523	0.002189038	46	46			0.000000891	0.00803	0.001793908
Mercury	MG/KG	22	26	0.02	0.28	0.04	0.73	0.235576923	11	12	0.16	0.16	0.00743	0.946	0.4027025	33	38	0.02	0.28	0.00743	0.946	0.288353421
Mercury (methyl)	MG/KG								7	7			0.000259	0.00959	0.002074143	7	7			0.000259	0.00959	0.002074143
Total Organic Carbon	MG/KG	24	24			1010	229000	66662.91667	21	21			1800	169600	88638	24	24			1010	229000	66662.91667
Total Organic Carbon	percent								21	21			0.18	16.96	8.863809524	9	9			7.85	16.96	10.38777778

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Checked By:	MJM

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Table B-4. Comparison of Pre-Breach, Post-Breach and BHHRA Sediment Data (Key Analytes) with Available Organic Carbon for Allendale Pond Reach and Lyman Mill Pond Reach Centredale Manor Restoration Project Superfund Site

		PRE BREACH							POST BREACH							RISK ASSESSMENT VALUES						
PARAMETER	Units	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean	Frequency of Detection		Minimum Nondetect	Maximum Nondetect	Minimum Detect	Maximum Detect	Arithmetic Mean
Allendale Reach																						
Benzo(a)pyrene	MG/KG	18	20	4.8	4.9	0.084	5.4	1.6492	7	7			1.17966	7.23658	4.26409	25	27	4.8	4.9	0.084	7.23658	2.327134444
4,4'-DDD	MG/KG	4	24	0.0038	0.011	0.0037	0.016	0.003314583	10	10			0.00002	0.02083	0.014082	14	34	0.0038	0.011	0.00002	0.02083	0.006481471
4,4'-DDE	MG/KG	10	29	0.0038	0.005	0.00038	0.031	0.004901034	10	10			0.00262	0.01904	0.011118	20	39	0.0038	0.005	0.00038	0.031	0.006495128
4,4'-DDT	MG/KG	3	25	0.0038	0.011	0.0049	0.021	0.003544	6	10	0.00084	0.00254	0.00276	0.02996	0.0070555	9	35	0.00084	0.011	0.00276	0.02996	0.004547286
alpha-Chlordane	MG/KG	15	25	0.0021	0.0026	0.0012	0.034	0.006202	10	10			0.00237	0.0551	0.021458	25	35	0.0021	0.0026	0.0012	0.0551	0.010560857
Dieldrin	MG/KG	7	25	0.0038	0.011	0.011	0.047	0.008506	10	10			0.00389	0.11297	0.01972	17	35	0.0038	0.011	0.00389	0.11297	0.01171
gamma-Chlordane	MG/KG	20	25	0.0021	0.0026	0.0024	0.019	0.006914	3	10	0.00084	0.00254	0.00324	0.00744	0.0020545	23	35	0.00084	0.0026	0.0024	0.019	0.005525571
Technical Chlordane	MG/KG								10	10			0.2814	0.85181	0.564222	10	10			0.2814	0.85181	0.564222
Aroclor-1254	MG/KG	26	29	0.04	0.049	0.033	2	0.286224138	10	10			0.17209	3.21148	1.040359	36	39	0.04	0.049	0.033	3.21148	0.479592051
Aroclor-1268	MG/KG	1	1			0.12	0.12	0.12	10	10			0.03393	0.15642	0.075167	11	11			0.03393	0.15642	0.079242727
Aroclor, Total	MG/KG	26	29	0.081	0.099	0.033	2.41	0.315793103	10	10			0.27386	3.25184	1.115529	36	39	0.081	0.099	0.033	3.25184	0.52085359
Toxicity Equivalency (PCB) - Mammals	MG/KG	2	2			1.12E-07	1.12E-07	0.000000112								2	2			1.12E-07	1.12E-07	0.000000112
HCX	MG/KG	19	22	0.00026132	0.0026367	0.00000194	0.364758	0.041544956	7	7			0.01080543	0.1356088	0.042467659	26	29	0.00026132	0.0026367	0.00000194	0.364758	0.041767677
2,3,7,8-TCDD	MG/KG	22	24	0.0000012	0.00000213	0.0000063	0.0100508	0.003140557	26	26			0.00004892	0.05282845	0.006087558	29	31	0.0000012	0.00000213	0.0000063	0.0100508	0.002858072
Dioxin TEQ - Mammals	MG/KG	24	24			0.00000287	0.0101	0.003178078	26	26			0.00015122	0.05299558	0.006164002	31	31			0.00000287	0.0101	0.002894512
Mercury	MG/KG	27	39	0.02	0.32	0.02	3.6	0.461282051	10	10			0.00988	1.08	0.490088	37	49	0.02	0.32	0.00988	3.6	0.467160816
Mercury (methyl)	MG/KG								10	10			0.000196	0.00285	0.0008042	10	10			0.000196	0.00285	0.0008042
Total Organic Carbon	MG/KG	29	29			1120	202000	72320	46	46			8800	215400	81254.34783	39	39			1120	202000	70220
Lyman Mill Reach																						
Benzo(a)pyrene	MG/KG	16	19	0.41	2.5	0.11	3.9	1.269210526	6	6			1.094	6.17711	3.19624	21	24	0.41	2.5	0.11	6.17711	1.7101225
4,4'-DDD	MG/KG	6	24	0.0037	0.01	0.0014	0.052	0.005310417	10	10			0.00642	0.05019	0.028895	19	33	0.004	0.007	0.00031	0.048	0.010206061
4,4'-DDE	MG/KG	12	24	0.004	0.0058	0.00031	0.048	0.006312917	8	10	0.006	0.007	0.00496	0.04293	0.022371	15	33	0.0037	0.01	0.0014	0.052	0.011626061
4,4'-DDT	MG/KG	3	23	0.0037	0.027	0.0016	0.0023	0.00303913	9	10	0.00239	0.00239	0.00596	0.032	0.0104915	11	32	0.00239	0.027	0.0016	0.032	0.005259531
alpha-Chlordane	MG/KG	14	24	0.002	0.003	0.00021	0.04	0.006750417	10	10			0.009	0.14075	0.05576	23	33	0.002	0.003	0.00021	0.14075	0.020545758
Dieldrin	MG/KG	2	24	0.0022	0.01	0.0014	0.0086	0.002791667	8	10	0.006	0.007	0.0061	0.01002	0.006346	9	33	0.0022	0.01	0.0014	0.01002	0.003751212
gamma-Chlordane	MG/KG	13	22	0.0021	0.003	0.0028	0.021	0.005834091	5	10	0.0014	0.00269	0.014	0.06988	0.022204	17	31	0.0014	0.003	0.0028	0.06988	0.009189032
Technical Chlordane	MG/KG								8	8			0.70121	2.21273	1.25137625	7	7			0.70121	2.21273	1.293668571
Aroclor-1254	MG/KG	14	24	0.039	0.066	0.023	2.2	0.210291667	10	10			0.12451	2.04782	0.76667	23	33	0.039	0.066	0.023	2.2	0.323208485
Aroclor-1268	MG/KG	1	1			0.091	0.091	0.091	8	8			0.03699	0.31379	0.12874125	8	8			0.03699	0.31379	0.1164675
Aroclor, Total	MG/KG	14	21	0.079	0.13	0.023	1.191	0.164380952	8	8			0.16242	2.237	1.0120775	21	28	0.079	0.13	0.023	2.21205	0.332557857
Toxicity Equivalency (PCB) - Mammals	MG/KG	1	1			0.00000015	0.00000015	0.00000015	2	2			0.0000345	0.0000649	0.0000497	3	3			0.00000015	0.0000649	3.31833E-05
HCX	MG/KG	15	22	0.00037783	0.005036	0.000254	0.1665	0.010927317	4	4			0.00374363	0.1176491	0.053564748	19	26	0.00037783	0.005036	0.000254	0.1665	0.017486921
2,3,7,8-TCDD	MG/KG	23	24	0.0000007	0.0000007	0.0000064	0.00798702	0.002447933	11	11			0.00001285	0.00747542	0.002478215	29	30	0.0000007	0.0000007	0.0000064	0.00798702	0.002308593
Dioxin TEQ - Mammals	MG/KG	24	24			8.91E-07	0.00803	0.002480541	11	11			1.3808E-05	0.00758652	0.002515684	30	30			8.91E-07	0.00803	0.0023394
Mercury	MG/KG	22	26	0.02	0.28	0.04	0.73	0.235576923	11	12	0.16	0.16	0.00743	0.946	0.4027025	33	38	0.02	0.28	0.00743	0.946	0.288353421
Mercury (methyl)	MG/KG								7	7			0.000259	0.00959	0.002074143	7	7			0.000259	0.00959	0.002074143
Total Organic Carbon	MG/KG	24	24			1010	229000	66662.91667	21	21			1800	169600	88638.09524	33	33			1010	229000	76812.42424

Prepared By:	KJA
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APPENDIX C

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APPENDIX C

FISH TISSUE ANALYTICAL DATA FOR ALLENDALE POND AND LYMAN MILL POND (reproduced from the Data Evaluation Report, 2003)

AND

TABLE 4-1 OF THE USEPA DRAFT DIOXIN REASSESSMENT DOCUMENT

US EPA ARCHIVE DOCUMENT

APPENDIX C

FISH TISSUE ANALYTICAL DATA FOR ALLENDALE POND AND LYMAN MILL POND (reproduced from the Data Evaluation Report, 2003)

AND

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US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	APC-AE-4001-0000-01-W 6/20/2001	APC-AE-4002-0000-01-W 6/20/2001	APC-AE-4003-0000-01-W 6/20/2001
Semivolatile Organics (ug/Kg)										
1,1'-Biphenyl	7	10	1.26	1.34	0.55	0.7	0.63	1.34 U	0.65 J	0.7 J
2-Methylnaphthalene	10	10			2.43	4.45	3.15	4.05	3.85	2.43
Acenaphthene	10	10			2.34	5.6	4.01	2.37	5.11	3.15
Acenaphthylene	10	10			0.77	1.87	1.26	0.84 J	1.87	0.96 J
Anthracene	10	10			0.89	2.16	1.46	0.89 J	1.87	1.04 J
Benzo(a)anthracene	0	10	1.26	1.86			0.68	1.34 U	1.31 U	1.27 U
Benzo(a)pyrene	0	10	1.26	1.66			0.67	1.34 U	1.31 U	1.27 U
Benzo(b)fluoranthene	0	10	1.27	2.86			0.77	1.34 U	1.31 U	1.27 U
Benzo(g,h,i)perylene	0	10	1.26	1.65			0.67	1.34 U	1.31 U	1.27 U
Benzo(k)fluoranthene	0	10	1.26	2.58			0.74	1.34 U	1.31 U	1.27 U
Chrysene	0	10	1.29	3.81			0.92	1.34 U	1.32 U	2.04 U
Dibenzo(a,h)anthracene	0	10	1.26	1.34			0.65	1.34 U	1.31 U	1.27 U
Dibenzofuran	10	10			0.84	1.33	1.13	1.22 J	1.25 J	1.24 J
Fluoranthene	9	10	4.76	4.76	5.66	12.53	7.61	4.76 U	8.92	6.51
Fluorene	10	10			1.26	2.24	1.70	1.52	2.11	1.5
Indeno(1,2,3-cd)pyrene	0	10	1.26	1.62			0.67	1.34 U	1.31 U	1.27 U
Naphthalene	10	10			3.32	5.46	4.17	4.41	5.46	3.67
Phenanthrene	10	10			5.96	10.63	8.07	5.96	10.07	6.4
Pyrene	1	10	2.29	4.8	6.65	6.65	2.13	2.31 U	3.64 U	3 U
Total PAH	10	10			21.26	51.18	33.43	21.26	41.16	27.62
Pesticides/PCBs (ug/Kg)										
4,4'-DDD	12	12			6.06	42.05	12.66	6.06 J	13.15 J	8.21
4,4'-DDE	12	12			3.52	33.05	20.36	15.16 J	26.66 J	17.65
4,4'-DDT	10	12	1.29	1.32	1.37	11.06	3.56	2.11 J	6.14 J	1.37
Aldrin	0	12	0.59	1.34			0.62	1.34 UJ	1.31 UJ	1.27 U
alpha-BHC	0	12	0.59	1.34			0.62	1.34 UJ	1.31 UJ	1.28 U
alpha-Chlordane	12	12			5.79	71.2	22.44	7.5 J	21.81 J	12.63
Aroclor, Total	9	12	128.57	132.07	360.24	1233.23	597.05	499.87 J	723.98 J	820.17
Aroclor-1016	0	12	7.42	16.69			7.73	16.69 UJ	16.34 UJ	15.89 U
Aroclor-1221	0	12	7.42	16.69			7.73	16.69 UJ	16.34 UJ	15.89 U
Aroclor-1232	0	12	7.42	16.69			7.73	16.69 UJ	16.34 UJ	15.89 U
Aroclor-1242	0	12	7.42	16.69			7.73	16.69 UJ	16.34 UJ	15.89 U
Aroclor-1248	0	12	7.42	16.69			7.73	16.69 UJ	16.34 UJ	15.89 U
Aroclor-1254	9	12	16.07	16.51	360.24	1155.76	576.33	499.87 J	723.98 J	820.17
Aroclor-1260	0	12	7.42	16.69			7.73	16.69 UJ	16.34 UJ	15.89 U
Aroclor-1268	1	12	15.73	16.69	77.47	77.47	13.88	16.69 UJ	16.34 UJ	15.89 U
beta-BHC	1	12	0.59	1.34	0.72	0.72	0.63	1.34 UJ	1.31 UJ	1.27 U

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Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

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Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	APC-AE-4001-0000-01-W 6/20/2001	APC-AE-4002-0000-01-W 6/20/2001	APC-AE-4003-0000-01-W 6/20/2001
delta-BHC	0	12	0.59	1.34			0.62	1.34 UJ	1.31 UJ	1.28 U
Dieldrin	11	12	0.59	0.59	2.97	14.48	6.10	5.6 J	7.72 J	7.6
Endosulfan I	0	12	0.59	1.34			0.62	1.34 UJ	1.31 UJ	1.27 U
Endosulfan II	0	12	0.59	1.34			0.62	1.34 UJ	1.31 UJ	1.27 U
Endosulfan Sulfate	1	12	1.26	1.34	9.99	9.99	1.43	1.34 UJ	1.31 UJ	1.27 U
Endrin	0	12	0.59	1.34			0.62	1.34 UJ	1.31 UJ	1.27 U
Endrin Aldehyde	1	12	1.26	1.34	0.8	0.8	0.66	1.34 UJ	1.31 UJ	1.27 UJ
Endrin Ketone	0	12	0.59	1.34			0.62	1.34 UJ	1.31 UJ	1.27 U
gamma-BHC	9	12	0.59	1.34	0.08	0.72	0.46	1.34 UJ	0.42 J	0.27 J
gamma-Chlordane	12	12			2.14	25.49	8.23	2.6 J	8.1 J	4.56
Heptachlor	1	12	0.59	1.34	1.29	1.29	0.67	1.34 UJ	1.31 UJ	1.27 U
Heptachlor Epoxide	11	12	0.59	0.59	0.67	4.83	1.68	0.67 J	1.78 J	0.95 J
Methoxychlor	0	12	0.59	1.34			0.62	1.34 UJ	1.31 UJ	1.28 UJ
Technical Chlordane	12	12			88.24	885.69	299.07	102.59 J	261.78 J	145.84 J
Toxaphene	0	12	7.42	33.38			15.15	33.38 UJ	32.69 UJ	31.79 U
Inorganics (mg/Kg)										
Aluminum	10	10			1.16	19.5	7.40	8.06 J	1.22 J	4.69 J
Antimony	0	10	0.034	0.034			0.0170	0.034 U	0.034 U	0.034 U
Arsenic	0	10	0.0464	0.11			0.0409	0.0845 U	0.0909 U	0.0903 U
Barium	10	10			0.24	0.681	0.434	0.432 J	0.308 J	0.38 J
Beryllium	0	10	0.004	0.004			0.00200	0.004 U	0.004 U	0.004 U
Cadmium	10	10			0.0295	0.248	0.0971	0.0843 J	0.132 J	0.0984 J
Chromium	10	10			0.0281	0.123	0.0650	0.0644 J	0.0579 J	0.0475 J
Cobalt	10	10			0.0563	0.138	0.0745	0.0564 J	0.0703 J	0.0589 J
Copper	10	10			0.519	1.03	0.750	0.787 J	0.888 J	0.724 J
Iron	10	10			14.3	39.3	27.8	27.6	25.6	25.1
Lead	9	10	0.12	0.12	0.229	0.952	0.428	0.642 J	0.231 J	0.502 J
Manganese	10	10			1.62	7.7	3.51	2.7 J	2.04 J	2.33 J
Mercury	10	10			0.0356	0.24	0.111	0.0826	0.0838	0.0356
Mercury (methyl)	10	10			0.0326	0.471	0.134	0.0829	0.0944	0.0326
Molybdenum	1	10	0.32	0.32	0.115	0.115	0.156	0.32 U	0.32 U	0.32 U
Nickel	10	10			0.0799	0.214	0.118	0.0801 J	0.1 J	0.0894 J
Selenium	10	10			0.307	0.523	0.379	0.455	0.369 J	0.523
Silver	0	10	0.06	0.06			0.0300	0.06 U	0.06 U	0.06 U
Thallium	0	10	0.022	0.022			0.0110	0.022 U	0.022 U	0.022 U
Vanadium	2	10	0.179	0.179	0.0804	0.109	0.0905	0.0804 J	0.179 U	0.179 U
Zinc	10	10			24.2	34.6	28.6	29.9 J	24.2 J	27.9 J
Dioxins/Furans (ug/Kg)										

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Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	APC-AE-4001-0000-01-W 6/20/2001	APC-AE-4002-0000-01-W 6/20/2001	APC-AE-4003-0000-01-W 6/20/2001
HCX	9	10	0.01998	0.01998	0.00774	0.10904	0.05825	0.03672 J	0.09129 J	0.04654 J
TCX	0	0						R	R	R
2,3,7,8-TCDD	10	10			0.00928	0.30691	0.11078	0.05464 J	0.13875 J	0.08423 J
1,2,3,7,8-PeCDD	0	10	0.00019	0.00115			0.00027	0.00115 UJ	0.00049 UJ	0.0005 UJ
1,2,3,4,7,8-HxCDD	6	10	0.00009	0.00058	0.00018	0.00049	0.00025	0.00058 UJ	0.00042 J	0.00039 UJ
1,2,3,6,7,8-HxCDD	9	10	0.00057	0.00057	0.00047	0.00187	0.00109	0.00057 UJ	0.00187 J	0.00084 J
1,2,3,7,8,9-HxCDD	6	10	0.00018	0.00054	0.00015	0.00043	0.00021	0.00054 UJ	0.00032 J	0.00037 UJ
1,2,3,4,6,7,8-HpCDD	5	10	0.00058	0.00203	0.00096	0.00241	0.00112	0.00058 UJ	0.00203 UJ	0.00096 UJ
OCDD	0	10	0.00114	0.00786			0.00137	0.00196 UJ	0.00344 UJ	0.00201 UJ
2,3,7,8-TCDF	2	10	0.00015	0.00049	0.00006	0.00008	0.00013	0.0004 UJ	0.00045 UJ	0.00049 UJ
1,2,3,7,8-PeCDF	1	10	0.0001	0.00061	0.00008	0.00008	0.00017	0.00061 UJ	0.00051 UJ	0.00058 UJ
2,3,4,7,8-PeCDF	3	10	0.00019	0.0006	0.00012	0.00031	0.00019	0.0006 UJ	0.00049 UJ	0.00054 UJ
1,2,3,4,7,8-HxCDF	0	10	0.00013	0.00036			0.00011	0.00028 UJ	0.00027 UJ	0.00017 UJ
1,2,3,6,7,8-HxCDF	7	10	0.00012	0.00028	0.00011	0.00033	0.00017	0.00028 UJ	0.00033 J	0.00011 J
2,3,4,6,7,8-HxCDF	0	10	0.00007	0.00036			0.00009	0.0003 UJ	0.00025 UJ	0.00036 UJ
1,2,3,7,8,9-HxCDF	1	10	0.0001	0.00038	0.00002	0.00002	0.00010	0.00032 UJ	0.0003 UJ	0.00038 UJ
1,2,3,4,6,7,8-HpCDF	3	10	0.00022	0.00086	0.00042	0.00087	0.00037	0.0003 UJ	0.00086 UJ	0.00034 UJ
1,2,3,4,7,8,9-HpCDF	0	10	0.00013	0.00049			0.00011	0.00036 UJ	0.00026 UJ	0.00049 UJ
OCDF	0	10	0.00008	0.00054			0.00015	0.00054 UJ	0.0004 UJ	0.00039 UJ
Total TCDD	10	10			0.00928	0.30691	0.11078	0.05464 J	0.13875 J	0.08423 J
Total PeCDD	0	10	0.00019	0.00115			0.00027	0.00115 UJ	0.00049 UJ	0.0005 UJ
Total HxCDD	9	10	0.00056	0.00056	0.00075	0.00312	0.00154	0.00056 UJ	0.0026 J	0.00084 J
Total HpCDD	0	10	0.00058	0.00251			0.00075	0.00058 UJ	0.00203 UJ	0.00096 UJ
Total TCDF	4	10	0.00006	0.00049	0.00006	0.00023	0.00014	0.0004 UJ	0.00045 UJ	0.00049 UJ
Total PeCDF	5	10	0.00026	0.00061	0.00015	0.00083	0.00040	0.00061 UJ	0.0005 UJ	0.00072 J
Total HxCDF	0	10	0.00024	0.00104			0.00024	0.00024 UJ	0.00086 UJ	0.00027 UJ
Total HpCDF	0	10	0.00022	0.00199			0.00042	0.0005 UJ	0.00163 UJ	0.00034 UJ
Toxicity Equivalency (Dioxins, Furans, HCX)	10	10			0.00943	0.307	0.111	0.0546	0.139	0.0843
PCB Congeners (ug/Kg)										
2-Monochlorobiphenyl (1)	0	3	0.01061	0.01501			0.00625	0.01061 UJ	0.01501 UJ	0.0119 UJ
4-Chlorobiphenyl (3)	0	3	0.0116	0.01449			0.00665	0.0116 UJ	0.01449 UJ	0.01382 UJ
2,2'-Dichlorobiphenyl (4)	1	3	0.03373	0.03585	0.05477	0.05477	0.02985	0.03373 UJ	0.05477 J	0.03585 UJ
2,3-Dichlorobiphenyl (5)	0	3	0.00214	0.00999			0.00239	0.00999 UJ	0.00222 UJ	0.00214 UJ
2,3'-Dichlorobiphenyl (6)	0	3	0.01402	0.01626			0.00758	0.01402 UJ	0.01522 UJ	0.01626 UJ
2,4-Dichlorobiphenyl (7)	0	3	0.00352	0.0062			0.00243	0.00352 UJ	0.00485 UJ	0.0062 UJ
2,4'-Dichlorobiphenyl (8)	0	3	0.07111	0.08704			0.03864	0.07111 UJ	0.07367 UJ	0.08704 UJ
2,5-Dichlorobiphenyl (9)	0	3	0.00502	0.00695			0.00315	0.00502 UJ	0.00692 UJ	0.00695 UJ
2,6-Dichlorobiphenyl (10)	3	3			0.00175	0.0023	0.00204	0.0023 J	0.00206 J	0.00175 J

US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	APC-AE-4001-0000-01-W 6/20/2001	APC-AE-4002-0000-01-W 6/20/2001	APC-AE-4003-0000-01-W 6/20/2001
3,4-Dichlorobiphenyl (12)	0	3	0.00916	0.0165			0.00654	0.00916 UJ	0.0165 UJ	0.01358 UJ
2,2',3'-Trichlorobiphenyl (16)	0	3	0.03667	0.06634			0.02417	0.03667 UJ	0.06634 UJ	0.04198 UJ
2,2',4-Trichlorobiphenyl (17)	1	3	0.04095	0.05015	0.07725	0.07725	0.04093	0.04095 UJ	0.07725 J	0.05015 UJ
2,2',5-Trichlorobiphenyl (18)	2	3	0.1212	0.1212	0.14918	0.2759	0.16189	0.1212 UJ	0.2759 J	0.14918 J
2,2',6-Trichlorobiphenyl (19)	3	3			0.01808	0.03684	0.02719	0.01808 J	0.03684 J	0.02664 J
2,3,3'-Trichlorobiphenyl (20)	3	3			1.0754	4.51384	2.54773	1.0754 J	4.51384 J	2.05396 J
2,3,4'-Trichlorobiphenyl (22)	3	3			0.12909	0.32507	0.24255	0.12909 J	0.32507 J	0.27349 J
2,3,6-Trichlorobiphenyl (24)	2	3	0.0129	0.0129	0.01506	0.03114	0.01755	0.0129 UJ	0.03114 J	0.01506 J
2,3',4-Trichlorobiphenyl (25)	2	3	0.01345	0.01345	0.02809	0.03786	0.02423	0.01345 UJ	0.03786 J	0.02809 J
2,3',5-Trichlorobiphenyl (26)	3	3			0.1249	0.50686	0.28547	0.1249 J	0.50686 J	0.22466 J
2,4',5-Trichlorobiphenyl (31)	3	3			0.53872	1.97938	1.14903	0.53872 J	1.97938 J	0.929 J
2,4',6-Trichlorobiphenyl (32)	3	3			0.06656	0.17737	0.11496	0.06656 J	0.17737 J	0.10094 J
2,2',3,3'-Tetrachlorobiphenyl (40)	3	3			0.0792	0.20826	0.15175	0.0792 J	0.20826 J	0.16779 J
2,2',3,4'-Tetrachlorobiphenyl (42)	3	3			0.49435	1.46931	1.00633	0.49435 J	1.46931 J	1.05532 J
2,2',3,5-Tetrachlorobiphenyl (43)	3	3			16.74573	47.28633	34.17321	16.74573 J	47.28633 J	38.48757 J
2,2',3,5'-Tetrachlorobiphenyl (44)	3	3			3.21243	11.84715	7.53655	3.21243 J	11.84715 J	7.55007 J
2,2',3,6-Tetrachlorobiphenyl (45)	3	3			0.07316	0.29294	0.16811	0.07316 J	0.29294 J	0.13824 J
2,2',3,6'-Tetrachlorobiphenyl (46)	3	3			0.01636	0.0424	0.02964	0.01636 J	0.0424 J	0.03017 J
2,2',4,5-Tetrachlorobiphenyl (48)	1	3	0.0262	0.04084	0.09497	0.09497	0.04283	0.0262 UJ	0.09497 J	0.04084 UJ
2,2',4,5'-Tetrachlorobiphenyl (49)	3	3			1.21338	3.8119	2.74363	1.21338 J	3.8119 J	3.2056 J
2,2',4,6-Tetrachlorobiphenyl (50)	3	3			0.07506	0.34124	0.19317	0.07506 J	0.34124 J	0.1632 J
2,3,3',4'-Tetrachlorobiphenyl (56)	1	3	0.03984	0.0687	0.24446	0.24446	0.09958	0.0687 UJ	0.03984 UJ	0.24446 J
2,3,3',6-Tetrachlorobiphenyl (59)	3	3			2.33334	5.94804	4.40070	2.33334 J	5.94804 J	4.92072 J
2,3,4,4'-Tetrachlorobiphenyl (60)	3	3			0.62382	1.36268	0.92385	0.62382 J	1.36268 J	0.78504 J
2,3,4,5-Tetrachlorobiphenyl (61)	3	3			2.00672	8.08904	5.08189	2.00672 J	8.08904 J	5.14992 J
2,3,4',5-Tetrachlorobiphenyl (63)	3	3			0.1043	0.36308	0.23505	0.1043 J	0.36308 J	0.23776 J
2,3,4',6-Tetrachlorobiphenyl (64)	3	3			4.08494	14.17297	8.77107	4.08494 J	14.17297 J	8.05529 J
2,3',4,4'-Tetrachlorobiphenyl (66)	3	3			3.48906	21.72241	13.06816	3.48906 J	21.72241 J	13.99302 J
3,3',4,4'-Tetrachlorobiphenyl (77)	3	3			0.02316	0.0801	0.05190	0.02316 J	0.05243 J	0.0801 J
3,4,4',5-Tetrachlorobiphenyl (81)	0	3	0.09959	0.09995			0.04991	0.09995 UJ	0.09959 UJ	0.09993 UJ
2,2',3,3',4-Pentachlorobiphenyl (82)	3	3			0.55838	3.23522	2.34209	0.55838 J	3.23522 J	3.23268 J
2,2',3,3',5-Pentachlorobiphenyl (83)	3	3			21.58828	58.88034	44.41984	21.58828 J	58.88034 J	52.7909 J
2,2',3,3',6-Pentachlorobiphenyl (84)	3	3			1.4581	9.89024	6.49384	1.4581 J	9.89024 J	8.13317 J
2,2',3,4,4'-Pentachlorobiphenyl (85)	3	3			8.39232	24.55848	17.59026	8.39232 J	24.55848 J	19.81998 J
2,2',3,4,5-Pentachlorobiphenyl (86)	3	3			6.6777	36.21222	24.33284	6.6777 J	36.21222 J	30.1086 J
2,2',3,4,6-Pentachlorobiphenyl (88)	3	3			1.27484	6.92126	4.96181	1.27484 J	6.68932 J	6.92126 J
2,2',3,4,6'-Pentachlorobiphenyl (89)	3	3			0.00617	0.01645	0.01200	0.00617 J	0.01645 J	0.01339 J
2,2',3,4',5-Pentachlorobiphenyl (90)	2	3	0.19919	0.19919	14.9307	64.0341	26.35480	14.9307 J	0.19919 UJ	64.0341 J

US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	APC-AE-4001-0000-01-W 6/20/2001	APC-AE-4002-0000-01-W 6/20/2001	APC-AE-4003-0000-01-W 6/20/2001
2,2',3,5,5'-Pentachlorobiphenyl (92)	3	3			4.93167	29.7467	19.59123	4.93167 J	29.7467 J	24.09531 J
2,2',3,5,6-Pentachlorobiphenyl (93)	3	3			4.88625	34.4837	24.50975	4.88625 J	34.1593 J	34.4837 J
2,3,3',4,4'-Pentachlorobiphenyl (105)	3	3			8.6516	32.93143	19.20014	8.6516 J	32.93143 J	16.01738 J
2,3,3',4,5-Pentachlorobiphenyl (106)	3	3			0.72966	3.98376	2.54914	0.72966 J	3.98376 J	2.934 J
2,3,3',4',5'-Pentachlorobiphenyl (108)	3	3			0.21428	0.89592	0.63359	0.21428 J	0.89592 J	0.79056 J
2,3,3',4',6-Pentachlorobiphenyl (110)	3	3			31.61692	90.8878	60.44795	31.61692 J	58.83914 J	90.8878 J
2,3,4,4',5-Pentachlorobiphenyl (114)	3	3			0.47424	1.38881	0.98030	0.47424 J	1.38881 J	1.07785 J
2,3',4,4',5-Pentachlorobiphenyl (118)	3	3			38.15123	77.93649	59.30778	38.15123 J	61.83562 J	77.93649 J
3,3',4,4',5-Pentachlorobiphenyl (126)	3	3			0.18562	0.26193	0.21530	0.19836 J	0.18562 J	0.26193 J
2,2',3,3',4,4'-Hexachlorobiphenyl (128)	3	3			10.73276	40.96492	26.03015	10.73276 J	40.96492 J	26.39278 J
2,2',3,3',4,5-Hexachlorobiphenyl (129)	2	3	0.09959	0.09959	81.81936	198.53288	93.46735	81.81936 J	0.09959 UJ	198.53288 J
2,2',3,3',4,5'-Hexachlorobiphenyl (130)	3	3			4.50121	13.57866	9.82927	4.50121 J	13.57866 J	11.40795 J
2,2',3,3',4,6-Hexachlorobiphenyl (131)	3	3			0.05741	0.558	0.32602	0.05741 J	0.558 J	0.36265 J
2,2',3,3',4,6'-Hexachlorobiphenyl (132)	3	3			2.37057	26.31192	15.69301	2.37057 J	26.31192 J	18.39653 J
2,2',3,3',5,6-Hexachlorobiphenyl (134)	3	3			1.31356	6.19102	4.32394	1.31356 J	6.19102 J	5.46724 J
2,2',3,3',5,6'-Hexachlorobiphenyl (135)	3	3			2.13474	15.77205	9.87112	2.13474 J	11.70657 J	15.77205 J
2,2',3,3',6,6'-Hexachlorobiphenyl (136)	3	3			0.41494	2.9647	1.97741	0.41494 J	2.9647 J	2.55259 J
2,2',3,4,4',5-Hexachlorobiphenyl (137)	3	3			4.97642	21.35934	15.21126	4.97642 J	19.29802 J	21.35934 J
2,2',3,4,5,5'-Hexachlorobiphenyl (141)	3	3			4.8536	17.31979	12.05997	4.8536 J	17.31979 J	14.00651 J
2,2',3,4,5',6-Hexachlorobiphenyl (144)	1	3	0.09959	0.09995	0.10486	0.10486	0.06821	0.09995 UJ	0.09959 UJ	0.10486 J
2,2',3,4',5,5'-Hexachlorobiphenyl (146)	3	3			9.89756	24.76886	19.63271	9.89756 J	24.2317 J	24.76886 J
2,2',3,4',5,6-Hexachlorobiphenyl (147)	3	3			26.53416	158.8132	93.79665	26.53416 J	96.0426 J	158.8132 J
2,2',4,4',5,5'-Hexachlorobiphenyl (153)	3	3			49.3737	92.0445	76.01673	49.3737 J	92.0445 J	86.632 J
2,3,3',4,4',5-Hexachlorobiphenyl (156)	3	3			4.2665	14.36836	9.34429	4.2665 J	14.36836 J	9.398 J
2,3,3',4,4',6-Hexachlorobiphenyl (158)	3	3			5.78747	18.14329	12.04495	5.78747 J	18.14329 J	12.20409 J
2,3',4,4',5,5'-Hexachlorobiphenyl (167)	3	3			1.79768	6.52664	4.19429	1.79768 J	6.52664 J	4.25856 J
3,3',4,4',5,5'-Hexachlorobiphenyl (169)	1	3	0.09995	0.21475	0.1249	0.1249	0.09408	0.09995 UJ	0.1249 J	0.21475 UJ
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)	3	3			5.8596	20.50263	13.50558	5.8596 J	20.50263 J	14.1545 J
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)	3	3			1.8289	6.16718	4.08168	1.8289 J	6.16718 J	4.24896 J
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)	3	3			1.17437	3.02973	2.18125	1.17437 J	3.02973 J	2.33964 J
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)	3	3			1.58702	7.129	5.16478	1.58702 J	7.129 J	6.77832 J
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)	3	3			0.09935	0.32172	0.19926	0.09935 J	0.32172 J	0.1767 J
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)	3	3			0.03743	0.35797	0.18325	0.03743 J	0.35797 J	0.15436 J
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)	3	3			4.01781	11.92712	8.54284	4.01781 J	11.92712 J	9.6836 J
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)	3	3			1.7053	3.47069	2.73884	1.7053 J	3.47069 J	3.04053 J
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)	3	3			9.58516	29.05826	18.78534	9.58516 J	29.05826 J	17.7126 J
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)	0	3	0.19919	0.1999			0.09982	0.1999 UJ	0.19919 UJ	0.19985 UJ
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)	3	3			2.36863	5.27826	3.60914	2.36863 J	5.27826 J	3.18054 J

US EPA ARCHIVE DOCUMENT

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North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	APC-AE-4001-0000-01-W 6/20/2001	APC-AE-4002-0000-01-W 6/20/2001	APC-AE-4003-0000-01-W 6/20/2001
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)	3	3			0.01095	0.02223	0.01573	0.01095 J	0.02223 J	0.01401 J
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)	3	3			0.07786	0.36328	0.24105	0.07786 J	0.36328 J	0.28202 J
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)	3	3			25.83873	57.86682	43.28915	25.83873 J	46.1619 J	57.86682 J
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)	3	3			0.17875	0.49632	0.34137	0.17875 J	0.49632 J	0.34905 J
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)	3	3			2.07324	5.42516	3.68571	2.07324 J	5.42516 J	3.55873 J
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)	3	3			0.18794	0.62282	0.39144	0.18794 J	0.62282 J	0.36355 J
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)	3	3			1.58798	4.88722	2.98242	1.58798 J	4.88722 J	2.47206 J
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)	3	3			0.72547	1.97857	1.25091	0.72547 J	1.97857 J	1.04869 J
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)	3	3			0.84563	2.57743	1.47447	0.84563 J	2.57743 J	1.00034 J
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)	3	3			0.06455	0.14054	0.08988	0.06455 J	0.14054 J	0.06455 J
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)	3	3			12.24624	27.8624	22.43299	12.24624 J	27.8624 J	27.19034 J
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)	3	3			0.03147	0.16105	0.09741	0.03147 J	0.16105 J	0.0997 J
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)	3	3			0.24237	0.62736	0.37926	0.24237 J	0.62736 J	0.26804 J
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)	3	3			2.81398	7.35651	4.60995	2.81398 J	7.35651 J	3.65937 J
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)	3	3			0.10035	0.24909	0.16263	0.10035 J	0.24909 J	0.13846 J
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	3	3			5.69203	16.07881	10.72211	5.69203 J	16.07881 J	10.39548 J
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	3	3			0.38422	1.10777	0.67121	0.38422 J	1.10777 J	0.52163 J
Decachlorobiphenyl (209)	3	3			2.81527	9.26879	5.82671	2.81527 J	9.26879 J	5.39606 J
PCB Congeners, Total	3	3			476.283	1308.19488	958.68511	476.283 J	1091.57746 J	1308.19488 J
Toxicity Equivalency (PCB)	3	3			0.0269	0.0409	0.0350	0.0269	0.0373	0.0409
Other (%)										
Lipid_percent	11	11			7.33	17.7	13.1	7.33	15.8	10.7

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

US EPA ARCHIVE DOCUMENT

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Centredale Manor Restoration Project Superfund Site
North Providence, RI

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Samples ending with:
W - whole body

US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-AE-4004-0000-01-W 6/20/2001	APC-AE-4005-0000-01-W 6/20/2001	APC-AE-4006-0000-01-W 6/20/2001	APC-AE-4006-0000-01-W 6/20/2001 REEXTRACTED	APC-AE-4007-0000-01-W 6/20/2001 DUPLICATE	APC-AE-4007-0000-01-W 6/20/2001	APC-AE-4008-0000-01-W 6/20/2001	APC-AE-4009-0000-01-W 6/20/2001
Semivolatile Organics (ug/Kg)								
1,1'-Biphenyl	0.57 J	0.63 J	1.26 U			1.29 U	0.59 J	0.64 J
2-Methylnaphthalene	2.66	3.25	2.85			2.45	3.06	4.45
Acenaphthene	4.23	5.6	2.34			3.56	4.13	5.44
Acenaphthylene	1.09 J	1.83	0.77 J			0.98 J	0.9 J	1.75
Anthracene	1.39	2.16	1.04 J			0.97 J	1.24 J	1.92
Benzo(a)anthracene	1.27 U	1.86 U	1.26 U			1.29 U	1.31 U	1.31 U
Benzo(a)pyrene	1.27 U	1.66 U	1.26 U			1.29 U	1.31 U	1.32 U
Benzo(b)fluoranthene	1.27 U	2.86 U	1.27 U			1.29 U	1.31 U	2.14 U
Benzo(g,h,i)perylene	1.27 U	1.65 U	1.26 U			1.29 U	1.31 U	1.35 U
Benzo(k)fluoranthene	1.3 U	2.58 U	1.26 U			1.29 U	1.31 U	1.86 U
Chrysene	1.73 U	3.81 U	1.57 U			1.29 U	1.31 U	2.6 U
Dibenzo(a,h)anthracene	1.27 U	1.29 U	1.26 U			1.29 U	1.31 U	1.31 U
Dibenzofuran	1.15 J	1.21 J	0.84 J			0.93 J	0.96 J	1.33
Fluoranthene	8.77	12.53	5.66			6.63	7.4	9.97
Fluorene	1.79	1.99	1.33			1.26 J	1.58	2.24
Indeno(1,2,3-cd)pyrene	1.27 U	1.62 U	1.26 U			1.29 U	1.31 U	1.44 U
Naphthalene	3.64	4.7	3.37			3.82	4.23	5.1
Phenanthrene	9.5	10.63	6.26			6.08	7.54	9.83
Pyrene	4.2 U	6.65	2.92 U			2.7 U	2.29 U	4.8 U
Total PAH	34.79	51.18	24.47			26.68	31.63	42.68
Pesticides/PCBs (ug/Kg)								
4,4'-DDD	10.01	12	11.06	42.05	10.3	9.1	7.15	10.99
4,4'-DDE	21.47	20.83	11.36 J	3.52	22.61	19.12	25.26	33.05
4,4'-DDT	2.45	4.46	3.52	11.06	1.32 U	3.56	4.74	2.05
Aldrin	1.27 U	1.29 U	1.26 UJ	0.59 U	1.32 U	1.29 U	1.31 U	1.31 U
alpha-BHC	1.27 U	1.29 U	1.26 UJ	0.59 U	1.32 U	1.29 U	1.31 U	1.32 U
alpha-Chlordane	12.83	14.24	5.79 J	25.31	71.2	63.27	11.49	10.12
Aroclor, Total	600.52	692.01	360.24 J	1233.23 J	132.07 U	128.57 U	130.63 U	1031.08
Aroclor-1016	15.86 U	16.14 U	15.73 UJ	7.42 U	16.51 U	16.07 U	16.33 U	16.39 U
Aroclor-1221	15.86 U	16.14 U	15.73 UJ	7.42 U	16.51 U	16.07 U	16.33 U	16.39 U
Aroclor-1232	15.86 U	16.14 U	15.73 UJ	7.42 U	16.51 U	16.07 U	16.33 U	16.39 U
Aroclor-1242	15.86 U	16.14 U	15.73 UJ	7.42 U	16.51 U	16.07 U	16.33 U	16.39 U
Aroclor-1248	15.86 U	16.14 U	15.73 UJ	7.42 U	16.51 U	16.07 U	16.33 U	16.39 U
Aroclor-1254	600.52	692.01	360.24 J	1155.76	16.51 U	16.07 U	16.33 U	1031.08
Aroclor-1260	15.86 U	16.14 U	15.73 UJ	7.42 U	16.51 U	16.07 U	16.33 U	16.39 U
Aroclor-1268	15.86 U	16.14 U	15.73 UJ	77.47 J	16.51 U	16.07 U	16.33 U	16.39 U
beta-BHC	0.72 J	1.29 U	1.26 UJ	0.59 U	1.32 U	1.29 U	1.31 U	1.31 U

US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-AE-4004-0000-01-W 6/20/2001	APC-AE-4005-0000-01-W 6/20/2001	APC-AE-4006-0000-01-W 6/20/2001	APC-AE-4006-0000-01-W 6/20/2001 REEXTRACTED	APC-AE-4007-0000-01-W 6/20/2001 DUPLICATE	APC-AE-4007-0000-01-W 6/20/2001	APC-AE-4008-0000-01-W 6/20/2001	APC-AE-4009-0000-01-W 6/20/2001
delta-BHC	1.27 U	1.29 U	1.26 UJ	0.59 UJ	1.32 U	1.29 U	1.31 U	1.32 U
Dieldrin	4.86	6.5	2.97 J	0.59 U	3.52	3.13	3.92	14.48
Endosulfan I	1.27 U	1.29 U	1.26 UJ	0.59 U	1.32 U	1.29 U	1.31 U	1.31 U
Endosulfan II	1.27 U	1.29 U	1.26 UJ	0.59 U	1.32 U	1.29 U	1.31 U	1.31 U
Endosulfan Sulfate	1.27 U	1.29 U	1.26 UJ	9.99	1.32 U	1.29 U	1.31 U	1.31 U
Endrin	1.27 U	1.29 U	1.26 UJ	0.59 U	1.32 U	1.29 U	1.31 U	1.31 U
Endrin Aldehyde	1.27 UJ	1.29 UJ	1.26 UJ	0.8	1.32 U	1.29 UJ	1.31 UJ	1.31 UJ
Endrin Ketone	1.27 U	1.29 U	1.26 UJ	0.59 U	1.32 U	1.29 U	1.31 U	1.31 U
gamma-BHC	1.27 U	0.7 J	0.08 J	0.59 UJ	0.41 J	0.5 J	0.72 J	0.54 J
gamma-Chlordane	5.09	5.69	2.14 J	8.98	25.49	22.96	4.31	4.2
Heptachlor	1.27 U	1.29 U	1.26 UJ	0.59 U	1.32 U	1.29	1.31 U	1.31 U
Heptachlor Epoxide	1.42	1.57	0.74 J	0.59 U	4.83	4.46	1.42	0.93 J
Methoxychlor	1.27 UJ	1.29 UJ	1.26 UJ	0.59 U	1.32 U	1.29 UJ	1.31 UJ	1.32 UJ
Technical Chlordane	173.41	180.63	88.24 J	321.69	885.69	762.53	183.39	256.09
Toxaphene	31.73 U	32.28 U	31.46 UJ	7.42 U	33.02 U	32.14 U	32.66 U	32.79 U
Inorganics (mg/Kg)								
Aluminum	5.95 J	15.7 J	19.5 J			2.01 J	2.57 J	13.1 J
Antimony	0.034 U	0.034 U	0.034 U			0.034 U	0.034 U	0.034 U
Arsenic	0.11 U	0.0919 U	0.0924 U			0.0718 U	0.0565 U	0.0824 U
Barium	0.24 J	0.364 J	0.604 J			0.681 J	0.263 J	0.457 J
Beryllium	0.004 U	0.004 U	0.004 U			0.004 U	0.004 U	0.004 U
Cadmium	0.0696 J	0.0665 J	0.0756 J			0.0295 J	0.08 J	0.248
Chromium	0.0417 J	0.123 J	0.0779 J			0.0346 J	0.0681 J	0.107 J
Cobalt	0.0591 J	0.0563 J	0.0617 J			0.138 J	0.0587 J	0.0818 J
Copper	0.766 J	0.652 J	0.657 J			1.03 J	0.714 J	0.76 J
Iron	27.9	33.8	31.3			31	22.3	39.3
Lead	0.229 J	0.251 J	0.279 J			0.952 J	0.12 U	0.596 J
Manganese	2.53 J	1.62 J	4.16 J			4.05 J	7.7 J	2.57 J
Mercury	0.148	0.0635	0.145			0.24	0.216	0.0435
Mercury (methyl)	0.139	0.0638	0.116			0.226	0.471	0.0483
Molybdenum	0.115 J	0.32 U	0.32 U			0.32 U	0.32 U	0.32 U
Nickel	0.131 J	0.0888 J	0.0799 J			0.214 J	0.0856 J	0.147 J
Selenium	0.339 J	0.401 J	0.347 J			0.307 J	0.393 J	0.317 J
Silver	0.06 U	0.06 U	0.06 U			0.06 U	0.06 U	0.06 U
Thallium	0.022 U	0.022 U	0.022 U			0.022 U	0.022 U	0.022 U
Vanadium	0.179 U	0.109 J	0.179 U			0.179 U	0.179 U	0.179 U
Zinc	34.6 J	29.2 J	24.9 J			26.8 J	34.3 J	24.4 J
Dioxins/Furans (ug/Kg)								

US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-AE-4004-0000-01-W 6/20/2001	APC-AE-4005-0000-01-W 6/20/2001	APC-AE-4006-0000-01-W 6/20/2001	APC-AE-4006-0000-01-W 6/20/2001 REEXTRACTED	APC-AE-4007-0000-01-W 6/20/2001 DUPLICATE	APC-AE-4007-0000-01-W 6/20/2001	APC-AE-4008-0000-01-W 6/20/2001	APC-AE-4009-0000-01-W 6/20/2001
HCX	0.07239 J	0.10904 J	0.08916 J			0.01998 UJ	0.00774 J	0.07011 J
TCX	R	R	R			R	R	R
2,3,7,8-TCDD	0.07649 J	0.22532 J	0.30691 J			0.00928 J	0.02649 J	0.09259 J
1,2,3,7,8-PeCDD	0.00023 UJ	0.0006 UJ	0.00059 UJ			0.00019 UJ	0.00048 UJ	0.00061 UJ
1,2,3,4,7,8-HxCDD	0.00018 J	0.00021 UJ	0.00025 J			0.00009 UJ	0.00049 J	0.00032 J
1,2,3,6,7,8-HxCDD	0.00057 J	0.00168 J	0.00116 J			0.00047 J	0.00175 J	0.00128 J
1,2,3,7,8,9-HxCDD	0.00018 UJ	0.00017 J	0.00034 UJ			0.00015 J	0.00043 J	0.00019 J
1,2,3,4,6,7,8-HpCDD	0.00071 UJ	0.00172 J	0.00168 J			0.00089 UJ	0.00241 J	0.00187 J
OCDD	0.00114 UJ	0.00278 UJ	0.00281 UJ			0.00155 UJ	0.00239 UJ	0.00786 UJ
2,3,7,8-TCDF	0.00022 UJ	0.00015 UJ	0.00032 UJ			0.0002 UJ	0.00008 J	0.00006 J
1,2,3,7,8-PeCDF	0.00033 UJ	0.00026 UJ	0.00028 UJ			0.00023 UJ	0.00008 J	0.00025 UJ
2,3,4,7,8-PeCDF	0.00032 UJ	0.00025 UJ	0.00028 UJ			0.00015 J	0.00031 J	0.00019 UJ
1,2,3,4,7,8-HxCDF	0.00013 UJ	0.00019 UJ	0.00024 UJ			0.00014 UJ	0.00036 UJ	0.00018 UJ
1,2,3,6,7,8-HxCDF	0.00016 J	0.00022 J	0.00014 J			0.00013 J	0.00033 J	0.00024 UJ
2,3,4,6,7,8-HxCDF	0.00012 UJ	0.00013 UJ	0.0001 UJ			0.00011 UJ	0.00026 UJ	0.00011 UJ
1,2,3,7,8,9-HxCDF	0.00015 UJ	0.00012 UJ	0.00028 UJ			0.00002 J	0.00011 UJ	0.00028 UJ
1,2,3,4,6,7,8-HpCDF	0.0003 UJ	0.00076 J	0.0006 UJ			0.00022 UJ	0.00087 J	0.00064 UJ
1,2,3,4,7,8,9-HpCDF	0.00025 UJ	0.00015 UJ	0.00017 UJ			0.00014 UJ	0.00019 UJ	0.00014 UJ
OCDF	0.00008 UJ	0.00028 UJ	0.00027 UJ			0.00009 UJ	0.00023 UJ	0.00054 UJ
Total TCDD	0.07649 J	0.22532 J	0.30691 J			0.00928 J	0.02649 J	0.09259 J
Total PeCDD	0.00023 UJ	0.0006 UJ	0.00069 UJ			0.00019 UJ	0.00048 UJ	0.00061 UJ
Total HxCDD	0.00075 J	0.00185 J	0.00141 J			0.00108 J	0.00312 J	0.00211 J
Total HpCDD	0.00083 UJ	0.00193 UJ	0.00195 UJ			0.00089 UJ	0.00251 UJ	0.00227 UJ
Total TCDF	0.00022 UJ	0.00012 J	0.00023 J			0.0002 UJ	0.00008 J	0.00006 J
Total PeCDF	0.00033 UJ	0.00026 UJ	0.00083 J			0.00015 J	0.00066 J	0.00059 J
Total HxCDF	0.00038 UJ	0.00063 UJ	0.00039 UJ			0.0004 UJ	0.00104 UJ	0.0003 UJ
Total HpCDF	0.00057 UJ	0.00109 UJ	0.00068 UJ			0.00022 UJ	0.00097 UJ	0.00199 UJ
Toxicity Equivalency (Dioxins, Furans, HCX)	0.0766	0.226	0.307			0.00943	0.027	0.0928
PCB Congeners (ug/Kg)								
2-Monochlorobiphenyl (1)								
4-Chlorobiphenyl (3)								
2,2'-Dichlorobiphenyl (4)								
2,3-Dichlorobiphenyl (5)								
2,3'-Dichlorobiphenyl (6)								
2,4-Dichlorobiphenyl (7)								
2,4'-Dichlorobiphenyl (8)								
2,5-Dichlorobiphenyl (9)								
2,6-Dichlorobiphenyl (10)								

US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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3,4-Dichlorobiphenyl (12)								
2,2',3'-Trichlorobiphenyl (16)								
2,2',4-Trichlorobiphenyl (17)								
2,2',5-Trichlorobiphenyl (18)								
2,2',6-Trichlorobiphenyl (19)								
2,3,3'-Trichlorobiphenyl (20)								
2,3,4'-Trichlorobiphenyl (22)								
2,3,6-Trichlorobiphenyl (24)								
2,3',4-Trichlorobiphenyl (25)								
2,3',5-Trichlorobiphenyl (26)								
2,4',5-Trichlorobiphenyl (31)								
2,4',6-Trichlorobiphenyl (32)								
2,2',3,3'-Tetrachlorobiphenyl (40)								
2,2',3,4'-Tetrachlorobiphenyl (42)								
2,2',3,5-Tetrachlorobiphenyl (43)								
2,2',3,5'-Tetrachlorobiphenyl (44)								
2,2',3,6-Tetrachlorobiphenyl (45)								
2,2',3,6'-Tetrachlorobiphenyl (46)								
2,2',4,5-Tetrachlorobiphenyl (48)								
2,2',4,5'-Tetrachlorobiphenyl (49)								
2,2',4,6-Tetrachlorobiphenyl (50)								
2,3,3',4'-Tetrachlorobiphenyl (56)								
2,3,3',6-Tetrachlorobiphenyl (59)								
2,3,4,4'-Tetrachlorobiphenyl (60)								
2,3,4,5-Tetrachlorobiphenyl (61)								
2,3,4',5-Tetrachlorobiphenyl (63)								
2,3,4',6-Tetrachlorobiphenyl (64)								
2,3',4,4'-Tetrachlorobiphenyl (66)								
3,3',4,4'-Tetrachlorobiphenyl (77)								
3,4,4',5-Tetrachlorobiphenyl (81)								
2,2',3,3',4-Pentachlorobiphenyl (82)								
2,2',3,3',5-Pentachlorobiphenyl (83)								
2,2',3,3',6-Pentachlorobiphenyl (84)								
2,2',3,4,4'-Pentachlorobiphenyl (85)								
2,2',3,4,5-Pentachlorobiphenyl (86)								
2,2',3,4,6-Pentachlorobiphenyl (88)								
2,2',3,4,6'-Pentachlorobiphenyl (89)								
2,2',3,4',5-Pentachlorobiphenyl (90)								

US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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2,2',3,5,5'-Pentachlorobiphenyl (92)								
2,2',3,5,6-Pentachlorobiphenyl (93)								
2,3,3',4,4'-Pentachlorobiphenyl (105)								
2,3,3',4,5-Pentachlorobiphenyl (106)								
2,3,3',4',5'-Pentachlorobiphenyl (108)								
2,3,3',4',6-Pentachlorobiphenyl (110)								
2,3,4,4',5-Pentachlorobiphenyl (114)								
2,3',4,4',5-Pentachlorobiphenyl (118)								
3,3',4,4',5-Pentachlorobiphenyl (126)								
2,2',3,3',4,4'-Hexachlorobiphenyl (128)								
2,2',3,3',4,5-Hexachlorobiphenyl (129)								
2,2',3,3',4,5'-Hexachlorobiphenyl (130)								
2,2',3,3',4,6-Hexachlorobiphenyl (131)								
2,2',3,3',4,6'-Hexachlorobiphenyl (132)								
2,2',3,3',5,6-Hexachlorobiphenyl (134)								
2,2',3,3',5,6'-Hexachlorobiphenyl (135)								
2,2',3,3',6,6'-Hexachlorobiphenyl (136)								
2,2',3,4,4',5-Hexachlorobiphenyl (137)								
2,2',3,4,5,5'-Hexachlorobiphenyl (141)								
2,2',3,4,5',6-Hexachlorobiphenyl (144)								
2,2',3,4',5,5'-Hexachlorobiphenyl (146)								
2,2',3,4',5,6-Hexachlorobiphenyl (147)								
2,2',4,4',5,5'-Hexachlorobiphenyl (153)								
2,3,3',4,4',5-Hexachlorobiphenyl (156)								
2,3,3',4,4',6-Hexachlorobiphenyl (158)								
2,3',4,4',5,5'-Hexachlorobiphenyl (167)								
3,3',4,4',5,5'-Hexachlorobiphenyl (169)								
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)								
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)								
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)								
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)								
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)								
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)								
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)								
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)								
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)								
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)								
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)								

US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-AE-4004-0000-01-W 6/20/2001	APC-AE-4005-0000-01-W 6/20/2001	APC-AE-4006-0000-01-W 6/20/2001	APC-AE-4006-0000-01-W 6/20/2001 REEXTRACTED	APC-AE-4007-0000-01-W 6/20/2001 DUPLICATE	APC-AE-4007-0000-01-W 6/20/2001	APC-AE-4008-0000-01-W 6/20/2001	APC-AE-4009-0000-01-W 6/20/2001
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)								
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)								
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)								
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)								
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)								
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)								
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)								
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)								
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)								
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)								
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)								
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)								
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)								
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)								
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)								
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl								
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl								
Decachlorobiphenyl (209)								
PCB Congeners, Total								
Toxicity Equivalency (PCB)								
Other (%)								
Lipid_percent	14.3	17.7	13.4		13.4	12.8	17.2	11

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

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Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-AE-4004-0000-01-W 6/20/2001	APC-AE-4005-0000-01-W 6/20/2001	APC-AE-4006-0000-01-W 6/20/2001	APC-AE-4006-0000-01-W 6/20/2001 REEXTRACTED	APC-AE-4007-0000-01-W 6/20/2001 DUPLICATE	APC-AE-4007-0000-01-W 6/20/2001	APC-AE-4008-0000-01-W 6/20/2001	APC-AE-4009-0000-01-W 6/20/2001

Samples ending with:
W - whole body

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Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-AE-4010-0000-01-W 6/20/2001	APC-DU-062001-0000-B-W 6/20/2001 REPLICATE
Semivolatile Organics (ug/Kg)		
1,1'-Biphenyl	0.55 J	
2-Methylnaphthalene	2.46	
Acenaphthene	4.18	
Acenaphthylene	1.64	
Anthracene	2.09	
Benzo(a)anthracene	1.29 U	
Benzo(a)pyrene	1.29 U	
Benzo(b)fluoranthene	1.29 U	
Benzo(g,h,i)perylene	1.29 U	
Benzo(k)fluoranthene	1.29 U	
Chrysene	1.29 U	
Dibenzo(a,h)anthracene	1.29 U	
Dibenzofuran	1.16 J	
Fluoranthene	7.3	
Fluorene	1.72	
Indeno(1,2,3-cd)pyrene	1.29 U	
Naphthalene	3.32	
Phenanthrene	8.4	
Pyrene	3.53 U	
Total PAH	32.81	
Pesticides/PCBs (ug/Kg)		
4,4'-DDD	11.79	
4,4'-DDE	27.68	
4,4'-DDT	1.29 U	
Aldrin	1.29 U	
alpha-BHC	1.29 U	
alpha-Chlordane	13.14	
Aroclor, Total	1007.84	
Aroclor-1016	16.11 U	
Aroclor-1221	16.11 U	
Aroclor-1232	16.11 U	
Aroclor-1242	16.11 U	
Aroclor-1248	16.11 U	
Aroclor-1254	1007.84	
Aroclor-1260	16.11 U	
Aroclor-1268	16.11 U	
beta-BHC	1.29 U	

US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-AE-4010-0000-01-W 6/20/2001	APC-DU-062001-0000-B-W 6/20/2001 REPLICATE
delta-BHC	1.29 U	
Dieldrin	12.62	
Endosulfan I	1.29 U	
Endosulfan II	1.29 U	
Endosulfan Sulfate	1.29 U	
Endrin	1.29 U	
Endrin Aldehyde	1.29 UJ	
Endrin Ketone	1.29 U	
gamma-BHC	0.26 J	
gamma-Chlordane	4.68	
Heptachlor	1.29 U	
Heptachlor Epoxide	1.07 J	
Methoxychlor	1.29 U	
Technical Chlordane	227.01	
Toxaphene	32.22 U	
Inorganics (mg/Kg)		
Aluminum	1.16 J	5.61 J
Antimony	0.034 U	0.034 U
Arsenic	0.0464 U	0.0891 U
Barium	0.609 J	0.189 J
Beryllium	0.004 U	0.004 U
Cadmium	0.0871 J	0.07 J
Chromium	0.0281 J	0.259 J
Cobalt	0.104 J	0.0533 J
Copper	0.519 J	0.83 J
Iron	14.3	29.6
Lead	0.535 J	0.206 J
Manganese	5.44 J	2 J
Mercury	0.051	0.134
Mercury (methyl)	0.0621	0.133
Molybdenum	0.32 U	0.32 U
Nickel	0.164 J	0.116 J
Selenium	0.334 J	0.318 J
Silver	0.06 U	0.06 U
Thallium	0.022 U	0.022 U
Vanadium	0.179 U	0.179 U
Zinc	29.4 J	30.3 J
Dioxins/Furans (ug/Kg)		

US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-AE-4010-0000-01-W 6/20/2001	APC-DU-062001-0000-B-W 6/20/2001 REPLICATE
HCX	0.0495 J	
TCX	R	
2,3,7,8-TCDD	0.09312 J	
1,2,3,7,8-PeCDD	0.00048 UJ	
1,2,3,4,7,8-HxCDD	0.0002 J	
1,2,3,6,7,8-HxCDD	0.00103 J	
1,2,3,7,8,9-HxCDD	0.00015 J	
1,2,3,4,6,7,8-HpCDD	0.00096 J	
OCDD	0.00137 UJ	
2,3,7,8-TCDF	0.00016 UJ	
1,2,3,7,8-PeCDF	0.0001 UJ	
2,3,4,7,8-PeCDF	0.00012 J	
1,2,3,4,7,8-HxCDF	0.00015 UJ	
1,2,3,6,7,8-HxCDF	0.00012 UJ	
2,3,4,6,7,8-HxCDF	0.00007 UJ	
1,2,3,7,8,9-HxCDF	0.0001 UJ	
1,2,3,4,6,7,8-HpCDF	0.00042 J	
1,2,3,4,7,8,9-HpCDF	0.00013 UJ	
OCDF	0.00012 UJ	
Total TCDD	0.09312 J	
Total PeCDD	0.00048 UJ	
Total HxCDD	0.00139 J	
Total HpCDD	0.00096 UJ	
Total TCDF	0.00006 UJ	
Total PeCDF	0.00044 UJ	
Total HxCDF	0.00034 UJ	
Total HpCDF	0.00049 UJ	
Toxicity Equivalency (Dioxins, Furans, HCX)	0.0933	
PCB Congeners (ug/Kg)		
2-Monochlorobiphenyl (1)		
4-Chlorobiphenyl (3)		
2,2'-Dichlorobiphenyl (4)		
2,3-Dichlorobiphenyl (5)		
2,3'-Dichlorobiphenyl (6)		
2,4-Dichlorobiphenyl (7)		
2,4'-Dichlorobiphenyl (8)		
2,5-Dichlorobiphenyl (9)		
2,6-Dichlorobiphenyl (10)		

US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-AE-4010-0000-01-W 6/20/2001	APC-DU-062001-0000-B-W 6/20/2001 REPLICATE
3,4-Dichlorobiphenyl (12)		
2,2',3'-Trichlorobiphenyl (16)		
2,2',4-Trichlorobiphenyl (17)		
2,2',5-Trichlorobiphenyl (18)		
2,2',6-Trichlorobiphenyl (19)		
2,3,3'-Trichlorobiphenyl (20)		
2,3,4'-Trichlorobiphenyl (22)		
2,3,6-Trichlorobiphenyl (24)		
2,3',4-Trichlorobiphenyl (25)		
2,3',5-Trichlorobiphenyl (26)		
2,4',5-Trichlorobiphenyl (31)		
2,4',6-Trichlorobiphenyl (32)		
2,2',3,3'-Tetrachlorobiphenyl (40)		
2,2',3,4'-Tetrachlorobiphenyl (42)		
2,2',3,5-Tetrachlorobiphenyl (43)		
2,2',3,5'-Tetrachlorobiphenyl (44)		
2,2',3,6-Tetrachlorobiphenyl (45)		
2,2',3,6'-Tetrachlorobiphenyl (46)		
2,2',4,5-Tetrachlorobiphenyl (48)		
2,2',4,5'-Tetrachlorobiphenyl (49)		
2,2',4,6-Tetrachlorobiphenyl (50)		
2,3,3',4'-Tetrachlorobiphenyl (56)		
2,3,3',6-Tetrachlorobiphenyl (59)		
2,3,4,4'-Tetrachlorobiphenyl (60)		
2,3,4,5-Tetrachlorobiphenyl (61)		
2,3,4',5-Tetrachlorobiphenyl (63)		
2,3,4',6-Tetrachlorobiphenyl (64)		
2,3',4,4'-Tetrachlorobiphenyl (66)		
3,3',4,4'-Tetrachlorobiphenyl (77)		
3,4,4',5-Tetrachlorobiphenyl (81)		
2,2',3,3',4-Pentachlorobiphenyl (82)		
2,2',3,3',5-Pentachlorobiphenyl (83)		
2,2',3,3',6-Pentachlorobiphenyl (84)		
2,2',3,4,4'-Pentachlorobiphenyl (85)		
2,2',3,4,5-Pentachlorobiphenyl (86)		
2,2',3,4,6-Pentachlorobiphenyl (88)		
2,2',3,4,6'-Pentachlorobiphenyl (89)		
2,2',3,4',5-Pentachlorobiphenyl (90)		

US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-AE-4010-0000-01-W 6/20/2001	APC-DU-062001-0000-B-W 6/20/2001 REPLICATE
2,2',3,5,5'-Pentachlorobiphenyl (92)		
2,2',3,5,6-Pentachlorobiphenyl (93)		
2,3,3',4,4'-Pentachlorobiphenyl (105)		
2,3,3',4,5-Pentachlorobiphenyl (106)		
2,3,3',4',5'-Pentachlorobiphenyl (108)		
2,3,3',4',6-Pentachlorobiphenyl (110)		
2,3,4,4',5-Pentachlorobiphenyl (114)		
2,3',4,4',5-Pentachlorobiphenyl (118)		
3,3',4,4',5-Pentachlorobiphenyl (126)		
2,2',3,3',4,4'-Hexachlorobiphenyl (128)		
2,2',3,3',4,5-Hexachlorobiphenyl (129)		
2,2',3,3',4,5'-Hexachlorobiphenyl (130)		
2,2',3,3',4,6-Hexachlorobiphenyl (131)		
2,2',3,3',4,6'-Hexachlorobiphenyl (132)		
2,2',3,3',5,6-Hexachlorobiphenyl (134)		
2,2',3,3',5,6'-Hexachlorobiphenyl (135)		
2,2',3,3',6,6'-Hexachlorobiphenyl (136)		
2,2',3,4,4',5-Hexachlorobiphenyl (137)		
2,2',3,4,5,5'-Hexachlorobiphenyl (141)		
2,2',3,4,5',6-Hexachlorobiphenyl (144)		
2,2',3,4',5,5'-Hexachlorobiphenyl (146)		
2,2',3,4',5,6-Hexachlorobiphenyl (147)		
2,2',4,4',5,5'-Hexachlorobiphenyl (153)		
2,3,3',4,4',5-Hexachlorobiphenyl (156)		
2,3,3',4,4',6-Hexachlorobiphenyl (158)		
2,3',4,4',5,5'-Hexachlorobiphenyl (167)		
3,3',4,4',5,5'-Hexachlorobiphenyl (169)		
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)		
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)		
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)		
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)		
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)		
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)		
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)		
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)		
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)		
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)		
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)		

US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-AE-4010-0000-01-W 6/20/2001	APC-DU-062001-0000-B-W 6/20/2001 REPLICATE
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)		
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)		
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)		
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)		
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)		
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)		
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)		
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)		
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)		
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)		
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)		
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)		
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)		
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)		
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)		
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl		
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl		
Decachlorobiphenyl (209)		
PCB Congeners, Total		
Toxicity Equivalency (PCB)		
Other (%)		
Lipid_percent	10.8	

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

US EPA ARCHIVE DOCUMENT

Table A-15
Summary Statistics and Analytical Results for American Eel - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-AE-4010-0000-01-W 6/20/2001	APC-DU-062001-0000-B-W 6/20/2001 REPLICATE

Samples ending with:
W - whole body

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	APC-DU-062001-0000-A-W 6/20/2001	APC-WS-4001-0000-01-W 6/20/2001	APC-WS-4002-0000-01-W 6/20/2001
Semivolatile Organics (ug/Kg)										
1,1'-Biphenyl	10	10			0.78	1.42	0.99		0.8	0.95
2-Methylnaphthalene	10	10			3.09	5.51	3.83		3.49	3.64
Acenaphthene	10	10			2.74	4.9	3.50		3.17	2.74
Acenaphthylene	10	10			1.36	3.87	2.15		1.61	1.36
Anthracene	10	10			1.54	4.06	2.71		2.18	1.54
Benzo(a)anthracene	10	10			0.37	3.01	1.28		0.79	0.37 J
Benzo(a)pyrene	10	10			0.13	2.79	0.95		0.69	0.13 J
Benzo(b)fluoranthene	10	10			0.25	4.01	1.21		0.95	0.25 J
Benzo(g,h,i)perylene	2	10	0.66	0.75	1.15	2.43	0.63		0.71 U	0.67 U
Benzo(k)fluoranthene	10	10			0.27	3.38	1.06		0.69	0.27 J
Chrysene	10	10			0.72	4.53	1.94		1.76	0.72
Dibenzo(a,h)anthracene	10	10			0.13	0.69	0.27		0.2 J	0.13 J
Dibenzofuran	10	10			1.89	3.37	2.48		2.44	1.89
Fluoranthene	10	10			5.17	13.85	8.26		8	5.32
Fluorene	10	10			2.84	5.6	4.07		4.3	3.2
Indeno(1,2,3-cd)pyrene	10	10			0.24	2.67	0.79		0.59 J	0.24 J
Naphthalene	10	10			2.24	4.09	2.84		2.46	2.52
Phenanthrene	10	10			5.69	14.51	9.58		10.02	7.32
Pyrene	10	10			1.18	3.89	2.29		3.05	1.43
Total PAH	10	10			34.02	73.92	50.54		47.17	34.02
Pesticides/PCBs (ug/Kg)										
4,4'-DDD	10	10			6.18	34.98	12.61		14.79 J	8.01 J
4,4'-DDE	10	10			10.89	53.83	28.69		16.97 J	10.89 J
4,4'-DDT	10	10			2.31	24.62	6.86		24.62 J	3.01 J
Aldrin	0	10	0.6	1.23			0.34		0.62 UJ	0.61 UJ
alpha-BHC	0	10	0.6	1.23			0.34		0.62 UJ	0.61 UJ
alpha-Chlordane	10	10			8.37	35.11	16.80		15.34 J	21.2 J
Aroclor, Total	10	10			444.66	3274.19	1612.71		1282.23 J	766.58 J
Aroclor-1016	0	10	7.52	15.31			4.20		7.68 UJ	7.61 UJ
Aroclor-1221	0	10	7.52	15.31			4.20		7.68 UJ	7.61 UJ
Aroclor-1232	0	10	7.52	15.31			4.20		7.68 UJ	7.61 UJ
Aroclor-1242	0	10	7.52	15.31			4.20		7.68 UJ	7.61 UJ
Aroclor-1248	0	10	7.52	15.31			4.20		7.68 UJ	7.61 UJ
Aroclor-1254	10	10			426.43	3243.44	1583.22		1257.52 J	748.08 J
Aroclor-1260	0	10	7.52	15.31			4.20		7.68 UJ	7.61 UJ
Aroclor-1268	10	10			18.23	52.74	29.49		24.71 J	18.5 J
beta-BHC	0	10	0.6	1.23			0.34		0.62 UJ	0.61 UJ

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	APC-DU-062001-0000-A-W 6/20/2001	APC-WS-4001-0000-01-W 6/20/2001	APC-WS-4002-0000-01-W 6/20/2001
delta-BHC	0	10	0.6	1.23			0.34		0.62 UJ	0.61 UJ
Dieldrin	10	10			1.66	9.9	5.37		4.93 J	3.87 J
Endosulfan I	0	10	0.6	1.23			0.34		0.62 UJ	0.61 UJ
Endosulfan II	0	10	0.6	1.23			0.34		0.62 UJ	0.61 UJ
Endosulfan Sulfate	0	10	0.6	1.23			0.34		0.62 UJ	0.61 UJ
Endrin	0	10	0.6	1.23			0.34		0.62 UJ	0.61 UJ
Endrin Aldehyde	0	10	0.6	1.23			0.34		0.62 UJ	0.61 UJ
Endrin Ketone	0	10	0.6	1.23			0.34		0.62 UJ	0.61 UJ
gamma-BHC	9	10	1.23	1.23	0.07	0.25	0.19		0.2 J	0.16 J
gamma-Chlordane	10	10			5.1	24.7	8.93		5.39 J	14.04 J
Heptachlor	0	10	0.6	1.23			0.34		0.62 UJ	0.61 UJ
Heptachlor Epoxide	10	10			0.32	0.83	0.61		0.57 J	0.83 J
Methoxychlor	0	10	0.6	1.23			0.34		0.62 UJ	0.61 UJ
Technical Chlordane	10	10			99.9	1247.42	346.24		116.33 J	155.6 J
Toxaphene	0	10	15.05	30.62			8.40		15.36 UJ	15.23 UJ
Inorganics (mg/Kg)										
Aluminum	10	10			1.06	25.8	8.02	25.4 J	4.56 J	1.06 J
Antimony	0	10	0.034	0.034			0.0170	0.034 U	0.034 U	0.034 U
Arsenic	0	10	0.0397	0.08			0.0295	0.0792 U	0.0507 U	0.0584 U
Barium	10	10			0.4	1.45	0.744	1.12 J	0.945 J	0.4 J
Beryllium	0	10	0.004	0.00509			0.00215	0.0057 U	0.00461 U	0.004 U
Cadmium	10	10			0.0156	0.0484	0.0241	0.04 J	0.0273 J	0.0285 J
Chromium	8	10	0.139	0.269	0.0669	0.229	0.112	0.214 J	0.11 J	0.0812 J
Cobalt	10	10			0.0663	0.127	0.0889	0.0858 J	0.115 J	0.0663 J
Copper	10	10			0.581	2.23	0.872	0.89 J	0.724 J	0.581 J
Iron	10	10			14.1	46.4	23.8	41.5	19.8	14.1
Lead	6	10	0.0513	0.135	0.14	0.349	0.158	0.507 J	0.215 J	0.0513 U
Manganese	10	10			3.83	12.3	6.78	8.61 J	8.86 J	4.48 J
Mercury	10	10			0.0808	0.216	0.136	0.2	0.113	0.184
Mercury (methyl)	10	10			0.0847	0.225	0.147	0.199	0.127	0.186
Molybdenum	3	10	0.32	0.32	0.0298	0.0939	0.130	0.0769 J	0.32 U	0.32 U
Nickel	10	10			0.114	0.221	0.147	0.169 J	0.161 J	0.126 J
Selenium	10	10			0.215	0.349	0.285	0.337 J	0.226 J	0.281 J
Silver	0	10	0.06	0.06			0.0300	0.06 U	0.06 U	0.06 U
Thallium	0	10	0.022	0.022			0.0110	0.022 U	0.022 U	0.022 U
Vanadium	4	10	0.179	0.179	0.071	0.154	0.0966	0.0971 J	0.0869 J	0.179 U
Zinc	10	10			14.6	26.3	20.9	19.7 J	23.6 J	14.6 J
Dioxins/Furans (ug/Kg)										

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	APC-DU-062001-0000-A-W 6/20/2001	APC-WS-4001-0000-01-W 6/20/2001	APC-WS-4002-0000-01-W 6/20/2001
HCX	9	10	0.01987	0.01987	0.01474	0.08931	0.04722		0.02349	0.01474 J
TCX	0	9	0.05	0.099			0.03317		0.05 UJ	0.05 UJ
2,3,7,8-TCDD	10	10			0.07943	0.80121	0.34522		0.32604 J	0.07943 J
1,2,3,7,8-PeCDD	3	10	0.00021	0.0008	0.00039	0.0007	0.00032		0.00029 UJ	0.00032 UJ
1,2,3,4,7,8-HxCDD	4	10	0.00013	0.00092	0.00007	0.00028	0.00019		0.0001 J	0.00018 J
1,2,3,6,7,8-HxCDD	7	10	0.00054	0.00099	0.00014	0.00048	0.00030		0.00024 J	0.0003 J
1,2,3,7,8,9-HxCDD	0	10	0.00013	0.0009			0.00017		0.00021 UJ	0.00019 UJ
1,2,3,4,6,7,8-HpCDD	1	10	0.00016	0.00127	0.00089	0.00089	0.00035		0.00047 UJ	0.00044 UJ
OCDD	0	10	0.00073	0.00333			0.00072		0.00118 UJ	0.00113 UJ
2,3,7,8-TCDF	9	10	0.00048	0.00048	0.00054	0.00272	0.00158		0.00174 J#	0.00167 J#
1,2,3,7,8-PeCDF	4	10	0.00023	0.00075	0.00012	0.00021	0.00021		0.00012 J	0.00018 J
2,3,4,7,8-PeCDF	5	10	0.00018	0.00071	0.00021	0.0005	0.00028		0.00018 UJ	0.00026 J
1,2,3,4,7,8-HxCDF	0	10	0.00011	0.00061			0.00013		0.00012 UJ	0.00014 UJ
1,2,3,6,7,8-HxCDF	0	10	0.00006	0.00062			0.00012		0.00006 UJ	0.00009 UJ
2,3,4,6,7,8-HxCDF	3	10	0.00016	0.00064	0.00002	0.00008	0.00014		0.00028 UJ	0.00008 J
1,2,3,7,8,9-HxCDF	0	10	0.0001	0.0007			0.00016		0.00031 UJ	0.0001 UJ
1,2,3,4,6,7,8-HpCDF	0	10	0.0001	0.00146			0.00019		0.00017 UJ	0.00017 UJ
1,2,3,4,7,8,9-HpCDF	0	10	0.00014	0.00158			0.00022		0.00023 UJ	0.0002 UJ
OCDF	0	10	0.0001	0.0008			0.00015		0.00021 UJ	0.00025 UJ
Total TCDD	10	10			0.07943	0.80121	0.34522		0.32604 J	0.07943 J
Total PeCDD	1	10	0.00021	0.0008	0.0007	0.0007	0.00028		0.00029 UJ	0.00032 UJ
Total HxCDD	1	10	0.0002	0.00117	0.00014	0.00014	0.00027		0.00051 UJ	0.00051 UJ
Total HpCDD	0	10	0.00016	0.00127			0.00033		0.00047 UJ	0.00044 UJ
Total TCDF	9	10	0.00048	0.00048	0.00064	0.0023	0.00130		0.00177 J	0.00178 J
Total PeCDF	9	10	0.00049	0.00049	0.0003	0.00224	0.00097		0.00161 J	0.0011 J
Total HxCDF	1	10	0.00037	0.00078	0.00014	0.00014	0.00028		0.0006 UJ	0.00057 UJ
Total HpCDF	0	10	0.0001	0.00152			0.00023		0.0003 UJ	0.00032 UJ
Toxicity Equivalency (Dioxins, Furans, HCX)	10	10			0.0798	0.802	0.346		0.326	0.0798
PCB Congeners (ug/Kg)										
2-Monochlorobiphenyl (1)	2	3	0.03194	0.03194	0.05019	0.09519	0.05378			
4-Chlorobiphenyl (3)	0	3	0.0146	0.02093			0.00845			
2,2'-Dichlorobiphenyl (4)	3	3			0.20592	0.30534	0.24311			
2,3-Dichlorobiphenyl (5)	2	3	0.00993	0.00993	0.01065	0.0135	0.00971			
2,3'-Dichlorobiphenyl (6)	3	3			0.1639	0.30499	0.21889			
2,4-Dichlorobiphenyl (7)	3	3			0.02269	0.0505	0.03480			
2,4'-Dichlorobiphenyl (8)	3	3			0.73317	1.26453	0.95498			
2,5-Dichlorobiphenyl (9)	3	3			0.05429	0.11595	0.07925			
2,6-Dichlorobiphenyl (10)	3	3			0.01327	0.02999	0.01926			

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	APC-DU-062001-0000-A-W 6/20/2001	APC-WS-4001-0000-01-W 6/20/2001	APC-WS-4002-0000-01-W 6/20/2001
3,4-Dichlorobiphenyl (12)	3	3			0.01	0.0111	0.01055			
2,2',3'-Trichlorobiphenyl (16)	3	3			0.51934	0.91054	0.71649			
2,2',4-Trichlorobiphenyl (17)	3	3			1.02463	1.3163	1.16918			
2,2',5-Trichlorobiphenyl (18)	3	3			1.33064	1.66914	1.54447			
2,2',6-Trichlorobiphenyl (19)	3	3			0.16578	0.26643	0.21623			
2,3,3'-Trichlorobiphenyl (20)	3	3			8.42256	10.98232	9.44373			
2,3,4'-Trichlorobiphenyl (22)	3	3			1.56512	1.90573	1.70516			
2,3,6-Trichlorobiphenyl (24)	3	3			0.18964	0.25232	0.21333			
2,3',4-Trichlorobiphenyl (25)	3	3			0.13621	0.16971	0.14828			
2,3',5-Trichlorobiphenyl (26)	3	3			0.5954	0.7398	0.67321			
2,4',5-Trichlorobiphenyl (31)	3	3			3.26415	3.59507	3.43852			
2,4',6-Trichlorobiphenyl (32)	3	3			0.60048	1.07513	0.81614			
2,2',3,3'-Tetrachlorobiphenyl (40)	3	3			3.00303	4.77789	4.12480			
2,2',3,4'-Tetrachlorobiphenyl (42)	3	3			1.99019	3.89529	3.02134			
2,2',3,5-Tetrachlorobiphenyl (43)	3	3			4.50357	11.11485	7.93113			
2,2',3,5'-Tetrachlorobiphenyl (44)	3	3			5.61669	12.62706	8.65001			
2,2',3,6-Tetrachlorobiphenyl (45)	3	3			0.84224	1.3327	1.13369			
2,2',3,6'-Tetrachlorobiphenyl (46)	3	3			0.25885	0.41525	0.35059			
2,2',4,5-Tetrachlorobiphenyl (48)	3	3			1.11699	2.01385	1.52387			
2,2',4,5'-Tetrachlorobiphenyl (49)	3	3			6.03226	11.93142	9.20030			
2,2',4,6-Tetrachlorobiphenyl (50)	3	3			0.75486	1.34684	0.99234			
2,3,3',4'-Tetrachlorobiphenyl (56)	3	3			1.95151	3.34801	2.66171			
2,3,3',6-Tetrachlorobiphenyl (59)	3	3			0.66747	10.41663	4.04030			
2,3,4,4'-Tetrachlorobiphenyl (60)	3	3			1.11938	2.52264	1.79643			
2,3,4,5-Tetrachlorobiphenyl (61)	3	3			12.19988	22.02172	17.23369			
2,3,4',5-Tetrachlorobiphenyl (63)	3	3			0.29882	0.70151	0.47240			
2,3,4',6-Tetrachlorobiphenyl (64)	3	3			3.49232	6.92708	5.29564			
2,3',4,4'-Tetrachlorobiphenyl (66)	3	3			10.35864	18.24741	14.18310			
3,3',4,4'-Tetrachlorobiphenyl (77)	3	3			0.10004	0.33726	0.20628			
3,4,4',5-Tetrachlorobiphenyl (81)	1	3	0.09914	0.09934	0.643	0.643	0.24741			
2,2',3,3',4-Pentachlorobiphenyl (82)	3	3			2.65321	4.839	3.95365			
2,2',3,3',5-Pentachlorobiphenyl (83)	3	3			18.78558	36.20996	25.94581			
2,2',3,3',6-Pentachlorobiphenyl (84)	3	3			3.84393	8.16888	6.11028			
2,2',3,4,4'-Pentachlorobiphenyl (85)	3	3			4.97585	8.56608	6.97353			
2,2',3,4,5-Pentachlorobiphenyl (86)	3	3			22.2261	37.11396	30.36814			
2,2',3,4,6-Pentachlorobiphenyl (88)	3	3			3.74088	7.99262	5.99042			
2,2',3,4,6'-Pentachlorobiphenyl (89)	2	3	0.09934	0.09934	0.14995	0.27197	0.15720			
2,2',3,4',5-Pentachlorobiphenyl (90)	3	3			24.65643	46.02189	36.44186			

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	APC-DU-062001-0000-A-W 6/20/2001	APC-WS-4001-0000-01-W 6/20/2001	APC-WS-4002-0000-01-W 6/20/2001
2,2',3,5,5'-Pentachlorobiphenyl (92)	3	3			3.46561	8.24751	6.34271			
2,2',3,5,6-Pentachlorobiphenyl (93)	3	3			15.31725	40.6324	27.11413			
2,3,3',4,4'-Pentachlorobiphenyl (105)	3	3			9.89039	12.30964	10.95368			
2,3,3',4,5-Pentachlorobiphenyl (106)	3	3			4.172	5.85288	4.79318			
2,3,3',4',5'-Pentachlorobiphenyl (108)	3	3			1.12482	1.54362	1.33755			
2,3,3',4',6-Pentachlorobiphenyl (110)	3	3			36.07698	76.2935	52.23814			
2,3,4,4',5-Pentachlorobiphenyl (114)	3	3			0.59239	1.03166	0.78857			
2,3',4,4',5-Pentachlorobiphenyl (118)	3	3			41.97209	51.62399	45.56357			
3,3',4,4',5-Pentachlorobiphenyl (126)	3	3			0.08331	0.12482	0.09960			
2,2',3,3',4,4'-Hexachlorobiphenyl (128)	3	3			10.10296	12.67886	11.75553			
2,2',3,3',4,5-Hexachlorobiphenyl (129)	3	3			66.1754	108.14568	87.61493			
2,2',3,3',4,5'-Hexachlorobiphenyl (130)	3	3			3.06563	5.12676	3.93065			
2,2',3,3',4,6-Hexachlorobiphenyl (131)	2	3	0.09934	0.09934	0.67898	0.95916	0.56260			
2,2',3,3',4,6'-Hexachlorobiphenyl (132)	3	3			13.6052	23.49928	16.94694			
2,2',3,3',5,6-Hexachlorobiphenyl (134)	3	3			0.98638	3.43574	1.89693			
2,2',3,3',5,6'-Hexachlorobiphenyl (135)	3	3			8.07048	20.88405	12.64180			
2,2',3,3',6,6'-Hexachlorobiphenyl (136)	3	3			1.8061	3.98017	2.59867			
2,2',3,4,4',5-Hexachlorobiphenyl (137)	3	3			7.25844	11.488	8.76486			
2,2',3,4,5,5'-Hexachlorobiphenyl (141)	3	3			4.36236	5.96641	5.39798			
2,2',3,4,5',6-Hexachlorobiphenyl (144)	3	3			1.02537	1.22366	1.12401			
2,2',3,4',5,5'-Hexachlorobiphenyl (146)	3	3			6.81686	7.63278	7.24980			
2,2',3,4',5,6-Hexachlorobiphenyl (147)	3	3			31.3895	107.77742	61.16152			
2,2',4,4',5,5'-Hexachlorobiphenyl (153)	3	3			34.5166	46.69464	40.25410			
2,3,3',4,4',5-Hexachlorobiphenyl (156)	3	3			5.17428	5.81774	5.53908			
2,3,3',4,4',6-Hexachlorobiphenyl (158)	3	3			6.23661	6.49345	6.34452			
2,3',4,4',5,5'-Hexachlorobiphenyl (167)	3	3			2.0818	2.42847	2.25438			
3,3',4,4',5,5'-Hexachlorobiphenyl (169)	2	3	0.09934	0.09934	0.06501	0.07635	0.06368			
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)	3	3			6.24752	8.59226	7.69761			
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)	3	3			1.77074	2.65482	2.33861			
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)	3	3			1.18213	1.33246	1.24077			
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)	3	3			2.79992	7.61061	4.72033			
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)	3	3			0.15677	0.17642	0.16905			
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)	3	3			0.3438	0.60453	0.47939			
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)	3	3			2.45517	5.31597	3.62101			
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)	3	3			1.03538	1.68073	1.32503			
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)	3	3			10.07784	11.82032	11.02877			
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)	0	3	0.19828	0.19867			0.09926			
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)	3	3			2.19836	2.67618	2.47722			

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	APC-DU-062001-0000-A-W 6/20/2001	APC-WS-4001-0000-01-W 6/20/2001	APC-WS-4002-0000-01-W 6/20/2001
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)	3	3			0.01465	0.01525	0.01491			
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)	3	3			0.38996	0.4954	0.43380			
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)	3	3			8.99726	23.16662	16.05190			
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)	3	3			0.18604	0.22207	0.20555			
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)	3	3			1.524	2.12202	1.85509			
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)	3	3			0.20144	0.2382	0.22047			
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)	3	3			1.47303	2.08656	1.76465			
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)	3	3			0.42654	0.75748	0.63704			
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)	3	3			0.93248	1.07068	0.97928			
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)	2	3	0.19858	0.19858	0.05949	0.07347	0.07742			
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)	3	3			7.66826	14.4197	11.89843			
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)	3	3			0.12975	0.25176	0.18122			
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)	3	3			0.3285	0.4419	0.40158			
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)	3	3			2.63972	3.52699	3.21107			
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)	3	3			0.08999	0.12493	0.11321			
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	3	3			6.88279	10.33108	8.79097			
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	3	3			0.49141	0.67806	0.59264			
Decachlorobiphenyl (209)	3	3			3.55472	5.37883	4.43590			
PCB Congeners, Total	3	3			622.46203	878.96671	732.88815			
Toxicity Equivalency (PCB)	3	3			0.0182	0.0215	0.0193			
Other (%)										
Lipid_percent	10	10			5.2	8.72	6.12		5.42	6.75

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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Samples ending with:
W - whole body

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-WS-4003-0000-01-W 6/20/2001	APC-WS-4004-0000-01-W 6/20/2001	APC-WS-4005-0000-01-W 6/20/2001	APC-WS-4006-0000-01-W 6/20/2001	APC-WS-4007-0000-01-W 6/20/2001	APC-WS-4008-0000-01-W 6/20/2001 DUPLICATE	APC-WS-4008-0000-01-W 6/20/2001	APC-WS-4009-0000-01-W 6/20/2001
Semivolatile Organics (ug/Kg)								
1,1'-Biphenyl	0.81	1.1	1.04	1.42	0.94		0.87	1.14
2-Methylnaphthalene	3.11	3.86	3.68	5.51	3.78		3.84	4.31
Acenaphthene	2.84	3.61	3.28	4.9	4.29		3.3	4.11
Acenaphthylene	1.97	1.45	2.62	3.87	2.26		2.19	1.74
Anthracene	2.41	2.6	2.92	4.06	3.64		2.57	2.45
Benzo(a)anthracene	0.72	0.69	1.24	1.53	2.31		3.01	1.11
Benzo(a)pyrene	0.28 J	0.54 J	0.63 J	0.63 J	2.13		2.79	0.89
Benzo(b)fluoranthene	0.41 J	0.68	0.71	0.91	2.45		4.01	1.02
Benzo(g,h,i)perylene	0.67 U	0.68 U	0.66 U	0.75 U	1.15		2.43	0.67 U
Benzo(k)fluoranthene	0.42 J	0.53 J	0.71	0.85	2.09		3.38	1
Chrysene	1.06	1.47	1.4	1.74	3.47		4.53	2.03
Dibenzo(a,h)anthracene	0.14 J	0.14 J	0.33 J	0.32 J	0.33 J		0.69	0.21 J
Dibenzofuran	1.96	2.67	2.12	3.37	3.12		2.08	3.13
Fluoranthene	5.81	7.63	6.08	9.4	13.85		12.68	8.65
Fluorene	3.09	4.64	3.53	5.14	5.6		3.8	4.6
Indeno(1,2,3-cd)pyrene	0.37 J	0.47 J	0.56 J	0.67	1.25		2.67	0.62 J
Naphthalene	2.24	2.64	2.83	4.09	2.86		2.85	3.39
Phenanthrene	6.06	14.51	6.41	10.84	14.51		10.65	9.78
Pyrene	2.22	1.87	1.18	2.34	3.89		3.62 J	1.76
Total PAH	35.92	51.08	41.27	61.59	73.92		71.96	51.97
Pesticides/PCBs (ug/Kg)								
4,4'-DDD	6.18 J	6.21 J	14.92 J	34.98 J	9.01 J		12.15 J	6.56 J
4,4'-DDE	11.21 J	13.5 J	28.51 J	46.69 J	44.11 J		38.61 J	22.53 J
4,4'-DDT	2.31 J	4.71 J	4.04 J	6.4 J	7.38 J		7.76 J	5.3 J
Aldrin	1.23 UJ	0.62 UJ	0.6 UJ	0.6 UJ	0.61 UJ		0.62 UJ	0.61 UJ
alpha-BHC	1.23 UJ	0.62 UJ	0.61 UJ	0.6 UJ	0.61 UJ		0.62 UJ	0.61 UJ
alpha-Chlordane	9.15 J	11.13 J	21.87 J	35.11 J	11.64 J		13.69 J	8.37 J
Aroclor, Total	670.26 J	444.66 J	3274.19 J	3269.06 J	1657.23 J		1546.97 J	1043.86 J
Aroclor-1016	15.31 UJ	7.68 UJ	7.55 UJ	7.52 UJ	7.61 UJ		7.71 UJ	7.64 UJ
Aroclor-1221	15.31 UJ	7.68 UJ	7.55 UJ	7.52 UJ	7.61 UJ		7.71 UJ	7.64 UJ
Aroclor-1232	15.31 UJ	7.68 UJ	7.55 UJ	7.52 UJ	7.61 UJ		7.71 UJ	7.64 UJ
Aroclor-1242	15.31 UJ	7.68 UJ	7.55 UJ	7.52 UJ	7.61 UJ		7.71 UJ	7.64 UJ
Aroclor-1248	15.31 UJ	7.68 UJ	7.55 UJ	7.52 UJ	7.61 UJ		7.71 UJ	7.64 UJ
Aroclor-1254	648 J	426.43 J	3243.44 J	3224.16 J	1604.49 J		1509.72 J	1024.04 J
Aroclor-1260	15.31 UJ	7.68 UJ	7.55 UJ	7.52 UJ	7.61 UJ		7.71 UJ	7.64 UJ
Aroclor-1268	22.26 J	18.23 J	30.74 J	44.9 J	52.74 J		37.25 J	19.82 J
beta-BHC	1.23 UJ	0.62 UJ	0.61 UJ	0.6 UJ	0.61 UJ		0.62 UJ	0.61 UJ

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-WS-4003-0000-01-W 6/20/2001	APC-WS-4004-0000-01-W 6/20/2001	APC-WS-4005-0000-01-W 6/20/2001	APC-WS-4006-0000-01-W 6/20/2001	APC-WS-4007-0000-01-W 6/20/2001	APC-WS-4008-0000-01-W 6/20/2001 DUPLICATE	APC-WS-4008-0000-01-W 6/20/2001	APC-WS-4009-0000-01-W 6/20/2001
delta-BHC	1.23 UJ	0.62 UJ	0.61 UJ	0.6 UJ	0.61 UJ		0.62 UJ	0.61 UJ
Dieldrin	2.58 J	3.04 J	9.9 J	8.6 J	5.63 J		5.88 J	7.58 J
Endosulfan I	1.23 UJ	0.62 UJ	0.61 UJ	0.6 UJ	0.61 UJ		0.62 UJ	0.61 UJ
Endosulfan II	1.23 UJ	0.61 UJ	0.6 UJ	0.6 UJ	0.61 UJ		0.62 UJ	0.61 UJ
Endosulfan Sulfate	1.23 UJ	0.62 UJ	0.6 UJ	0.6 UJ	0.61 UJ		0.62 UJ	0.61 UJ
Endrin	1.23 UJ	0.62 UJ	0.61 UJ	0.6 UJ	0.61 UJ		0.62 UJ	0.61 UJ
Endrin Aldehyde	1.23 UJ	0.62 UJ	0.61 UJ	0.6 UJ	0.61 UJ		0.62 UJ	0.61 UJ
Endrin Ketone	1.23 UJ	0.62 UJ	0.61 UJ	0.6 UJ	0.61 UJ		0.62 UJ	0.61 UJ
gamma-BHC	1.23 UJ	0.1 J	0.07 J	0.14 J	0.25 J		0.16 J	0.08 J
gamma-Chlordane	5.1 J	5.99 J	7.13 J	24.7 J	5.37 J		7 J	5.44 J
Heptachlor	1.23 UJ	0.62 UJ	0.6 UJ	0.6 UJ	0.61 UJ		0.62 UJ	0.61 UJ
Heptachlor Epoxide	0.32 J	0.68 J	0.48 J	0.8 J	0.54 J		0.6 J	0.75 J
Methoxychlor	1.23 UJ	0.62 UJ	0.61 UJ	0.6 UJ	0.61 UJ		0.62 UJ	0.61 UJ
Technical Chlordane	99.9 J	155.05 J	354.82 J	1247.42 J	354.51 J		425.78 J	274.49 J
Toxaphene	30.62 UJ	15.35 UJ	15.1 UJ	15.05 UJ	15.22 UJ		15.43 UJ	15.28 UJ
Inorganics (mg/Kg)								
Aluminum	3.53 J	7.4 J	3.22 J	9.73 J	8.31 J		25.8 J	9.68
Antimony	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U		0.034 U	0.034 U
Arsenic	0.0507 U	0.0649 U	0.0589 U	0.07 U	0.08 U		0.0749 U	0.0397 U
Barium	0.433 J	0.466 J	1 J	0.713	0.578 J		1.45 J	0.835
Beryllium	0.004 U	0.004 U	0.004 U	0.004 U	0.00494 U		0.00509 U	0.004 U
Cadmium	0.016 J	0.0156 J	0.0158 J	0.0167 J	0.0337 J		0.0484 J	0.0178 J
Chromium	0.0669 J	0.111 J	0.11 J	0.0989 J	0.106 J		0.229 J	0.269 U
Cobalt	0.0817 J	0.0842 J	0.127 J	0.0816 J	0.0717 J		0.107 J	0.0793 J
Copper	0.696 J	0.785 J	0.718 J	0.606 J	0.689 J		0.981	0.71
Iron	20.7	21	23.2	21.8	21.1		46.4	24
Lead	0.105 U	0.119 U	0.249 J	0.26 J	0.135 U		0.349	0.14 J
Manganese	4.25 J	4.31 J	7.79 J	6.44 J	3.83 J		12.3 J	9.09
Mercury	0.0808	0.0935	0.0923	0.118	0.216		0.205	0.106
Mercury (methyl)	0.0847	0.169	0.115	0.125	0.225		0.219	0.0938
Molybdenum	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U		0.0939 J	0.0524 J
Nickel	0.126 J	0.125 J	0.205 J	0.135 J	0.114 J		0.221 J	0.141 J
Selenium	0.288 J	0.324 J	0.296 J	0.297 J	0.292 J		0.349 J	0.215 J
Silver	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U		0.06 U	0.06 U
Thallium	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U		0.022 U	0.022 U
Vanadium	0.179 U	0.071 J	0.179 U	0.179 U	0.179 U		0.154 J	0.179 U
Zinc	16.3 J	20.2 J	26.3 J	18.6 J	21.9 J		20.6	22.1
Dioxins/Furans (ug/Kg)								

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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HCX	0.08931 J	0.06395 J	0.04549 J	0.06004 J	0.05164 J		0.0492 J	0.06445 J
TCX	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.099 UJ		0.099 UJ	0.099 UJ
2,3,7,8-TCDD	0.80121 J	0.07989 J	0.51083 J	0.68022 J	0.10112 J		0.40982 J	0.22011 J
1,2,3,7,8-PeCDD	0.00052 J	0.00021 UJ	0.00039 J	0.0007 J	0.00063 UJ		0.00067 UJ	0.0008 UJ
1,2,3,4,7,8-HxCDD	0.00023 UJ	0.00007 J	0.00013 UJ	0.00028 J	0.00055 UJ		0.00092 UJ	0.00053 UJ
1,2,3,6,7,8-HxCDD	0.00037 J	0.00025 J	0.00019 J	0.00048 J	0.00059 UJ		0.00099 UJ	0.00054 UJ
1,2,3,7,8,9-HxCDD	0.00022 UJ	0.00017 UJ	0.00013 UJ	0.00026 UJ	0.00054 UJ		0.0009 UJ	0.0005 UJ
1,2,3,4,6,7,8-HpCDD	0.0006 UJ	0.00051 UJ	0.00039 UJ	0.00089 J	0.00127 UJ		0.00083 UJ	0.00057 UJ
OCDD	0.00113 UJ	0.00124 UJ	0.00099 UJ	0.00177 UJ	0.00138 UJ		0.00333 UJ	0.00144 UJ
2,3,7,8-TCDF	0.00222 J#	0.0025 J#	0.00168 J#	0.00272 J#	0.00054 J		0.00048 UJ	0.00142 J#
1,2,3,7,8-PeCDF	0.00021 J	0.0003 UJ	0.00031 UJ	0.0002 J	0.00061 UJ		0.00052 UJ	0.00075 UJ
2,3,4,7,8-PeCDF	0.00045 J	0.00031 UJ	0.0003 J	0.0005 J	0.00057 UJ		0.00047 UJ	0.00071 UJ
1,2,3,4,7,8-HxCDF	0.00017 UJ	0.00015 UJ	0.00011 UJ	0.00017 UJ	0.00061 UJ		0.00054 UJ	0.00042 UJ
1,2,3,6,7,8-HxCDF	0.00015 UJ	0.00015 UJ	0.00007 UJ	0.00017 UJ	0.00062 UJ		0.00054 UJ	0.00042 UJ
2,3,4,6,7,8-HxCDF	0.00016 UJ	0.00016 UJ	0.00016 UJ	0.00008 J	0.00064 UJ		0.00058 UJ	0.00044 UJ
1,2,3,7,8,9-HxCDF	0.00018 UJ	0.00016 UJ	0.00017 UJ	0.0002 UJ	0.0007 UJ		0.00065 UJ	0.0005 UJ
1,2,3,4,6,7,8-HpCDF	0.00022 UJ	0.00018 UJ	0.00013 UJ	0.00028 UJ	0.00084 UJ		0.00146 UJ	0.00022 UJ
1,2,3,4,7,8,9-HpCDF	0.00019 UJ	0.00018 UJ	0.00014 UJ	0.00024 UJ	0.00091 UJ		0.00158 UJ	0.00056 UJ
OCDF	0.00018 UJ	0.0001 UJ	0.00012 UJ	0.00019 UJ	0.00036 UJ		0.00069 UJ	0.0008 UJ
Total TCDD	0.80121 J	0.07989 J	0.51083 J	0.68022 J	0.10112 J		0.40982 J	0.22011 J
Total PeCDD	0.00052 UJ	0.00021 UJ	0.00039 UJ	0.0007 J	0.00063 UJ		0.00067 UJ	0.0008 UJ
Total HxCDD	0.00037 UJ	0.00032 UJ	0.00051 UJ	0.00117 UJ	0.0002 UJ		0.00093 UJ	0.00052 UJ
Total HpCDD	0.00077 UJ	0.00073 UJ	0.00053 UJ	0.00089 UJ	0.00127 UJ		0.00083 UJ	0.00057 UJ
Total TCDF	0.0023 J	0.00079 J	0.00142 J	0.00219 J	0.00064 J		0.00048 UJ	0.001 J
Total PeCDF	0.00224 J	0.0008 J	0.00068 J	0.00185 J	0.0003 J		0.00049 UJ	0.00047 J
Total HxCDF	0.0007 UJ	0.00049 UJ	0.00056 UJ	0.00078 UJ	0.00064 UJ		0.00057 UJ	0.00037 UJ
Total HpCDF	0.00026 UJ	0.0006 UJ	0.00013 UJ	0.00033 UJ	0.00088 UJ		0.00152 UJ	0.00022 UJ
Toxicity Equivalency (Dioxins, Furans, HCX)	0.802	0.0802	0.512	0.682	0.101		0.41	0.22
PCB Congeners (ug/Kg)								
2-Monochlorobiphenyl (1)					0.09519 J		0.03194 UJ	0.05019 J
4-Chlorobiphenyl (3)					0.02093 UJ		0.01514 UJ	0.0146 UJ
2,2'-Dichlorobiphenyl (4)					0.21808 J		0.20592 J	0.30534 J
2,3-Dichlorobiphenyl (5)					0.0135 J		0.01065 J	0.00993 UJ
2,3'-Dichlorobiphenyl (6)					0.18777 J		0.1639 J	0.30499 J
2,4-Dichlorobiphenyl (7)					0.0312 J		0.02269 J	0.0505 J
2,4'-Dichlorobiphenyl (8)					0.86724 J		0.73317 J	1.26453 J
2,5-Dichlorobiphenyl (9)					0.06752 J		0.05429 J	0.11595 J
2,6-Dichlorobiphenyl (10)					0.01451 J		0.01327 J	0.02999 J

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-WS-4003-0000-01-W 6/20/2001	APC-WS-4004-0000-01-W 6/20/2001	APC-WS-4005-0000-01-W 6/20/2001	APC-WS-4006-0000-01-W 6/20/2001	APC-WS-4007-0000-01-W 6/20/2001	APC-WS-4008-0000-01-W 6/20/2001 DUPLICATE	APC-WS-4008-0000-01-W 6/20/2001	APC-WS-4009-0000-01-W 6/20/2001
3,4-Dichlorobiphenyl (12)					0.01056 J		0.0111 J	0.01 J
2,2',3'-Trichlorobiphenyl (16)					0.71958 J		0.91054 J	0.51934 J
2,2',4-Trichlorobiphenyl (17)					1.02463 J		1.3163 J	1.16661 J
2,2',5-Trichlorobiphenyl (18)					1.33064 J		1.63362 J	1.66914 J
2,2',6-Trichlorobiphenyl (19)					0.16578 J		0.21648 J	0.26643 J
2,3,3'-Trichlorobiphenyl (20)					8.92632 J		10.98232 J	8.42256 J
2,3,4'-Trichlorobiphenyl (22)					1.64463 J		1.90573 J	1.56512 J
2,3,6-Trichlorobiphenyl (24)					0.18964 J		0.25232 J	0.19802 J
2,3',4-Trichlorobiphenyl (25)					0.16971 J		0.13621 J	0.13892 J
2,3',5-Trichlorobiphenyl (26)					0.7398 J		0.68444 J	0.5954 J
2,4',5-Trichlorobiphenyl (31)					3.59507 J		3.26415 J	3.45633 J
2,4',6-Trichlorobiphenyl (32)					0.77281 J		1.07513 J	0.60048 J
2,2',3,3'-Tetrachlorobiphenyl (40)					3.00303 J		4.59348 J	4.77789 J
2,2',3,4'-Tetrachlorobiphenyl (42)					1.99019 J		3.17854 J	3.89529 J
2,2',3,5-Tetrachlorobiphenyl (43)					4.50357 J		8.17497 J	11.11485 J
2,2',3,5'-Tetrachlorobiphenyl (44)					7.70628 J		12.62706 J	5.61669 J
2,2',3,6-Tetrachlorobiphenyl (45)					0.84224 J		1.3327 J	1.22612 J
2,2',3,6'-Tetrachlorobiphenyl (46)					0.25885 J		0.41525 J	0.37767 J
2,2',4,5-Tetrachlorobiphenyl (48)					1.11699 J		1.44076 J	2.01385 J
2,2',4,5'-Tetrachlorobiphenyl (49)					6.03226 J		9.63722 J	11.93142 J
2,2',4,6-Tetrachlorobiphenyl (50)					0.75486 J		1.34684 J	0.87532 J
2,3,3',4'-Tetrachlorobiphenyl (56)					1.95151 J		3.34801 J	2.6856 J
2,3,3',6-Tetrachlorobiphenyl (59)					0.66747 J		1.0368 J	10.41663 J
2,3,4,4'-Tetrachlorobiphenyl (60)					1.11938 J		1.74726 J	2.52264 J
2,3,4,5-Tetrachlorobiphenyl (61)					12.19988 J		17.47948 J	22.02172 J
2,3,4',5-Tetrachlorobiphenyl (63)					0.29882 J		0.41686 J	0.70151 J
2,3,4',6-Tetrachlorobiphenyl (64)					3.49232 J		5.46751 J	6.92708 J
2,3',4,4'-Tetrachlorobiphenyl (66)					10.35864 J		13.94324 J	18.24741 J
3,3',4,4'-Tetrachlorobiphenyl (77)					0.10004 J		0.18153 J	0.33726 J
3,4,4',5-Tetrachlorobiphenyl (81)					0.643 J		0.09914 UJ	0.09934 UJ
2,2',3,3',4-Pentachlorobiphenyl (82)					2.65321 J		4.36874 J	4.839 J
2,2',3,3',5-Pentachlorobiphenyl (83)					18.78558 J		22.8419 J	36.20996 J
2,2',3,3',6-Pentachlorobiphenyl (84)					3.84393 J		8.16888 J	6.31802 J
2,2',3,4,4'-Pentachlorobiphenyl (85)					7.37865 J		8.56608 J	4.97585 J
2,2',3,4,5-Pentachlorobiphenyl (86)					22.2261 J		31.76436 J	37.11396 J
2,2',3,4,6-Pentachlorobiphenyl (88)					3.74088 J		7.99262 J	6.23776 J
2,2',3,4,6'-Pentachlorobiphenyl (89)					0.14995 J		0.27197 J	0.09934 UJ
2,2',3,4',5-Pentachlorobiphenyl (90)					24.65643 J		38.64726 J	46.02189 J

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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2,2',3,5,5'-Pentachlorobiphenyl (92)					3.46561 J		7.315 J	8.24751 J
2,2',3,5,6-Pentachlorobiphenyl (93)					15.31725 J		40.6324 J	25.39275 J
2,3,3',4,4'-Pentachlorobiphenyl (105)					9.89039 J		10.661 J	12.30964 J
2,3,3',4,5-Pentachlorobiphenyl (106)					4.172 J		4.35465 J	5.85288 J
2,3,3',4',5'-Pentachlorobiphenyl (108)					1.12482 J		1.34422 J	1.54362 J
2,3,3',4',6-Pentachlorobiphenyl (110)					44.34394 J		76.2935 J	36.07698 J
2,3,4,4',5-Pentachlorobiphenyl (114)					0.59239 J		0.74167 J	1.03166 J
2,3',4,4',5-Pentachlorobiphenyl (118)					41.97209 J		43.09462 J	51.62399 J
3,3',4,4',5-Pentachlorobiphenyl (126)					0.09068 J		0.12482 J	0.08331 J
2,2',3,3',4,4'-Hexachlorobiphenyl (128)					12.48476 J		12.67886 J	10.10296 J
2,2',3,3',4,5-Hexachlorobiphenyl (129)					88.52372 J		108.14568 J	66.1754 J
2,2',3,3',4,5'-Hexachlorobiphenyl (130)					3.06563 J		5.12676 J	3.59957 J
2,2',3,3',4,6-Hexachlorobiphenyl (131)					0.67898 J		0.95916 J	0.09934 UJ
2,2',3,3',4,6'-Hexachlorobiphenyl (132)					13.6052 J		23.49928 J	13.73634 J
2,2',3,3',5,6-Hexachlorobiphenyl (134)					0.98638 J		3.43574 J	1.26866 J
2,2',3,3',5,6'-Hexachlorobiphenyl (135)					8.07048 J		20.88405 J	8.97087 J
2,2',3,3',6,6'-Hexachlorobiphenyl (136)					1.8061 J		3.98017 J	2.00973 J
2,2',3,4,4',5-Hexachlorobiphenyl (137)					7.54814 J		11.488 J	7.25844 J
2,2',3,4,5,5'-Hexachlorobiphenyl (141)					4.36236 J		5.86518 J	5.96641 J
2,2',3,4,5',6-Hexachlorobiphenyl (144)					1.02537 J		1.22366 J	1.12299 J
2,2',3,4',5,5'-Hexachlorobiphenyl (146)					6.81686 J		7.63278 J	7.29976 J
2,2',3,4',5,6-Hexachlorobiphenyl (147)					44.31764 J		107.77742 J	31.3895 J
2,2',4,4',5,5'-Hexachlorobiphenyl (153)					39.55106 J		34.5166 J	46.69464 J
2,3,3',4,4',5-Hexachlorobiphenyl (156)					5.62522 J		5.17428 J	5.81774 J
2,3,3',4,4',6-Hexachlorobiphenyl (158)					6.49345 J		6.30349 J	6.23661 J
2,3',4,4',5,5'-Hexachlorobiphenyl (167)					2.42847 J		2.0818 J	2.25287 J
3,3',4,4',5,5'-Hexachlorobiphenyl (169)					0.07635 J		0.06501 J	0.09934 UJ
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)					8.59226 J		8.25304 J	6.24752 J
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)					2.59026 J		2.65482 J	1.77074 J
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)					1.33246 J		1.18213 J	1.20771 J
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)					3.75047 J		7.61061 J	2.79992 J
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)					0.17395 J		0.15677 J	0.17642 J
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)					0.48984 J		0.60453 J	0.3438 J
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)					3.09189 J		5.31597 J	2.45517 J
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)					1.25897 J		1.68073 J	1.03538 J
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)					11.82032 J		10.07784 J	11.18814 J
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)					0.19858 UJ		0.19828 UJ	0.19867 UJ
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)					2.55713 J		2.19836 J	2.67618 J

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-WS-4003-0000-01-W 6/20/2001	APC-WS-4004-0000-01-W 6/20/2001	APC-WS-4005-0000-01-W 6/20/2001	APC-WS-4006-0000-01-W 6/20/2001	APC-WS-4007-0000-01-W 6/20/2001	APC-WS-4008-0000-01-W 6/20/2001 DUPLICATE	APC-WS-4008-0000-01-W 6/20/2001	APC-WS-4009-0000-01-W 6/20/2001
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)					0.01525 J		0.01465 J	0.01483 J
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)					0.41604 J		0.4954 J	0.38996 J
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)					15.99182 J		23.16662 J	8.99726 J
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)					0.22207 J		0.20853 J	0.18604 J
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)					2.12202 J		1.91926 J	1.524 J
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)					0.2382 J		0.20144 J	0.22177 J
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)					2.08656 J		1.73437 J	1.47303 J
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)					0.75748 J		0.72711 J	0.42654 J
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)					1.07068 J		0.93467 J	0.93248 J
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)					0.19858 UJ		0.05949 J	0.07347 J
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)					13.60734 J		14.4197 J	7.66826 J
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)					0.16215 J		0.25176 J	0.12975 J
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)					0.4419 J		0.3285 J	0.43434 J
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)					3.46649 J		2.63972 J	3.52699 J
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)					0.12493 J		0.12472 J	0.08999 J
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl					10.33108 J		9.15905 J	6.88279 J
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl					0.67806 J		0.49141 J	0.60845 J
Decachlorobiphenyl (209)					5.37883 J		4.37416 J	3.55472 J
PCB Congeners, Total					622.46203 J		878.96671 J	697.23571 J
Toxicity Equivalency (PCB)					0.0182		0.0215	0.0182
Other (%)								
Lipid_percent	5.24	5.2	5.91	8.72	6	NA	5.36	6.82

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-WS-4003-0000-01-W 6/20/2001	APC-WS-4004-0000-01-W 6/20/2001	APC-WS-4005-0000-01-W 6/20/2001	APC-WS-4006-0000-01-W 6/20/2001	APC-WS-4007-0000-01-W 6/20/2001	APC-WS-4008-0000-01-W 6/20/2001 DUPLICATE	APC-WS-4008-0000-01-W 6/20/2001	APC-WS-4009-0000-01-W 6/20/2001

Samples ending with:
W - whole body

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-WS-4010-0000-01-W 6/20/2001
Semivolatile Organics (ug/Kg)	
1,1'-Biphenyl	0.78
2-Methylnaphthalene	3.09
Acenaphthene	2.78
Acenaphthylene	2.44
Anthracene	2.71
Benzo(a)anthracene	0.99
Benzo(a)pyrene	0.82
Benzo(b)fluoranthene	0.74
Benzo(g,h,i)perylene	0.67 U
Benzo(k)fluoranthene	0.61 J
Chrysene	1.23
Dibenzo(a,h)anthracene	0.16 J
Dibenzofuran	1.97
Fluoranthene	5.17
Fluorene	2.84
Indeno(1,2,3-cd)pyrene	0.49 J
Naphthalene	2.47
Phenanthrene	5.69
Pyrene	1.51
Total PAH	36.48
Pesticides/PCBs (ug/Kg)	
4,4'-DDD	13.31 J
4,4'-DDE	53.83 J
4,4'-DDT	3.1 J
Aldrin	0.61 UJ
alpha-BHC	0.61 UJ
alpha-Chlordane	20.54 J
Aroclor, Total	2172.1 J
Aroclor-1016	7.64 UJ
Aroclor-1221	7.64 UJ
Aroclor-1232	7.64 UJ
Aroclor-1242	7.64 UJ
Aroclor-1248	7.64 UJ
Aroclor-1254	2146.35 J
Aroclor-1260	7.64 UJ
Aroclor-1268	25.76 J
beta-BHC	0.61 UJ

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-WS-4010-0000-01-W 6/20/2001
delta-BHC	0.61 UJ
Dieldrin	1.66 J
Endosulfan I	0.61 UJ
Endosulfan II	0.61 UJ
Endosulfan Sulfate	0.61 UJ
Endrin	0.61 UJ
Endrin Aldehyde	0.61 UJ
Endrin Ketone	0.61 UJ
gamma-BHC	0.16 J
gamma-Chlordane	9.16 J
Heptachlor	0.61 UJ
Heptachlor Epoxide	0.53 J
Methoxychlor	0.61 UJ
Technical Chlordane	278.5 J
Toxaphene	15.29 UJ
Inorganics (mg/Kg)	
Aluminum	6.93
Antimony	0.034 U
Arsenic	0.042 U
Barium	0.619
Beryllium	0.00443 U
Cadmium	0.0209 J
Chromium	0.139 U
Cobalt	0.0753 J
Copper	2.23
Iron	26
Lead	0.158 J
Manganese	6.48
Mercury	0.149
Mercury (methyl)	0.129
Molybdenum	0.0298 J
Nickel	0.114 J
Selenium	0.281 J
Silver	0.06 U
Thallium	0.022 U
Vanadium	0.117 J
Zinc	24.3
Dioxins/Furans (ug/Kg)	

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-WS-4010-0000-01-W 6/20/2001
HCX	0.01987 UJ
TCX	R
2,3,7,8-TCDD	0.24351 J
1,2,3,7,8-PeCDD	0.00023 UJ
1,2,3,4,7,8-HxCDD	0.00018 UJ
1,2,3,6,7,8-HxCDD	0.00014 J
1,2,3,7,8,9-HxCDD	0.00018 UJ
1,2,3,4,6,7,8-HpCDD	0.00016 UJ
OCDD	0.00073 UJ
2,3,7,8-TCDF	0.00107 J#
1,2,3,7,8-PeCDF	0.00023 UJ
2,3,4,7,8-PeCDF	0.00021 J
1,2,3,4,7,8-HxCDF	0.00011 UJ
1,2,3,6,7,8-HxCDF	0.00011 UJ
2,3,4,6,7,8-HxCDF	0.00002 J
1,2,3,7,8,9-HxCDF	0.00014 UJ
1,2,3,4,6,7,8-HpCDF	0.0001 UJ
1,2,3,4,7,8,9-HpCDF	0.00015 UJ
OCDF	0.00011 UJ
Total TCDD	0.24351 J
Total PeCDD	0.00028 UJ
Total HxCDD	0.00014 J
Total HpCDD	0.00016 UJ
Total TCDF	0.00084 J
Total PeCDF	0.0004 J
Total HxCDF	0.00014 J
Total HpCDF	0.0001 UJ
Toxicity Equivalency (Dioxins, Furans, HCX)	0.244
PCB Congeners (ug/Kg)	
2-Monochlorobiphenyl (1)	
4-Chlorobiphenyl (3)	
2,2'-Dichlorobiphenyl (4)	
2,3-Dichlorobiphenyl (5)	
2,3'-Dichlorobiphenyl (6)	
2,4-Dichlorobiphenyl (7)	
2,4'-Dichlorobiphenyl (8)	
2,5-Dichlorobiphenyl (9)	
2,6-Dichlorobiphenyl (10)	

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-WS-4010-0000-01-W 6/20/2001
3,4-Dichlorobiphenyl (12)	
2,2',3'-Trichlorobiphenyl (16)	
2,2',4-Trichlorobiphenyl (17)	
2,2',5-Trichlorobiphenyl (18)	
2,2',6-Trichlorobiphenyl (19)	
2,3,3'-Trichlorobiphenyl (20)	
2,3,4'-Trichlorobiphenyl (22)	
2,3,6-Trichlorobiphenyl (24)	
2,3',4-Trichlorobiphenyl (25)	
2,3',5-Trichlorobiphenyl (26)	
2,4',5-Trichlorobiphenyl (31)	
2,4',6-Trichlorobiphenyl (32)	
2,2',3,3'-Tetrachlorobiphenyl (40)	
2,2',3,4'-Tetrachlorobiphenyl (42)	
2,2',3,5-Tetrachlorobiphenyl (43)	
2,2',3,5'-Tetrachlorobiphenyl (44)	
2,2',3,6-Tetrachlorobiphenyl (45)	
2,2',3,6'-Tetrachlorobiphenyl (46)	
2,2',4,5-Tetrachlorobiphenyl (48)	
2,2',4,5'-Tetrachlorobiphenyl (49)	
2,2',4,6-Tetrachlorobiphenyl (50)	
2,3,3',4'-Tetrachlorobiphenyl (56)	
2,3,3',6-Tetrachlorobiphenyl (59)	
2,3,4,4'-Tetrachlorobiphenyl (60)	
2,3,4,5-Tetrachlorobiphenyl (61)	
2,3,4',5-Tetrachlorobiphenyl (63)	
2,3,4',6-Tetrachlorobiphenyl (64)	
2,3',4,4'-Tetrachlorobiphenyl (66)	
3,3',4,4'-Tetrachlorobiphenyl (77)	
3,4,4',5-Tetrachlorobiphenyl (81)	
2,2',3,3',4-Pentachlorobiphenyl (82)	
2,2',3,3',5-Pentachlorobiphenyl (83)	
2,2',3,3',6-Pentachlorobiphenyl (84)	
2,2',3,4,4'-Pentachlorobiphenyl (85)	
2,2',3,4,5-Pentachlorobiphenyl (86)	
2,2',3,4,6-Pentachlorobiphenyl (88)	
2,2',3,4,6'-Pentachlorobiphenyl (89)	
2,2',3,4',5-Pentachlorobiphenyl (90)	

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-WS-4010-0000-01-W 6/20/2001
2,2',3,5,5'-Pentachlorobiphenyl (92)	
2,2',3,5,6-Pentachlorobiphenyl (93)	
2,3,3',4,4'-Pentachlorobiphenyl (105)	
2,3,3',4,5-Pentachlorobiphenyl (106)	
2,3,3',4',5'-Pentachlorobiphenyl (108)	
2,3,3',4',6-Pentachlorobiphenyl (110)	
2,3,4,4',5-Pentachlorobiphenyl (114)	
2,3',4,4',5-Pentachlorobiphenyl (118)	
3,3',4,4',5-Pentachlorobiphenyl (126)	
2,2',3,3',4,4'-Hexachlorobiphenyl (128)	
2,2',3,3',4,5-Hexachlorobiphenyl (129)	
2,2',3,3',4,5'-Hexachlorobiphenyl (130)	
2,2',3,3',4,6-Hexachlorobiphenyl (131)	
2,2',3,3',4,6'-Hexachlorobiphenyl (132)	
2,2',3,3',5,6-Hexachlorobiphenyl (134)	
2,2',3,3',5,6'-Hexachlorobiphenyl (135)	
2,2',3,3',6,6'-Hexachlorobiphenyl (136)	
2,2',3,4,4',5-Hexachlorobiphenyl (137)	
2,2',3,4,5,5'-Hexachlorobiphenyl (141)	
2,2',3,4,5',6-Hexachlorobiphenyl (144)	
2,2',3,4',5,5'-Hexachlorobiphenyl (146)	
2,2',3,4',5,6-Hexachlorobiphenyl (147)	
2,2',4,4',5,5'-Hexachlorobiphenyl (153)	
2,3,3',4,4',5-Hexachlorobiphenyl (156)	
2,3,3',4,4',6-Hexachlorobiphenyl (158)	
2,3',4,4',5,5'-Hexachlorobiphenyl (167)	
3,3',4,4',5,5'-Hexachlorobiphenyl (169)	
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)	
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)	
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)	
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)	
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)	
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)	
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)	
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)	
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)	
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)	
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)	

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-WS-4010-0000-01-W 6/20/2001
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)	
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)	
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)	
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)	
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)	
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)	
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)	
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)	
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)	
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)	
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)	
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)	
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)	
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)	
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)	
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	
Decachlorobiphenyl (209)	
PCB Congeners, Total	
Toxicity Equivalency (PCB)	
Other (%)	
Lipid_percent	5.74

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

US EPA ARCHIVE DOCUMENT

Table A-16
Summary Statistics and Analytical Results for White Sucker - Allendale

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	APC-WS-4010-0000-01-W 6/20/2001

Samples ending with:
W - whole body

US EPA ARCHIVE DOCUMENT

Table A-17
Summary Statistics and Analytical Results for American Eel - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	LPX-AE-4001-0000-01-W 6/21/2001	LPX-AE-4002-0000-01-W 6/21/2001	LPX-AE-4003-0000-01-W 6/21/2001
Semivolatile Organics (ug/Kg)										
1,1'-Biphenyl	10	10			0.6	1.28	0.84	0.6 J	0.79 J	0.82 J
2-Methylnaphthalene	10	10			2.81	5.34	3.92	2.81	3.7	3.1
Acenaphthene	10	10			4.86	8.2	6.89	4.86	8.2	7.82
Acenaphthylene	10	10			1.08	2.94	1.93	1.51	1.39	1.08 J
Anthracene	10	10			1.78	3.79	2.67	2.3	2.52	2.69
Benzo(a)anthracene	1	10	1.26	1.7	3.45	3.45	0.95	1.28 U	1.32 U	1.26 U
Benzo(a)pyrene	1	10	1.26	1.32	3.82	3.82	0.96	1.28 U	1.32 U	1.26 U
Benzo(b)fluoranthene	1	10	1.26	2.01	5.77	5.77	1.19	1.28 U	1.32 U	1.26 U
Benzo(g,h,i)perylene	0	10	1.26	1.32			0.64	1.28 U	1.32 U	1.26 U
Benzo(k)fluoranthene	1	10	1.26	2.02	5.11	5.11	1.13	1.28 U	1.32 U	1.26 U
Chrysene	1	10	1.26	3.23	7.38	7.38	1.46	1.28 U	1.69 U	1.26 U
Dibenzo(a,h)anthracene	2	10	1.26	1.32	0.61	0.75	0.65	1.28 U	1.32 U	1.26 U
Dibenzofuran	10	10			1.32	2.31	1.63	1.38	2.17	2.31
Fluoranthene	10	10			9.55	23.09	13.68	9.64	21.46	14.3
Fluorene	10	10			2.5	5.11	3.37	2.92	5.02	5.11
Indeno(1,2,3-cd)pyrene	1	10	1.26	1.32	3.38	3.38	0.92	1.28 U	1.32 U	1.26 U
Naphthalene	10	10			4.01	6.66	5.53	4.01	5.34	4.71
Phenanthrene	10	10			10.27	27.17	15.54	11.99	27.17	25.32
Pyrene	3	10	3.23	5.02	5.96	11.65	3.85	3.23 U	5.96	4.48 U
Total PAH	10	10			42.03	110.9	61.41	42.03	83.74	67.25
Pesticides/PCBs (ug/Kg)										
4,4'-DDD	10	10			12.41	20.72	14.69	16.06 J	12.41	14.74
4,4'-DDE	10	10			27.78	78.91	44.51	53.84	27.78	36.27
4,4'-DDT	6	10	1.27	1.32	2.37	5.66	2.38	1.28 U	1.32 U	1.27 U
Aldrin	0	10	1.27	1.32			0.65	1.28 UJ	1.32 U	1.27 U
alpha-BHC	0	10	1.27	1.32			0.65	1.28 UJ	1.32 U	1.27 U
alpha-Chlordane	10	10			14.07	42.72	20.07	18.58	18.11	42.72
Aroclor, Total	10	10			306.63	1177.73	703.16	1004.31	381.95	306.63
Aroclor-1016	0	10	15.81	16.44			8.06	15.95 U	16.44 U	15.81 U
Aroclor-1221	0	10	15.81	16.44			8.06	15.95 U	16.44 U	15.81 U
Aroclor-1232	0	10	15.81	16.44			8.06	15.95 U	16.44 U	15.81 U
Aroclor-1242	0	10	15.81	16.44			8.06	15.95 U	16.44 U	15.81 U
Aroclor-1248	0	10	15.81	16.44			8.06	15.95 U	16.44 U	15.81 U
Aroclor-1254	10	10			306.63	1177.73	703.16	1004.31	381.95	306.63
Aroclor-1260	0	10	15.81	16.44			8.06	15.95 U	16.44 U	15.81 U
Aroclor-1268	0	10	15.81	16.44			8.06	15.95 U	16.44 U	15.81 U
beta-BHC	9	10	1.28	1.28	0.61	2.55	1.25	1.28 UJ	1.6	0.82 J
delta-BHC	0	10	1.27	1.32			0.65	1.28 UJ	1.32 U	1.27 U

US EPA ARCHIVE DOCUMENT

Table A-17
Summary Statistics and Analytical Results for American Eel - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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Dieldrin	10	10			6.62	11.15	7.89	6.76 J	7.89	8.37
Endosulfan I	0	10	1.27	1.32			0.65	1.28 UJ	1.32 U	1.27 U
Endosulfan II	0	10	1.27	1.32			0.65	1.28 UJ	1.32 U	1.27 U
Endosulfan Sulfate	0	10	1.27	1.32			0.65	1.28 U	1.32 U	1.27 U
Endrin	0	10	1.27	1.32			0.65	1.28 UJ	1.32 U	1.27 U
Endrin Aldehyde	0	10	1.27	1.32			0.65	1.28 UJ	1.32 UJ	1.27 UJ
Endrin Ketone	0	10	1.27	1.32			0.65	1.28 UJ	1.32 U	1.27 U
gamma-BHC	9	10	1.29	1.29	0.51	1.4	1.07	0.51 J	1.18 J	0.85 J
gamma-Chlordane	10	10			6.12	16.05	8.59	6.56 J	8.12	16.05
Heptachlor	0	10	1.27	1.32			0.65	1.28 UJ	1.32 U	1.27 U
Heptachlor Epoxide	10	10			1.53	5.59	2.27	1.53 J	3.14	5.59
Methoxychlor	0	10	1.27	1.32			0.65	1.28 UJ	1.32 U	1.27 U
Technical Chlordane	10	10			293.95	765.77	447.22	293.95	473.89	765.77
Toxaphene	0	10	31.62	32.89			16.12	31.9 U	32.89 U	31.62 U
Inorganics (mg/Kg)										
Aluminum	10	10			1.86	41.6	9.48	3.5	1.86	2.43
Antimony	1	10	0.034	0.034	0.00643	0.00643	0.0159	0.034 U	0.034 U	0.034 U
Arsenic	0	10	0.034	0.0731			0.0240	0.0577 U	0.043 U	0.0376 U
Barium	10	10			0.2	0.781	0.353	0.279	0.247	0.234
Beryllium	0	10	0.004	0.00525			0.00211	0.004 U	0.004 U	0.004 U
Cadmium	10	10			0.011	0.0425	0.0262	0.0117 J	0.0408 J	0.0311 J
Chromium	2	10	0.269	0.269	0.0468	0.187	0.131	0.269 U	0.269 U	0.0468 J
Cobalt	10	10			0.0427	0.0688	0.0539	0.0523 J	0.048 J	0.0504 J
Copper	10	10			0.532	0.793	0.659	0.632	0.61	0.719
Iron	10	10			18.7	53.2	29.7	24.8	28	19.9
Lead	10	10			0.11	0.473	0.266	0.174 J	0.249 J	0.204 J
Manganese	10	10			1.69	7.65	3.50	3.99	1.95	1.69
Mercury	6	10	0.0202	0.0646	0.0297	0.0756	0.0349	0.0443	0.0462	0.0297
Mercury (methyl)	10	10			0.0164	0.0673	0.0367	0.0443	0.0408	0.0319
Molybdenum	2	10	0.32	0.32	0.0135	0.019	0.131	0.32 U	0.32 U	0.32 U
Nickel	10	10			0.0653	0.124	0.0906	0.0864 J	0.0834 J	0.0749 J
Selenium	9	10	0.448	0.448	0.273	0.432	0.341	0.326 J	0.344 J	0.432 J
Silver	3	10	0.06	0.06	0.000324	0.0238	0.0247	0.06 U	0.0238 J	0.0132 J
Thallium	4	10	0.022	0.022	0.00444	0.00815	0.00886	0.022 U	0.022 U	0.022 U
Vanadium	2	10	0.179	0.179	0.0681	0.108	0.0892	0.108 J	0.179 U	0.179 U
Zinc	10	10			18.2	29.3	23.9	29.3	23.9	25.5
Dioxins/Furans (ug/Kg)										
HCX	10	10			0.02418	0.10774	0.05712	0.10774 J	0.02418 J	0.03929 J
TCX	0	0						R	R	R

US EPA ARCHIVE DOCUMENT

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Centredale Manor Restoration Project Superfund Site
North Providence, RI

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2,3,7,8-TCDD	10	10			0.02515	0.24673	0.14015	0.13352 J	0.05374 J	0.02515 J
1,2,3,7,8-PeCDD	1	10	0.00065	0.00146	0.00087	0.00087	0.00054	0.00103 UJ	0.00138 UJ	0.00069 UJ
1,2,3,4,7,8-HxCDD	9	10	0.00025	0.00025	0.00041	0.00093	0.00061	0.00025 UJ	0.00093 J	0.00041 J
1,2,3,6,7,8-HxCDD	10	10			0.00179	0.00432	0.00302	0.00262 J	0.00432 J	0.00179 J
1,2,3,7,8,9-HxCDD	8	10	0.00019	0.00039	0.00022	0.00047	0.00029	0.00037 J	0.00019 UJ	0.00039 UJ
1,2,3,4,6,7,8-HpCDD	8	10	0.00181	0.00214	0.00209	0.00486	0.00284	0.00214 UJ	0.00486 J	0.00181 UJ
OCDD	0	10	0.0023	0.00886			0.00194	0.00248 UJ	0.00505 UJ	0.00293 UJ
2,3,7,8-TCDF	1	10	0.00013	0.00036	0.00006	0.00006	0.00011	0.00033 UJ	0.00034 UJ	0.00036 UJ
1,2,3,7,8-PeCDF	0	10	0.00012	0.00051			0.00014	0.00044 UJ	0.00032 UJ	0.00051 UJ
2,3,4,7,8-PeCDF	4	10	0.00016	0.00052	0.00016	0.00025	0.00018	0.00042 UJ	0.00031 UJ	0.00052 UJ
1,2,3,4,7,8-HxCDF	0	10	0.00007	0.00033			0.00010	0.00025 UJ	0.00018 UJ	0.00021 UJ
1,2,3,6,7,8-HxCDF	6	10	0.00009	0.00024	0.00018	0.00032	0.00019	0.00024 UJ	0.00017 UJ	0.00032 J
2,3,4,6,7,8-HxCDF	0	10	0.00012	0.00033			0.00009	0.00026 UJ	0.00018 UJ	0.00033 UJ
1,2,3,7,8,9-HxCDF	0	10	0.00008	0.00035			0.00009	0.00027 UJ	0.00018 UJ	0.00035 UJ
1,2,3,4,6,7,8-HpCDF	4	10	0.00049	0.00113	0.00076	0.0016	0.00060	0.0005 UJ	0.00113 UJ	0.00051 UJ
1,2,3,4,7,8,9-HpCDF	0	10	0.00006	0.00052			0.00011	0.00034 UJ	0.00052 UJ	0.00032 UJ
OCDF	0	10	0.00023	0.00146			0.00024	0.00037 UJ	0.00038 UJ	0.0004 UJ
Total TCDD	10	10			0.02515	0.24673	0.14015	0.13352 J	0.05374 J	0.02515 J
Total PeCDD	0	10	0.00065	0.00155			0.00051	0.00103 UJ	0.00155 UJ	0.00069 UJ
Total HxCDD	10	10			0.00219	0.0062	0.00397	0.00299 J	0.00524 J	0.00219 J
Total HpCDD	3	10	0.002	0.00498	0.00372	0.00426	0.00221	0.00232 UJ	0.00498 UJ	0.002 UJ
Total TCDF	6	10	0.00014	0.00034	0.00001	0.00023	0.00008	0.00006 J	0.00034 UJ	0.00001 J
Total PeCDF	5	10	0.00016	0.00051	0.00016	0.00133	0.00035	0.00043 UJ	0.00031 UJ	0.00051 UJ
Total HxCDF	0	10	0.00012	0.00095			0.00023	0.00036 UJ	0.00018 UJ	0.00053 UJ
Total HpCDF	2	10	0.00083	0.00202	0.00103	0.00263	0.00091	0.00171 UJ	0.00129 UJ	0.00202 UJ
Toxicity Equivalency (Dioxins, Furans, HCX)	10	10			0.0254	0.248	0.141	0.134	0.0543	0.0254
PCB Congeners (ug/Kg)										
2-Monochlorobiphenyl (1)	0	3	0.00871	0.02056			0.00709	0.01329 UJ	0.02056 UJ	0.00871 UJ
4-Chlorobiphenyl (3)	0	3	0.01322	0.01585			0.00714	0.01376 UJ	0.01585 UJ	0.01322 UJ
2,2'-Dichlorobiphenyl (4)	0	3	0.02283	0.0449			0.01793	0.0449 UJ	0.03982 UJ	0.02283 UJ
2,3-Dichlorobiphenyl (5)	0	3	0.00412	0.00995			0.00400	0.00412 UJ	0.00995 UJ	0.00994 UJ
2,3'-Dichlorobiphenyl (6)	1	3	0.01139	0.01912	0.02189	0.02189	0.01238	0.01912 UJ	0.02189 J	0.01139 UJ
2,4-Dichlorobiphenyl (7)	0	3	0.00409	0.00995			0.00374	0.00839 UJ	0.00995 UJ	0.00409 UJ
2,4'-Dichlorobiphenyl (8)	0	3	0.05579	0.08393			0.03688	0.08393 UJ	0.08157 UJ	0.05579 UJ
2,5-Dichlorobiphenyl (9)	0	3	0.00409	0.00995			0.00387	0.00916 UJ	0.00995 UJ	0.00409 UJ
2,6-Dichlorobiphenyl (10)	1	3	0.00994	0.00995	0.0021	0.0021	0.00402	0.0021 J	0.00995 UJ	0.00994 UJ
3,4-Dichlorobiphenyl (12)	1	3	0.01486	0.01648	0.02846	0.02846	0.01471	0.01648 UJ	0.02846 J	0.01486 UJ
2,2',3'-Trichlorobiphenyl (16)	1	3	0.04138	0.05502	0.07763	0.07763	0.04194	0.07763 J	0.05502 UJ	0.04138 UJ
2,2',4-Trichlorobiphenyl (17)	1	3	0.03881	0.05691	0.07162	0.07162	0.03983	0.07162 J	0.05691 UJ	0.03881 UJ

US EPA ARCHIVE DOCUMENT

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North Providence, RI

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2,2',5-Trichlorobiphenyl (18)	2	3	0.08424	0.08424	0.16352	0.2553	0.15365	0.2553 J	0.16352 J	0.08424 UJ
2,2',6-Trichlorobiphenyl (19)	3	3			0.01198	0.03037	0.02182	0.03037 J	0.0231 J	0.01198 J
2,3,3'-Trichlorobiphenyl (20)	3	3			1.7214	5.1426	3.34709	5.1426 J	3.17728 J	1.7214 J
2,3,4'-Trichlorobiphenyl (22)	3	3			0.13628	0.28248	0.18848	0.28248 J	0.14669 J	0.13628 J
2,3,6-Trichlorobiphenyl (24)	2	3	0.0091	0.0091	0.01794	0.02904	0.01718	0.02904 J	0.01794 J	0.0091 UJ
2,3',4-Trichlorobiphenyl (25)	2	3	0.01993	0.01993	0.02142	0.03856	0.02332	0.03856 J	0.02142 J	0.01993 UJ
2,3',5-Trichlorobiphenyl (26)	3	3			0.15456	0.48324	0.31765	0.48324 J	0.31514 J	0.15456 J
2,4',5-Trichlorobiphenyl (31)	3	3			0.63207	1.85299	1.23161	1.85299 J	1.20976 J	0.63207 J
2,4',6-Trichlorobiphenyl (32)	3	3			0.064	0.1743	0.10778	0.1743 J	0.08503 J	0.064 J
2,2',3,3'-Tetrachlorobiphenyl (40)	3	3			0.08688	0.46152	0.22635	0.46152 J	0.13065 J	0.08688 J
2,2',3,4'-Tetrachlorobiphenyl (42)	3	3			0.31472	2.19151	1.07720	2.19151 J	0.72536 J	0.31472 J
2,2',3,5-Tetrachlorobiphenyl (43)	3	3			21.21426	94.94631	48.87256	94.94631 J	30.45711 J	21.21426 J
2,2',3,5'-Tetrachlorobiphenyl (44)	3	3			3.35106	22.07328	10.18434	22.07328 J	5.12868 J	3.35106 J
2,2',3,6-Tetrachlorobiphenyl (45)	3	3			0.06558	0.24834	0.13312	0.24834 J	0.08544 J	0.06558 J
2,2',3,6'-Tetrachlorobiphenyl (46)	3	3			0.01319	0.04794	0.02836	0.04794 J	0.02396 J	0.01319 J
2,2',4,5-Tetrachlorobiphenyl (48)	2	3	0.0205	0.0205	0.10534	0.14127	0.08562	0.14127 J	0.10534 J	0.0205 UJ
2,2',4,5'-Tetrachlorobiphenyl (49)	3	3			1.52574	4.57948	2.56071	4.57948 J	1.52574 J	1.57692 J
2,2',4,6-Tetrachlorobiphenyl (50)	3	3			0.11	0.41486	0.21819	0.41486 J	0.11 J	0.1297 J
2,3,3',4'-Tetrachlorobiphenyl (56)	2	3	0.07804	0.07804	0.12455	0.14757	0.10371	0.14757 J	0.07804 UJ	0.12455 J
2,3,3',6-Tetrachlorobiphenyl (59)	3	3			2.36577	8.8371	4.59125	8.8371 J	2.57088 J	2.36577 J
2,3,4,4'-Tetrachlorobiphenyl (60)	3	3			0.34589	1.47536	0.90868	1.47536 J	0.9048 J	0.34589 J
2,3,4,5-Tetrachlorobiphenyl (61)	3	3			2.31944	9.0022	5.32628	9.0022 J	4.6572 J	2.31944 J
2,3,4',5-Tetrachlorobiphenyl (63)	3	3			0.1104	0.58372	0.33531	0.58372 J	0.31182 J	0.1104 J
2,3,4',6-Tetrachlorobiphenyl (64)	3	3			3.52202	22.55194	10.98139	22.55194 J	6.87021 J	3.52202 J
2,3',4,4'-Tetrachlorobiphenyl (66)	3	3			6.61755	32.53625	15.99655	32.53625 J	8.83585 J	6.61755 J
3,3',4,4'-Tetrachlorobiphenyl (77)	3	3			0.01809	0.07311	0.03933	0.07311 J	0.01809 J	0.02678 J
3,4,4',5-Tetrachlorobiphenyl (81)	1	3	0.09954	0.0997	0.05796	0.05796	0.05253	0.0997 UJ	0.09954 UJ	0.05796 J
2,2',3,3',4-Pentachlorobiphenyl (82)	3	3			0.89481	6.35672	2.89074	6.35672 J	0.89481 J	1.42068 J
2,2',3,3',5-Pentachlorobiphenyl (83)	3	3			27.00962	146.61278	67.45325	146.61278 J	28.73734 J	27.00962 J
2,2',3,3',6-Pentachlorobiphenyl (84)	3	3			2.6914	12.06892	5.87240	12.06892 J	2.6914 J	2.85687 J
2,2',3,4,4'-Pentachlorobiphenyl (85)	3	3			7.88352	43.10832	20.08909	43.10832 J	9.27543 J	7.88352 J
2,2',3,4,5-Pentachlorobiphenyl (86)	3	3			10.45764	62.01954	28.52220	62.01954 J	10.45764 J	13.08942 J
2,2',3,4,6-Pentachlorobiphenyl (88)	3	3			1.7845	10.66698	4.89983	10.66698 J	1.7845 J	2.248 J
2,2',3,4,6'-Pentachlorobiphenyl (89)	2	3	0.09954	0.09954	0.00821	0.02325	0.02708	0.02325 J	0.09954 UJ	0.00821 J
2,2',3,4',5-Pentachlorobiphenyl (90)	3	3			29.08842	125.35764	61.85345	125.35764 J	29.08842 J	31.11429 J
2,2',3,5,5'-Pentachlorobiphenyl (92)	3	3			7.45899	50.99518	23.32095	50.99518 J	11.50869 J	7.45899 J
2,2',3,5,6-Pentachlorobiphenyl (93)	3	3			10.1288	46.776	22.59830	46.776 J	10.1288 J	10.8901 J
2,3,3',4,4'-Pentachlorobiphenyl (105)	3	3			9.747	39.25978	21.15363	39.25978 J	14.45411 J	9.747 J
2,3,3',4,5-Pentachlorobiphenyl (106)	3	3			1.36947	4.39251	2.44992	4.39251 J	1.58778 J	1.36947 J

US EPA ARCHIVE DOCUMENT

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2,3,3',4',5'-Pentachlorobiphenyl (108)	3	3			0.2976	0.94038	0.53777	0.94038 J	0.2976 J	0.37534 J
2,3,3',4',6-Pentachlorobiphenyl (110)	3	3			51.44472	337.41246	149.08021	337.41246 J	51.44472 J	58.38346 J
2,3,4,4',5-Pentachlorobiphenyl (114)	3	3			0.54496	2.36006	1.16576	2.36006 J	0.59226 J	0.54496 J
2,3',4,4',5-Pentachlorobiphenyl (118)	3	3			45.30813	207.7078	104.32554	207.7078 J	59.96069 J	45.30813 J
3,3',4,4',5-Pentachlorobiphenyl (126)	3	3			0.06586	0.21718	0.12308	0.21718 J	0.08621 J	0.06586 J
2,2',3,3',4,4'-Hexachlorobiphenyl (128)	3	3			9.5995	49.69804	25.93390	49.69804 J	18.50416 J	9.5995 J
2,2',3,3',4,5-Hexachlorobiphenyl (129)	3	3			89.11776	468.8138	229.97936	468.8138 J	132.00652 J	89.11776 J
2,2',3,3',4,5'-Hexachlorobiphenyl (130)	3	3			3.64415	20.68318	10.63832	20.68318 J	7.58764 J	3.64415 J
2,2',3,3',4,6-Hexachlorobiphenyl (131)	3	3			0.10523	0.47465	0.25575	0.47465 J	0.18737 J	0.10523 J
2,2',3,3',4,6'-Hexachlorobiphenyl (132)	3	3			3.8733	36.61489	16.06132	36.61489 J	7.69577 J	3.8733 J
2,2',3,3',5,6-Hexachlorobiphenyl (134)	3	3			1.33252	10.60782	4.87535	10.60782 J	2.68572 J	1.33252 J
2,2',3,3',5,6'-Hexachlorobiphenyl (135)	3	3			2.98707	30.26892	13.03646	30.26892 J	5.85339 J	2.98707 J
2,2',3,3',6,6'-Hexachlorobiphenyl (136)	3	3			0.69249	3.89434	1.84474	3.89434 J	0.94739 J	0.69249 J
2,2',3,4,4',5-Hexachlorobiphenyl (137)	3	3			5.41884	30.83694	15.44031	30.83694 J	10.06514 J	5.41884 J
2,2',3,4,5,5'-Hexachlorobiphenyl (141)	3	3			4.72461	25.83505	14.06990	25.83505 J	11.65003 J	4.72461 J
2,2',3,4,5',6-Hexachlorobiphenyl (144)	0	3	0.09944	0.0997			0.04978	0.0997 UJ	0.09954 UJ	0.09944 UJ
2,2',3,4',5,5'-Hexachlorobiphenyl (146)	3	3			9.25822	37.06244	21.00209	37.06244 J	16.6856 J	9.25822 J
2,2',3,4',5,6-Hexachlorobiphenyl (147)	3	3			37.89422	240.69742	106.79941	240.69742 J	41.8066 J	37.89422 J
2,2',4,4',5,5'-Hexachlorobiphenyl (153)	3	3			49.10966	224.97482	122.10743	224.97482 J	92.23782 J	49.10966 J
2,3,3',4,4',5-Hexachlorobiphenyl (156)	3	3			4.54002	20.7077	10.65481	20.7077 J	6.71672 J	4.54002 J
2,3,3',4,4',6-Hexachlorobiphenyl (158)	3	3			5.63	22.22589	12.87031	22.22589 J	10.75504 J	5.63 J
2,3',4,4',5,5'-Hexachlorobiphenyl (167)	3	3			2.19901	8.53938	4.53287	8.53938 J	2.86021 J	2.19901 J
3,3',4,4',5,5'-Hexachlorobiphenyl (169)	3	3			0.07443	0.22618	0.14452	0.22618 J	0.13294 J	0.07443 J
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)	3	3			5.2444	27.621	13.29659	27.621 J	7.02436 J	5.2444 J
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)	3	3			1.45456	8.43314	3.92229	8.43314 J	1.87916 J	1.45456 J
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)	3	3			1.00634	4.3722	2.29821	4.3722 J	1.51608 J	1.00634 J
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)	3	3			1.09217	12.42297	5.16550	12.42297 J	1.98135 J	1.09217 J
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)	3	3			0.08497	0.45648	0.23367	0.45648 J	0.15956 J	0.08497 J
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)	2	3	0.00492	0.00492	0.03529	0.25443	0.09739	0.25443 J	0.03529 J	0.00492 UJ
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)	3	3			2.71064	17.44082	7.90983	17.44082 J	3.57804 J	2.71064 J
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)	3	3			1.02277	5.23876	2.51111	5.23876 J	1.2718 J	1.02277 J
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)	3	3			8.55126	35.91006	19.17611	35.91006 J	13.067 J	8.55126 J
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)	0	3	0.19888	0.19941			0.09956	0.19941 UJ	0.19908 UJ	0.19888 UJ
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)	3	3			1.56187	7.44783	3.93416	7.44783 J	2.79277 J	1.56187 J
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)	3	3			0.00825	0.0316	0.01688	0.0316 J	0.01079 J	0.00825 J
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)	3	3			0.06458	0.47036	0.21876	0.47036 J	0.12134 J	0.06458 J
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)	3	3			14.03705	70.05311	32.74379	70.05311 J	14.14121 J	14.03705 J
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)	3	3			0.17222	0.7062	0.38936	0.7062 J	0.28965 J	0.17222 J
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)	3	3			1.7304	7.58653	3.78687	7.58653 J	2.04369 J	1.7304 J

US EPA ARCHIVE DOCUMENT

Table A-17
Summary Statistics and Analytical Results for American Eel - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	LPX-AE-4001-0000-01-W 6/21/2001	LPX-AE-4002-0000-01-W 6/21/2001	LPX-AE-4003-0000-01-W 6/21/2001
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)	3	3			0.18857	0.6882	0.38312	0.6882 J	0.27259 J	0.18857 J
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)	3	3			1.63433	6.76815	3.67319	6.76815 J	2.61708 J	1.63433 J
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)	3	3			0.51945	2.81942	1.34873	2.81942 J	0.70731 J	0.51945 J
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)	3	3			0.80155	3.34361	1.75556	3.34361 J	1.12151 J	0.80155 J
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)	3	3			0.0507	0.19903	0.10984	0.19903 J	0.0798 J	0.0507 J
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)	3	3			9.44118	47.1084	22.06739	47.1084 J	9.44118 J	9.65258 J
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)	3	3			0.03105	0.27166	0.11337	0.27166 J	0.03741 J	0.03105 J
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)	3	3			0.18727	1.00344	0.51347	1.00344 J	0.34971 J	0.18727 J
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)	3	3			3.12008	10.69282	5.96319	10.69282 J	4.07666 J	3.12008 J
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)	3	3			0.08458	0.3543	0.19534	0.3543 J	0.14713 J	0.08458 J
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	3	3			5.95456	23.82844	12.26355	23.82844 J	7.00765 J	5.95456 J
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	3	3			0.41108	1.47746	0.83073	1.47746 J	0.60366 J	0.41108 J
Decachlorobiphenyl (209)	3	3			3.13481	16.52843	7.66151	16.52843 J	3.32128 J	3.13481 J
PCB Congeners, Total	3	3			559.45	2850.7178	1386.30089	2850.7178 J	748.73488 J	559.45 J
Toxicity Equivalency (PCB)	3	3			0.0154	0.0604	0.0323	0.0604	0.0211	0.0154
Other (%)										
Lipid_percent	10	10			15.9	22.1	18.7	17.8	17.1	19.8

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

Samples ending with:
W - whole body

US EPA ARCHIVE DOCUMENT

Table A-17
Summary Statistics and Analytical Results for American Eel - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-AE-4004-0000-01-W 6/21/2001	LPX-AE-4005-0000-01-W 6/21/2001	LPX-AE-4006-0000-01-W 6/21/2001	LPX-AE-4007-0000-01-W 6/21/2001	LPX-AE-4008-0000-01-W 6/21/2001	LPX-AE-4009-0000-01-W 6/21/2001	LPX-AE-4010-0000-01-W 6/21/2001	LPX-DU-062101-B-W 6/21/2001 REPLICATE
Semivolatile Organics (ug/Kg)								
1,1'-Biphenyl	0.77 J	0.72 J	1.28 J	1.05 J	0.79 J	0.77 J	0.78 J	
2-Methylnaphthalene	4	3.23	5.34	3.87	4.6	4.52	4.02	
Acenaphthene	7.8	6.12	6.39	8.15	5.93	7.16	6.51	
Acenaphthylene	1.65	1.3	1.9	2.54	2.16	2.94	2.79	
Anthracene	2.45	1.78	2.46	2.84	2.68	3.79	3.22	
Benzo(a)anthracene	3.45	1.3 U	1.28 U	1.3 U	1.3 U	1.7 U	1.27 U	
Benzo(a)pyrene	3.82	1.3 U	1.28 U	1.3 U	1.3 U	1.29 U	1.27 U	
Benzo(b)fluoranthene	5.77	1.3 U	1.28 U	1.3 U	1.3 U	2.01 U	1.27 U	
Benzo(g,h,i)perylene	1.29 U	1.3 U	1.28 U	1.3 U	1.3 U	1.29 U	1.27 U	
Benzo(k)fluoranthene	5.11	1.3 U	1.28 U	1.3 U	1.3 U	2.02 U	1.27 U	
Chrysene	7.38	1.46 U	1.28 U	1.3 U	1.34 U	3.23 U	1.65 U	
Dibenzo(a,h)anthracene	0.75 J	1.3 U	1.28 U	1.3 U	1.3 U	0.61 J	1.27 U	
Dibenzofuran	1.6	1.41	1.32	1.75	1.4	1.67	1.32	
Fluoranthene	23.09	9.55	10.91	11.44	10.17	14.28	11.92	
Fluorene	3.08	2.81	2.5	3.18	2.75	3.53	2.75	
Indeno(1,2,3-cd)pyrene	3.38	1.3 U	1.28 U	1.3 U	1.3 U	1.29 U	1.27 U	
Naphthalene	5.23	4.43	6.57	6.11	6.23	6.66	5.98	
Phenanthrene	19.93	11.01	10.27	11.83	10.93	15.45	11.5	
Pyrene	11.65	3.76 U	4.27 U	4.31 U	4.05 U	6.32	5.02 U	
Total PAH	110.9	42.34	48.95	52.77	47.65	67.68	50.8	
Pesticides/PCBs (ug/Kg)								
4,4'-DDD	13.17 J	13.62 J	13.83	15.35	14.27	20.72 J	12.69 J	
4,4'-DDE	47.33 J	37.17 J	38.98	46.5	37.22	78.91 J	41.05 J	
4,4'-DDT	1.3 U	5.66 J	3.26	2.37	2.73	3.65 J	3.59 J	
Aldrin	1.3 U	1.3 U	1.28 U	1.3 U	1.31 U	1.29 U	1.28 U	
alpha-BHC	1.3 U	1.3 U	1.28 U	1.3 U	1.31 U	1.29 U	1.28 U	
alpha-Chlordane	18.07 J	15.97 J	18.11	14.07	18.37	19.5 J	17.16 J	
Aroclor, Total	652.27 J	633.66 J	678.34	673.14	785.81	1177.73 J	737.8 J	
Aroclor-1016	16.17 U	16.25 U	16.01 U	16.23 U	16.3 U	16.07 U	15.92 U	
Aroclor-1221	16.17 U	16.25 U	16.01 U	16.23 U	16.3 U	16.07 U	15.92 U	
Aroclor-1232	16.17 U	16.25 U	16.01 U	16.23 U	16.3 U	16.07 U	15.92 U	
Aroclor-1242	16.17 U	16.25 U	16.01 U	16.23 U	16.3 U	16.07 U	15.92 U	
Aroclor-1248	16.17 U	16.25 U	16.01 U	16.23 U	16.3 U	16.07 U	15.92 U	
Aroclor-1254	652.27 J	633.66 J	678.34	673.14	785.81	1177.73 J	737.8 J	
Aroclor-1260	16.17 U	16.25 U	16.01 U	16.23 U	16.3 U	16.07 U	15.92 U	
Aroclor-1268	16.17 U	16.25 U	16.01 U	16.23 U	16.3 U	16.07 U	15.92 U	
beta-BHC	1.91 J	2.55 J	1.35	0.73 J	0.61 J	1.17 J	1.07 J	
delta-BHC	1.3 U	1.3 U	1.28 U	1.3 U	1.31 UJ	1.29 UJ	1.28 UJ	

US EPA ARCHIVE DOCUMENT

Table A-17
Summary Statistics and Analytical Results for American Eel - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-AE-4004-0000-01-W 6/21/2001	LPX-AE-4005-0000-01-W 6/21/2001	LPX-AE-4006-0000-01-W 6/21/2001	LPX-AE-4007-0000-01-W 6/21/2001	LPX-AE-4008-0000-01-W 6/21/2001	LPX-AE-4009-0000-01-W 6/21/2001	LPX-AE-4010-0000-01-W 6/21/2001	LPX-DU-062101-B-W 6/21/2001 REPLICATE
Dieldrin	6.62 J	7.81 J	6.73	6.65	7.42 J	11.15 J	9.45 J	
Endosulfan I	1.3 U	1.3 U	1.28 U	1.3 U	1.31 U	1.29 U	1.28 U	
Endosulfan II	1.3 U	1.3 U	1.28 U	1.3 U	1.31 U	1.29 U	1.28 U	
Endosulfan Sulfate	1.3 U	1.3 U	1.28 U	1.3 U	1.31 U	1.29 U	1.28 U	
Endrin	1.3 U	1.3 U	1.28 U	1.3 U	1.31 U	1.29 U	1.28 U	
Endrin Aldehyde	1.3 UJ	1.3 UJ	1.28 UJ	1.3 UJ	1.31 UJ	1.29 UJ	1.28 UJ	
Endrin Ketone	1.3 U	1.3 U	1.28 U	1.3 U	1.31 U	1.29 U	1.28 U	
gamma-BHC	1.37 J	1.4 J	1.12 J	0.97 J	1.24 J	1.29 UJ	1.37 J	
gamma-Chlordane	6.12 J	7.55 J	7.65	7	9.43	9.31 J	8.06 J	
Heptachlor	1.3 U	1.3 U	1.28 U	1.3 U	1.31 UJ	1.29 UJ	1.28 UJ	
Heptachlor Epoxide	1.82 J	1.78 J	1.75	1.64	1.66	1.93 J	1.85 J	
Methoxychlor	1.3 U	1.3 U	1.28 U	1.3 U	1.31 U	1.29 U	1.28 U	
Technical Chlordane	319.18 J	336.13 J	360.47	340.93	344.26	600.57 J	637.02 J	
Toxaphene	32.34 U	32.51 U	32.02 U	32.47 U	32.59 U	32.15 U	31.83 U	
Inorganics (mg/Kg)								
Aluminum	41.6	2.92	3.38	5.1	5.65	23	5.38	2.84
Antimony	0.00643 J	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U
Arsenic	0.0425 U	0.0486 U	0.034 U	0.0531 U	0.0492 U	0.0417 U	0.0731 U	0.0404 U
Barium	0.781	0.234	0.2	0.248	0.353	0.601	0.357	0.217
Beryllium	0.00485 U	0.004 U	0.004 U	0.004 U	0.004 U	0.00525 U	0.004 U	0.004 U
Cadmium	0.0247 J	0.0425 J	0.027 J	0.0139 J	0.0293 J	0.011 J	0.0303 J	0.0411 J
Chromium	0.187 J	0.269 U	0.269 U	0.269 U	0.269 U	0.269 U	0.269 U	0.269 U
Cobalt	0.0624 J	0.0688 J	0.0454 J	0.0427 J	0.0495 J	0.0643 J	0.055 J	0.0593 J
Copper	0.728	0.756	0.542	0.664 J	0.609 J	0.532 J	0.793	0.979
Iron	53.2	22	18.7	28 J	31.3 J	42.9 J	27.7 J	24.3
Lead	0.473 J	0.312 J	0.164 J	0.11 J	0.203 J	0.44 J	0.334 J	0.268 J
Manganese	7.65	4.14	1.76	3.52	3.74	3.61	2.96	3.75
Mercury	0.0356	0.0756	0.0321	0.0424 U	0.0646 U	0.0202 U	0.0433 U	0.0721
Mercury (methyl)	0.0428	0.0673	0.0337	0.0247	0.0289	0.0164	0.0359	0.0735
Molybdenum	0.0135 J	0.019 J	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
Nickel	0.119 J	0.107 J	0.0757 J	0.0653 J	0.0862 J	0.124 J	0.0844 J	0.0983 J
Selenium	0.273 J	0.31 J	0.366 J	0.448 U	0.385 J	0.35 J	0.402 J	0.31 J
Silver	0.06 U	0.000324 J	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
Thallium	0.022 U	0.022 U	0.022 U	0.00815 J	0.00444 J	0.00467 J	0.00534 J	0.022 U
Vanadium	0.179 U	0.179 U	0.179 U	0.179 U	0.179 U	0.179 U	0.0681 J	0.179 U
Zinc	19.8	28.3	25.7	18.2 J	22.5 J	21.3 J	24.4 J	30.2
Dioxins/Furans (ug/Kg)								
HCX	0.03535 J	0.05672 J	0.06196 J	0.05206 J	0.05707 J	0.09623 J	0.04055 J	
TCX	R	R	R	R	R	R	R	

US EPA ARCHIVE DOCUMENT

Table A-17
Summary Statistics and Analytical Results for American Eel - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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2,3,7,8-TCDD	0.08475 J	0.18052 J	0.13602 J	0.17748 J	0.20919 J	0.24673 J	0.15437 J	
1,2,3,7,8-PeCDD	0.00065 UJ	0.00097 UJ	0.00084 UJ	0.00106 UJ	0.00105 UJ	0.00146 UJ	0.00087 J	
1,2,3,4,7,8-HxCDD	0.00048 J	0.00064 J	0.00044 J	0.00064 J	0.00086 J	0.00084 J	0.00076 J	
1,2,3,6,7,8-HxCDD	0.00179 J	0.00291 J	0.00231 J	0.00285 J	0.0037 J	0.0043 J	0.00362 J	
1,2,3,7,8,9-HxCDD	0.00047 J	0.00027 J	0.00023 J	0.00022 J	0.00037 J	0.00041 J	0.0003 J	
1,2,3,4,6,7,8-HpCDD	0.00355 J	0.00256 J	0.00209 J	0.00248 J	0.00329 J	0.0039 J	0.00372 J	
OCDD	0.00886 UJ	0.00262 UJ	0.0023 UJ	0.00244 UJ	0.00343 UJ	0.00554 UJ	0.0032 UJ	
2,3,7,8-TCDF	0.00015 UJ	0.00013 UJ	0.0002 UJ	0.00017 UJ	0.00022 UJ	0.00006 J	0.00014 UJ	
1,2,3,7,8-PeCDF	0.00016 UJ	0.00027 UJ	0.00028 UJ	0.0002 UJ	0.00032 UJ	0.00018 UJ	0.00012 UJ	
2,3,4,7,8-PeCDF	0.00016 UJ	0.00025 UJ	0.00027 UJ	0.00016 J	0.00019 J	0.00025 J	0.0002 J	
1,2,3,4,7,8-HxCDF	0.00033 UJ	0.00024 UJ	0.0002 UJ	0.00007 UJ	0.00009 UJ	0.00024 UJ	0.00023 UJ	
1,2,3,6,7,8-HxCDF	0.00025 J	0.00021 J	0.0002 UJ	0.00018 J	0.00009 UJ	0.00032 J	0.00025 J	
2,3,4,6,7,8-HxCDF	0.00015 UJ	0.00013 UJ	0.00012 UJ	0.00013 UJ	0.00018 UJ	0.00022 UJ	0.00016 UJ	
1,2,3,7,8,9-HxCDF	0.00023 UJ	0.00009 UJ	0.00022 UJ	0.00008 UJ	0.0001 UJ	0.00018 UJ	0.00011 UJ	
1,2,3,4,6,7,8-HpCDF	0.0016 J	0.0006 UJ	0.00049 UJ	0.00062 UJ	0.00083 J	0.00084 J	0.00076 J	
1,2,3,4,7,8,9-HpCDF	0.00016 UJ	0.00006 UJ	0.00011 UJ	0.00009 UJ	0.00012 UJ	0.00027 UJ	0.00017 UJ	
OCDF	0.00146 UJ	0.00023 UJ	0.00033 UJ	0.00025 UJ	0.00036 UJ	0.00069 UJ	0.0003 UJ	
Total TCDD	0.08475 J	0.18052 J	0.13602 J	0.17748 J	0.20919 J	0.24673 J	0.15437 J	
Total PeCDD	0.00065 UJ	0.00097 UJ	0.00084 UJ	0.00106 UJ	0.00105 UJ	0.00146 UJ	0.00087 UJ	
Total HxCDD	0.00293 J	0.00384 J	0.00299 J	0.00371 J	0.00493 J	0.0062 J	0.00468 J	
Total HpCDD	0.00423 J	0.00256 UJ	0.00209 UJ	0.00248 UJ	0.0034 UJ	0.00426 J	0.00372 J	
Total TCDF	0.00002 J	0.00002 J	0.0002 UJ	0.00001 J	0.00022 UJ	0.00023 J	0.00014 UJ	
Total PeCDF	0.00016 UJ	0.00037 J	0.00019 J	0.00016 J	0.00056 J	0.00133 J	0.00032 UJ	
Total HxCDF	0.00095 UJ	0.0006 UJ	0.00012 UJ	0.00033 UJ	0.0002 UJ	0.00078 UJ	0.00064 UJ	
Total HpCDF	0.00263 J	0.00083 UJ	0.001 UJ	0.00103 UJ	0.00164 UJ	0.0014 UJ	0.00103 J	
Toxicity Equivalency (Dioxins, Furans, HCX)	0.0851	0.181	0.136	0.178	0.21	0.248	0.156	
PCB Congeners (ug/Kg)								
2-Monochlorobiphenyl (1)								
4-Chlorobiphenyl (3)								
2,2'-Dichlorobiphenyl (4)								
2,3-Dichlorobiphenyl (5)								
2,3'-Dichlorobiphenyl (6)								
2,4-Dichlorobiphenyl (7)								
2,4'-Dichlorobiphenyl (8)								
2,5-Dichlorobiphenyl (9)								
2,6-Dichlorobiphenyl (10)								
3,4-Dichlorobiphenyl (12)								
2,2',3'-Trichlorobiphenyl (16)								
2,2',4-Trichlorobiphenyl (17)								

US EPA ARCHIVE DOCUMENT

Table A-17
Summary Statistics and Analytical Results for American Eel - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-AE-4004-0000-01-W 6/21/2001	LPX-AE-4005-0000-01-W 6/21/2001	LPX-AE-4006-0000-01-W 6/21/2001	LPX-AE-4007-0000-01-W 6/21/2001	LPX-AE-4008-0000-01-W 6/21/2001	LPX-AE-4009-0000-01-W 6/21/2001	LPX-AE-4010-0000-01-W 6/21/2001	LPX-DU-062101-B-W 6/21/2001 REPLICATE
2,2',5-Trichlorobiphenyl (18)								
2,2',6-Trichlorobiphenyl (19)								
2,3,3'-Trichlorobiphenyl (20)								
2,3,4'-Trichlorobiphenyl (22)								
2,3,6-Trichlorobiphenyl (24)								
2,3',4-Trichlorobiphenyl (25)								
2,3',5-Trichlorobiphenyl (26)								
2,4',5-Trichlorobiphenyl (31)								
2,4',6-Trichlorobiphenyl (32)								
2,2',3,3'-Tetrachlorobiphenyl (40)								
2,2',3,4'-Tetrachlorobiphenyl (42)								
2,2',3,5-Tetrachlorobiphenyl (43)								
2,2',3,5'-Tetrachlorobiphenyl (44)								
2,2',3,6-Tetrachlorobiphenyl (45)								
2,2',3,6'-Tetrachlorobiphenyl (46)								
2,2',4,5-Tetrachlorobiphenyl (48)								
2,2',4,5'-Tetrachlorobiphenyl (49)								
2,2',4,6-Tetrachlorobiphenyl (50)								
2,3,3',4'-Tetrachlorobiphenyl (56)								
2,3,3',6-Tetrachlorobiphenyl (59)								
2,3,4,4'-Tetrachlorobiphenyl (60)								
2,3,4,5-Tetrachlorobiphenyl (61)								
2,3,4',5-Tetrachlorobiphenyl (63)								
2,3,4',6-Tetrachlorobiphenyl (64)								
2,3',4,4'-Tetrachlorobiphenyl (66)								
3,3',4,4'-Tetrachlorobiphenyl (77)								
3,4,4',5-Tetrachlorobiphenyl (81)								
2,2',3,3',4-Pentachlorobiphenyl (82)								
2,2',3,3',5-Pentachlorobiphenyl (83)								
2,2',3,3',6-Pentachlorobiphenyl (84)								
2,2',3,4,4'-Pentachlorobiphenyl (85)								
2,2',3,4,5-Pentachlorobiphenyl (86)								
2,2',3,4,6-Pentachlorobiphenyl (88)								
2,2',3,4,6'-Pentachlorobiphenyl (89)								
2,2',3,4',5-Pentachlorobiphenyl (90)								
2,2',3,5,5'-Pentachlorobiphenyl (92)								
2,2',3,5,6-Pentachlorobiphenyl (93)								
2,3,3',4,4'-Pentachlorobiphenyl (105)								
2,3,3',4,5-Pentachlorobiphenyl (106)								

US EPA ARCHIVE DOCUMENT

Table A-17
Summary Statistics and Analytical Results for American Eel - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-AE-4004-0000-01-W 6/21/2001	LPX-AE-4005-0000-01-W 6/21/2001	LPX-AE-4006-0000-01-W 6/21/2001	LPX-AE-4007-0000-01-W 6/21/2001	LPX-AE-4008-0000-01-W 6/21/2001	LPX-AE-4009-0000-01-W 6/21/2001	LPX-AE-4010-0000-01-W 6/21/2001	LPX-DU-062101-B-W 6/21/2001 REPLICATE
2,3,3',4',5'-Pentachlorobiphenyl (108)								
2,3,3',4',6-Pentachlorobiphenyl (110)								
2,3,4,4',5-Pentachlorobiphenyl (114)								
2,3',4,4',5-Pentachlorobiphenyl (118)								
3,3',4,4',5-Pentachlorobiphenyl (126)								
2,2',3,3',4,4'-Hexachlorobiphenyl (128)								
2,2',3,3',4,5-Hexachlorobiphenyl (129)								
2,2',3,3',4,5'-Hexachlorobiphenyl (130)								
2,2',3,3',4,6-Hexachlorobiphenyl (131)								
2,2',3,3',4,6'-Hexachlorobiphenyl (132)								
2,2',3,3',5,6-Hexachlorobiphenyl (134)								
2,2',3,3',5,6'-Hexachlorobiphenyl (135)								
2,2',3,3',6,6'-Hexachlorobiphenyl (136)								
2,2',3,4,4',5-Hexachlorobiphenyl (137)								
2,2',3,4,5,5'-Hexachlorobiphenyl (141)								
2,2',3,4,5',6-Hexachlorobiphenyl (144)								
2,2',3,4',5,5'-Hexachlorobiphenyl (146)								
2,2',3,4',5,6-Hexachlorobiphenyl (147)								
2,2',4,4',5,5'-Hexachlorobiphenyl (153)								
2,3,3',4,4',5-Hexachlorobiphenyl (156)								
2,3,3',4,4',6-Hexachlorobiphenyl (158)								
2,3',4,4',5,5'-Hexachlorobiphenyl (167)								
3,3',4,4',5,5'-Hexachlorobiphenyl (169)								
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)								
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)								
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)								
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)								
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)								
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)								
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)								
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)								
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)								
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)								
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)								
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)								
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)								
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)								
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)								
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)								

US EPA ARCHIVE DOCUMENT

Table A-17
Summary Statistics and Analytical Results for American Eel - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-AE-4004-0000-01-W 6/21/2001	LPX-AE-4005-0000-01-W 6/21/2001	LPX-AE-4006-0000-01-W 6/21/2001	LPX-AE-4007-0000-01-W 6/21/2001	LPX-AE-4008-0000-01-W 6/21/2001	LPX-AE-4009-0000-01-W 6/21/2001	LPX-AE-4010-0000-01-W 6/21/2001	LPX-DU-062101-B-W 6/21/2001 REPLICATE
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)								
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)								
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)								
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)								
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)								
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)								
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)								
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)								
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)								
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)								
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl								
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl								
Decachlorobiphenyl (209)								
PCB Congeners, Total								
Toxicity Equivalency (PCB)								
Other (%)								
Lipid_percent	16.3	15.9	16.7	21.2	18.5	22.1	21.7	

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

Samples ending with:
W - whole body

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	LPX-DU-062101-0000-C-F 6/21/2001 REPLICATE	LPX-DU-062101-0000-C-O 6/21/2001 REPLICATE	LPX-DU-062101-0000-C-W 6/21/2001 REPLICATE
Semivolatile Organics (ug/Kg)										
1,1'-Biphenyl	30	32	0.9	0.94	0.07	0.75	0.38			
2-Methylnaphthalene	31	32	0.98	0.98	0.17	6.87	2.32			
Acenaphthene	25	32	0.57	1.12	0.16	2.15	0.91			
Acenaphthylene	27	32	0.63	1.12	0.05	1.06	0.45			
Anthracene	31	32	0.9	0.9	0.06	1.85	0.66			
Benzo(a)anthracene	26	32	0.59	1.12	0.04	3.77	0.55			
Benzo(a)pyrene	17	32	0.57	1.12	0.14	5.85	0.79			
Benzo(b)fluoranthene	22	32	0.57	1.12	0.09	7.52	0.99			
Benzo(g,h,i)perylene	15	32	0.57	1.12	0.35	6.03	0.96			
Benzo(k)fluoranthene	19	32	0.57	1.12	0.16	6.78	0.91			
Chrysene	29	32	0.81	1.12	0.09	7.25	1.11			
Dibenzo(a,h)anthracene	12	32	0.57	1.12	0.08	1.7	0.41			
Dibenzofuran	31	32	1.12	1.12	0.07	1.97	0.78			
Fluoranthene	29	32	0.81	1.12	0.32	10.84	2.52			
Fluorene	31	32	1.12	1.12	0.08	6.71	1.71			
Indeno(1,2,3-cd)pyrene	29	32	0.81	1.12	0.1	7.04	0.91			
Naphthalene	25	32	0.76	3.05	0.76	6.2	1.91			
Phenanthrene	30	32	0.9	1.12	0.3	8.58	3.57			
Pyrene	21	32	0.57	1.12	0.48	7.59	1.61			
Total PAH	32	32			0.29	84.94	21.81			
Pesticides/PCBs (ug/Kg)										
4,4'-DDD	32	32			0.15	39.1	5.66			
4,4'-DDE	31	32	0.72	0.72	0.95	177.73	46.22			
4,4'-DDT	30	32	0.72	0.79	0.06	7.4	2.31			
Aldrin	0	19	0.46	1.09			0.31			
alpha-BHC	0	19	0.46	1.1			0.31			
alpha-Chlordane	32	32			0.25	13.76	5.42			
Aroclor, Total	32	32			17.37	3349.86	1102.98			
Aroclor-1016	0	19	5.71	13.65			3.91			
Aroclor-1221	0	19	5.71	13.65			3.91			
Aroclor-1232	0	19	5.71	13.65			3.91			
Aroclor-1242	0	19	5.71	13.65			3.91			
Aroclor-1248	0	19	5.71	13.65			3.91			
Aroclor-1254	32	32			16.71	3332.9	1080.73			
Aroclor-1260	0	19	5.71	13.65			3.91			
Aroclor-1268	32	32			0.67	81.18	22.25			
beta-BHC	0	19	0.46	1.09			0.31			

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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delta-BHC	0	19	0.46	1.1			0.31			
Dieldrin	30	31	0.72	0.72	0.18	3.74	1.43			
Endosulfan I	0	19	0.46	1.09			0.31			
Endosulfan II	0	19	0.46	1.09			0.31			
Endosulfan Sulfate	0	19	0.46	1.09			0.31			
Endrin	0	19	0.46	1.09			0.31			
Endrin Aldehyde	0	19	0.46	1.09			0.31			
Endrin Ketone	0	19	0.46	1.09			0.31			
gamma-BHC	0	19	0.46	1.09			0.31			
gamma-Chlordane	31	32	0.72	0.72	0.03	5.82	2.11			
Heptachlor	0	19	0.46	1.09			0.31			
Heptachlor Epoxide	0	19	0.46	1.09			0.31			
Methoxychlor	0	19	0.46	1.1			0.31			
Technical Chlordane	32	32			3.19	215.57	96.04			
Toxaphene	0	19	9.02	27.31			7.26			
Inorganics (mg/Kg)										
Aluminum	28	30	1.12	1.12	0.4	101	8.38	0.504 J	3.72	2.69
Antimony	1	30	0.000695	0.034	0.00194	0.00194	0.0159	0.034 U	0.034 U	0.034 U
Arsenic	0	30	0.034	0.0929			0.0226	0.034 U	0.0392 U	0.0375 U
Barium	28	30	0.011	0.018	0.0195	2.45	0.735	0.0222 J	1.76 J	1.21 J
Beryllium	8	30	0.004	0.00721	0.00125	0.0164	0.00340	0.004 U	0.00729 U	0.00624 U
Cadmium	21	30	0.2	0.2	0.00304	0.0297	0.0395	0.2 U	0.0297 J	0.0202 J
Chromium	11	30	0.0303	0.269	0.035	0.436	0.144	0.269 U	0.269 U	0.269 U
Cobalt	28	30	0.00163	0.38	0.0045	0.145	0.0573	0.01 J	0.124 J	0.0876 J
Copper	30	30			0.136	1.71	0.818	0.159 J	1.58 J	1.13 J
Iron	30	30			2	140	23.4	2.94 J	30.5 J	21.7 J
Lead	28	30	0.022	0.022	0.0017	0.557	0.0818	0.000945 J	0.133 J	0.0909 J
Manganese	30	30			0.103	22.1	3.90	0.116 U	8.67	5.91
Mercury	9	30	0.0712	0.385	0.0806	0.398	0.128	0.344 U	0.196 U	0.243 U
Mercury (methyl)	30	30			0.0384	0.41	0.190	0.302	0.16	0.205
Molybdenum	13	30	0.00956	0.32	0.0235	0.0673	0.103	0.32 U	0.0706 J	0.0481 J
Nickel	29	30	0.32	0.32	0.0154	0.249	0.0971	0.0218 J	0.219 J	0.156 J
Selenium	25	30	0.0431	0.448	0.102	0.281	0.184	0.155 J	0.18 J	0.172 J
Silver	6	30	0.06	0.06	0.00768	0.0292	0.0280	0.06 U	0.06 U	0.06 U
Thallium	30	30			0.00163	0.00643	0.00420	0.00241 J	0.00441 J	0.00377 J
Vanadium	14	30	0.179	0.179	0.0207	0.167	0.0735	0.179 U	0.179 U	0.179 U
Zinc	30	30			4.07	26.7	14.5	4.68 J	26.7 J	19.7 J

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	LPX-DU-062101-0000-C-F 6/21/2001 REPLICATE	LPX-DU-062101-0000-C-O 6/21/2001 REPLICATE	LPX-DU-062101-0000-C-W 6/21/2001 REPLICATE
Dioxins/Furans (ug/Kg)										
HCX	18	30	0.01986	0.04	0.005	0.04848	0.01967			
TCX	0	0								
2,3,7,8-TCDD	30	30			0.00972	0.44062	0.16287			
1,2,3,7,8-PeCDD	20	30	0.00014	0.0003	0.00013	0.00075	0.00030			
1,2,3,4,7,8-HxCDD	6	30	0.00004	0.00045	0.00005	0.00012	0.00011			
1,2,3,6,7,8-HxCDD	16	30	0.00004	0.00046	0.00013	0.00044	0.00018			
1,2,3,7,8,9-HxCDD	6	30	0.00004	0.00043	0.00003	0.00011	0.00011			
1,2,3,4,6,7,8-HpCDD	8	30	0.00015	0.00141	0.0002	0.00057	0.00025			
OCDD	0	30	0.00019	0.00371			0.00036			
2,3,7,8-TCDF	20	30	0.00004	0.0002	0.00009	0.00134	0.00024			
1,2,3,7,8-PeCDF	2	30	0.00014	0.0004	0.0004	0.00056	0.00013			
2,3,4,7,8-PeCDF	8	30	0.00014	0.00035	0.00018	0.00049	0.00016			
1,2,3,4,7,8-HxCDF	0	30	0.00005	0.00042			0.00007			
1,2,3,6,7,8-HxCDF	4	30	0.00001	0.00049	0.0001	0.00034	0.00009			
2,3,4,6,7,8-HxCDF	2	30	0.00003	0.00052	0.00012	0.00017	0.00010			
1,2,3,7,8,9-HxCDF	2	30	0.00004	0.00056	0.00012	0.00017	0.00011			
1,2,3,4,6,7,8-HpCDF	0	30	0.00005	0.00052			0.00012			
1,2,3,4,7,8,9-HpCDF	2	30	0.00012	0.00084	0.00006	0.00008	0.00017			
OCDF	0	30	0.00008	0.00064			0.00012			
Total TCDD	30	30			0.00972	0.44062	0.16287			
Total PeCDD	20	30	0.00004	0.00046	0.00013	0.00279	0.00073			
Total HxCDD	16	30	0.00002	0.00045	0.00013	0.00064	0.00022			
Total HpCDD	0	30	0.00006	0.00141			0.00020			
Total TCDF	20	30	0.00003	0.00018	0.00011	0.00086	0.00026			
Total PeCDF	18	30	0.00016	0.00025	0.00009	0.00105	0.00033			
Total HxCDF	0	30	0.00006	0.00108			0.00012			
Total HpCDF	0	30	0.00002	0.00056			0.00013			
Toxicity Equivalency (Dioxins, Furans, HCX)	30	30			0.00972	0.441	0.163			
PCB Congeners (ug/Kg)										
2-Monochlorobiphenyl (1)	0	15	0.00448	0.03998			0.01180			
4-Chlorobiphenyl (3)	0	15	0.00399	0.03998			0.00963			
2,2'-Dichlorobiphenyl (4)	12	15	0.01585	0.02753	0.04076	0.26443	0.10433			
2,3-Dichlorobiphenyl (5)	8	15	0.00993	0.00999	0.00339	0.01121	0.00580			
2,3'-Dichlorobiphenyl (6)	10	15	0.00913	0.0228	0.02665	0.14722	0.04996			
2,4-Dichlorobiphenyl (7)	10	15	0.00993	0.00999	0.00612	0.0289	0.01174			
2,4'-Dichlorobiphenyl (8)	11	15	0.03556	0.06409	0.10376	0.57355	0.20645			
2,5-Dichlorobiphenyl (9)	11	15	0.00369	0.00999	0.00895	0.05791	0.01945			

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	LPX-DU-062101-0000-C-F 6/21/2001 REPLICATE	LPX-DU-062101-0000-C-O 6/21/2001 REPLICATE	LPX-DU-062101-0000-C-W 6/21/2001 REPLICATE
2,6-Dichlorobiphenyl (10)	10	15	0.00993	0.00999	0.00212	0.0147	0.00630			
3,4-Dichlorobiphenyl (12)	6	15	0.01985	0.01997	0.00286	0.00514	0.00762			
3,4'-Dichlorobiphenyl (13)	5	5			0.01989	0.01999	0.01995			
2,2',3'-Trichlorobiphenyl (16)	12	15	0.02936	0.03503	0.0673	1.04524	0.34042			
2,2',4-Trichlorobiphenyl (17)	15	15			0.03686	1.35438	0.44312			
2,2',5-Trichlorobiphenyl (18)	15	15			0.07692	2.70596	0.90066			
2,2',6-Trichlorobiphenyl (19)	15	15			0.00827	0.26415	0.08789			
2,3,3'-Trichlorobiphenyl (20)	15	15			0.30752	14.65468	4.84752			
2,3,4-Trichlorobiphenyl (21)	5	5			0.09947	0.09994	0.09973			
2,3,4'-Trichlorobiphenyl (22)	12	15	0.05464	0.06216	0.11518	2.09214	0.66354			
2,3,6-Trichlorobiphenyl (24)	15	15			0.0079	0.27756	0.09239			
2,3',4-Trichlorobiphenyl (25)	13	15	0.00775	0.01075	0.01275	0.54826	0.16380			
2,3',5-Trichlorobiphenyl (26)	14	15	0.0277	0.0277	0.03612	1.6092	0.50415			
2,3',6-Trichlorobiphenyl (27)	5	5			0.03979	0.03998	0.03990			
2,4,4'-Trichlorobiphenyl (28)	5	5			0.09947	0.09994	0.09973			
2,4,5-Trichlorobiphenyl (29)	5	5			0.03979	0.03998	0.03990			
2,4,6-Trichlorobiphenyl (30)	5	5			0.09947	0.09994	0.09973			
2,4',5-Trichlorobiphenyl (31)	12	15	0.0871	0.13369	0.25775	5.94703	1.74622			
2,4',6-Trichlorobiphenyl (32)	15	15			0.0288	1.08573	0.33637			
2,3',4'-Trichlorobiphenyl (33)	5	5			0.09947	0.09994	0.09973			
2,2',3,3'-Tetrachlorobiphenyl (40)	15	15			0.13041	5.34375	1.75807			
2,2',3,4-Tetrachlorobiphenyl (41)	5	5			0.09947	0.09994	0.09973			
2,2',3,4'-Tetrachlorobiphenyl (42)	15	15			0.08868	3.99692	1.28144			
2,2',3,5-Tetrachlorobiphenyl (43)	15	15			0.65073	33.86298	11.64585			
2,2',3,5'-Tetrachlorobiphenyl (44)	15	15			0.1152	6.31398	2.17912			
2,2',3,6-Tetrachlorobiphenyl (45)	15	15			0.03862	1.5303	0.48565			
2,2',3,6'-Tetrachlorobiphenyl (46)	14	15	0.00673	0.00673	0.00858	0.3689	0.10915			
2,2',4,4'-Tetrachlorobiphenyl (47)	5	5			0.09947	0.09994	0.09973			
2,2',4,5-Tetrachlorobiphenyl (48)	15	15			0.0416	2.02286	0.65902			
2,2',4,5'-Tetrachlorobiphenyl (49)	15	15			0.2523	13.9686	4.65515			
2,2',4,6-Tetrachlorobiphenyl (50)	15	15			0.03066	1.40466	0.43509			
2,2',4,6'-Tetrachlorobiphenyl (51)	5	5			0.03979	0.03998	0.03990			
2,2',5,5'-Tetrachlorobiphenyl (52)	5	5			0.03979	0.03998	0.03990			
2,2',5,6'-Tetrachlorobiphenyl (53)	5	5			0.03979	0.03998	0.03990			
2,3,3',4'-Tetrachlorobiphenyl (56)	15	15			0.0824	3.57182	1.21990			
2,3,3',6-Tetrachlorobiphenyl (59)	15	15			0.27312	10.35582	3.40341			
2,3,4,4'-Tetrachlorobiphenyl (60)	15	15			0.07476	2.70199	1.01708			
2,3,4,5-Tetrachlorobiphenyl (61)	15	15			0.4634	26.71432	9.50170			

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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2,3,4,6-Tetrachlorobiphenyl (62)	5	5			0.03979	0.03998	0.03990			
2,3,4',5-Tetrachlorobiphenyl (63)	15	15			0.01698	1.02851	0.37669			
2,3,4',6-Tetrachlorobiphenyl (64)	15	15			0.17283	6.85574	2.34033			
2,3,5,6-Tetrachlorobiphenyl (65)	5	5			0.09947	0.09994	0.09973			
2,3',4,4'-Tetrachlorobiphenyl (66)	15	15			0.62186	29.57713	11.35110			
2,3',4,6-Tetrachlorobiphenyl (69)	5	5			0.09947	0.09994	0.09973			
2,3',4',5-Tetrachlorobiphenyl (70)	5	5			0.09947	0.09994	0.09973			
2,3',4',6-Tetrachlorobiphenyl (71)	5	5			0.09947	0.09994	0.09973			
2,3',5',6-Tetrachlorobiphenyl (73)	5	5			0.03979	0.03998	0.03990			
2,3',4',5-Tetrachlorobiphenyl (74)	5	5			0.09947	0.09994	0.09973			
2,4,4',6-Tetrachlorobiphenyl (75)	5	5			0.03979	0.03998	0.03990			
2,3',4',5-Tetrachlorobiphenyl (76)	5	5			0.09947	0.09994	0.09973			
3,3',4,4'-Tetrachlorobiphenyl (77)	14	15	0.00977	0.00977	0.01053	0.55653	0.18264			
3,4,4',5-Tetrachlorobiphenyl (81)	0	15	0.09927	0.09999			0.04986			
2,2',3,3',4-Pentachlorobiphenyl (82)	14	15	0.09946	0.09946	0.14714	5.72716	1.92093			
2,2',3,3',5-Pentachlorobiphenyl (83)	15	15			0.81944	52.68812	20.66482			
2,2',3,3',6-Pentachlorobiphenyl (84)	15	15			0.18605	7.20688	2.37775			
2,2',3,4,4'-Pentachlorobiphenyl (85)	15	15			0.35442	17.13003	6.58967			
2,2',3,4,5-Pentachlorobiphenyl (86)	15	15			1.0593	46.12596	17.26539			
2,2',3,4,5'-Pentachlorobiphenyl (87)	5	5			0.09947	0.09994	0.09973			
2,2',3,4,6-Pentachlorobiphenyl (88)	15	15			0.16506	6.66188	2.36853			
2,2',3,4,6'-Pentachlorobiphenyl (89)	14	15	0.09982	0.09982	0.0065	0.24908	0.08040			
2,2',3,4',5-Pentachlorobiphenyl (90)	15	15			1.48497	92.94813	36.63416			
2,2',3,4',6-Pentachlorobiphenyl (91)	5	5			0.09947	0.09994	0.09973			
2,2',3,5,5'-Pentachlorobiphenyl (92)	15	15			0.24063	14.29803	5.47164			
2,2',3,5,6-Pentachlorobiphenyl (93)	15	15			0.8072	31.1542	10.99868			
2,2',3,5',6-Pentachlorobiphenyl (95)	5	5			0.09947	0.09994	0.09973			
2,2',3,4',5'-Pentachlorobiphenyl (97)	5	5			0.09947	0.09994	0.09973			
2,2',3,4',6'-Pentachlorobiphenyl (98)	5	5			0.09947	0.09994	0.09973			
2,2',4,4',5-Pentachlorobiphenyl (99)	5	5			0.09947	0.09994	0.09973			
2,2',4,4',6-Pentachlorobiphenyl (100)	5	5			0.09947	0.09994	0.09973			
2,2',4,5,5'-Pentachlorobiphenyl (101)	5	5			0.19894	0.19988	0.19947			
2,2',4,5,6'-Pentachlorobiphenyl (102)	5	5			0.09947	0.09994	0.09973			
2,3,3',4,4'-Pentachlorobiphenyl (105)	15	15			0.37511	17.3437	6.89405			
2,3,3',4,5-Pentachlorobiphenyl (106)	15	15			0.15095	9.16308	3.62852			
2,3,3',4',5-Pentachlorobiphenyl (107)	5	5			0.19894	0.19988	0.19947			
2,3,3',4',5'-Pentachlorobiphenyl (108)	15	15			0.04094	2.54468	0.92173			
2,3,3',4,6-Pentachlorobiphenyl (109)	5	5			0.09947	0.09994	0.09973			

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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2,3,3',4',6-Pentachlorobiphenyl (110)	15	15			1.65808	72.9419	25.88479			
2,3,3',5,5'-Pentachlorobiphenyl (111)	5	5			0.09947	0.09994	0.09973			
2,3,3',5',6-Pentachlorobiphenyl (113)	5	5			0.19894	0.19988	0.19947			
2,3,4,4',5-Pentachlorobiphenyl (114)	15	15			0.03286	1.64285	0.63150			
2,3,4,4',6-Pentachlorobiphenyl (115)	5	5			0.19894	0.19988	0.19947			
2,3,4,5,6-Pentachlorobiphenyl (116)	5	5			0.03979	0.03998	0.03990			
2,3,4',5,6-Pentachlorobiphenyl (117)	5	5			0.03979	0.03998	0.03990			
2,3',4,4',5-Pentachlorobiphenyl (118)	15	15			1.74523	82.57286	35.19822			
2,3',4,4',6-Pentachlorobiphenyl (119)	5	5			0.09947	0.09994	0.09973			
2,3',4,5',6-Pentachlorobiphenyl (121)	5	5			0.09947	0.09994	0.09973			
2,3,3',4',5'-Pentachlorobiphenyl (122)	5	5			0.09947	0.09994	0.09973			
2,3',4,4',5'-Pentachlorobiphenyl (123)	5	5			0.09947	0.09994	0.09973			
2,3',4',5,5'-Pentachlorobiphenyl (124)	5	5			0.09947	0.09994	0.09973			
2,3',4',5',6-Pentachlorobiphenyl (125)	5	5			0.09947	0.09994	0.09973			
3,3',4,4',5-Pentachlorobiphenyl (126)	14	15	0.19964	0.19964	0.00362	0.35499	0.09648			
2,2',3,3',4,4'-Hexachlorobiphenyl (128)	15	15			0.37562	16.27094	6.44581			
2,2',3,3',4,5-Hexachlorobiphenyl (129)	15	15			1.87356	90.605	31.27671			
2,2',3,3',4,5'-Hexachlorobiphenyl (130)	15	15			0.11639	5.68844	2.18035			
2,2',3,3',4,6-Hexachlorobiphenyl (131)	13	15	0.04266	0.09969	0.01509	0.54935	0.18820			
2,2',3,3',4,6'-Hexachlorobiphenyl (132)	15	15			0.32242	12.61257	4.43207			
2,2',3,3',5,6-Hexachlorobiphenyl (134)	15	15			0.04514	1.85546	0.72615			
2,2',3,3',5,6'-Hexachlorobiphenyl (135)	15	15			0.16938	9.52059	3.41199			
2,2',3,3',6,6'-Hexachlorobiphenyl (136)	15	15			0.03653	2.22422	0.68748			
2,2',3,4,4',5-Hexachlorobiphenyl (137)	15	15			0.1762	9.55296	3.89672			
2,2',3,4,4',5'-Hexachlorobiphenyl (138)	5	5			0.09947	0.09994	0.09973			
2,2',3,4,5,5'-Hexachlorobiphenyl (141)	15	15			0.18533	10.30442	4.20399			
2,2',3,4,5,6'-Hexachlorobiphenyl (143)	5	5			0.09947	0.09994	0.09973			
2,2',3,4,5',6-Hexachlorobiphenyl (144)	15	15			0.0296	1.84826	0.71574			
2,2',3,4',5,5'-Hexachlorobiphenyl (146)	15	15			0.13578	11.03536	4.52040			
2,2',3,4',5,6-Hexachlorobiphenyl (147)	15	15			0.8181	39.29194	15.23295			
2,2',3,4',5',6-Hexachlorobiphenyl (149)	5	5			0.09947	0.09994	0.09973			
2,2',3,5,5',6-Hexachlorobiphenyl (151)	5	5			0.09947	0.09994	0.09973			
2,2',4,4',5,5'-Hexachlorobiphenyl (153)	15	15			0.82082	78.31572	31.70326			
2,2',4,4',5,6'-Hexachlorobiphenyl (154)	5	5			0.09947	0.09994	0.09973			
2,3,3',4,4',5-Hexachlorobiphenyl (156)	15	15			0.1434	9.89622	4.10561			
2,3,3',4,4',5'-Hexachlorobiphenyl (157)	5	5			0.09947	0.09994	0.09973			
2,3,3',4,4',6-Hexachlorobiphenyl (158)	15	15			0.16325	9.23977	3.68251			
2,3,3',4,5,6-Hexachlorobiphenyl (160)	5	5			0.09947	0.09994	0.09973			

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	LPX-DU-062101-0000-C-F 6/21/2001 REPLICATE	LPX-DU-062101-0000-C-O 6/21/2001 REPLICATE	LPX-DU-062101-0000-C-W 6/21/2001 REPLICATE
2,3,3',4,5',6-Hexachlorobiphenyl (161)	5	5			0.19894	0.19988	0.19947			
2,3,3',4',5,6-Hexachlorobiphenyl (163)	5	5			0.09947	0.09994	0.09973			
2,3,3',4',5',6-Hexachlorobiphenyl (164)	5	5			0.19894	0.19988	0.19947			
2,3,4,4',5,6-Hexachlorobiphenyl (166)	5	5			0.09947	0.09994	0.09973			
2,3',4,4',5,5'-Hexachlorobiphenyl (167)	15	15			0.06761	4.25315	1.74246			
2,3',4,4',5',6-Hexachlorobiphenyl (168)	5	5			0.09947	0.09994	0.09973			
3,3',4,4',5,5'-Hexachlorobiphenyl (169)	0	15	0.09927	0.09999			0.04986			
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)	15	15			0.29459	10.34189	4.44373			
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)	15	15			0.0812	2.9897	1.23713			
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)	15	15			0.03606	1.96033	0.80600			
2,2',3,3',4,5,6-Heptachlorobiphenyl (173)	5	5			0.19894	0.19988	0.19947			
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)	15	15			0.11442	3.44004	1.26887			
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)	15	15			0.00392	0.29035	0.10742			
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)	15	15			0.00978	0.35338	0.11800			
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)	15	15			0.09318	3.4922	1.30847			
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)	15	15			0.01959	1.35883	0.47178			
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)	15	15			0.30822	19.56424	8.10739			
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)	10	15	0.19855	0.19973	0.01231	0.06198	0.05473			
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)	15	15			0.05975	4.11565	1.59338			
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)	10	15	0.19855	0.19973	0.00409	0.01911	0.04031			
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)	15	15			0.0101	0.51327	0.18261			
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)	15	15			0.17996	9.54086	3.82959			
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)	14	15	0.09987	0.09987	0.00665	0.3221	0.13981			
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)	15	15			0.04054	2.35327	0.94634			
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)	14	15	0.19973	0.19973	0.00907	0.37017	0.15914			
2,3,3',4',5,5',6-Heptachlorobiphenyl (193)	5	5			0.09947	0.09994	0.09973			
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)	15	15			0.04635	3.19405	1.22900			
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)	15	15			0.02106	0.91123	0.37385			
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)	15	15			0.03108	1.93445	0.70534			
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)	12	15	0.19964	0.19973	0.0024	0.11753	0.06463			
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)	15	15			0.20958	10.00778	3.74554			
2,2',3,3',4,5,5',6'-Octachlorobiphenyl (199)	5	5			0.03979	0.03998	0.03990			
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)	12	15	0.19892	0.19973	0.0059	0.12846	0.06032			
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)	15	15			0.01549	0.64432	0.22574			
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)	15	15			0.08362	6.04013	2.07953			
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)	13	15	0.19964	0.19973	0.0034	0.16939	0.07944			
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	15	15			0.22862	11.95946	4.21693			
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	13	15	0.19855	0.19973	0.03831	1.13169	0.41447			

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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Decachlorobiphenyl (209)	15	15			0.12586	5.61068	1.97388			
PCB Congeners, Total	15	15			20.44633	1022.33456	399.71203			
Toxicity Equivalency (PCB)	15	15			0.000376	0.0494	0.0156			
Other (%)										
Lipid_percent	22	22			0.181	5.21	1.88			

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

Samples ending with:
F - Fillet
O - Offal
W - whole body

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-DU-062101-0000-D-F 6/21/2001 REPLICATE	LPX-DU-062101-0000-D-O 6/21/2001 REPLICATE	LPX-DU-062101-0000-D-W 6/21/2001 REPLICATE	LPX-LB-4001-0000-01-F 6/21/2001	LPX-LB-4001-0000-01-O 6/21/2001	LPX-LB-4001-0000-01-W 6/21/2001	LPX-LB-4002-0000-01-F 6/21/2001	LPX-LB-4002-0000-01-O 6/21/2001
Semivolatile Organics (ug/Kg)								
1,1'-Biphenyl				0.16 J	0.64	0.51	0.13 J	0.55 J
2-Methylnaphthalene				0.97 J	6.68	5.18	0.75	3.86
Acenaphthene				0.23 J	2.04	1.56	0.28 J	1.78
Acenaphthylene				1.11 U	0.72	0.53	0.1 J	0.86
Anthracene				0.23 J	1.52	1.18	0.19 J	1.39
Benzo(a)anthracene				0.13 J	0.21 J	0.19 J	0.05 J	0.28 J
Benzo(a)pyrene				1.11 U	0.25 J	0.18 J	0.57 U	0.42 J
Benzo(b)fluoranthene				1.11 U	0.27 J	0.2 J	0.57 U	0.49 J
Benzo(g,h,i)perylene				1.11 U	0.58 U	0.72 U	0.57 U	0.55 J
Benzo(k)fluoranthene				1.11 U	0.24 J	0.18 J	0.57 U	0.38 J
Chrysene				0.2 J	0.63	0.52	0.11 J	0.89
Dibenzo(a,h)anthracene				1.11 U	0.14 J	0.11 J	0.57 U	0.13 J
Dibenzofuran				0.22 J	1.79	1.38	0.22 J	1.65
Fluoranthene				0.65 J	3.7	2.9	0.6	3.47
Fluorene				0.35 J	4.5	3.41	0.41 J	3.3
Indeno(1,2,3-cd)pyrene				0.22 J	0.38 J	0.34 J	0.1 J	0.52 J
Naphthalene				1.12 U	3.77	2.78	0.8	2.49
Phenanthrene				1.03 J	8.58	6.6	1.13	7.69
Pyrene				1.11 U	1.5	1.11	0.57 U	1.5
Total PAH				4.39 J	37.56 J	28.85 J	4.87 J	32.22 J
Pesticides/PCBs (ug/Kg)								
4,4'-DDD				1.1 J	4.51 J	3.61	1.15 J	5.41 J
4,4'-DDE				3.61 J	84.34 J	63.15 D	5.89 J	91.41 J
4,4'-DDT				0.38 J	1.74 J	1.38	0.47 J	4.06 J
Aldrin				0.89 UJ	R	0.58 U	R	R
alpha-BHC				0.89 UJ	R	0.58 U	R	R
alpha-Chlordane				1.66 J	8.48 J	6.69	2.47 J	11.57 J
Aroclor, Total				105.01 J	1681.93 J	1268.05	121.6 J	2027.09 J
Aroclor-1016				11.11 UJ	R	7.18 U	R	R
Aroclor-1221				11.11 UJ	R	7.18 U	R	R
Aroclor-1232				11.11 UJ	R	7.18 U	R	R
Aroclor-1242				11.11 UJ	R	7.18 U	R	R
Aroclor-1248				11.11 UJ	R	7.18 U	R	R
Aroclor-1254				101.02 J	1674.51 J	1261.53 D	118.62 J	2013.88 J
Aroclor-1260				11.11 UJ	R	7.18 U	R	R
Aroclor-1268				4 J	7.41 J	6.52 J	2.98 J	13.21 J
beta-BHC				0.89 UJ	R	0.58 U	R	R

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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delta-BHC				0.89 UJ	R	0.58 U	R	R
Dieldrin				0.65 J	3.01 J	2.39	0.48 J	3.27 J
Endosulfan I				0.89 UJ	R	0.58 U	R	R
Endosulfan II				0.89 UJ	R	0.58 U	R	R
Endosulfan Sulfate				0.89 UJ	R	0.58 U	R	R
Endrin				0.89 UJ	R	0.58 U	R	R
Endrin Aldehyde				0.89 UJ	R	0.58 U	R	R
Endrin Ketone				0.89 UJ	R	0.58 U	R	R
gamma-BHC				0.89 UJ	R	0.58 U	R	R
gamma-Chlordane				0.53 J	3.5 J	2.72	0.81 J	4.74 J
Heptachlor				0.89 UJ	R	0.58 U	R	R
Heptachlor Epoxide				0.89 UJ	R	0.58 U	R	R
Methoxychlor				0.89 UJ	R	0.58 U	R	R
Technical Chlordane				20.51 J	121.97 J	95.34	28.46 J	151.52 J
Toxaphene				22.22 UJ	R	14.36 U	R	R
Inorganics (mg/Kg)								
Aluminum	1.12 U	7.22	4.63	0.4	1.3	1.06	0.522 J	3.68
Antimony	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U
Arsenic	0.0353 U	0.0401 U	0.0384 U	0.0452 U	0.0494 U	0.0483 U	0.034 U	0.0433 U
Barium	0.0552	0.705	0.472	0.0343	0.712	0.534	0.06	0.815
Beryllium	0.004 U	0.00549	0.00352	0.004 U	0.00524 U	0.00491 U	0.004 U	0.00721 U
Cadmium	0.2 U	0.0156 J	0.01 J	0.2 U	0.00972 J	0.00717 J	0.2 U	0.0134 J
Chromium	0.269 U	0.118 J	0.0757 J	0.269 U	0.269 U	0.269 U	0.269 U	0.269 U
Cobalt	0.00629 J	0.0425 J	0.0295 J	0.0167 J	0.0947 J	0.0742 J	0.0231 J	0.111 J
Copper	0.28 J	0.637 J	0.509 J	0.262 J	0.922 J	0.749 J	0.22 J	0.504 J
Iron	2.38	29.2	19.6	2 J	16.2 J	12.5 J	3.9 J	21.7 J
Lead	0.00215 J	0.022 UJ	0.000771 UJ	0.0033 J	0.0549 J	0.0414 J	0.00661 J	0.0721 J
Manganese	0.111 J	1.79 J	1.19 J	0.317	4	3.03	0.367	3.73
Mercury	0.406	0.282	0.326	0.0924 U	0.0712 U	0.0768 U	0.141 U	0.0952 U
Mercury (methyl)	0.412	0.0994 J	0.211 J	0.0886	0.0384	0.0516	0.14	0.0881
Molybdenum	0.32 U	0.32 U	0.32 U	0.32 U	0.0386 J	0.0285 J	0.32 U	0.0371 J
Nickel	0.00455 J	0.0678 J	0.0451 J	0.0317 J	0.151 J	0.12 J	0.0466 J	0.193 J
Selenium	0.448 U	0.27 J	0.173 J	0.14 J	0.23 J	0.206 J	0.174 J	0.251 J
Silver	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 UJ	0.06 U
Thallium	0.00284 J	0.00423 J	0.00373 J	0.00432 J	0.00544 J	0.00515 J	0.00301 J	0.0063 J
Vanadium	0.179 U	0.0549 J	0.0352 J	0.179 U	0.179 U	0.179 U	0.179 U	0.179 U
Zinc	10.3	16.4	14.2	8.88 J	19.2 J	16.5 J	8.2 J	26.7 J

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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Dioxins/Furans (ug/Kg)								
HCX				0.03971 UJ	0.03621 J	0.02671 J	0.005 J	0.02952 J
TCX				R	R	R	R	R
2,3,7,8-TCDD				0.01472 J	0.35538 J	0.26597 J	0.04393 J	0.40481 J
1,2,3,7,8-PeCDD				0.00028 UJ	0.00059 J	0.00044 J	0.0003 UJ	0.00075 J
1,2,3,4,7,8-HxCDD				0.00018 UJ	0.0003 UJ	0.00027 UJ	0.00021 UJ	0.00035 UJ
1,2,3,6,7,8-HxCDD				0.00018 UJ	0.0004 J	0.0003 J	0.00022 UJ	0.00031 J
1,2,3,7,8,9-HxCDD				0.00017 UJ	0.00029 UJ	0.00026 UJ	0.0002 UJ	0.00033 UJ
1,2,3,4,6,7,8-HpCDD				0.00072 UJ	0.00039 UJ	0.00048 UJ	0.00074 UJ	0.00036 UJ
OCDD				0.00063 UJ	0.00064 UJ	0.00064 UJ	0.00038 UJ	0.0007 UJ
2,3,7,8-TCDF				0.0002 UJ	0.00134 J#	0.00099 J#	0.00016 UJ	0.00046 J
1,2,3,7,8-PeCDF				0.00016 UJ	0.0004 UJ	0.00034 UJ	0.00021 UJ	0.00027 UJ
2,3,4,7,8-PeCDF				0.00015 UJ	0.00039 J	0.00029 J	0.00022 UJ	0.00029 J
1,2,3,4,7,8-HxCDF				0.0001 UJ	0.00042 UJ	0.00034 UJ	0.00005 UJ	0.00014 UJ
1,2,3,6,7,8-HxCDF				0.00009 UJ	0.0001 UJ	0.0001 UJ	0.00005 UJ	0.00049 UJ
2,3,4,6,7,8-HxCDF				0.0001 UJ	0.00044 UJ	0.00035 UJ	0.00006 UJ	0.00052 UJ
1,2,3,7,8,9-HxCDF				0.00011 UJ	0.00047 UJ	0.00038 UJ	0.00007 UJ	0.00056 UJ
1,2,3,4,6,7,8-HpCDF				0.00029 UJ	0.00052 UJ	0.00046 UJ	0.00026 UJ	0.00046 UJ
1,2,3,4,7,8,9-HpCDF				0.00034 UJ	0.0006 UJ	0.00053 UJ	0.00031 UJ	0.00056 UJ
OCDF				0.00037 UJ	0.00034 UJ	0.00035 UJ	0.00046 UJ	0.0004 UJ
Total TCDD				0.01472 J	0.35538 J	0.26597 J	0.04393 J	0.40481 J
Total PeCDD				0.00028 UJ	0.00059 J	0.00044 J	0.0003 UJ	0.00075 J
Total HxCDD				0.00018 UJ	0.00052 J	0.00038 J	0.00021 UJ	0.00031 J
Total HpCDD				0.00072 UJ	0.00039 UJ	0.00048 UJ	0.00074 UJ	0.00036 UJ
Total TCDF				0.00004 UJ	0.00086 J	0.00063 J	0.00016 UJ	0.00066 J
Total PeCDF				0.00016 UJ	0.00072 J	0.00053 J	0.00021 UJ	0.00054 J
Total HxCDF				0.0001 UJ	0.0003 UJ	0.00025 UJ	0.00006 UJ	0.00014 UJ
Total HpCDF				0.00031 UJ	0.00056 UJ	0.00049 UJ	0.00028 UJ	0.00051 UJ
Toxicity Equivalency (Dioxins, Furans, HCX)				0.0147	0.356	0.267	0.0439	0.406
PCB Congeners (ug/Kg)								
2-Monochlorobiphenyl (1)				0.00867 UJ	0.03603 UJ	0.03988 UJ	0.00877 UJ	0.03327 UJ
4-Chlorobiphenyl (3)				0.0065 UJ	0.01447 UJ	0.03988 UJ	0.00642 UJ	0.01552 UJ
2,2'-Dichlorobiphenyl (4)				0.02753 UJ	0.26443 J	0.19503 J	0.04399 J	0.2411 J
2,3-Dichlorobiphenyl (5)				0.00993 UJ	0.01121 J	0.00827 J	0.00999 UJ	0.00953 J
2,3'-Dichlorobiphenyl (6)				0.0179 UJ	0.14722 J	0.10858 J	0.0228 UJ	0.13445 J
2,4-Dichlorobiphenyl (7)				0.00993 UJ	0.0289 J	0.02131 J	0.00999 UJ	0.02812 J
2,4'-Dichlorobiphenyl (8)				0.06409 UJ	0.57355 J	0.42301 J	0.10376 J	0.53063 J
2,5-Dichlorobiphenyl (9)				0.00521 UJ	0.05791 J	0.04271 J	0.00895 J	0.04813 J

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-DU-062101-0000-D-F 6/21/2001 REPLICATE	LPX-DU-062101-0000-D-O 6/21/2001 REPLICATE	LPX-DU-062101-0000-D-W 6/21/2001 REPLICATE	LPX-LB-4001-0000-01-F 6/21/2001	LPX-LB-4001-0000-01-O 6/21/2001	LPX-LB-4001-0000-01-W 6/21/2001	LPX-LB-4002-0000-01-F 6/21/2001	LPX-LB-4002-0000-01-O 6/21/2001
2,6-Dichlorobiphenyl (10)				0.00993 UJ	0.01127 J	0.00831 J	0.00999 UJ	0.0147 J
3,4-Dichlorobiphenyl (12)				0.01985 UJ	0.00498 J	0.00367 J	0.01997 UJ	0.00452 J
3,4'-Dichlorobiphenyl (13)						0.01994		
2,2',3'-Trichlorobiphenyl (16)				0.0673 J	1.04524 J	0.78857 J	0.1512 J	1.02041 J
2,2',4-Trichlorobiphenyl (17)				0.08165 J	1.30577 J	0.98449 J	0.18623 J	1.35438 J
2,2',5-Trichlorobiphenyl (18)				0.16514 J	2.70596 J	2.03909 J	0.36564 J	2.6717 J
2,2',6-Trichlorobiphenyl (19)				0.01931 J	0.26415 J	0.19989 J	0.04429 J	0.24061 J
2,3,3'-Trichlorobiphenyl (20)				0.7262 J	14.19176 J	10.65756 J	1.52488 J	14.65468 J
2,3,4-Trichlorobiphenyl (21)						0.09969		
2,3,4'-Trichlorobiphenyl (22)				0.11518 J	2.09214 J	1.57326 J	0.24966 J	2.0339 J
2,3,6-Trichlorobiphenyl (24)				0.01808 J	0.27756 J	0.20946 J	0.03914 J	0.27416 J
2,3',4-Trichlorobiphenyl (25)				0.02211 J	0.54826 J	0.41017 J	0.0506 J	0.51915 J
2,3',5-Trichlorobiphenyl (26)				0.06998 J	1.6092 J	1.20521 J	0.14206 J	1.5923 J
2,3',6-Trichlorobiphenyl (27)						0.03988		
2,4,4'-Trichlorobiphenyl (28)						0.09969		
2,4,5-Trichlorobiphenyl (29)						0.03988		
2,4,6-Trichlorobiphenyl (30)						0.09969		
2,4',5-Trichlorobiphenyl (31)				0.25775 J	5.94703 J	4.45381 J	0.50373 J	5.26873 J
2,4',6-Trichlorobiphenyl (32)				0.05822 J	1.04159 J		0.13547 J	1.08573 J
2,3',4'-Trichlorobiphenyl (33)						0.09969		
2,2',3,3'-Tetrachlorobiphenyl (40)				0.25314 J	4.60617 J	3.46367 J	0.76452 J	5.34375 J
2,2',3,4-Tetrachlorobiphenyl (41)						0.09969		
2,2',3,4'-Tetrachlorobiphenyl (42)				0.17112 J	3.28668 J	2.46896 J	0.54594 J	3.99692 J
2,2',3,5-Tetrachlorobiphenyl (43)				1.37418 J	30.61599 J	22.94113 J	3.93141 J	33.86298 J
2,2',3,5'-Tetrachlorobiphenyl (44)				0.20535 J	5.42214 J	4.05293 J	0.62211 J	6.31398 J
2,2',3,6-Tetrachlorobiphenyl (45)				0.07706 J	1.3532 J	1.01826 J	0.21084 J	1.5303 J
2,2',3,6'-Tetrachlorobiphenyl (46)				0.01836 J	0.27123 J	0.20486 J	0.05412 J	0.3689 J
2,2',4,4'-Tetrachlorobiphenyl (47)						0.09969		
2,2',4,5-Tetrachlorobiphenyl (48)				0.08798 J	1.76019 J	1.3213 J	0.25295 J	2.02286 J
2,2',4,5'-Tetrachlorobiphenyl (49)				0.51722 J	11.95728 J	8.9547 J	1.52704 J	13.9686 J
2,2',4,6-Tetrachlorobiphenyl (50)				0.05826 J	1.24794 J	0.93569 J	0.17812 J	1.40466 J
2,2',4,6'-Tetrachlorobiphenyl (51)						0.03988		
2,2',5,5'-Tetrachlorobiphenyl (52)						0.03988		
2,2',5,6'-Tetrachlorobiphenyl (53)						0.03988		
2,3,3',4'-Tetrachlorobiphenyl (56)				0.19684 J	3.57182 J	2.68602 J	0.54124 J	3.4848 J
2,3,3',6-Tetrachlorobiphenyl (59)				0.48864 J	8.85699 J	6.66062 J	1.4613 J	10.35582 J
2,3,4,4'-Tetrachlorobiphenyl (60)				0.13657 J	2.38359 J	1.79383 J	0.38483 J	2.70199 J
2,3,4,5-Tetrachlorobiphenyl (61)				1.17024 J	26.27512 J	19.68605 J	3.01164 J	26.71432 J

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

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North Providence, RI

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2,3,4,6-Tetrachlorobiphenyl (62)						0.03988		
2,3,4',5-Tetrachlorobiphenyl (63)				0.03348 J	0.91903 J	0.68661 J	0.08837 J	1.02851 J
2,3,4',6-Tetrachlorobiphenyl (64)				0.30971 J	5.99569 J	4.50334 J	1.00094 J	6.85574 J
2,3,5,6-Tetrachlorobiphenyl (65)						0.09969		
2,3',4,4'-Tetrachlorobiphenyl (66)				1.27832 J	27.19875 J	20.39562 J	3.63803 J	29.57713 J
2,3',4,6-Tetrachlorobiphenyl (69)						0.09969		
2,3',4',5-Tetrachlorobiphenyl (70)						0.09969		
2,3',4',6-Tetrachlorobiphenyl (71)						0.09969		
2,3',5',6-Tetrachlorobiphenyl (73)						0.03988		
2,3',4',5-Tetrachlorobiphenyl (74)						0.09969		
2,4,4',6-Tetrachlorobiphenyl (75)						0.03988		
2,3',4',5-Tetrachlorobiphenyl (76)						0.09969		
3,3',4,4'-Tetrachlorobiphenyl (77)				0.02781 J	0.55653 J	0.41776 J	0.06508 J	0.4693 J
3,4,4',5-Tetrachlorobiphenyl (81)				0.09927 UJ	0.09984 UJ	0.09969 UJ	0.09986 UJ	0.09969 UJ
2,2',3,3',4-Pentachlorobiphenyl (82)				0.23654 J	4.70597 J	3.53291 J	0.91443 J	5.72716 J
2,2',3,3',5-Pentachlorobiphenyl (83)				1.547 J	46.4658 J	34.67633 J	4.95944 J	52.68812 J
2,2',3,3',6-Pentachlorobiphenyl (84)				0.33663 J	5.63044 J	4.24102 J	1.22886 J	7.20688 J
2,2',3,4,4'-Pentachlorobiphenyl (85)				0.62322 J	14.97894 J	11.21111 J	2.32584 J	17.13003 J
2,2',3,4,5-Pentachlorobiphenyl (86)				1.7643 J	40.0368 J	29.99173 J	6.80154 J	46.12596 J
2,2',3,4,5'-Pentachlorobiphenyl (87)						0.09969		
2,2',3,4,6-Pentachlorobiphenyl (88)				0.27014 J	5.45558 J	4.0946 J	1.04566 J	6.66188 J
2,2',3,4,6'-Pentachlorobiphenyl (89)				0.01316 J	0.20203 J	0.15246 J	0.03527 J	0.24908 J
2,2',3,4',5-Pentachlorobiphenyl (90)				2.84262 J	84.28359 J	62.90844 J	9.09231 J	92.94813 J
2,2',3,4',6-Pentachlorobiphenyl (91)						0.09969		
2,2',3,5,5'-Pentachlorobiphenyl (92)				0.47622 J	13.29236 J	9.92861 J	1.51232 J	14.29803 J
2,2',3,5,6-Pentachlorobiphenyl (93)				1.3301 J	26.8565 J	20.15679 J	4.9076 J	31.1542 J
2,2',3,5',6-Pentachlorobiphenyl (95)						0.09969		
2,2',3,4',5'-Pentachlorobiphenyl (97)						0.09969		
2,2',3,4',6'-Pentachlorobiphenyl (98)						0.09969		
2,2',4,4',5-Pentachlorobiphenyl (99)						0.09969		
2,2',4,4',6-Pentachlorobiphenyl (100)						0.09969		
2,2',4,5,5'-Pentachlorobiphenyl (101)						0.19938		
2,2',4,5,6'-Pentachlorobiphenyl (102)						0.09969		
2,3,3',4,4'-Pentachlorobiphenyl (105)				0.63052 J	14.83163 J	11.10438 J	2.23801 J	17.3437 J
2,3,3',4,5-Pentachlorobiphenyl (106)				0.30882 J	7.84341 J	5.86587 J	0.97905 J	9.16308 J
2,3,3',4',5-Pentachlorobiphenyl (107)						0.19938		
2,3,3',4',5'-Pentachlorobiphenyl (108)				0.09444 J	2.4302 J	1.81715 J	0.26856 J	2.54468 J
2,3,3',4,6-Pentachlorobiphenyl (109)						0.09969		

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

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Centredale Manor Restoration Project Superfund Site
North Providence, RI

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2,3,3',4',6-Pentachlorobiphenyl (110)				2.86658 J	60.91832 J	45.68195 J	10.77102 J	72.9419 J
2,3,3',5,5'-Pentachlorobiphenyl (111)						0.09969		
2,3,3',5',6-Pentachlorobiphenyl (113)						0.19938		
2,3,4,4',5-Pentachlorobiphenyl (114)				0.06279 J	1.51875 J	1.13662 J	0.18474 J	1.64285 J
2,3,4,4',6-Pentachlorobiphenyl (115)						0.19938		
2,3,4,5,6-Pentachlorobiphenyl (116)						0.03988		
2,3,4',5,6-Pentachlorobiphenyl (117)						0.03988		
2,3',4,4',5-Pentachlorobiphenyl (118)				3.14341 J	73.54217 J	55.06518 J	10.86219 J	82.57286 J
2,3',4,4',6-Pentachlorobiphenyl (119)						0.09969		
2,3',4,5',6-Pentachlorobiphenyl (121)						0.09969		
2,3,3',4',5'-Pentachlorobiphenyl (122)						0.09969		
2,3',4,4',5'-Pentachlorobiphenyl (123)						0.09969		
2,3',4',5,5'-Pentachlorobiphenyl (124)						0.09969		
2,3',4',5',6-Pentachlorobiphenyl (125)						0.09969		
3,3',4,4',5-Pentachlorobiphenyl (126)				0.00362 J	0.35499 J	0.26277 J	0.02132 J	0.14757 J
2,2',3,3',4,4'-Hexachlorobiphenyl (128)				0.56504 J	13.02414 J	9.7541 J	2.61646 J	16.27094 J
2,2',3,3',4,5-Hexachlorobiphenyl (129)				3.1094 J	45.07082 J	34.05755 J	13.16756 J	55.24292 J
2,2',3,3',4,5'-Hexachlorobiphenyl (130)				0.16903 J	4.85267 J	3.62339 J	0.7264 J	5.68844 J
2,2',3,3',4,6-Hexachlorobiphenyl (131)				0.03177 J	0.54935 J	0.4135 J	0.11595 J	0.09969 UJ
2,2',3,3',4,6'-Hexachlorobiphenyl (132)				0.46514 J	10.25928 J	7.68869 J	2.1014 J	12.61257 J
2,2',3,3',5,6-Hexachlorobiphenyl (134)				0.08194 J	1.85546 J	1.38998 J	0.31924 J	1.82694 J
2,2',3,3',5,6'-Hexachlorobiphenyl (135)				0.28473 J	7.88058 J	5.88696 J	1.12278 J	9.52059 J
2,2',3,3',6,6'-Hexachlorobiphenyl (136)				0.07239 J	1.65192 J	1.23735 J	0.35345 J	2.22422 J
2,2',3,4,4',5-Hexachlorobiphenyl (137)				0.28882 J	7.7766 J	5.81134 J	1.21288 J	9.55296 J
2,2',3,4,4',5'-Hexachlorobiphenyl (138)						0.09969		
2,2',3,4,5,5'-Hexachlorobiphenyl (141)				0.30339 J	8.63893 J	6.45117 J	1.16032 J	10.30442 J
2,2',3,4,5,6'-Hexachlorobiphenyl (143)						0.09969		
2,2',3,4,5',6-Hexachlorobiphenyl (144)				0.05809 J	1.59364 J	1.19062 J	0.19274 J	1.84826 J
2,2',3,4',5,5'-Hexachlorobiphenyl (146)				0.2377 J	9.16314 J	6.82055 J	0.79612 J	11.03536 J
2,2',3,4',5,6-Hexachlorobiphenyl (147)				1.37774 J	31.99204 J	23.95695 J	5.49064 J	39.29194 J
2,2',3,4',5',6-Hexachlorobiphenyl (149)						0.09969		
2,2',3,5,5',6-Hexachlorobiphenyl (151)						0.09969		
2,2',4,4',5,5'-Hexachlorobiphenyl (153)				1.5479 J	63.4693 J	47.21729 J	5.1484 J	78.31572 J
2,2',4,4',5,6'-Hexachlorobiphenyl (154)						0.09969		
2,3,3',4,4',5-Hexachlorobiphenyl (156)				0.2544 J	8.31834 J	6.20186 J	1.01074 J	9.89622 J
2,3,3',4,4',5'-Hexachlorobiphenyl (157)						0.09969		
2,3,3',4,4',6-Hexachlorobiphenyl (158)				0.24309 J	7.62171 J	5.6851 J	1.1097 J	9.23977 J
2,3,3',4,5,6-Hexachlorobiphenyl (160)						0.09969		

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-DU-062101-0000-D-F 6/21/2001 REPLICATE	LPX-DU-062101-0000-D-O 6/21/2001 REPLICATE	LPX-DU-062101-0000-D-W 6/21/2001 REPLICATE	LPX-LB-4001-0000-01-F 6/21/2001	LPX-LB-4001-0000-01-O 6/21/2001	LPX-LB-4001-0000-01-W 6/21/2001	LPX-LB-4002-0000-01-F 6/21/2001	LPX-LB-4002-0000-01-O 6/21/2001
2,3,3',4,5',6-Hexachlorobiphenyl (161)						0.19938		
2,3,3',4',5,6-Hexachlorobiphenyl (163)						0.09969		
2,3,3',4',5',6-Hexachlorobiphenyl (164)						0.19938		
2,3,4,4',5,6-Hexachlorobiphenyl (166)						0.09969		
2,3',4,4',5,5'-Hexachlorobiphenyl (167)				0.10444 J	3.40709 J	2.54027 J	0.44797 J	4.25315 J
2,3',4,4',5',6-Hexachlorobiphenyl (168)						0.09969		
3,3',4,4',5,5'-Hexachlorobiphenyl (169)				0.09927 UJ	0.09984 UJ	0.09969 UJ	0.09986 UJ	0.09969 UJ
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)				0.39815 J	7.91964 J	5.94554 J	2.35977 J	10.34189 J
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)				0.11464 J	2.2001 J	1.65275 J	0.69304 J	2.9897 J
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)				0.05527 J	1.49578 J	1.1177 J	0.29917 J	1.96033 J
2,2',3,3',4,5,6-Heptachlorobiphenyl (173)						0.19938		
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)				0.15819 J	2.49774 J	1.8837 J	0.90803 J	3.44004 J
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)				0.00687 J	0.2091 J	0.15602 J	0.03317 J	0.29035 J
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)				0.01468 J	0.25088 J	0.18889 J	0.08379 J	0.35338 J
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)				0.15236 J	2.66787 J	2.00764 J	0.83546 J	3.4922 J
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)				0.04312 J	1.0287 J	0.77002 J	0.19393 J	1.35883 J
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)				0.49014 J	14.52634 J	10.84237 J	2.43824 J	19.56424 J
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)				0.19855 UJ	0.04526 J	0.03338 J	0.19972 UJ	0.06198 J
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)				0.10253 J	2.94512 J	2.19905 J	0.50076 J	4.11565 J
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)				0.19855 UJ	0.01495 J	0.01103 J	0.19972 UJ	0.01911 J
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)				0.01576 J	0.38152 J	0.28552 J	0.08156 J	0.51327 J
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)				0.29659 J	6.84018 J	5.12274 J	1.28154 J	9.54086 J
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)				0.00665 J	0.2422 J	0.18038 J	0.03441 J	0.3221 J
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)				0.07348 J	1.78422 J	1.33522 J	0.3595 J	2.35327 J
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)				0.00907 J	0.26235 J	0.19587 J	0.05436 J	0.37017 J
2,3,3',4',5,5',6-Heptachlorobiphenyl (193)						0.09969		
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)				0.06321 J	2.36741 J	1.76265 J	0.31816 J	3.19405 J
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)				0.03073 J	0.69848 J	0.52322 J	0.17707 J	0.91123 J
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)				0.04194 J	1.34202 J	1.0008 J	0.20726 J	1.93445 J
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)				0.0024 J	0.0811 J	0.06044 J	0.19972 UJ	0.11753 J
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)				0.25816 J	7.23644 J	5.40491 J	1.25986 J	10.00778 J
2,2',3,3',4,5,5',6'-Octachlorobiphenyl (199)						0.03988		
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)				0.0059 J	0.08919 J	0.06733 J	0.03056 J	0.12846 J
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)				0.01549 J	0.42624 J	0.31843 J	0.06397 J	0.64432 J
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)				0.10307 J	4.07909 J	3.03554 J	0.40125 J	6.04013 J
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)				0.0034 J	0.12056 J	0.08981 J	0.02664 J	0.16939 J
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl				0.24728 J	7.61204 J	5.67907 J	1.32025 J	11.95946 J
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl				0.19855 UJ	0.76397 J	0.56346 J	0.10535 J	1.13169 J

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-DU-062101-0000-D-F 6/21/2001 REPLICATE	LPX-DU-062101-0000-D-O 6/21/2001 REPLICATE	LPX-DU-062101-0000-D-W 6/21/2001 REPLICATE	LPX-LB-4001-0000-01-F 6/21/2001	LPX-LB-4001-0000-01-O 6/21/2001	LPX-LB-4001-0000-01-W 6/21/2001	LPX-LB-4002-0000-01-F 6/21/2001	LPX-LB-4002-0000-01-O 6/21/2001
Decachlorobiphenyl (209)				0.14678 J	3.66669 J	2.74285 J	0.5704 J	5.61068 J
PCB Congeners, Total				36.60618 J	872.67414 J	653.23815 J	131.70649 J	1022.33456 J
Toxicity Equivalency (PCB)				0.000902	0.0494	0.0367	0.00405	0.0306
Other (%)								
Lipid_percent				1.14	4.62		0.99	4.5

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

Samples ending with:
F - Fillet
O - Offal
W - whole body

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4002-0000-01-W 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001 REEXTRACTED	LPX-LB-4003-0000-01-O 6/21/2001	LPX-LB-4003-0000-01-W 6/21/2001	LPX-LB-4004-0000-01-F 6/21/2001 DUPLICATE	LPX-LB-4004-0000-01-F 6/21/2001	LPX-LB-4004-0000-01-O 6/21/2001 DUPLICATE
Semivolatile Organics (ug/Kg)								
1,1'-Biphenyl	0.4 J	0.08 J	0.94 U	0.5 J	0.33 J		0.07 J	
2-Methylnaphthalene	2.72	0.46 J	2.98	3.55	3.36		0.17 J	
Acenaphthene	1.23	0.81 UJ	1.44	1.65	1.58		1.12 UJ	
Acenaphthylene	0.58	0.81 UJ	0.62 J	0.99	0.86		1.12 UJ	
Anthracene	0.95	0.06 J	0.99	1.25	1.16		0.06 J	
Benzo(a)anthracene	0.2 J	0.81 UJ	2.9	3.77	3.48		1.12 UJ	
Benzo(a)pyrene	0.27 J	0.81 UJ	3.73	5.85	5.13		1.12 UJ	
Benzo(b)fluoranthene	0.31 J	0.81 UJ	5.09	7.52	6.7		1.12 UJ	
Benzo(g,h,i)perylene	0.35 J	0.81 UJ	3.72	6.03	5.24		1.12 UJ	
Benzo(k)fluoranthene	0.24 J	0.81 UJ	4.62	6.78	6.05		1.12 UJ	
Chrysene	0.6	0.81 UJ	5.62	7.25	6.7		1.12 UJ	
Dibenzo(a,h)anthracene	0.08 J	0.81 UJ	0.8 J	1.7	1.39		1.12 UJ	
Dibenzofuran	1.12	0.07 J	0.96	1.17	1.1		1.12 UJ	
Fluoranthene	2.42	0.81 U	10.84	9.74	10.11		1.12 U	
Fluorene	2.24	0.08 J	1.54	1.94	1.8		1.12 UJ	
Indeno(1,2,3-cd)pyrene	0.36 J	0.81 UJ	3.87	7.04	5.96		1.12 UJ	
Naphthalene	1.87	0.81 U	3.05 U	3.16	2.09		1.12 U	
Phenanthrene	5.28	0.3 J	7.12 J	7.64	7.46		1.12 U	
Pyrene	0.95	0.81 U	7.59	7.41	7.47		1.12 U	
Total PAH	22.16 J	1.05 J	64.43 J	84.94 J	77.99 J		0.29 J	
Pesticides/PCBs (ug/Kg)								
4,4'-DDD	3.84	0.15 J	39.1	5.71 J	6.28 J		0.79	
4,4'-DDE	59.95 D	0.95 J	3.37	51.03 J	46.99 J		3.09	
4,4'-DDT	2.74	0.06 J	7.4	3.34 J	3.35 J		0.72 U	
Aldrin	0.47 U	R	0.75 U	R	R		R	
alpha-BHC	0.47 U	R	0.75 U	R	R		R	
alpha-Chlordane	8.22	0.72 J	9.9	8.38 J	8.9 J		0.25 J	
Aroclor, Total	1326.1	26.63 J	649.1 J	1243.63 J	1042.08 J		17.37 J	
Aroclor-1016	5.81 U	R	9.35 U	R	R		R	
Aroclor-1221	5.81 U	R	9.35 U	R	R		R	
Aroclor-1232	5.81 U	R	9.35 U	R	R		R	
Aroclor-1242	5.81 U	R	9.35 U	R	R		R	
Aroclor-1248	5.81 U	R	9.35 U	R	R		R	
Aroclor-1254	1316.65 D	25.9 J	594.34 J	1225.33 J	1011.42 J		16.71 J	
Aroclor-1260	5.81 U	R	9.35 U	R	R		R	
Aroclor-1268	9.45	0.72 J	54.76 J	18.3 J	30.66 J		0.67 J	
beta-BHC	0.47 U	R	0.75 U	R	R		R	

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4002-0000-01-W 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001 REEXTRACTED	LPX-LB-4003-0000-01-O 6/21/2001	LPX-LB-4003-0000-01-W 6/21/2001	LPX-LB-4004-0000-01-F 6/21/2001 DUPLICATE	LPX-LB-4004-0000-01-F 6/21/2001	LPX-LB-4004-0000-01-O 6/21/2001 DUPLICATE
delta-BHC	0.47 U	R	0.75 UJ	R	R		R	
Dieldrin	2.24	0.19 J	2.55	1.89 J	2.12 J		R	
Endosulfan I	0.47 U	R	0.75 U	R	R		R	
Endosulfan II	0.47 U	R	0.75 U	R	R		R	
Endosulfan Sulfate	0.47 U	R	0.75 U	R	R		R	
Endrin	0.47 U	R	0.75 U	R	R		R	
Endrin Aldehyde	0.47 U	R	0.75 UJ	R	R		R	
Endrin Ketone	0.47 U	R	0.75 U	R	R		R	
gamma-BHC	0.47 U	R	0.75 UJ	R	R		R	
gamma-Chlordane	3.3	0.14 J	3.8	3.92 J	3.88 J		0.03 J	
Heptachlor	0.47 U	R	0.75 U	R	R		R	
Heptachlor Epoxide	0.47 U	R	0.75 U	R	R		R	
Methoxychlor	0.47 U	R	0.75 U	R	R		R	
Technical Chlordane	106.25	5.19 J	136.5 J	112.9 J	120.9 J		3.19 J	
Toxaphene	11.63 U	R	9.35 U	R	R		R	
Inorganics (mg/Kg)								
Aluminum	2.52	0.561 J		101	67		0.685 J	
Antimony	0.034 U	0.034 U		0.034 U	0.034 U		0.034 U	
Arsenic	0.0399 U	0.034 U		0.0533 U	0.0468 U		0.034 U	
Barium	0.537	0.0215 J		2.45 J	1.63 J		0.0195 J	
Beryllium	0.00603 U	0.004 U		0.0164	0.0108		0.004 U	
Cadmium	0.00847 J	0.2 U		0.0197 J	0.013 J		0.2 U	
Chromium	0.269 U	0.269 U		0.436	0.288		0.269 U	
Cobalt	0.0787 J	0.0123 J		0.145 J	0.1 J		0.0138 J	
Copper	0.4 J	0.225 J		1.69	1.19		0.136 J	
Iron	15.2 J	3.4 J		140	93.7		2.62 J	
Lead	0.048 J	0.0017 J		0.557 J	0.369 J		0.00347 J	
Manganese	2.49	0.281		22.1	14.7		0.164	
Mercury	0.112 U	0.149 U		0.0791 U	0.103 U		0.33 U	
Mercury (methyl)	0.107	0.137		0.0812	0.1		0.33	
Molybdenum	0.0235 J	0.32 U		0.0673 J	0.0445 J		0.32 U	
Nickel	0.139 J	0.0352 J		0.249 J	0.177 J		0.0222 J	
Selenium	0.223 J	0.153 J		0.249 J	0.216 J		0.102 J	
Silver	0.06 U	0.06 U		0.06 U	0.06 U		0.06 U	
Thallium	0.00509 J	0.00308 J		0.00643 J	0.00529 J		0.00163 J	
Vanadium	0.179 U	0.179 U		0.167 J	0.11 J		0.179 U	
Zinc	19.9 J	12.9 J		25.2 J	21 J		4.07 J	

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4002-0000-01-W 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001 REEXTRACTED	LPX-LB-4003-0000-01-O 6/21/2001	LPX-LB-4003-0000-01-W 6/21/2001	LPX-LB-4004-0000-01-F 6/21/2001 DUPLICATE	LPX-LB-4004-0000-01-F 6/21/2001	LPX-LB-4004-0000-01-O 6/21/2001 DUPLICATE
Dioxins/Furans (ug/Kg)								
HCX	0.0205 J	0.03995 UJ		0.03992 UJ	0.03993 UJ		0.03993 UJ	
TCX	R	R		R	R		R	
2,3,7,8-TCDD	0.27205 J	0.00972 J		0.18103 J	0.12295 J		0.01049 J	
1,2,3,7,8-PeCDD	0.00047 J	0.00014 UJ		0.00025 J	0.00017 J		0.00025 UJ	
1,2,3,4,7,8-HxCDD	0.0003 UJ	0.00018 UJ		0.00038 UJ	0.00031 UJ		0.00013 UJ	
1,2,3,6,7,8-HxCDD	0.0002 J	0.00019 UJ		0.00038 UJ	0.00032 UJ		0.00014 UJ	
1,2,3,7,8,9-HxCDD	0.00028 UJ	0.00018 UJ		0.00036 UJ	0.0003 UJ		0.00013 UJ	
1,2,3,4,6,7,8-HpCDD	0.0005 UJ	0.00026 UJ		0.00057 J	0.00038 J		0.00023 UJ	
OCDD	0.00058 UJ	0.00052 UJ		0.00371 UJ	0.00263 UJ		0.00042 UJ	
2,3,7,8-TCDF	0.00029 J	0.00013 UJ		0.0003 J	0.0002 J		0.00016 UJ	
1,2,3,7,8-PeCDF	0.00025 UJ	0.00018 UJ		0.00032 UJ	0.00027 UJ		0.00023 UJ	
2,3,4,7,8-PeCDF	0.00018 J	0.00018 UJ		0.00031 UJ	0.00027 UJ		0.00023 UJ	
1,2,3,4,7,8-HxCDF	0.00011 UJ	0.00014 UJ		0.00036 UJ	0.00029 UJ		0.00009 UJ	
1,2,3,6,7,8-HxCDF	0.00033 UJ	0.00009 UJ		0.00035 UJ	0.00026 UJ		0.00001 UJ	
2,3,4,6,7,8-HxCDF	0.00035 UJ	0.0001 UJ		0.00036 UJ	0.00027 UJ		0.00013 UJ	
1,2,3,7,8,9-HxCDF	0.00038 UJ	0.0001 UJ		0.0004 UJ	0.0003 UJ		0.00014 UJ	
1,2,3,4,6,7,8-HpCDF	0.00039 UJ	0.00015 UJ		0.00022 UJ	0.0002 UJ		0.00014 UJ	
1,2,3,4,7,8,9-HpCDF	0.00047 UJ	0.00016 UJ		0.00084 UJ	0.00061 UJ		0.00013 UJ	
OCDF	0.00042 UJ	0.00011 UJ		0.00026 UJ	0.00021 UJ		0.00022 UJ	
Total TCDD	0.27205 J	0.00972 J		0.18103 J	0.12295 J		0.01049 J	
Total PeCDD	0.00047 J	0.00014 UJ		0.00025 J	0.00017 J		0.00025 UJ	
Total HxCDD	0.0002 J	0.00018 UJ		0.00037 UJ	0.00031 UJ		0.00002 UJ	
Total HpCDD	0.0005 UJ	0.00026 UJ		0.00057 UJ	0.00046 UJ		0.00023 UJ	
Total TCDF	0.00042 J	0.00013 UJ		0.0003 J	0.0002 J		0.00003 UJ	
Total PeCDF	0.00034 J	0.00018 UJ		0.00084 J	0.00056 J		0.00023 UJ	
Total HxCDF	0.00011 UJ	0.00014 UJ		0.00037 UJ	0.00029 UJ		0.0001 UJ	
Total HpCDF	0.00043 UJ	0.00015 UJ		0.00022 UJ	0.0002 UJ		0.00013 UJ	
Toxicity Equivalency (Dioxins, Furans, HCX)	0.273	0.00972		0.181	0.123		0.0105	
PCB Congeners (ug/Kg)								
2-Monochlorobiphenyl (1)	0.0399 UJ	0.00606 UJ		0.02317 UJ	0.03993 UJ		0.00448 UJ	
4-Chlorobiphenyl (3)	0.0399 UJ	0.00527 UJ		0.01396 UJ	0.03993 UJ		0.00399 UJ	
2,2'-Dichlorobiphenyl (4)	0.16859 J	0.02351 UJ		0.17279 J	0.11421 J		0.09982 J	
2,3-Dichlorobiphenyl (5)	0.00602 J	0.00999 UJ		0.00513 J	0.00339 J		0.00998 UJ	
2,3'-Dichlorobiphenyl (6)	0.08499 J	0.011 UJ		0.0635 J	0.04197 J		0.01038 UJ	
2,4-Dichlorobiphenyl (7)	0.01778 J	0.00999 UJ		0.01371 J	0.00906 J		0.00998 UJ	
2,4'-Dichlorobiphenyl (8)	0.37359 J	0.03988 UJ		0.27865 J	0.18418 J		0.03556 UJ	
2,5-Dichlorobiphenyl (9)	0.03372 J	0.00999 UJ		0.02141 J	0.01415 J		0.00998 UJ	

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4002-0000-01-W 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001 REEXTRACTED	LPX-LB-4003-0000-01-O 6/21/2001	LPX-LB-4003-0000-01-W 6/21/2001	LPX-LB-4004-0000-01-F 6/21/2001 DUPLICATE	LPX-LB-4004-0000-01-F 6/21/2001	LPX-LB-4004-0000-01-O 6/21/2001 DUPLICATE
2,6-Dichlorobiphenyl (10)	0.00929 J	0.00999 UJ		0.00778 J	0.00514 J		0.00998 UJ	
3,4-Dichlorobiphenyl (12)	0.00286 J	0.01997 UJ		0.01996 UJ	0.01996 UJ		0.01996 UJ	
3,4'-Dichlorobiphenyl (13)	0.01995				0.01996			
2,2',3'-Trichlorobiphenyl (16)	0.70065 J	0.03153 UJ		0.38065 J	0.25161 J		0.02936 UJ	
2,2',4-Trichlorobiphenyl (17)	0.92464 J	0.03686 J		0.47235 J	0.32471 J		0.03838 J	
2,2',5-Trichlorobiphenyl (18)	1.82335 J	0.07894 J		0.98828 J	0.68 J		0.07692 J	
2,2',6-Trichlorobiphenyl (19)	0.16839 J	0.01169 J		0.09243 J	0.06506 J		0.00827 J	
2,3,3'-Trichlorobiphenyl (20)	9.82449 J	0.30752 J		4.62388 J	3.16059 J		0.367 J	
2,3,4-Trichlorobiphenyl (21)	0.09975				0.09982			
2,3,4'-Trichlorobiphenyl (22)	1.37751 J	0.05464 UJ		0.55072 J	0.36402 J		0.06111 UJ	
2,3,6-Trichlorobiphenyl (24)	0.1877 J	0.0079 J		0.10126 J	0.06961 J		0.00866 J	
2,3',4-Trichlorobiphenyl (25)	0.34678 J	0.00775 UJ		0.11933 J	0.07888 J		0.01275 J	
2,3',5-Trichlorobiphenyl (26)	1.05879 J	0.0277 UJ		0.40078 J	0.26491 J		0.03612 J	
2,3',6-Trichlorobiphenyl (27)	0.0399				0.03993			
2,4,4'-Trichlorobiphenyl (28)	0.09975				0.09982			
2,4,5-Trichlorobiphenyl (29)	0.0399				0.03993			
2,4,6-Trichlorobiphenyl (30)	0.09975				0.09982			
2,4',5-Trichlorobiphenyl (31)	3.51578 J	0.0871 UJ		1.3338 J	0.88163 J		0.13369 UJ	
2,4',6-Trichlorobiphenyl (32)		0.03007 J		0.36783 J			0.0288 J	
2,3',4'-Trichlorobiphenyl (33)	0.09975				0.09982			
2,2',3,3'-Tetrachlorobiphenyl (40)	3.65914 J	0.13041 J		1.65051 J	1.13518 J		0.14403 J	
2,2',3,4-Tetrachlorobiphenyl (41)	0.09975				0.09982			
2,2',3,4'-Tetrachlorobiphenyl (42)	2.72737 J	0.08868 J		1.21468 J	0.83295 J		0.10614 J	
2,2',3,5-Tetrachlorobiphenyl (43)	22.85177 J	0.65073 J		11.46306 J	7.79757 J		0.98526 J	
2,2',3,5'-Tetrachlorobiphenyl (44)	4.22006 J	0.1152 J		2.36679 J	1.60348 J		0.14457 J	
2,2',3,6-Tetrachlorobiphenyl (45)	1.0449 J	0.03862 J		0.4705 J	0.32409 J		0.03988 J	
2,2',3,6'-Tetrachlorobiphenyl (46)	0.2531 J	0.00673 UJ		0.10696 J	0.0707 J		0.00858 J	
2,2',4,4'-Tetrachlorobiphenyl (47)	0.09975				0.09982			
2,2',4,5-Tetrachlorobiphenyl (48)	1.37175 J	0.0416 J		0.65574 J	0.44754 J		0.05003 J	
2,2',4,5'-Tetrachlorobiphenyl (49)	9.3916 J	0.2523 J		4.69032 J	3.18579 J		0.3546 J	
2,2',4,6-Tetrachlorobiphenyl (50)	0.95344 J	0.03446 J		0.39956 J	0.27579 J		0.03066 J	
2,2',4,6'-Tetrachlorobiphenyl (51)	0.0399				0.03993			
2,2',5,5'-Tetrachlorobiphenyl (52)	0.0399				0.03993			
2,2',5,6'-Tetrachlorobiphenyl (53)	0.0399				0.03993			
2,3,3',4'-Tetrachlorobiphenyl (56)	2.40192 J	0.08267 J		1.27057 J	0.86786 J		0.11579 J	
2,3,3',6-Tetrachlorobiphenyl (59)	7.08371 J	0.27312 J		3.51516 J	2.41608 J		0.2835 J	
2,3,4,4'-Tetrachlorobiphenyl (60)	1.84955 J	0.07785 J		1.35549 J	0.92236 J		0.07476 J	
2,3,4,5-Tetrachlorobiphenyl (61)	17.99459 J	0.4634 J		10.31212 J	6.97331 J		0.70216 J	

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4002-0000-01-W 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001 REEXTRACTED	LPX-LB-4003-0000-01-O 6/21/2001	LPX-LB-4003-0000-01-W 6/21/2001	LPX-LB-4004-0000-01-F 6/21/2001 DUPLICATE	LPX-LB-4004-0000-01-F 6/21/2001	LPX-LB-4004-0000-01-O 6/21/2001 DUPLICATE
2,3,4,6-Tetrachlorobiphenyl (62)	0.0399				0.03993			
2,3,4',5-Tetrachlorobiphenyl (63)	0.68265 J	0.01698 J		0.47242 J	0.31802 J		0.02419 J	
2,3,4',6-Tetrachlorobiphenyl (64)	4.70188 J	0.17283 J		2.61886 J	1.78963 J		0.20382 J	
2,3,5,6-Tetrachlorobiphenyl (65)	0.09975				0.09982			
2,3',4,4'-Tetrachlorobiphenyl (66)	20.03466 J	0.62186 J		13.1121 J	8.87779 J		0.83035 J	
2,3',4,6-Tetrachlorobiphenyl (69)	0.09975				0.09982			
2,3',4',5-Tetrachlorobiphenyl (70)	0.09975				0.09982			
2,3',4',6-Tetrachlorobiphenyl (71)	0.09975				0.09982			
2,3',5',6-Tetrachlorobiphenyl (73)	0.0399				0.03993			
2,3',4',5-Tetrachlorobiphenyl (74)	0.09975				0.09982			
2,4,4',6-Tetrachlorobiphenyl (75)	0.0399				0.03993			
2,3',4',5-Tetrachlorobiphenyl (76)	0.09975				0.09982			
3,3',4,4'-Tetrachlorobiphenyl (77)	0.3206 J	0.01053 J		0.24071 J	0.16268 J		0.01687 J	
3,4,4',5-Tetrachlorobiphenyl (81)	0.09975 UJ	0.09987 UJ		0.09979 UJ	0.09982 UJ		0.09982 UJ	
2,2',3,3',4-Pentachlorobiphenyl (82)	3.95665 J	0.15031 J		2.57974 J	1.75614 J		0.14714 J	
2,2',3,3',5-Pentachlorobiphenyl (83)	35.12971 J	0.81944 J		26.79034 J	17.98595 J		1.0974 J	
2,2',3,3',6-Pentachlorobiphenyl (84)	5.00769 J	0.22808 J		3.5003 J	2.39099 J		0.18605 J	
2,2',3,4,4'-Pentachlorobiphenyl (85)	11.68387 J	0.35442 J		7.89963 J	5.34173 J		0.37518 J	
2,2',3,4,5-Pentachlorobiphenyl (86)	31.65931 J	1.0593 J		22.84758 J	15.46114 J		1.15542 J	
2,2',3,4,5'-Pentachlorobiphenyl (87)	0.09975				0.09982			
2,2',3,4,6-Pentachlorobiphenyl (88)	4.59579 J	0.16506 J		3.18438 J	2.1608 J		0.18034 J	
2,2',3,4,6'-Pentachlorobiphenyl (89)	0.17042 J	0.00771 J		0.09751 J	0.06707 J		0.09982 UJ	
2,2',3,4',5-Pentachlorobiphenyl (90)	62.09928 J	1.48497 J		47.08815 J	31.62823 J		2.0679 J	
2,2',3,4',6-Pentachlorobiphenyl (91)	0.09975				0.09982			
2,2',3,5,5'-Pentachlorobiphenyl (92)	9.59443 J	0.24063 J		7.07416 J	4.75753 J		0.34709 J	
2,2',3,5,6-Pentachlorobiphenyl (93)	21.49861 J	0.8072 J		15.3053 J	10.3903 J		0.8653 J	
2,2',3,5',6-Pentachlorobiphenyl (95)	0.09975				0.09982			
2,2',3,4',5'-Pentachlorobiphenyl (97)	0.09975				0.09982			
2,2',3,4',6'-Pentachlorobiphenyl (98)	0.09975				0.09982			
2,2',4,4',5-Pentachlorobiphenyl (99)	0.09975				0.09982			
2,2',4,4',6-Pentachlorobiphenyl (100)	0.09975				0.09982			
2,2',4,5,5'-Pentachlorobiphenyl (101)	0.1995				0.19963			
2,2',4,5,6'-Pentachlorobiphenyl (102)	0.09975				0.09982			
2,3,3',4,4'-Pentachlorobiphenyl (105)	11.78662 J	0.37511 J		8.46636 J	5.72335 J		0.38753 J	
2,3,3',4,5-Pentachlorobiphenyl (106)	6.15234 J	0.15095 J		4.80171 J	3.22506 J		0.19944 J	
2,3,3',4',5-Pentachlorobiphenyl (107)	0.1995				0.19963			
2,3,3',4',5'-Pentachlorobiphenyl (108)	1.70734 J	0.04094 J		1.0292 J	0.69417 J		0.06042 J	
2,3,3',4,6-Pentachlorobiphenyl (109)	0.09975				0.09982			

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4002-0000-01-W 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001 REEXTRACTED	LPX-LB-4003-0000-01-O 6/21/2001	LPX-LB-4003-0000-01-W 6/21/2001	LPX-LB-4004-0000-01-F 6/21/2001 DUPLICATE	LPX-LB-4004-0000-01-F 6/21/2001	LPX-LB-4004-0000-01-O 6/21/2001 DUPLICATE
2,3,3',4',6-Pentachlorobiphenyl (110)	50.0705 J	1.65808 J		31.51618 J	21.39399 J		1.83218 J	
2,3,3',5,5'-Pentachlorobiphenyl (111)	0.09975				0.09982			
2,3,3',5',6-Pentachlorobiphenyl (113)	0.1995				0.19963			
2,3,4,4',5-Pentachlorobiphenyl (114)	1.10644 J	0.03286 J		0.78684 J	0.53123 J		0.04538 J	
2,3,4,4',6-Pentachlorobiphenyl (115)	0.1995				0.19963			
2,3,4,5,6-Pentachlorobiphenyl (116)	0.0399				0.03993			
2,3,4',5,6-Pentachlorobiphenyl (117)	0.0399				0.03993			
2,3',4,4',5-Pentachlorobiphenyl (118)	56.19197 J	1.74523 J		45.84738 J	30.89632 J		2.12305 J	
2,3',4,4',6-Pentachlorobiphenyl (119)	0.09975				0.09982			
2,3',4,5',6-Pentachlorobiphenyl (121)	0.09975				0.09982			
2,3,3',4',5'-Pentachlorobiphenyl (122)	0.09975				0.09982			
2,3',4,4',5'-Pentachlorobiphenyl (123)	0.09975				0.09982			
2,3',4',5,5'-Pentachlorobiphenyl (124)	0.09975				0.09982			
2,3',4',5',6-Pentachlorobiphenyl (125)	0.09975				0.09982			
3,3',4,4',5-Pentachlorobiphenyl (126)	0.10113 J	0.00573 J		0.08934 J	0.061 J		0.19964 UJ	
2,2',3,3',4,4'-Hexachlorobiphenyl (128)	11.24774 J	0.3762 J		7.71084 J	5.22433 J		0.37562 J	
2,2',3,3',4,5-Hexachlorobiphenyl (129)	39.76425 J	1.87356 J		50.75012 J	34.18049 J		2.4702 J	
2,2',3,3',4,5'-Hexachlorobiphenyl (130)	3.86301 J	0.11639 J		2.94067 J	1.98321 J		0.13147 J	
2,2',3,3',4,6-Hexachlorobiphenyl (131)	0.04266 UJ	0.01509 J		0.37861 J	0.25537 J		0.01551 J	
2,2',3,3',4,6'-Hexachlorobiphenyl (132)	8.74573 J	0.34184 J		6.32992 J	4.2999 J		0.32242 J	
2,2',3,3',5,6-Hexachlorobiphenyl (134)	1.27229 J	0.05594 J		1.0481 J	0.71175 J		0.06274 J	
2,2',3,3',5,6'-Hexachlorobiphenyl (135)	6.43121 J	0.16938 J		4.45815 J	3.00422 J		0.25761 J	
2,2',3,3',6,6'-Hexachlorobiphenyl (136)	1.536 J	0.04977 J		0.90939 J	0.61797 J		0.05522 J	
2,2',3,4,4',5-Hexachlorobiphenyl (137)	6.48481 J	0.1762 J		4.81336 J	3.24132 J		0.23686 J	
2,2',3,4,4',5'-Hexachlorobiphenyl (138)	0.09975				0.09982			
2,2',3,4,5,5'-Hexachlorobiphenyl (141)	6.94049 J	0.18533 J		5.5503 J	3.73152 J		0.24465 J	
2,2',3,4,5,6'-Hexachlorobiphenyl (143)	0.09975				0.09982			
2,2',3,4,5',6-Hexachlorobiphenyl (144)	1.23923 J	0.0296 J		0.95998 J	0.64457 J		0.03913 J	
2,2',3,4',5,5'-Hexachlorobiphenyl (146)	7.26855 J	0.13578 J		6.07338 J	4.06048 J		0.20504 J	
2,2',3,4',5,6-Hexachlorobiphenyl (147)	26.85713 J	0.8181 J		20.69508 J	13.95659 J		1.13154 J	
2,2',3,4',5',6-Hexachlorobiphenyl (149)	0.09975				0.09982			
2,2',3,5,5',6-Hexachlorobiphenyl (151)	0.09975				0.09982			
2,2',4,4',5,5'-Hexachlorobiphenyl (153)	51.39896 J	0.82082 J		41.55354 J	27.74475 J		1.29566 J	
2,2',4,4',5,6'-Hexachlorobiphenyl (154)	0.09975				0.09982			
2,3,3',4,4',5-Hexachlorobiphenyl (156)	6.62743 J	0.1434 J		5.0229 J	3.3687 J		0.19808 J	
2,3,3',4,4',5'-Hexachlorobiphenyl (157)	0.09975				0.09982			
2,3,3',4,4',6-Hexachlorobiphenyl (158)	6.24888 J	0.16325 J		4.51279 J	3.03825 J		0.18745 J	
2,3,3',4,5,6-Hexachlorobiphenyl (160)	0.09975				0.09982			

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4002-0000-01-W 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001 REEXTRACTED	LPX-LB-4003-0000-01-O 6/21/2001	LPX-LB-4003-0000-01-W 6/21/2001	LPX-LB-4004-0000-01-F 6/21/2001 DUPLICATE	LPX-LB-4004-0000-01-F 6/21/2001	LPX-LB-4004-0000-01-O 6/21/2001 DUPLICATE
2,3,3',4,5',6-Hexachlorobiphenyl (161)	0.1995				0.19963			
2,3,3',4',5,6-Hexachlorobiphenyl (163)	0.09975				0.09982			
2,3,3',4',5',6-Hexachlorobiphenyl (164)	0.1995				0.19963			
2,3,4,4',5,6-Hexachlorobiphenyl (166)	0.09975				0.09982			
2,3',4,4',5,5'-Hexachlorobiphenyl (167)	2.8533 J	0.06761 J		2.18274 J	1.46569 J		0.08302 J	
2,3',4,4',5',6-Hexachlorobiphenyl (168)	0.09975				0.09982			
3,3',4,4',5,5'-Hexachlorobiphenyl (169)	0.09975 UJ	0.09987 UJ		0.09979 UJ	0.09982 UJ		0.09982 UJ	
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)	7.40543 J	0.29459 J		5.52007 J	3.74858 J		0.30991 J	
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)	2.14481 J	0.0812 J		1.66126 J	1.1256 J		0.08386 J	
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)	1.34922 J	0.03606 J		1.15203 J	0.77371 J		0.0565 J	
2,2',3,3',4,5,6-Heptachlorobiphenyl (173)	0.1995				0.19963			
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)	2.50857 J	0.11745 J		1.68872 J	1.15604 J		0.11442 J	
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)	0.19574 J	0.00392 J		0.1388 J	0.09307 J		0.00698 J	
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)	0.2542 J	0.00978 J		0.16914 J	0.11512 J		0.01127 J	
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)	2.51484 J	0.09318 J		2.04145 J	1.38097 J		0.12915 J	
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)	0.93029 J	0.01959 J		0.59937 J	0.40282 J		0.03724 J	
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)	13.26393 J	0.30822 J		11.47672 J	7.69049 J		0.48026 J	
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)	0.03918 J	0.19973 UJ		0.02164 J	0.0143 J		0.19964 UJ	
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)	2.78581 J	0.05975 J		2.15401 J	1.44404 J		0.09732 J	
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)	0.01208 J	0.19973 UJ		0.01064 J	0.00703 J		0.19964 UJ	
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)	0.35445 J	0.0101 J		0.2232 J	0.15096 J		0.01129 J	
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)	6.50242 J	0.17996 J		4.41509 J	2.97934 J		0.3927 J	
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)	0.21626 J	0.09987 UJ		0.19024 J	0.12575 J		0.00853 J	
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)	1.6198 J	0.04054 J		1.21824 J	0.81899 J		0.06253 J	
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)	0.25399 J	0.19973 UJ		0.23272 J	0.15383 J		0.01043 J	
2,3,3',4',5,5',6-Heptachlorobiphenyl (193)	0.09975				0.09982			
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)	2.13607 J	0.04635 J		1.43147 J	0.9619 J		0.08225 J	
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)	0.64115 J	0.02106 J		0.44717 J	0.30271 J		0.03118 J	
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)	1.29905 J	0.03108 J		0.95015 J	0.63858 J		0.05292 J	
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)	0.07429 J	0.19973 UJ		0.07558 J	0.04996 J		0.19964 UJ	
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)	6.7896 J	0.20958 J		5.01466 J	3.38569 J		0.34236 J	
2,2',3,3',4,5,5',6'-Octachlorobiphenyl (199)	0.0399				0.03993			
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)	0.09244 J	0.19973 UJ		0.06264 J	0.0414 J		0.19964 UJ	
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)	0.43082 J	0.01653 J		0.35805 J	0.24227 J		0.01804 J	
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)	3.9657 J	0.08362 J		2.95816 J	1.98366 J		0.11237 J	
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)	0.11688 J	0.19973 UJ		0.09681 J	0.06399 J		0.19964 UJ	
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	8.04551 J	0.22862 J		5.96897 J	4.02294 J		0.48055 J	
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	0.75412 J	0.19973 UJ		0.65359 J	0.43202 J		0.03831 J	

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4002-0000-01-W 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001	LPX-LB-4003-0000-01-F 6/21/2001 REEXTRACTED	LPX-LB-4003-0000-01-O 6/21/2001	LPX-LB-4003-0000-01-W 6/21/2001	LPX-LB-4004-0000-01-F 6/21/2001 DUPLICATE	LPX-LB-4004-0000-01-F 6/21/2001	LPX-LB-4004-0000-01-O 6/21/2001 DUPLICATE
Decachlorobiphenyl (209)	3.75646 J	0.14665 J		2.91433 J	1.97606 J		0.202 J	
PCB Congeners, Total	694.69067 J	20.44633 J		514.54872 J	347.04318 J		26.34632 J	
Toxicity Equivalency (PCB)	0.0209	0.000875		0.0173	0.0118		0.000376	
Other (%)								
Lipid_percent		0.593		3.14		0.598	0.447	1.84

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

Samples ending with:
F - Fillet
O - Offal
W - whole body

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4004-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-F 6/21/2001	LPX-LB-4005-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-W 6/21/2001	LPX-LB-4006-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-F 6/21/2001	LPX-LB-4007-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-W 6/21/2001
Semivolatile Organics (ug/Kg)								
1,1'-Biphenyl	0.57 J	0.19 J	0.32 J	0.28 J	0.51 J	0.22 J	0.75	0.59
2-Methylnaphthalene	3.38	0.57 J	2.03	1.61	1.46	0.39 J	2.96	2.16
Acenaphthene	0.96 J	0.58 U	0.57 U	0.57 U	1.13	0.82 U	2.15	1.48
Acenaphthylene	0.38 J	0.05 J	0.21 J	0.16 J	0.39 J	0.82 U	0.98	0.68
Anthracene	0.75 J	0.08 J	0.42 J	0.32 J	0.66	0.11 J	1.73	1.22
Benzo(a)anthracene	0.73 J	0.07 J	0.16 J	0.14 J	0.13 J	0.07 J	0.43 J	0.32 J
Benzo(a)pyrene	0.84 J	0.58 U	0.35 J	0.25 J	0.58 U	0.82 U	0.58	0.4
Benzo(b)fluoranthene	1.65	0.2 J	0.36 J	0.31 J	0.17 J	0.2 J	0.67	0.52
Benzo(g,h,i)perylene	2.08	0.58 U	0.64	0.45	0.59	0.82 U	0.85	0.59
Benzo(k)fluoranthene	1.41	0.16 J	0.32 J	0.28 J	0.58 U	0.18 J	0.57 J	0.44 J
Chrysene	1.45	0.14 J	0.58	0.45	0.32 J	0.17 J	1.09	0.81
Dibenzo(a,h)anthracene	0.55 J	0.58 U	0.57 U	0.57 U	0.58 U	0.12 J	0.21 J	0.18 J
Dibenzofuran	0.91 J	0.14 J	0.54 J	0.42 J	0.84	0.22 J	1.97	1.43
Fluoranthene	2.77	0.39 J	1.92	1.49	1.68	0.44 J	4.47	3.22
Fluorene	1.72	0.17 J	0.82	0.64	1.49	0.27 J	6.71	4.71
Indeno(1,2,3-cd)pyrene	1.67	0.26 J	0.53 J	0.45 J	0.35 J	0.35 J	0.8	0.66
Naphthalene	2.99	0.76	1.75	1.47	1.63	0.82 U	2.59	1.79
Phenanthrene	5.24	0.46 J	2.52	1.93	2.97	0.62 J	7.4	5.3
Pyrene	1.59	0.58 U	0.77	0.55	0.76	0.82 U	1.97	1.36
Total PAH	31.65 J	3.66 J	14.23 J	11.22 J	15.06 J	3.36 J	38.87 J	27.85 J
Pesticides/PCBs (ug/Kg)								
4,4'-DDD	11.22 J	1.15 J	7.83 J	5.92	11.84 J	1.72 J	5.93 J	4.63
4,4'-DDE	77.14 J	6.18 J	84.14 J	61.95 D	117.26 J	7.99 J	177.73 J	125.07 D
4,4'-DDT	4.32 J	0.34 J	2.58 J	1.94	4.49 J	0.75 J	3.8 J	2.86
Aldrin	1.09 UJ	0.46 UJ	0.46 UJ	0.46 U	R	0.66 UJ	R	0.52 U
alpha-BHC	1.1 UJ	0.46 UJ	0.46 UJ	0.46 U	R	0.66 UJ	R	0.52 U
alpha-Chlordane	8.19 J	0.8 J	4.2 J	3.23	8.22 J	1.43 J	8.39 J	6.23
Aroclor, Total	1946.1 J	174.88 J	1923.72 J	1425.85	2918.28 J	175.66 J	3349.86 J	2365.14
Aroclor-1016	13.65 UJ	5.77 UJ	5.71 UJ	5.73 U	R	8.18 UJ	R	6.44 U
Aroclor-1221	13.65 UJ	5.77 UJ	5.71 UJ	5.73 U	R	8.18 UJ	R	6.44 U
Aroclor-1232	13.65 UJ	5.77 UJ	5.71 UJ	5.73 U	R	8.18 UJ	R	6.44 U
Aroclor-1242	13.65 UJ	5.77 UJ	5.71 UJ	5.73 U	R	8.18 UJ	R	6.44 U
Aroclor-1248	13.65 UJ	5.77 UJ	5.71 UJ	5.73 U	R	8.18 UJ	R	6.44 U
Aroclor-1254	1864.92 J	165.39 J	1870.59 J	1385.14 D	2850.58 J	167.98 J	3332.9 J	2351.05 D
Aroclor-1260	13.65 UJ	5.77 UJ	5.71 UJ	5.73 U	R	8.18 UJ	R	6.44 U
Aroclor-1268	81.18 J	9.49 J	53.14 J	40.71	67.71 J	7.68 J	16.97 J	14.09
beta-BHC	1.09 UJ	0.46 UJ	0.46 UJ	0.46 U	R	0.66 UJ	R	0.52 U

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4004-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-F 6/21/2001	LPX-LB-4005-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-W 6/21/2001	LPX-LB-4006-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-F 6/21/2001	LPX-LB-4007-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-W 6/21/2001
delta-BHC	1.1 UJ	0.46 UJ	0.46 UJ	0.46 U	R	0.66 UJ	R	0.52 U
Dieldrin	2.51 J	0.18 J	0.82 J	0.64	1.14 J	0.37 J	2.09 J	1.56
Endosulfan I	1.09 UJ	0.46 UJ	0.46 UJ	0.46 U	R	0.66 UJ	R	0.52 U
Endosulfan II	1.09 UJ	0.46 UJ	0.46 UJ	0.46 U	R	0.66 UJ	R	0.52 U
Endosulfan Sulfate	1.09 UJ	0.46 UJ	0.46 UJ	0.46 U	R	0.66 UJ	R	0.52 U
Endrin	1.09 UJ	0.46 UJ	0.46 UJ	0.46 U	R	0.66 UJ	R	0.52 U
Endrin Aldehyde	1.09 UJ	0.46 UJ	0.46 UJ	0.46 U	R	0.66 UJ	R	0.52 U
Endrin Ketone	1.09 UJ	0.46 UJ	0.46 UJ	0.46 U	R	0.66 UJ	R	0.52 U
gamma-BHC	1.09 UJ	0.46 UJ	0.46 UJ	0.46 U	R	0.66 UJ	R	0.52 U
gamma-Chlordane	3.01 J	0.24 J	1.66 J	1.26	2.76 J	0.41 J	3.43 J	2.49
Heptachlor	1.09 UJ	0.46 UJ	0.46 UJ	0.46 U	R	0.66 UJ	R	0.52 U
Heptachlor Epoxide	1.09 UJ	0.46 UJ	0.46 UJ	0.46 U	R	0.66 UJ	R	0.52 U
Methoxychlor	1.1 UJ	0.46 UJ	0.46 UJ	0.46 U	R	0.66 UJ	R	0.52 U
Technical Chlordane	180.2 J	18.92 J	140.98 J	106.23	215.57 J	26.74 J	176.96 J	130.36
Toxaphene	27.31 UJ	11.54 UJ	11.41 UJ	11.45 U	R	16.36 UJ	R	12.88 U
Inorganics (mg/Kg)								
Aluminum	3.81	0.557 J	7.28	5.37	1.21	1.02 J	8.65	6.28
Antimony	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U
Arsenic	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U	0.0481 U	0.0437 U
Barium	1.91	0.0784 J	1.62 J	1.18 J	0.573 J	0.021 J	0.612 J	0.429 J
Beryllium	0.00618 U	0.004 U	0.00509 U	0.00478 U	0.00634 U	0.004 U	0.004 U	0.004 U
Cadmium	0.0276 J	0.2 U	0.0235 J	0.0168 J	0.0297 J	0.2 U	0.0128 J	0.00883 J
Chromium	0.269 U	0.269 U	0.269 U	0.269 U	0.269 U	0.269 U	0.269 U	0.269 U
Cobalt	0.117 J	0.0105 J	0.119 J	0.0881 J	0.0844 J	0.00761 J	0.0546 J	0.04 J
Copper	1.51 J	0.277 J	1.19 J	0.93 J	0.913 J	0.277 J	1.7 J	1.26 J
Iron	32 J	3.28 J	40.6 J	30 J	33.7 J	3.93 J	32.4 J	23.6 J
Lead	0.139 J	0.00583 J	0.1 J	0.0732 J	0.0818 J	0.022 U	0.0911 J	0.0628 J
Manganese	9.49	0.649	8.29	6.11	3.42	0.103	2.45	1.72
Mercury	0.192 U	0.3 U	0.224 U	0.246 U	0.239 U	0.189 U	0.141 U	0.156 U
Mercury (methyl)	0.214	0.312	0.216	0.243	0.25	0.187	0.148	0.16
Molybdenum	0.0613 J	0.32 U	0.0479 J	0.0343 J	0.046 J	0.0308 J	0.32 U	0.00956 U
Nickel	0.214 J	0.0251 J	0.189 J	0.142 J	0.118 J	0.0202 J	0.0989 J	0.0745 J
Selenium	0.234 J	0.129 J	0.206 J	0.184 J	0.281 J	0.139 J	0.217 U	0.0431 U
Silver	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
Thallium	0.00422 J	0.00245 J	0.00496 J	0.00425 J	0.0045 J	0.00297 J	0.00582 J	0.00494 J
Vanadium	0.0673 J	0.179 U	0.0562 J	0.0402 J	0.179 U	0.179 U	0.0372 J	0.0257 J
Zinc	20.2 J	7.06 J	16.4 J	13.7 J	24.4 J	5.7 J	15.7 J	12.6 J

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4004-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-F 6/21/2001	LPX-LB-4005-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-W 6/21/2001	LPX-LB-4006-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-F 6/21/2001	LPX-LB-4007-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-W 6/21/2001
Dioxins/Furans (ug/Kg)								
HCX	0.04 UJ	0.03978 UJ	0.02353 J	0.01683 J	0.04848 J	0.01986 UJ	0.0223 J	0.01538 J
TCX	R	R	R	R	R	R	R	R
2,3,7,8-TCDD	0.12234 J	0.01578 J	0.15793 J	0.11746 J	0.44062 J	0.02222 J	0.33174 J	0.23572 J
1,2,3,7,8-PeCDD	0.00019 J	0.00018 UJ	0.00047 J	0.00034 J	0.0004	0.0002 UJ	0.00068 J	0.00047 J
1,2,3,4,7,8-HxCDD	0.00045 UJ	0.00004 UJ	0.00012 J	0.00009 J	0.00013 UJ	0.00015 UJ	0.00007 J	0.00005 J
1,2,3,6,7,8-HxCDD	0.00046 UJ	0.00004 UJ	0.00025 J	0.00018 J	0.0002 J	0.00016 UJ	0.00028 J	0.00019 J
1,2,3,7,8,9-HxCDD	0.00043 UJ	0.00004 UJ	0.00032 UJ	0.00024 UJ	0.00004 J	0.00014 UJ	0.00006 J	0.00004 J
1,2,3,4,6,7,8-HpCDD	0.00141 UJ	0.00028 UJ	0.00024 UJ	0.00025 UJ	0.00023 UJ	0.00015 UJ	0.00037 J	0.00026 J
OCDD	0.00038 UJ	0.00038 UJ	0.00098 UJ	0.00081 UJ	0.00047 UJ	0.00019 UJ	0.00091 UJ	0.00069 UJ
2,3,7,8-TCDF	0.00016 J	0.00018 UJ	0.00024 J	0.00017 J	0.00016 J	0.00013 UJ	0.00026 J	0.00018 J
1,2,3,7,8-PeCDF	0.00035 UJ	0.00026 UJ	0.00056 J	0.0004 J	0.00019 UJ	0.00017 UJ	0.00015 UJ	0.00016 UJ
2,3,4,7,8-PeCDF	0.00035 UJ	0.00025 UJ	0.00049 J	0.00035 J	0.00032	0.00015 UJ	0.00014 UJ	0.00014 UJ
1,2,3,4,7,8-HxCDF	0.0001 UJ	0.00009 UJ	0.0004 UJ	0.00031 UJ	0.00008 UJ	0.00006 UJ	0.0001 UJ	0.00009 UJ
1,2,3,6,7,8-HxCDF	0.00034 UJ	0.00003 UJ	0.00034 J	0.00024 J	0.00016 J	0.00008 UJ	0.00013 UJ	0.00011 UJ
2,3,4,6,7,8-HxCDF	0.00036 UJ	0.00003 UJ	0.00017 J	0.00012 J	0.00011 UJ	0.00008 UJ	0.00019 UJ	0.00016 UJ
1,2,3,7,8,9-HxCDF	0.00039 UJ	0.00004 UJ	0.00017 J	0.00012 J	0.00012 UJ	0.0001 UJ	0.0002 UJ	0.00017 UJ
1,2,3,4,6,7,8-HpCDF	0.00052 UJ	0.00014 UJ	0.00019 UJ	0.00018 UJ	0.00005 UJ	0.00008 UJ	0.00035 UJ	0.00027 UJ
1,2,3,4,7,8,9-HpCDF	0.00061 UJ	0.00013 UJ	0.00008 J	0.00006 J	0.00013 UJ	0.00012 UJ	0.00039 UJ	0.00031 UJ
OCDF	0.00064 UJ	0.00022 UJ	0.00014 UJ	0.00016 UJ	0.00008 UJ	0.00017 UJ	0.00011 UJ	0.00013 UJ
Total TCDD	0.12234 J	0.01578 J	0.15793 J	0.11746 J	0.44062 J	0.02222 J	0.33174 J	0.23572 J
Total PeCDD	0.00019 J	0.00018 UJ	0.00047 J	0.00034 J	0.00197 J	0.00043 UJ	0.00068 J	0.00047 J
Total HxCDD	0.00045 UJ	0.00002 UJ	0.00043 J	0.00031 J	0.00024 J	0.00015 UJ	0.00041 J	0.00028 J
Total HpCDD	0.00141 UJ	0.00006 UJ	0.00024 UJ	0.00019 UJ	0.00023 UJ	0.00015 UJ	0.00037 UJ	0.0003 UJ
Total TCDF	0.00016 J	0.00018 UJ	0.00024 J	0.00017 J	0.00042 J	0.00013 UJ	0.00032 J	0.00022 J
Total PeCDF	0.00034 J	0.00025 UJ	0.00105 J	0.00075 J	0.00032	0.00016 UJ	0.00093 J	0.00064 J
Total HxCDF	0.0001 UJ	0.00009 UJ	0.00108 UJ	0.0008 UJ	0.00024 UJ	0.00006 UJ	0.0005 UJ	0.00036 UJ
Total HpCDF	0.00056 UJ	0.00013 UJ	0.00036 UJ	0.00029 UJ	0.00023 UJ	0.00002 UJ	0.00014 UJ	0.0001 UJ
Toxicity Equivalency (Dioxins, Furans, HCX)	0.123	0.0158	0.159	0.118	0.441	0.0222	0.332	0.236
PCB Congeners (ug/Kg)								
2-Monochlorobiphenyl (1)	0.01251 UJ	0.00657 UJ	0.01497 UJ	0.03979 UJ				
4-Chlorobiphenyl (3)	0.00814 UJ	0.00499 UJ	0.01024 UJ	0.03979 UJ				
2,2'-Dichlorobiphenyl (4)	0.0607 J	0.01585 UJ	0.05698 J	0.04076 J				
2,3-Dichlorobiphenyl (5)	0.00514 J	0.00995 UJ	0.00995 UJ	0.00995 UJ				
2,3'-Dichlorobiphenyl (6)	0.04114 J	0.00913 UJ	0.03726 J	0.02665 J				
2,4-Dichlorobiphenyl (7)	0.01053 J	0.00995 UJ	0.00855 J	0.00612 J				
2,4'-Dichlorobiphenyl (8)	0.16421 J	0.03896 UJ	0.15395 J	0.11012 J				
2,5-Dichlorobiphenyl (9)	0.0151 J	0.00369 UJ	0.01455 J	0.01041 J				

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4004-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-F 6/21/2001	LPX-LB-4005-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-W 6/21/2001	LPX-LB-4006-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-F 6/21/2001	LPX-LB-4007-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-W 6/21/2001
2,6-Dichlorobiphenyl (10)	0.00472 J	0.00995 UJ	0.00297 J	0.00212 J				
3,4-Dichlorobiphenyl (12)	0.00514 J	0.01989 UJ	0.01989 UJ	0.01989 UJ				
3,4'-Dichlorobiphenyl (13)				0.01989				
2,2',3'-Trichlorobiphenyl (16)	0.19007 J	0.03503 UJ	0.19421 J	0.13892 J				
2,2',4-Trichlorobiphenyl (17)	0.26469 J	0.04045 J	0.24961 J	0.19006 J				
2,2',5-Trichlorobiphenyl (18)	0.52632 J	0.0871 J	0.52098 J	0.39746 J				
2,2',6-Trichlorobiphenyl (19)	0.05737 J	0.00957 J	0.05416 J	0.04147 J				
2,3,3'-Trichlorobiphenyl (20)	3.54388 J	0.39684 J	3.5502 J	2.65248 J				
2,3,4-Trichlorobiphenyl (21)				0.09947				
2,3,4'-Trichlorobiphenyl (22)	0.48959 J	0.06216 UJ	0.39915 J	0.28552 J				
2,3,6-Trichlorobiphenyl (24)	0.05118 J	0.0092 J	0.05344 J	0.04085 J				
2,3',4-Trichlorobiphenyl (25)	0.10838 J	0.01075 UJ	0.08945 J	0.06398 J				
2,3',5-Trichlorobiphenyl (26)	0.33568 J	0.03802 J	0.31738 J	0.23785 J				
2,3',6-Trichlorobiphenyl (27)				0.03979				
2,4,4'-Trichlorobiphenyl (28)				0.09947				
2,4,5-Trichlorobiphenyl (29)				0.03979				
2,4,6-Trichlorobiphenyl (30)				0.09947				
2,4',5-Trichlorobiphenyl (31)	1.35144 J	0.10871 UJ	0.92949 J	0.66488 J				
2,4',6-Trichlorobiphenyl (32)	0.20633 J	0.03197 J	0.19108 J					
2,3',4'-Trichlorobiphenyl (33)				0.09947				
2,2',3,3'-Tetrachlorobiphenyl (40)	1.42548 J	0.18468 J	1.48128 J	1.11215 J				
2,2',3,4-Tetrachlorobiphenyl (41)				0.09947				
2,2',3,4'-Tetrachlorobiphenyl (42)	1.07313 J	0.11729 J	1.0456 J	0.78132 J				
2,2',3,5-Tetrachlorobiphenyl (43)	10.39524 J	1.09653 J	11.08539 J	8.24168 J				
2,2',3,5'-Tetrachlorobiphenyl (44)	1.87059 J	0.19164 J	2.43876 J	1.79903 J				
2,2',3,6-Tetrachlorobiphenyl (45)	0.33574 J	0.0412 J	0.3189 J	0.23984 J				
2,2',3,6'-Tetrachlorobiphenyl (46)	0.07434 J	0.01119 J	0.07871 J	0.05949 J				
2,2',4,4'-Tetrachlorobiphenyl (47)				0.09947				
2,2',4,5-Tetrachlorobiphenyl (48)	0.47945 J	0.0625 J	0.56611 J	0.42274 J				
2,2',4,5'-Tetrachlorobiphenyl (49)	4.1503 J	0.37706 J	4.34502 J	3.21539 J				
2,2',4,6-Tetrachlorobiphenyl (50)	0.275 J	0.03594 J	0.2854 J	0.21438 J				
2,2',4,6'-Tetrachlorobiphenyl (51)				0.03979				
2,2',5,5'-Tetrachlorobiphenyl (52)				0.03979				
2,2',5,6'-Tetrachlorobiphenyl (53)				0.03979				
2,3,3',4'-Tetrachlorobiphenyl (56)	1.08791 J	0.0824 J	0.64555 J	0.48523 J				
2,3,3',6-Tetrachlorobiphenyl (59)	2.60649 J	0.3363 J	2.77029 J	2.07736 J				
2,3,4,4'-Tetrachlorobiphenyl (60)	0.78604 J	0.15056 J	1.18734 J	0.89218 J				
2,3,4,5-Tetrachlorobiphenyl (61)	8.6638 J	0.63812 J	7.93664 J	5.85884 J				

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4004-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-F 6/21/2001	LPX-LB-4005-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-W 6/21/2001	LPX-LB-4006-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-F 6/21/2001	LPX-LB-4007-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-W 6/21/2001
2,3,4,6-Tetrachlorobiphenyl (62)				0.03979				
2,3,4',5-Tetrachlorobiphenyl (63)	0.33326 J	0.02985 J	0.45107 J	0.33115 J				
2,3,4',6-Tetrachlorobiphenyl (64)	2.01694 J	0.21874 J	1.87472 J	1.40328 J				
2,3,5,6-Tetrachlorobiphenyl (65)				0.09947				
2,3',4,4'-Tetrachlorobiphenyl (66)	9.54959 J	1.38958 J	15.50604 J	11.48725 J				
2,3',4,6-Tetrachlorobiphenyl (69)				0.09947				
2,3',4',5-Tetrachlorobiphenyl (70)				0.09947				
2,3',4',6-Tetrachlorobiphenyl (71)				0.09947				
2,3',5',6-Tetrachlorobiphenyl (73)				0.03979				
2,3',4',5-Tetrachlorobiphenyl (74)				0.09947				
2,4,4',6-Tetrachlorobiphenyl (75)				0.03979				
2,3',4',5-Tetrachlorobiphenyl (76)				0.09947				
3,3',4,4'-Tetrachlorobiphenyl (77)	0.15437 J	0.00977 UJ	0.10608 J	0.07588 J				
3,4,4',5-Tetrachlorobiphenyl (81)	0.09999 UJ	0.09946 UJ	0.09948 UJ	0.09947 UJ				
2,2',3,3',4-Pentachlorobiphenyl (82)	1.378 J	0.09946 UJ	1.57039 J	1.12332 J				
2,2',3,3',5-Pentachlorobiphenyl (83)	15.0191 J	2.0933 J	34.70178 J	25.41853 J				
2,2',3,3',6-Pentachlorobiphenyl (84)	1.62474 J	0.20126 J	1.55077 J	1.16658 J				
2,2',3,4,4'-Pentachlorobiphenyl (85)	4.60179 J	0.91668 J	10.42815 J	7.72035 J				
2,2',3,4,5-Pentachlorobiphenyl (86)	12.75162 J	2.05578 J	21.93828 J	16.27797 J				
2,2',3,4,5'-Pentachlorobiphenyl (87)				0.09947				
2,2',3,4,6-Pentachlorobiphenyl (88)	1.77894 J	0.25862 J	2.52624 J	1.88068 J				
2,2',3,4,6'-Pentachlorobiphenyl (89)	0.04546 J	0.0065 J	0.04469 J	0.03382 J				
2,2',3,4',5-Pentachlorobiphenyl (90)	27.36144 J	3.82107 J	59.17419 J	43.41581 J				
2,2',3,4',6-Pentachlorobiphenyl (91)				0.09947				
2,2',3,5,5'-Pentachlorobiphenyl (92)	4.50816 J	0.54132 J	7.09391 J	5.22847 J				
2,2',3,5,6-Pentachlorobiphenyl (93)	8.2688 J	1.024 J	9.4536 J	7.05379 J				
2,2',3,5',6-Pentachlorobiphenyl (95)				0.09947				
2,2',3,4',5'-Pentachlorobiphenyl (97)				0.09947				
2,2',3,4',6'-Pentachlorobiphenyl (98)				0.09947				
2,2',4,4',5-Pentachlorobiphenyl (99)				0.09947				
2,2',4,4',6-Pentachlorobiphenyl (100)				0.09947				
2,2',4,5,5'-Pentachlorobiphenyl (101)				0.19894				
2,2',4,5,6'-Pentachlorobiphenyl (102)				0.09947				
2,3,3',4,4'-Pentachlorobiphenyl (105)	4.68364 J	1.06187 J	12.33706 J	9.12715 J				
2,3,3',4,5-Pentachlorobiphenyl (106)	2.74944 J	0.41901 J	6.12945 J	4.50376 J				
2,3,3',4',5-Pentachlorobiphenyl (107)				0.19894				
2,3,3',4',5'-Pentachlorobiphenyl (108)	0.7825 J	0.07738 J	0.99382 J	0.73292 J				
2,3,3',4,6-Pentachlorobiphenyl (109)				0.09947				

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4004-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-F 6/21/2001	LPX-LB-4005-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-W 6/21/2001	LPX-LB-4006-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-F 6/21/2001	LPX-LB-4007-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-W 6/21/2001
2,3,3',4',6-Pentachlorobiphenyl (110)	19.53554 J	3.11354 J	29.84594 J	22.23554 J				
2,3,3',5,5'-Pentachlorobiphenyl (111)				0.09947				
2,3,3',5',6-Pentachlorobiphenyl (113)				0.19894				
2,3,4,4',5-Pentachlorobiphenyl (114)	0.48744 J	0.08289 J	0.86495 J	0.64231 J				
2,3,4,4',6-Pentachlorobiphenyl (115)				0.19894				
2,3,4,5,6-Pentachlorobiphenyl (116)				0.03979				
2,3,4',5,6-Pentachlorobiphenyl (117)				0.03979				
2,3',4,4',5-Pentachlorobiphenyl (118)	25.36384 J	5.31553 J	67.53156 J	49.81939 J				
2,3',4,4',6-Pentachlorobiphenyl (119)				0.09947				
2,3',4,5',6-Pentachlorobiphenyl (121)				0.09947				
2,3,3',4',5'-Pentachlorobiphenyl (122)				0.09947				
2,3',4,4',5'-Pentachlorobiphenyl (123)				0.09947				
2,3',4',5,5'-Pentachlorobiphenyl (124)				0.09947				
2,3',4',5',6-Pentachlorobiphenyl (125)				0.09947				
3,3',4,4',5-Pentachlorobiphenyl (126)	0.0521 J	0.02972 J	0.10156 J	0.08111 J				
2,2',3,3',4,4'-Hexachlorobiphenyl (128)	4.0268 J	1.03944 J	12.41582 J	9.1771 J				
2,2',3,3',4,5-Hexachlorobiphenyl (129)	15.0602 J	6.182 J	90.605 J	66.57077 J				
2,2',3,3',4,5'-Hexachlorobiphenyl (130)	1.43987 J	0.23416 J	3.40887 J	2.50507 J				
2,2',3,3',4,6-Hexachlorobiphenyl (131)	0.14479 J	0.03318 J	0.39971 J	0.29536 J				
2,2',3,3',4,6'-Hexachlorobiphenyl (132)	3.04346 J	0.36311 J	4.4472 J	3.28451 J				
2,2',3,3',5,6-Hexachlorobiphenyl (134)	0.46862 J	0.04514 J	0.81736 J	0.59752 J				
2,2',3,3',5,6'-Hexachlorobiphenyl (135)	2.92101 J	0.26445 J	3.98247 J	2.92399 J				
2,2',3,3',6,6'-Hexachlorobiphenyl (136)	0.5062 J	0.03653 J	0.40167 J	0.29772 J				
2,2',3,4,4',5-Hexachlorobiphenyl (137)	2.53128 J	0.52942 J	8.07114 J	5.9241 J				
2,2',3,4,4',5'-Hexachlorobiphenyl (138)				0.09947				
2,2',3,4,5,5'-Hexachlorobiphenyl (141)	2.82469 J	0.51583 J	8.19671 J	6.01005 J				
2,2',3,4,5,6'-Hexachlorobiphenyl (143)				0.09947 J				
2,2',3,4,5',6-Hexachlorobiphenyl (144)	0.49731 J	0.07074 J	1.1665 J	0.85455 J				
2,2',3,4',5,5'-Hexachlorobiphenyl (146)	3.46714 J	0.34328 J	9.13818 J	6.63438 J				
2,2',3,4',5,6-Hexachlorobiphenyl (147)	11.44766 J	1.8202 J	23.89194 J	17.60838 J				
2,2',3,4',5',6-Hexachlorobiphenyl (149)				0.09947				
2,2',3,5,5',6-Hexachlorobiphenyl (151)				0.09947				
2,2',4,4',5,5'-Hexachlorobiphenyl (153)	22.0771 J	2.19994 J	68.02408 J	49.28473 J				
2,2',4,4',5,6'-Hexachlorobiphenyl (154)				0.09947				
2,3,3',4,4',5-Hexachlorobiphenyl (156)	2.76894 J	0.493 J	8.85588 J	6.47507 J				
2,3,3',4,4',5'-Hexachlorobiphenyl (157)				0.09947				
2,3,3',4,4',6-Hexachlorobiphenyl (158)	2.30572 J	0.47276 J	7.37145 J	5.40747 J				
2,3,3',4,5,6-Hexachlorobiphenyl (160)				0.09947				

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4004-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-F 6/21/2001	LPX-LB-4005-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-W 6/21/2001	LPX-LB-4006-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-F 6/21/2001	LPX-LB-4007-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-W 6/21/2001
2,3,3',4,5',6-Hexachlorobiphenyl (161)				0.19894				
2,3,3',4',5,6-Hexachlorobiphenyl (163)				0.09947				
2,3,3',4',5',6-Hexachlorobiphenyl (164)				0.19894				
2,3,4,4',5,6-Hexachlorobiphenyl (166)				0.09947				
2,3',4,4',5,5'-Hexachlorobiphenyl (167)	1.13314 J	0.20295 J	3.81238 J	2.78482 J				
2,3',4,4',5',6-Hexachlorobiphenyl (168)				0.09947				
3,3',4,4',5,5'-Hexachlorobiphenyl (169)	0.09999 UJ	0.09946 UJ	0.09948 UJ	0.09947 UJ				
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)	2.83494 J	1.04975 J	9.44379 J	7.05411 J				
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)	0.75274 J	0.25842 J	2.44026 J	1.81912 J				
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)	0.56234 J	0.0933 J	1.58046 J	1.15708 J				
2,2',3,3',4,5,6-Heptachlorobiphenyl (173)				0.19894				
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)	0.84541 J	0.21654 J	1.64646 J	1.23938 J				
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)	0.06437 J	0.01208 J	0.20479 J	0.14993 J				
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)	0.06962 J	0.01196 J	0.10657 J	0.07964 J				
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)	0.91799 J	0.15944 J	1.4707 J	1.0974 J				
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)	0.36288 J	0.04288 J	0.59221 J	0.43582 J				
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)	5.7829 J	0.95802 J	17.1538 J	12.54305 J				
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)	0.01807 J	0.19892 UJ	0.04461 J	0.03191 J				
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)	1.1073 J	0.17878 J	3.1332 J	2.29211 J				
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)	0.00601 J	0.19892 UJ	0.01253 J	0.00896 J				
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)	0.13975 J	0.0187 J	0.26174 J	0.19255 J				
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)	4.17982 J	0.47644 J	7.07063 J	5.19334 J				
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)	0.11144 J	0.01405 J	0.29884 J	0.21776 J				
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)	0.70041 J	0.13483 J	1.84146 J	1.3556 J				
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)	0.10099 J	0.02259 J	0.31616 J	0.23258 J				
2,3,3',4',5,5',6-Heptachlorobiphenyl (193)				0.09947				
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)	0.93001 J	0.15402 J	2.49748 J	1.83032 J				
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)	0.27113 J	0.07631 J	0.73453 J	0.54714 J				
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)	0.45669 J	0.0782 J	1.28067 J	0.93834 J				
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)	0.03396 J	0.00429 J	0.08511 J	0.0621 J				
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)	3.09062 J	0.40264 J	6.09324 J	4.47319 J				
2,2',3,3',4,5,5',6'-Octachlorobiphenyl (199)				0.03979				
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)	0.0242 J	0.19892 UJ	0.02742 J	0.01961 J				
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)	0.14383 J	0.01801 J	0.33882 J	0.24749 J				
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)	1.5013 J	0.12817 J	3.32645 J	2.41594 J				
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)	0.04892 J	0.00605 J	0.12496 J	0.09111 J				
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	3.17727 J	0.36212 J	6.83806 J	4.99444 J				
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	0.24768 J	0.03885 J	0.6395 J	0.4685 J				

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4004-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-F 6/21/2001	LPX-LB-4005-0000-01-O 6/21/2001	LPX-LB-4005-0000-01-W 6/21/2001	LPX-LB-4006-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-F 6/21/2001	LPX-LB-4007-0000-01-O 6/21/2001	LPX-LB-4007-0000-01-W 6/21/2001
Decachlorobiphenyl (209)	1.3345 J	0.12586 J	3.15144 J	2.29009 J				
PCB Congeners, Total	290.18285 J	46.48363 J	652.9949 J	480.32834 J				
Toxicity Equivalency (PCB)	0.00988	0.0039	0.0231	0.0177				
Other (%)								
Lipid_percent	3.09	0.181	1.05		2.48	1.01	4.15	

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

Samples ending with:
F - Fillet
O - Offal
W - whole body

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4008-0000-01-F 6/21/2001	LPX-LB-4008-0000-01-O 6/21/2001	LPX-LB-4008-0000-01-W 6/21/2001	LPX-LB-4009-0000-01-F 6/26/2001	LPX-LB-4009-0000-01-W 6/26/2001	LPX-LB-4010-0000-01-F 6/26/2001	LPX-LB-4010-0000-01-O 6/26/2001	LPX-LB-4010-0000-01-W 6/26/2001
Semivolatile Organics (ug/Kg)								
1,1'-Biphenyl	0.34 J	0.27 J	0.29 J	0.22 J	0.53 J	0.16 J	0.41 J	0.32 J
2-Methylnaphthalene	0.73	2.46	1.84	1.67	4.99	0.94	2.85	2.21
Acenaphthene	0.63 U	0.63 J	0.4 J	0.36 J	1.46	0.22 J	1.29	0.93
Acenaphthylene	0.63 U	0.28 J	0.18 J	0.15 J	0.73	0.11 J	0.42 J	0.31 J
Anthracene	0.12 J	0.52 J	0.38 J	0.19 J	1.25	0.11 J	0.57 J	0.41 J
Benzo(a)anthracene	0.63 U	0.11 J	0.07 J	0.84 U	0.34 J	0.59 U	0.22 J	0.14 J
Benzo(a)pyrene	0.63 U	0.68 U	0.66 U	0.84 U	0.26 J	0.59 U	0.21 J	0.14 J
Benzo(b)fluoranthene	0.63 U	0.68 U	0.66 U	0.84 U	0.47 J	0.59 U	0.27 J	0.18 J
Benzo(g,h,i)perylene	0.63 U	0.68 U	0.66 U	0.84 U	0.54	0.59 U	0.79 U	0.72 U
Benzo(k)fluoranthene	0.63 U	0.68 U	0.66 U	0.84 U	0.4 J	0.59 U	0.27 J	0.18 J
Chrysene	0.11 J	0.34 J	0.26 J	0.18 J	1.26	0.09 J	0.65 J	0.46 J
Dibenzo(a,h)anthracene	0.63 U	0.68 U	0.66 U	0.84 U	0.83 U	0.59 U	0.79 U	0.72 U
Dibenzofuran	0.23 J	0.63 J	0.49 J	0.38 J	1.18	0.34 J	0.93	0.73
Fluoranthene	0.47 J	1.92	1.4	0.58 J	2.76	0.36 J	1.99	1.44
Fluorene	0.22 J	1.13	0.8	0.53 J	3.82	0.37 J	1.6	1.18
Indeno(1,2,3-cd)pyrene	0.1 J	0.14 J	0.13 J	0.18 J	0.49 J	0.12 J	0.29 J	0.24 J
Naphthalene	1.07	1.88	1.59	1.94	4.66	1.36	2.6	2.18
Phenanthrene	0.79	3.21	2.34	1.33	5.65	0.81	3.11	2.33
Pyrene	0.63 U	0.88	0.56	0.84 U	1.19	0.59 U	3.95	2.61
Total PAH	4.17 J	14.41 J	10.74 J	7.7 J	31.98 J	4.99 J	21.64 J	16 J
Pesticides/PCBs (ug/Kg)								
4,4'-DDD	0.78 J	6.49 J	4.44	2.5 J	4.94	1.06 J	6.48 J	4.65
4,4'-DDE	5.51 J	48.96 J	33.39 D	8.65 J	20.45	7.43 J	62.29 J	43.73 D
4,4'-DDT	0.24 J	2.47 J	1.67	0.68 J	3.34	0.17 J	4.01 J	2.71
Aldrin	0.5 UJ	R	0.53 U	0.67 UJ	0.66 U	R	R	0.58 U
alpha-BHC	0.5 UJ	R	0.53 U	0.67 UJ	0.67 U	R	R	0.58 U
alpha-Chlordane	1.07 J	5.46 J	3.89	3.63 J	10.1	1.45 J	6.86 J	5.03
Aroclor, Total	140.3 J	1687.09 J	1132.69	180.78 J	442.37	138.87 J	1894.78 J	1300.63
Aroclor-1016	6.27 UJ	R	6.59 U	8.39 UJ	8.3 U	R	R	7.24 U
Aroclor-1221	6.27 UJ	R	6.59 U	8.39 UJ	8.3 U	R	R	7.24 U
Aroclor-1232	6.27 UJ	R	6.59 U	8.39 UJ	8.3 U	R	R	7.24 U
Aroclor-1242	6.27 UJ	R	6.59 U	8.39 UJ	8.3 U	R	R	7.24 U
Aroclor-1248	6.27 UJ	R	6.59 U	8.39 UJ	8.3 U	R	R	7.24 U
Aroclor-1254	133.76 J	1651.06 J	1107.23 D	173.55 J	430.63	135.86 J	1878.52 J	1288.86 D
Aroclor-1260	6.27 UJ	R	6.59 U	8.39 UJ	8.3 U	R	R	7.24 U
Aroclor-1268	6.54 J	36.03 J	25.46	7.23 J	11.73	3 J	16.26 J	11.77
beta-BHC	0.5 UJ	R	0.53 U	0.67 UJ	0.67 U	R	R	0.58 U

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4008-0000-01-F 6/21/2001	LPX-LB-4008-0000-01-O 6/21/2001	LPX-LB-4008-0000-01-W 6/21/2001	LPX-LB-4009-0000-01-F 6/26/2001	LPX-LB-4009-0000-01-W 6/26/2001	LPX-LB-4010-0000-01-F 6/26/2001	LPX-LB-4010-0000-01-O 6/26/2001	LPX-LB-4010-0000-01-W 6/26/2001
delta-BHC	0.5 UJ	R	0.53 U	0.67 UJ	0.67 U	R	R	0.58 U
Dieldrin	0.2 J	1.63 J	1.12	0.62 J	2.61	0.26 J	1.55 J	1.11
Endosulfan I	0.5 UJ	R	0.53 U	0.67 UJ	0.67 U	R	R	0.58 U
Endosulfan II	0.5 UJ	R	0.53 U	0.67 UJ	0.66 U	R	R	0.58 U
Endosulfan Sulfate	0.5 UJ	R	0.53 U	0.67 UJ	0.66 U	R	R	0.58 U
Endrin	0.5 UJ	R	0.53 U	0.67 UJ	0.67 U	R	R	0.58 U
Endrin Aldehyde	0.5 UJ	R	0.53 U	0.67 UJ	0.67 U	R	R	0.58 U
Endrin Ketone	0.5 UJ	R	0.53 U	0.67 UJ	0.67 U	R	R	0.58 U
gamma-BHC	0.5 UJ	R	0.53 U	0.67 UJ	0.66 U	R	R	0.58 U
gamma-Chlordane	0.31 J	2.01 J	1.4	1.21 J	4.15	0.45 J	2.8 J	2
Heptachlor	0.5 UJ	R	0.53 U	0.67 UJ	0.66 U	R	R	0.58 U
Heptachlor Epoxide	0.5 UJ	R	0.53 U	0.67 UJ	0.66 U	R	R	0.58 U
Methoxychlor	0.5 UJ	R	0.53 U	0.67 UJ	0.67 U	R	R	0.58 U
Technical Chlordane	16.95 J	104 J	72.8	41.82 J	136.01	23.87 J	150.62 J	107.73
Toxaphene	12.54 UJ	R	13.19 U	16.78 UJ	16.59 U	R	R	14.48 U
Inorganics (mg/Kg)								
Aluminum	5.34	8.23	7.19	1.12 U	2.98	1.12 U	2.54	1.68
Antimony	0.00194 J	0.034 U	0.000695 U	0.034 U	0.034 U	0.034 U	0.034 U	0.034 U
Arsenic	0.066 U	0.0929 U	0.0833 U	0.0392 U	0.0628 U	0.034 U	0.0383 U	0.0368 U
Barium	0.0564	1.05	0.694	0.018 U	0.555 J	0.212 J	2.17	1.51
Beryllium	0.004 U	0.0072	0.00462	0.004 U	0.00125 J	0.004 U	0.00443	0.00293
Cadmium	0.2 U	0.00823 J	0.00528 J	0.2 U	0.004 J	0.00304 J	0.0177 J	0.0127 J
Chromium	0.269 U	0.193 J	0.124 J	0.035 J	0.123 J	0.0659 J	0.198 J	0.153 J
Cobalt	0.014 J	0.0511 J	0.0378 J	0.0045 J	0.00163 U	0.0134 J	0.0392 J	0.0305 J
Copper	1.71 J	0.653 J	1.03 J	0.265	0.741	0.306	1.42	1.04
Iron	3.05	31.5	21.3	2.99 J	14.7 J	3.22 J	25.5 J	18 J
Lead	0.00611 J	0.195 J	0.127 J	0.022 U	0.0356 J	0.0144 J	0.0795 J	0.0575 J
Manganese	0.195 J	2.24	1.51	0.165 J	4.14 J	0.471 J	5.63	3.88
Mercury	0.398	0.304	0.338	0.111 J	0.0916 J	0.235 J	0.158 J	0.184 J
Mercury (methyl)	0.41	0.222 J	0.289 J	0.116	0.0917	0.235	0.186	0.203
Molybdenum	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
Nickel	0.0408 J	0.0778 J	0.0645 J	0.32 U	0.0386 J	0.0265 J	0.0841 J	0.0646 J
Selenium	0.448 U	0.448 U	0.448 U	0.131 J	0.201 J	0.13 J	0.171 J	0.157 J
Silver	0.06 U	0.06 U	0.06 U	0.00768 J	0.0214 J	0.0184 J	0.0219 J	0.0207 J
Thallium	0.00294 J	0.00435 J	0.00384 J	0.0032 J	0.00508 J	0.00218 J	0.00466 J	0.00382 J
Vanadium	0.179 U	0.0692 J	0.0444 J	0.179 UJ	0.0207 J	0.179 UJ	0.0346 J	0.0229 J
Zinc	6.68 J	18.4	14.2	6.29	15.3	7.87	15	12.6

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4008-0000-01-F 6/21/2001	LPX-LB-4008-0000-01-O 6/21/2001	LPX-LB-4008-0000-01-W 6/21/2001	LPX-LB-4009-0000-01-F 6/26/2001	LPX-LB-4009-0000-01-W 6/26/2001	LPX-LB-4010-0000-01-F 6/26/2001	LPX-LB-4010-0000-01-O 6/26/2001	LPX-LB-4010-0000-01-W 6/26/2001
Dioxins/Furans (ug/Kg)								
HCX	0.00649 J	0.01964 J	0.01493 J	0.01994 UJ	0.01341 J	0.01997 UJ	0.02404 J	0.01591 J
TCX	R	R	R	R	R	R	R	R
2,3,7,8-TCDD	0.02982 J	0.12646 J	0.09182 J	0.03111 J	0.2888 J	0.01414 J	0.20569 J	0.14088 J
1,2,3,7,8-PeCDD	0.00018 UJ	0.00032 J	0.00021 J	0.00015 UJ	0.00044 J	0.00022 UJ	0.00037 J	0.00024 J
1,2,3,4,7,8-HxCDD	0.00016 UJ	0.00029 UJ	0.00024 UJ	0.00017 UJ	0.00006 J	0.00022 UJ	0.00024 UJ	0.00023 UJ
1,2,3,6,7,8-HxCDD	0.00017 UJ	0.00021 J	0.00013 J	0.00017 UJ	0.00028 J	0.00024 UJ	0.00022 J	0.00015 J
1,2,3,7,8,9-HxCDD	0.00016 UJ	0.00027 UJ	0.00023 UJ	0.00016 UJ	0.00007 J	0.00022 UJ	0.00024 UJ	0.00023 UJ
1,2,3,4,6,7,8-HpCDD	0.00022 UJ	0.00031 J	0.0002 J	0.00027 UJ	0.00033 J	0.0002 UJ	0.00028 UJ	0.00025 UJ
OCDD	0.0003 UJ	0.00059 UJ	0.00049 UJ	0.00026 UJ	0.00068 UJ	0.00023 UJ	0.00094 UJ	0.0007 UJ
2,3,7,8-TCDF	0.00004 UJ	0.0003 J	0.00019 J	0.00004 UJ	0.0003 J	0.00012 UJ	0.00014 J	0.00009 J
1,2,3,7,8-PeCDF	0.00016 UJ	0.00018 UJ	0.00017 UJ	0.00018 UJ	0.00015 UJ	0.00018 UJ	0.00021 UJ	0.0002 UJ
2,3,4,7,8-PeCDF	0.00016 UJ	0.00018 UJ	0.00017 UJ	0.00017 UJ	0.00016 UJ	0.00018 UJ	0.00021 UJ	0.0002 UJ
1,2,3,4,7,8-HxCDF	0.00006 UJ	0.00008 UJ	0.00007 UJ	0.0001 UJ	0.00013 UJ	0.00007 UJ	0.00009 UJ	0.00008 UJ
1,2,3,6,7,8-HxCDF	0.00006 UJ	0.00008 UJ	0.00007 UJ	0.0001 UJ	0.00011 UJ	0.00012 UJ	0.00004 UJ	0.00007 UJ
2,3,4,6,7,8-HxCDF	0.00007 UJ	0.0002 UJ	0.00015 UJ	0.0001 UJ	0.00016 UJ	0.00012 UJ	0.00023 UJ	0.00019 UJ
1,2,3,7,8,9-HxCDF	0.00008 UJ	0.00022 UJ	0.00017 UJ	0.00011 UJ	0.00018 UJ	0.00014 UJ	0.00026 UJ	0.00022 UJ
1,2,3,4,6,7,8-HpCDF	0.00011 UJ	0.00045 UJ	0.00033 UJ	0.00016 UJ	0.00012 UJ	0.00011 UJ	0.00009 UJ	0.0001 UJ
1,2,3,4,7,8,9-HpCDF	0.00013 UJ	0.0005 UJ	0.00037 UJ	0.00019 UJ	0.00036 UJ	0.00014 UJ	0.00046 UJ	0.00035 UJ
OCDF	0.0002 UJ	0.00022 UJ	0.00021 UJ	0.00023 UJ	0.00014 UJ	0.00024 UJ	0.00009 UJ	0.00014 UJ
Total TCDD	0.02982 J	0.12646 J	0.09182 J	0.03111 J	0.2888 J	0.01414 J	0.20569 J	0.14088 J
Total PeCDD	0.00036 UJ	0.00279 J	0.00179 J	0.00046 UJ	0.0016 J	0.00004 UJ	0.00223 J	0.00148 J
Total HxCDD	0.00016 UJ	0.00021 J	0.00013 J	0.00016 UJ	0.00041 J	0.00023 UJ	0.00027 J	0.00018 J
Total HpCDD	0.00022 UJ	0.00031 UJ	0.00028 UJ	0.00027 UJ	0.00043 UJ	0.0002 UJ	0.00028 UJ	0.00025 UJ
Total TCDF	0.00004 UJ	0.00037 J	0.00024 J	0.00004 UJ	0.00053 J	0.00012 UJ	0.00026 J	0.00017 J
Total PeCDF	0.00016 UJ	0.00014 J	0.00009 J	0.00017 UJ	0.00015 J	0.00018 UJ	0.00021 UJ	0.0002 UJ
Total HxCDF	0.00006 UJ	0.0003 UJ	0.00021 UJ	0.0001 UJ	0.0002 UJ	0.00007 UJ	0.00027 UJ	0.0002 UJ
Total HpCDF	0.00012 UJ	0.00048 UJ	0.00035 UJ	0.00018 UJ	0.00013 UJ	0.00012 UJ	0.00026 UJ	0.00021 UJ
Toxicity Equivalency (Dioxins, Furans, HCX)	0.0298	0.127	0.0921	0.0311	0.289	0.0141	0.206	0.141
PCB Congeners (ug/Kg)								
2-Monochlorobiphenyl (1)								
4-Chlorobiphenyl (3)								
2,2'-Dichlorobiphenyl (4)								
2,3-Dichlorobiphenyl (5)								
2,3'-Dichlorobiphenyl (6)								
2,4-Dichlorobiphenyl (7)								
2,4'-Dichlorobiphenyl (8)								
2,5-Dichlorobiphenyl (9)								

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4008-0000-01-F 6/21/2001	LPX-LB-4008-0000-01-O 6/21/2001	LPX-LB-4008-0000-01-W 6/21/2001	LPX-LB-4009-0000-01-F 6/26/2001	LPX-LB-4009-0000-01-W 6/26/2001	LPX-LB-4010-0000-01-F 6/26/2001	LPX-LB-4010-0000-01-O 6/26/2001	LPX-LB-4010-0000-01-W 6/26/2001
2,6-Dichlorobiphenyl (10)								
3,4-Dichlorobiphenyl (12)								
3,4'-Dichlorobiphenyl (13)								
2,2',3'-Trichlorobiphenyl (16)								
2,2',4-Trichlorobiphenyl (17)								
2,2',5-Trichlorobiphenyl (18)								
2,2',6-Trichlorobiphenyl (19)								
2,3,3'-Trichlorobiphenyl (20)								
2,3,4-Trichlorobiphenyl (21)								
2,3,4'-Trichlorobiphenyl (22)								
2,3,6-Trichlorobiphenyl (24)								
2,3',4-Trichlorobiphenyl (25)								
2,3',5-Trichlorobiphenyl (26)								
2,3',6-Trichlorobiphenyl (27)								
2,4,4'-Trichlorobiphenyl (28)								
2,4,5-Trichlorobiphenyl (29)								
2,4,6-Trichlorobiphenyl (30)								
2,4',5-Trichlorobiphenyl (31)								
2,4',6-Trichlorobiphenyl (32)								
2,3',4'-Trichlorobiphenyl (33)								
2,2',3,3'-Tetrachlorobiphenyl (40)								
2,2',3,4-Tetrachlorobiphenyl (41)								
2,2',3,4'-Tetrachlorobiphenyl (42)								
2,2',3,5-Tetrachlorobiphenyl (43)								
2,2',3,5'-Tetrachlorobiphenyl (44)								
2,2',3,6-Tetrachlorobiphenyl (45)								
2,2',3,6'-Tetrachlorobiphenyl (46)								
2,2',4,4'-Tetrachlorobiphenyl (47)								
2,2',4,5-Tetrachlorobiphenyl (48)								
2,2',4,5'-Tetrachlorobiphenyl (49)								
2,2',4,6-Tetrachlorobiphenyl (50)								
2,2',4,6'-Tetrachlorobiphenyl (51)								
2,2',5,5'-Tetrachlorobiphenyl (52)								
2,2',5,6'-Tetrachlorobiphenyl (53)								
2,3,3',4'-Tetrachlorobiphenyl (56)								
2,3,3',6-Tetrachlorobiphenyl (59)								
2,3,4,4'-Tetrachlorobiphenyl (60)								
2,3,4,5-Tetrachlorobiphenyl (61)								

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4008-0000-01-F 6/21/2001	LPX-LB-4008-0000-01-O 6/21/2001	LPX-LB-4008-0000-01-W 6/21/2001	LPX-LB-4009-0000-01-F 6/26/2001	LPX-LB-4009-0000-01-W 6/26/2001	LPX-LB-4010-0000-01-F 6/26/2001	LPX-LB-4010-0000-01-O 6/26/2001	LPX-LB-4010-0000-01-W 6/26/2001
2,3,4,6-Tetrachlorobiphenyl (62)								
2,3,4',5-Tetrachlorobiphenyl (63)								
2,3,4',6-Tetrachlorobiphenyl (64)								
2,3,5,6-Tetrachlorobiphenyl (65)								
2,3',4,4'-Tetrachlorobiphenyl (66)								
2,3',4,6-Tetrachlorobiphenyl (69)								
2,3',4',5-Tetrachlorobiphenyl (70)								
2,3',4',6-Tetrachlorobiphenyl (71)								
2,3',5',6-Tetrachlorobiphenyl (73)								
2,3',4',5-Tetrachlorobiphenyl (74)								
2,4,4',6-Tetrachlorobiphenyl (75)								
2,3',4',5-Tetrachlorobiphenyl (76)								
3,3',4,4'-Tetrachlorobiphenyl (77)								
3,4,4',5-Tetrachlorobiphenyl (81)								
2,2',3,3',4-Pentachlorobiphenyl (82)								
2,2',3,3',5-Pentachlorobiphenyl (83)								
2,2',3,3',6-Pentachlorobiphenyl (84)								
2,2',3,4,4'-Pentachlorobiphenyl (85)								
2,2',3,4,5-Pentachlorobiphenyl (86)								
2,2',3,4,5'-Pentachlorobiphenyl (87)								
2,2',3,4,6-Pentachlorobiphenyl (88)								
2,2',3,4,6'-Pentachlorobiphenyl (89)								
2,2',3,4',5-Pentachlorobiphenyl (90)								
2,2',3,4',6-Pentachlorobiphenyl (91)								
2,2',3,5,5'-Pentachlorobiphenyl (92)								
2,2',3,5,6-Pentachlorobiphenyl (93)								
2,2',3,5',6-Pentachlorobiphenyl (95)								
2,2',3,4',5'-Pentachlorobiphenyl (97)								
2,2',3,4',6'-Pentachlorobiphenyl (98)								
2,2',4,4',5-Pentachlorobiphenyl (99)								
2,2',4,4',6-Pentachlorobiphenyl (100)								
2,2',4,5,5'-Pentachlorobiphenyl (101)								
2,2',4,5,6'-Pentachlorobiphenyl (102)								
2,3,3',4,4'-Pentachlorobiphenyl (105)								
2,3,3',4,5-Pentachlorobiphenyl (106)								
2,3,3',4',5-Pentachlorobiphenyl (107)								
2,3,3',4',5'-Pentachlorobiphenyl (108)								
2,3,3',4,6-Pentachlorobiphenyl (109)								

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4008-0000-01-F 6/21/2001	LPX-LB-4008-0000-01-O 6/21/2001	LPX-LB-4008-0000-01-W 6/21/2001	LPX-LB-4009-0000-01-F 6/26/2001	LPX-LB-4009-0000-01-W 6/26/2001	LPX-LB-4010-0000-01-F 6/26/2001	LPX-LB-4010-0000-01-O 6/26/2001	LPX-LB-4010-0000-01-W 6/26/2001
2,3,3',4',6-Pentachlorobiphenyl (110)								
2,3,3',5,5'-Pentachlorobiphenyl (111)								
2,3,3',5',6-Pentachlorobiphenyl (113)								
2,3,4,4',5-Pentachlorobiphenyl (114)								
2,3,4,4',6-Pentachlorobiphenyl (115)								
2,3,4,5,6-Pentachlorobiphenyl (116)								
2,3,4',5,6-Pentachlorobiphenyl (117)								
2,3',4,4',5-Pentachlorobiphenyl (118)								
2,3',4,4',6-Pentachlorobiphenyl (119)								
2,3',4,5',6-Pentachlorobiphenyl (121)								
2,3,3',4',5'-Pentachlorobiphenyl (122)								
2,3',4,4',5'-Pentachlorobiphenyl (123)								
2,3',4',5,5'-Pentachlorobiphenyl (124)								
2,3',4',5',6-Pentachlorobiphenyl (125)								
3,3',4,4',5-Pentachlorobiphenyl (126)								
2,2',3,3',4,4'-Hexachlorobiphenyl (128)								
2,2',3,3',4,5-Hexachlorobiphenyl (129)								
2,2',3,3',4,5'-Hexachlorobiphenyl (130)								
2,2',3,3',4,6-Hexachlorobiphenyl (131)								
2,2',3,3',4,6'-Hexachlorobiphenyl (132)								
2,2',3,3',5,6-Hexachlorobiphenyl (134)								
2,2',3,3',5,6'-Hexachlorobiphenyl (135)								
2,2',3,3',6,6'-Hexachlorobiphenyl (136)								
2,2',3,4,4',5-Hexachlorobiphenyl (137)								
2,2',3,4,4',5'-Hexachlorobiphenyl (138)								
2,2',3,4,5,5'-Hexachlorobiphenyl (141)								
2,2',3,4,5,6'-Hexachlorobiphenyl (143)								
2,2',3,4,5',6-Hexachlorobiphenyl (144)								
2,2',3,4',5,5'-Hexachlorobiphenyl (146)								
2,2',3,4',5,6-Hexachlorobiphenyl (147)								
2,2',3,4',5',6-Hexachlorobiphenyl (149)								
2,2',3,5,5',6-Hexachlorobiphenyl (151)								
2,2',4,4',5,5'-Hexachlorobiphenyl (153)								
2,2',4,4',5,6'-Hexachlorobiphenyl (154)								
2,3,3',4,4',5-Hexachlorobiphenyl (156)								
2,3,3',4,4',5'-Hexachlorobiphenyl (157)								
2,3,3',4,4',6-Hexachlorobiphenyl (158)								
2,3,3',4,5,6-Hexachlorobiphenyl (160)								

US EPA ARCHIVE DOCUMENT

Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4008-0000-01-F 6/21/2001	LPX-LB-4008-0000-01-O 6/21/2001	LPX-LB-4008-0000-01-W 6/21/2001	LPX-LB-4009-0000-01-F 6/26/2001	LPX-LB-4009-0000-01-W 6/26/2001	LPX-LB-4010-0000-01-F 6/26/2001	LPX-LB-4010-0000-01-O 6/26/2001	LPX-LB-4010-0000-01-W 6/26/2001
2,3,3',4,5',6-Hexachlorobiphenyl (161)								
2,3,3',4',5,6-Hexachlorobiphenyl (163)								
2,3,3',4',5',6-Hexachlorobiphenyl (164)								
2,3,4,4',5,6-Hexachlorobiphenyl (166)								
2,3',4,4',5,5'-Hexachlorobiphenyl (167)								
2,3',4,4',5',6-Hexachlorobiphenyl (168)								
3,3',4,4',5,5'-Hexachlorobiphenyl (169)								
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)								
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)								
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)								
2,2',3,3',4,5,6-Heptachlorobiphenyl (173)								
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)								
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)								
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)								
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)								
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)								
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)								
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)								
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)								
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)								
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)								
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)								
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)								
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)								
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)								
2,3,3',4',5,5',6-Heptachlorobiphenyl (193)								
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)								
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)								
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)								
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)								
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)								
2,2',3,3',4,5,5',6'-Octachlorobiphenyl (199)								
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)								
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)								
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)								
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)								
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl								
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl								

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Table A-18
Summary Statistics and Analytical Results for Largemouth Bass - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-LB-4008-0000-01-F 6/21/2001	LPX-LB-4008-0000-01-O 6/21/2001	LPX-LB-4008-0000-01-W 6/21/2001	LPX-LB-4009-0000-01-F 6/26/2001	LPX-LB-4009-0000-01-W 6/26/2001	LPX-LB-4010-0000-01-F 6/26/2001	LPX-LB-4010-0000-01-O 6/26/2001	LPX-LB-4010-0000-01-W 6/26/2001
Decachlorobiphenyl (209)								
PCB Congeners, Total								
Toxicity Equivalency (PCB)								
Other (%)								
Lipid_percent	0.349	1.63		0.73		0.529	2.52	

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

Samples ending with:
F - Fillet
O - Offal
W - whole body

US EPA ARCHIVE DOCUMENT

Table A-19
Summary Statistics and Analytical Results for White Sucker - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	Frequency of Detection		Minimum SQL	Maximum SQL	Minimum Detect	Maximum Detect	Average	LPX-DU-062101-A-W 6/21/2001 REPLICATE	LPX-WS-4001-0000-01-W 6/21/2001	LPX-WS-4002-0000-01-W 6/21/2001
Semivolatile Organics (ug/Kg)										
1,1'-Biphenyl	10	10			0.75	1.62	1.16		0.92	1.12
2-Methylnaphthalene	10	10			2.88	5.53	4.22		2.98	3.44
Acenaphthene	10	10			2.58	5.61	4.06		3.11	5.34
Acenaphthylene	10	10			2.14	4.58	2.97		2.14	2.68
Anthracene	10	10			2.11	5.41	3.53		2.13	3.21
Benzo(a)anthracene	10	10			1.11	11.73	4.47		5.32	4.58
Benzo(a)pyrene	9	10	0.68	0.68	0.78	14.69	4.88		6.65	5.05
Benzo(b)fluoranthene	10	10			0.27	20.77	6.66		9.35	6.79
Benzo(g,h,i)perylene	8	10	0.68	0.72	1.55	11.43	3.76		6.43	4.35
Benzo(k)fluoranthene	10	10			0.28	17.39	5.89		8.39	6.05
Chrysene	10	10			1.17	23.04	8.15		9.97	8.44
Dibenzo(a,h)anthracene	10	10			0.12	2.73	0.96		1.51	1.08
Dibenzofuran	10	10			1.86	4.61	3.29		2.4	4.61
Fluoranthene	10	10			7.16	49.06	22.02		22.24	24.06
Fluorene	10	10			2.74	8.14	5.15		4.39	8.14
Indeno(1,2,3-cd)pyrene	10	10			0.18	13.47	4.34		7.27	4.81
Naphthalene	10	10			2.15	4.92	3.51		2.73	2.84
Phenanthrene	10	10			6.87	29.54	15.37		14.74	20.26
Pyrene	10	10			1.62	22.35	10.57		12.22	12.3
Total PAH	10	10			38.97	251	114.85		124.9	129.15
Pesticides/PCBs (ug/Kg)										
4,4'-DDD	10	10			13.53	66.8	38.66		51.23 J	43.98 J
4,4'-DDE	10	10			37.11	286.51	130.87		121.97 J	139.22 J
4,4'-DDT	10	10			0.31	8.47	3.74		2.48 J	5.73 J
Aldrin	0	10	0.6	0.62			0.31		0.61 UJ	0.61 UJ
alpha-BHC	0	10	0.6	0.62			0.31		0.61 UJ	0.61 UJ
alpha-Chlordane	10	10			14.14	59.56	39.63		40.02 J	48.9 J
Aroclor, Total	10	10			2803.09	7144.43	4229.49		2803.09 J	3650.37 J
Aroclor-1016	0	10	7.54	7.71			3.82		7.6 UJ	7.57 UJ
Aroclor-1221	0	10	7.54	7.71			3.82		7.6 UJ	7.57 UJ
Aroclor-1232	0	10	7.54	7.71			3.82		7.6 UJ	7.57 UJ
Aroclor-1242	0	10	7.54	7.71			3.82		7.6 UJ	7.57 UJ
Aroclor-1248	0	10	7.54	7.71			3.82		7.6 UJ	7.57 UJ
Aroclor-1254	10	10			2771.55	7099.77	4193.59		2771.55 J	3604.71 J
Aroclor-1260	0	10	7.54	7.71			3.82		7.6 UJ	7.57 UJ
Aroclor-1268	10	10			21.71	45.66	35.90		31.54 J	45.66 J
beta-BHC	0	10	0.6	0.62			0.31		0.61 UJ	0.61 UJ
delta-BHC	0	10	0.61	0.62			0.31		0.61 UJ	0.61 UJ

US EPA ARCHIVE DOCUMENT

Table A-19
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Dieldrin	10	10			1.91	9.71	5.56		1.91 J	3.67 J
Endosulfan I	0	10	0.6	0.62			0.31		0.61 UJ	0.61 UJ
Endosulfan II	0	10	0.6	0.62			0.31		0.61 UJ	0.61 UJ
Endosulfan Sulfate	0	10	0.6	0.62			0.31		0.61 UJ	0.61 UJ
Endrin	0	10	0.6	0.62			0.31		0.61 UJ	0.61 UJ
Endrin Aldehyde	0	10	0.6	0.62			0.31		0.61 UJ	0.61 UJ
Endrin Ketone	0	10	0.6	0.62			0.31		0.61 UJ	0.61 UJ
gamma-BHC	10	10			0.12	0.47	0.21		0.14 J	0.15 J
gamma-Chlordane	10	10			22.98	40.8	29.21		32.05 J	33 J
Heptachlor	0	10	0.6	0.62			0.31		0.61 UJ	0.61 UJ
Heptachlor Epoxide	10	10			0.81	2	1.36		0.87 J	2 J
Methoxychlor	0	10	0.6	0.62			0.31		0.61 UJ	0.61 UJ
Technical Chlordane	10	10			335.33	2611.85	1365.71		870.47 J	1040.7 J
Toxaphene	0	10	15.08	15.41			7.64		15.19 UJ	15.15 UJ
Inorganics (mg/Kg)										
Aluminum	10	10			1.74	117	48.6	1.42	76.5	39.9
Antimony	6	10	0.034	0.034	0.00481	0.01	0.0111	0.034 U	0.00481 J	0.00743 J
Arsenic	1	10	0.0295	0.0605	0.0715	0.0715	0.0276	0.0448 U	0.0373 U	0.0598 U
Barium	10	10			0.458	2.06	1.10	0.585	1.38	1.13
Beryllium	5	10	0.004	0.00532	0.00642	0.0137	0.00579	0.004 U	0.008	0.00642
Cadmium	10	10			0.0113	0.0322	0.0184	0.0158 J	0.018 J	0.0237 J
Chromium	8	10	0.269	0.269	0.187	0.513	0.270	0.269 U	0.3	0.189 J
Cobalt	9	10	0.0745	0.0745	0.051	0.115	0.0775	0.0968 J	0.0828 J	0.0863 J
Copper	10	10			0.551	1.17	0.840	0.523	1.02	0.786
Iron	10	10			28	174	75.4	23.4	120	61.2
Lead	10	10			0.0976	1.01	0.428	0.149 J	0.61 J	0.434 J
Manganese	10	10			3.96	10.7	7.49	7.25	6.55	9.72
Mercury	10	10			0.0648	0.157	0.0984	0.111	0.108	0.157
Mercury (methyl)	10	10			0.0642	0.139	0.0927	0.0975	0.111	0.139
Molybdenum	9	10	0.0394	0.0394	0.0252	0.0642	0.0363	0.0319 J	0.0358 J	0.0459 J
Nickel	10	10			0.0963	0.252	0.154	0.157 J	0.179 J	0.138 J
Selenium	9	10	0.306	0.306	0.199	0.245	0.214	0.205 J	0.22 J	0.225 J
Silver	4	10	0.06	0.06	0.00283	0.0167	0.0222	0.06 U	0.00931 J	0.06 U
Thallium	0	10	0.022	0.022			0.0110	0.022 U	0.022 U	0.022 U
Vanadium	8	10	0.179	0.179	0.0726	0.254	0.127	0.0978 J	0.167 J	0.13 J
Zinc	10	10			17.6	24.9	20.6	18.8	20.9	24.9
Dioxins/Furans (ug/Kg)										
HCX	9	10	0.01994	0.01994	0.02494	0.0814	0.05476		0.02494 J	0.0263 J
TCX	0	9	0.05	0.1			0.03333		0.05 UJ	0.05 UJ

US EPA ARCHIVE DOCUMENT

Table A-19
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2,3,7,8-TCDD	10	10			0.21676	1.36549	0.57799		0.21676 J	0.25338 J
1,2,3,7,8-PeCDD	5	10	0.0005	0.00066	0.00077	0.00169	0.00079		0.00165 J	0.00132 J
1,2,3,4,7,8-HxCDD	6	10	0.00027	0.00064	0.00023	0.00044	0.00027		0.00028 UJ	0.00023 J
1,2,3,6,7,8-HxCDD	7	10	0.00029	0.00048	0.00037	0.00099	0.00050		0.00029 UJ	0.00036 UJ
1,2,3,7,8,9-HxCDD	4	10	0.00027	0.0006	0.00021	0.00041	0.00023		0.00027 UJ	0.00033 UJ
1,2,3,4,6,7,8-HpCDD	9	10	0.00136	0.00136	0.00079	0.00347	0.00185		0.00138 J	0.00143 J
OCDD	3	10	0.00181	0.00856	0.01184	0.0243	0.00731		0.00758 UJ	0.00658 UJ
2,3,7,8-TCDF	10	10			0.00211	0.00809	0.00370		0.00239 J#	0.00223 J#
1,2,3,7,8-PeCDF	6	10	0.00034	0.00062	0.00016	0.00038	0.00023		0.00034 UJ	0.00016 J
2,3,4,7,8-PeCDF	7	10	0.00031	0.00067	0.0003	0.00128	0.00051		0.00031 UJ	0.0003 J
1,2,3,4,7,8-HxCDF	1	10	0.0001	0.00058	0.00017	0.00017	0.00013		0.00015 UJ	0.0001 UJ
1,2,3,6,7,8-HxCDF	1	10	0.00015	0.0006	0.0001	0.0001	0.00014		0.00015 UJ	0.00026 UJ
2,3,4,6,7,8-HxCDF	5	10	0.00014	0.00065	0.00009	0.00021	0.00015		0.00016 UJ	0.00028 UJ
1,2,3,7,8,9-HxCDF	1	10	0.00012	0.00071	0.00012	0.00012	0.00015		0.00017 UJ	0.0003 UJ
1,2,3,4,6,7,8-HpCDF	3	10	0.00028	0.00064	0.00099	0.00114	0.00045		0.00033 UJ	0.00036 UJ
1,2,3,4,7,8,9-HpCDF	0	10	0.00017	0.0009			0.00018		0.00027 UJ	0.00025 UJ
OCDF	0	10	0.0002	0.0022			0.00047		0.0007 UJ	0.0006 UJ
Total TCDD	10	10			0.21676	1.36549	0.57799		0.21676 J	0.25338 J
Total PeCDD	6	10	0.0005	0.0007	0.00077	0.00428	0.00121		0.00165 J	0.00144 J
Total HxCDD	3	10	0.0001	0.00178	0.00048	0.00166	0.00062		0.0001 UJ	0.00049 UJ
Total HpCDD	7	10	0.00079	0.0019	0.00141	0.00636	0.00277		0.00237 J	0.00223 J
Total TCDF	10	10			0.00086	0.00876	0.00263		0.00086 J	0.00167 J
Total PeCDF	10	10			0.0003	0.00303	0.00138		0.0003 J	0.00132 J
Total HxCDF	2	10	0.00028	0.0018	0.00065	0.00183	0.00067		0.00028 UJ	0.00032 UJ
Total HpCDF	1	10	0.00044	0.00267	0.00199	0.00199	0.00077		0.00104 UJ	0.00077 UJ
Toxicity Equivalency (Dioxins, Furans, HCX)	10	10			0.219	1.37	0.580		0.219	0.255
PCB Congeners (ug/Kg)										
2-Monochlorobiphenyl (1)	3	3			0.07312	0.10098	0.08971			
4-Chlorobiphenyl (3)	1	3	0.01517	0.01588	0.06119	0.06119	0.02557			
2,2'-Dichlorobiphenyl (4)	3	3			0.52967	0.65812	0.58357			
2,3-Dichlorobiphenyl (5)	3	3			0.02128	0.02453	0.02262			
2,3'-Dichlorobiphenyl (6)	3	3			0.28407	0.32179	0.30745			
2,4-Dichlorobiphenyl (7)	3	3			0.04439	0.04623	0.04501			
2,4'-Dichlorobiphenyl (8)	3	3			0.95942	1.16279	1.06372			
2,5-Dichlorobiphenyl (9)	3	3			0.10089	0.11506	0.10660			
2,6-Dichlorobiphenyl (10)	2	3	0.00995	0.00995	0.04809	0.05547	0.03618			
3,4-Dichlorobiphenyl (12)	1	3	0.01991	0.01996	0.0136	0.0136	0.01118			
2,2',3'-Trichlorobiphenyl (16)	3	3			1.1837	1.77308	1.53893			
2,2',4-Trichlorobiphenyl (17)	3	3			1.76036	2.3594	2.09753			

US EPA ARCHIVE DOCUMENT

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2,2',5-Trichlorobiphenyl (18)	3	3			2.37212	3.31766	2.97069			
2,2',6-Trichlorobiphenyl (19)	3	3			0.43454	0.50026	0.46599			
2,3,3'-Trichlorobiphenyl (20)	3	3			12.1426	20.93972	16.56460			
2,3,4'-Trichlorobiphenyl (22)	3	3			2.0035	2.64631	2.32705			
2,3,6-Trichlorobiphenyl (24)	3	3			0.36704	0.53652	0.46106			
2,3',4-Trichlorobiphenyl (25)	3	3			0.13643	0.21729	0.17648			
2,3',5-Trichlorobiphenyl (26)	3	3			0.69486	1.08452	0.93708			
2,4',5-Trichlorobiphenyl (31)	3	3			3.99927	4.50948	4.33348			
2,4',6-Trichlorobiphenyl (32)	3	3			1.08301	1.93656	1.56414			
2,2',3,3'-Tetrachlorobiphenyl (40)	3	3			6.34008	12.36714	9.35291			
2,2',3,4'-Tetrachlorobiphenyl (42)	3	3			5.70407	8.18426	6.64659			
2,2',3,5-Tetrachlorobiphenyl (43)	3	3			12.96165	18.68031	16.66496			
2,2',3,5'-Tetrachlorobiphenyl (44)	3	3			7.06521	31.08492	21.47833			
2,2',3,6-Tetrachlorobiphenyl (45)	3	3			1.94652	2.70416	2.31636			
2,2',3,6'-Tetrachlorobiphenyl (46)	3	3			0.65629	0.86487	0.74436			
2,2',4,5-Tetrachlorobiphenyl (48)	3	3			2.11028	3.04497	2.56907			
2,2',4,5'-Tetrachlorobiphenyl (49)	3	3			14.81116	23.84478	20.11997			
2,2',4,6-Tetrachlorobiphenyl (50)	3	3			1.58856	2.86022	2.25846			
2,3,3',4'-Tetrachlorobiphenyl (56)	3	3			4.9995	6.97816	5.79207			
2,3,3',6-Tetrachlorobiphenyl (59)	3	3			2.14002	15.04476	6.52630			
2,3,4,4'-Tetrachlorobiphenyl (60)	3	3			3.1876	4.23045	3.53604			
2,3,4,5-Tetrachlorobiphenyl (61)	3	3			32.14628	44.10044	38.03096			
2,3,4',5-Tetrachlorobiphenyl (63)	3	3			0.8928	1.22387	1.09310			
2,3,4',6-Tetrachlorobiphenyl (64)	3	3			10.04053	13.13471	11.22687			
2,3',4,4'-Tetrachlorobiphenyl (66)	3	3			27.56763	52.90614	41.11566			
3,3',4,4'-Tetrachlorobiphenyl (77)	3	3			0.59637	0.81957	0.68805			
3,4,4',5-Tetrachlorobiphenyl (81)	1	3	0.09953	0.09978	1.80606	1.80606	0.63524			
2,2',3,3',4-Pentachlorobiphenyl (82)	3	3			6.7802	12.03038	9.07881			
2,2',3,3',5-Pentachlorobiphenyl (83)	3	3			51.07994	62.33564	58.39309			
2,2',3,3',6-Pentachlorobiphenyl (84)	3	3			12.07974	18.11699	14.14409			
2,2',3,4,4'-Pentachlorobiphenyl (85)	3	3			6.87232	25.92432	17.56256			
2,2',3,4,5-Pentachlorobiphenyl (86)	3	3			55.97736	86.31006	68.86990			
2,2',3,4,6-Pentachlorobiphenyl (88)	3	3			9.1997	14.95588	11.72281			
2,2',3,4,6'-Pentachlorobiphenyl (89)	3	3			0.45716	0.71252	0.54969			
2,2',3,4',5-Pentachlorobiphenyl (90)	3	3			70.20954	100.02849	85.77761			
2,2',3,5,5'-Pentachlorobiphenyl (92)	3	3			10.01659	13.12733	11.68759			
2,2',3,5,6-Pentachlorobiphenyl (93)	3	3			36.3734	58.54335	45.95168			
2,3,3',4,4'-Pentachlorobiphenyl (105)	3	3			15.78211	27.14543	22.15028			
2,3,3',4,5-Pentachlorobiphenyl (106)	3	3			10.98138	37.12125	20.28156			

US EPA ARCHIVE DOCUMENT

Table A-19
Summary Statistics and Analytical Results for White Sucker - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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2,3,3',4',5'-Pentachlorobiphenyl (108)	3	3			2.21902	3.53374	2.71537			
2,3,3',4',6-Pentachlorobiphenyl (110)	3	3			54.42027	144.53526	99.01306			
2,3,4,4',5-Pentachlorobiphenyl (114)	3	3			1.32961	2.27399	1.69946			
2,3',4,4',5-Pentachlorobiphenyl (118)	3	3			74.09379	126.82654	107.16193			
3,3',4,4',5-Pentachlorobiphenyl (126)	3	3			0.09952	0.25238	0.19646			
2,2',3,3',4,4'-Hexachlorobiphenyl (128)	3	3			16.11036	38.1667	27.27977			
2,2',3,3',4,5-Hexachlorobiphenyl (129)	3	3			96.47376	212.03484	164.18364			
2,2',3,3',4,5'-Hexachlorobiphenyl (130)	3	3			5.57121	13.02348	9.41010			
2,2',3,3',4,6-Hexachlorobiphenyl (131)	3	3			1.05748	2.09394	1.72134			
2,2',3,3',4,6'-Hexachlorobiphenyl (132)	3	3			23.07429	54.41169	37.76032			
2,2',3,3',5,6-Hexachlorobiphenyl (134)	3	3			2.37958	7.10846	4.45218			
2,2',3,3',5,6'-Hexachlorobiphenyl (135)	3	3			10.05705	19.09956	14.07747			
2,2',3,3',6,6'-Hexachlorobiphenyl (136)	3	3			3.45942	8.70498	6.10931			
2,2',3,4,4',5-Hexachlorobiphenyl (137)	3	3			9.77952	20.44934	15.99045			
2,2',3,4,5,5'-Hexachlorobiphenyl (141)	3	3			7.91512	16.47617	12.75060			
2,2',3,4,5',6-Hexachlorobiphenyl (144)	3	3			1.52675	3.31056	2.64590			
2,2',3,4',5,5'-Hexachlorobiphenyl (146)	3	3			9.57914	15.95748	12.90767			
2,2',3,4',5,6-Hexachlorobiphenyl (147)	3	3			44.3865	101.43014	75.91913			
2,2',4,4',5,5'-Hexachlorobiphenyl (153)	3	3			62.651	100.6528	82.55883			
2,3,3',4,4',5-Hexachlorobiphenyl (156)	3	3			7.76356	13.48578	11.34792			
2,3,3',4,4',6-Hexachlorobiphenyl (158)	3	3			8.73738	16.37627	13.66986			
2,3',4,4',5,5'-Hexachlorobiphenyl (167)	3	3			3.25965	6.10057	4.92827			
3,3',4,4',5,5'-Hexachlorobiphenyl (169)	1	3	0.09953	0.09978	0.13813	0.13813	0.07926			
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)	3	3			9.53936	27.40167	18.67875			
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)	3	3			2.74958	7.76388	5.48201			
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)	3	3			1.49735	3.00058	2.40357			
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)	3	3			3.85943	12.58246	7.99166			
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)	3	3			0.21956	0.4928	0.39184			
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)	3	3			0.48481	1.78914	1.22949			
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)	3	3			3.78289	11.79837	7.68811			
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)	3	3			1.14405	2.88723	2.23997			
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)	3	3			14.87992	27.74674	22.73489			
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)	1	3	0.19906	0.19956	0.09877	0.09877	0.09936			
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)	3	3			3.4802	6.56204	5.48787			
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)	3	3			0.01309	0.03495	0.02625			
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)	3	3			0.46831	1.11325	0.86141			
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)	3	3			9.5184	17.83585	14.62392			
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)	3	3			0.25369	0.48418	0.40465			
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)	3	3			1.92367	3.91034	3.05658			

US EPA ARCHIVE DOCUMENT

Table A-19
Summary Statistics and Analytical Results for White Sucker - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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2,3,3',4,4',5',6-Heptachlorobiphenyl (191)	3	3			0.30994	0.61708	0.50451			
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)	3	3			2.23061	4.48987	3.47600			
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)	3	3			0.66437	1.93784	1.35520			
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)	3	3			1.38958	2.71753	2.09199			
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)	3	3			0.09168	0.147	0.12654			
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)	3	3			8.31008	16.57656	13.18785			
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)	3	3			0.18685	0.67054	0.42720			
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)	3	3			0.4897	1.01681	0.82911			
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)	3	3			4.16882	5.90437	5.22599			
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)	3	3			0.10931	0.22639	0.17657			
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	3	3			9.05943	15.84419	13.52015			
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl	3	3			0.82561	1.32167	1.14143			
Decachlorobiphenyl (209)	3	3			4.77757	9.67813	7.90898			
PCB Congeners, Total	3	3			1023.47631	1791.22665	1444.49744			
Toxicity Equivalency (PCB)	3	3			0.0237	0.0503	0.0398			
Other (%)										
Lipid_percent	10	10			5.36	12.1	7.39		5.71	5.57

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

Samples ending with:
W - whole body

US EPA ARCHIVE DOCUMENT

Table A-19
Summary Statistics and Analytical Results for White Sucker - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-WS-4003-0000-01-W 6/21/2001	LPX-WS-4004-0000-01-W 6/21/2001	LPX-WS-4005-0000-01-W 6/21/2001	LPX-WS-4006-0000-01-W 6/21/2001	LPX-WS-4007-0000-01-W 6/21/2001	LPX-WS-4008-0000-01-W 6/21/2001	LPX-WS-4009-0000-01-W 6/21/2001	LPX-WS-4010-0000-01-W 6/21/2001
Semivolatile Organics (ug/Kg)								
1,1'-Biphenyl	0.75	1.05	1.62	1.3	1.49	1.27	1.31	0.81
2-Methylnaphthalene	2.88	3.6	5.41	5.14	5.53	5.49	4.68	3
Acenaphthene	2.58	3.25	5.61	4.3	4.56	4.01	5.23	2.62
Acenaphthylene	2.32	2.34	4.58	3.02	4.31	2.7	3.37	2.21
Anthracene	2.11	2.43	5.34	3.69	5.41	3.65	4.69	2.65
Benzo(a)anthracene	1.11	1.97	1.11	4.56	4.62	6.89	11.73	2.85
Benzo(a)pyrene	0.78	1.77	0.68 U	4.33	4.57	8.03	14.69	2.55
Benzo(b)fluoranthene	0.84	2.17	0.27 J	5.97	6.15	11.2	20.77	3.12
Benzo(g,h,i)perylene	0.72 U	1.55	0.68 U	3.05	2.79	5.66	11.43	1.67
Benzo(k)fluoranthene	0.81	1.92	0.28 J	5.44	5.59	10.23	17.39	2.81
Chrysene	1.41	3.06	1.17	7.8	8.4	13.37	23.04	4.83
Dibenzo(a,h)anthracene	0.3 J	0.46 J	0.12 J	0.83	0.73	1.41	2.73	0.46 J
Dibenzofuran	1.86	2.43	4.57	3.52	3.84	3.33	4.38	1.98
Fluoranthene	7.16	13.06	10.21	23.19	25.19	31.7	49.06	14.29
Fluorene	2.74	3.26	5.66	5.21	6.03	5.5	7.27	3.31
Indeno(1,2,3-cd)pyrene	0.68	1.52	0.18 J	3.57	3.27	6.74	13.47	1.88
Naphthalene	2.15	3.48	4.92	4.41	4.44	3.85	3.86	2.38
Phenanthrene	6.87	10.64	11.94	16.26	15.58	18.8	29.54	9.04
Pyrene	1.62	6.06	3.57	10.1	11.49	18.45	22.35	7.54
Total PAH	38.97	66.02	66.55	115.69	123.99	162.26	251	70
Pesticides/PCBs (ug/Kg)								
4,4'-DDD	36.78 J	48.68 J	66.8 J	19.84 J	54.29 J	37.86 J	13.6 J	13.53 J
4,4'-DDE	100.94 J	174.73 J	286.51 J	96.65 J	158.1 J	137.5 J	37.11 J	55.96 J
4,4'-DDT	6.69 J	4.88 J	8.47 J	2.4 J	3.57 J	1.39 J	0.31 J	1.51 J
Aldrin	0.62 UJ	0.61 UJ	0.62 UJ	0.61 UJ	0.61 UJ	0.62 UJ	0.62 UJ	0.6 UJ
alpha-BHC	0.62 UJ	0.61 UJ	0.62 UJ	0.61 UJ	0.62 UJ	0.62 UJ	0.62 UJ	0.6 UJ
alpha-Chlordane	51.58 J	40.29 J	59.56 J	37.86 J	42.67 J	30.54 J	30.74 J	14.14 J
Aroclor, Total	3703.16 J	4730.56 J	7144.43 J	3692.28 J	6070.25 J	4461.91 J	3055.9 J	2982.92 J
Aroclor-1016	7.68 UJ	7.61 UJ	7.69 UJ	7.61 UJ	7.67 UJ	7.68 UJ	7.71 UJ	7.54 UJ
Aroclor-1221	7.68 UJ	7.61 UJ	7.69 UJ	7.61 UJ	7.67 UJ	7.68 UJ	7.71 UJ	7.54 UJ
Aroclor-1232	7.68 UJ	7.61 UJ	7.69 UJ	7.61 UJ	7.67 UJ	7.68 UJ	7.71 UJ	7.54 UJ
Aroclor-1242	7.68 UJ	7.61 UJ	7.69 UJ	7.61 UJ	7.67 UJ	7.68 UJ	7.71 UJ	7.54 UJ
Aroclor-1248	7.68 UJ	7.61 UJ	7.69 UJ	7.61 UJ	7.67 UJ	7.68 UJ	7.71 UJ	7.54 UJ
Aroclor-1254	3661.64 J	4688.09 J	7099.77 J	3663.02 J	6024.9 J	4427.1 J	3033.88 J	2961.22 J
Aroclor-1260	7.68 UJ	7.61 UJ	7.69 UJ	7.61 UJ	7.67 UJ	7.68 UJ	7.71 UJ	7.54 UJ
Aroclor-1268	41.52 J	42.48 J	44.66 J	29.26 J	45.35 J	34.8 J	22.02 J	21.71 J
beta-BHC	0.62 UJ	0.61 UJ	0.62 UJ	0.61 UJ	0.62 UJ	0.62 UJ	0.62 UJ	0.6 UJ
delta-BHC	0.62 UJ	0.61 UJ	0.62 UJ	0.61 UJ	0.62 UJ	0.62 UJ	0.62 UJ	0.61 UJ

US EPA ARCHIVE DOCUMENT

Table A-19
Summary Statistics and Analytical Results for White Sucker - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

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Dieldrin	2.96 J	3.9 J	8.21 J	9.71 J	7.06 J	3.91 J	7.99 J	6.27 J
Endosulfan I	0.62 UJ	0.61 UJ	0.62 UJ	0.61 UJ	0.62 UJ	0.62 UJ	0.62 UJ	0.6 UJ
Endosulfan II	0.62 UJ	0.61 UJ	0.62 UJ	0.61 UJ	0.61 UJ	0.62 UJ	0.62 UJ	0.6 UJ
Endosulfan Sulfate	0.62 UJ	0.61 UJ	0.62 UJ	0.61 UJ	0.61 UJ	0.62 UJ	0.62 UJ	0.6 UJ
Endrin	0.62 UJ	0.61 UJ	0.62 UJ	0.61 UJ	0.61 UJ	0.62 UJ	0.62 UJ	0.6 UJ
Endrin Aldehyde	0.62 UJ	0.61 UJ	0.62 UJ	0.61 UJ	0.62 UJ	0.62 UJ	0.62 UJ	0.6 UJ
Endrin Ketone	0.62 UJ	0.61 UJ	0.62 UJ	0.61 UJ	0.61 UJ	0.62 UJ	0.62 UJ	0.6 UJ
gamma-BHC	0.14 J	0.19 J	0.47 J	0.23 J	0.27 J	0.21 J	0.12 J	0.14 J
gamma-Chlordane	24.16 J	35.54 J	40.8 J	22.98 J	33.95 J	23.38 J	23.27 J	23.01 J
Heptachlor	0.62 UJ	0.61 UJ	0.62 UJ	0.61 UJ	0.61 UJ	0.62 UJ	0.62 UJ	0.6 UJ
Heptachlor Epoxide	1.16 J	1.83 J	1.45 J	1.39 J	1.16 J	1.21 J	1.71 J	0.81 J
Methoxychlor	0.62 UJ	0.61 UJ	0.62 UJ	0.61 UJ	0.62 UJ	0.62 UJ	0.62 UJ	0.6 UJ
Technical Chlordane	1115.97 J	1347.91 J	2611.85 J	1897.83 J	2409.58 J	1611.63 J	415.87 J	335.33 J
Toxaphene	15.36 UJ	15.21 UJ	15.39 UJ	15.22 UJ	15.34 UJ	15.36 UJ	15.41 UJ	15.08 UJ
Inorganics (mg/Kg)								
Aluminum	8	15.7	1.74	52.3	71.8	77.6	117	25.4
Antimony	0.034 U	0.034 U	0.00905 J	0.034 U	0.00562 J	0.00582 J	0.01 J	0.034 U
Arsenic	0.0295 U	0.034 U	0.0605 U	0.0544 U	0.0516 U	0.0488 U	0.0715	0.0326 U
Barium	0.593	0.783	0.458	1.07	1.47	1.38	2.06	0.704
Beryllium	0.004 U	0.004 U	0.004 U	0.004 U	0.0104	0.00873	0.0137	0.00532 U
Cadmium	0.0192 J	0.015 J	0.0138 J	0.0178 J	0.0194 J	0.0131 J	0.0322 J	0.0113 J
Chromium	0.269 U	0.269 U	0.344	0.187 J	0.3	0.353	0.513	0.249 J
Cobalt	0.051 J	0.0745 U	0.0888 J	0.0742 J	0.0964 J	0.0806 J	0.115 J	0.0625 J
Copper	0.728	0.783	0.551	0.894	0.872	0.961	1.17	0.63
Iron	29	44.8	28	72	100	80.9	174	43.8
Lead	0.0976 J	0.17 J	0.123 J	0.407 J	0.589 J	0.632 J	1.01 J	0.21 J
Manganese	3.96	5.82	6.11	5.68	10.2	10.6	10.7	5.51
Mercury	0.0958	0.121	0.109	0.0842	0.0648	0.077	0.0958	0.071
Mercury (methyl)	0.0956	0.107	0.101	0.079	0.0642	0.0691	0.0826	0.0786
Molybdenum	0.0394 U	0.0349 J	0.0316 J	0.0365 J	0.0396 J	0.0292 J	0.0642 J	0.0252 J
Nickel	0.0963 J	0.115 J	0.147 J	0.131 J	0.187 J	0.177 J	0.252 J	0.118 J
Selenium	0.306 U	0.219 J	0.199 J	0.234 J	0.223 J	0.216 J	0.245 J	0.206 J
Silver	0.06 U	0.06 U	0.06 U	0.06 U	0.00283 J	0.0167 J	0.0131 J	0.06 U
Thallium	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U	0.022 U
Vanadium	0.0756 J	0.179 U	0.179 U	0.124 J	0.125 J	0.138 J	0.254	0.0726 J
Zinc	17.6	19.7	19.4	18.5	20.4	22.7	23.8	18.2
Dioxins/Furans (ug/Kg)								
HCX	0.03864 J	0.07769 J	0.05434 J	0.07681 J	0.07688 J	0.08061 J	0.0814 J	0.01994 UJ
TCX	0.05 UJ	0.05 UJ	0.05 UJ	0.05 UJ	0.1 UJ	0.1 UJ	0.1 UJ	R

US EPA ARCHIVE DOCUMENT

Table A-19
Summary Statistics and Analytical Results for White Sucker - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-WS-4003-0000-01-W 6/21/2001	LPX-WS-4004-0000-01-W 6/21/2001	LPX-WS-4005-0000-01-W 6/21/2001	LPX-WS-4006-0000-01-W 6/21/2001	LPX-WS-4007-0000-01-W 6/21/2001	LPX-WS-4008-0000-01-W 6/21/2001	LPX-WS-4009-0000-01-W 6/21/2001	LPX-WS-4010-0000-01-W 6/21/2001
2,3,7,8-TCDD	0.41592 J	0.667 J	1.36549 J	0.72286 J	0.73092 J	0.50732 J	0.39695 J	0.50332 J
1,2,3,7,8-PeCDD	0.0005 UJ	0.00077 J	0.00169 J	0.00093 J	0.00066 UJ	0.00064 UJ	0.00062 UJ	0.00063 UJ
1,2,3,4,7,8-HxCDD	0.00044 UJ	0.00028 J	0.00038 J	0.00044 J	0.00029 J	0.00025 J	0.00064 UJ	0.00027 UJ
1,2,3,6,7,8-HxCDD	0.00037 J	0.00069 J	0.00099 J	0.00075 J	0.00068 J	0.00048 UJ	0.00045 J	0.00048 J
1,2,3,7,8,9-HxCDD	0.00042 UJ	0.00021 J	0.00028 J	0.00041 J	0.00023 J	0.00043 UJ	0.0006 UJ	0.00027 UJ
1,2,3,4,6,7,8-HpCDD	0.00079 J	0.00124 J	0.00141 J	0.00281 J	0.00205 J	0.00322 J	0.00347 J	0.00136 UJ
OCDD	0.00238 UJ	0.0025 UJ	0.00181 UJ	0.01184 J	0.00856 UJ	0.02043 J	0.0243 J	0.00368 UJ
2,3,7,8-TCDF	0.0055 J#	0.00232 J#	0.00809 J#	0.00343 J#	0.00366 J#	0.00369 J#	0.00361 J#	0.00211 J#
1,2,3,7,8-PeCDF	0.00037 UJ	0.0002 J	0.00038 J	0.00026 J	0.00062 UJ	0.00023 J	0.00019 J	0.00039 UJ
2,3,4,7,8-PeCDF	0.00041 J	0.00065 J	0.00128 J	0.00068 J	0.0006 J	0.00042 UJ	0.00067 UJ	0.00045 J
1,2,3,4,7,8-HxCDF	0.00017 UJ	0.00024 UJ	0.00018 UJ	0.00032 UJ	0.00035 UJ	0.00021 UJ	0.00058 UJ	0.00017 J
1,2,3,6,7,8-HxCDF	0.00041 UJ	0.00015 UJ	0.00019 UJ	0.00026 UJ	0.00031 UJ	0.00019 UJ	0.0006 UJ	0.0001 J
2,3,4,6,7,8-HxCDF	0.00012 J	0.00009 J	0.00017 J	0.00021 J	0.00032 UJ	0.00014 J	0.00065 UJ	0.00014 UJ
1,2,3,7,8,9-HxCDF	0.00012 J	0.00036 UJ	0.00022 UJ	0.00012 UJ	0.00036 UJ	0.00042 UJ	0.00071 UJ	0.00016 UJ
1,2,3,4,6,7,8-HpCDF	0.00028 UJ	0.00029 UJ	0.00032 UJ	0.00099 J	0.00064 UJ	0.00108 J	0.00114 J	0.00036 UJ
1,2,3,4,7,8,9-HpCDF	0.0002 UJ	0.00044 UJ	0.0003 UJ	0.00023 UJ	0.00031 UJ	0.00049 UJ	0.0009 UJ	0.00017 UJ
OCDF	0.00043 UJ	0.0002 UJ	0.00033 UJ	0.00162 UJ	0.00081 UJ	0.00215 UJ	0.0022 UJ	0.00039 UJ
Total TCDD	0.41592 J	0.667 J	1.36549 J	0.72286 J	0.73092 J	0.50732 J	0.39695 J	0.50332 J
Total PeCDD	0.0005 UJ	0.00077 J	0.00177 J	0.00093 J	0.00066 UJ	0.00064 UJ	0.00428 J	0.0007 UJ
Total HxCDD	0.00071 UJ	0.00118 UJ	0.00166 J	0.0016 J	0.00178 UJ	0.00025 UJ	0.00045 UJ	0.00048 J
Total HpCDD	0.00079 UJ	0.00124 UJ	0.00141 J	0.00424 J	0.00326 J	0.00582 J	0.00636 J	0.0019 UJ
Total TCDF	0.00119 J	0.0024 J	0.00876 J	0.00341 J	0.00288 J	0.00207 J	0.00154 J	0.00152 J
Total PeCDF	0.00041 J	0.0019 J	0.00303 J	0.00201 J	0.00163 J	0.00149 J	0.00121 J	0.00045 J
Total HxCDF	0.00082 UJ	0.00102 UJ	0.00128 UJ	0.00183 J	0.0014 UJ	0.00145 UJ	0.0018 UJ	0.00065 J
Total HpCDF	0.00138 UJ	0.00044 UJ	0.0005 UJ	0.00199 J	0.00146 UJ	0.00267 UJ	0.00247 UJ	0.00067 UJ
Toxicity Equivalency (Dioxins, Furans, HCX)	0.417	0.668	1.37	0.725	0.732	0.508	0.397	0.504
PCB Congeners (ug/Kg)								
2-Monochlorobiphenyl (1)					0.10098 J	0.07312 J	0.09504 J	
4-Chlorobiphenyl (3)					0.01517 UJ	0.01588 UJ	0.06119 J	
2,2'-Dichlorobiphenyl (4)					0.65812 J	0.56291 J	0.52967 J	
2,3-Dichlorobiphenyl (5)					0.02128 J	0.02453 J	0.02206 J	
2,3'-Dichlorobiphenyl (6)					0.3165 J	0.28407 J	0.32179 J	
2,4-Dichlorobiphenyl (7)					0.0444 J	0.04623 J	0.04439 J	
2,4'-Dichlorobiphenyl (8)					1.06894 J	0.95942 J	1.16279 J	
2,5-Dichlorobiphenyl (9)					0.10089 J	0.11506 J	0.10386 J	
2,6-Dichlorobiphenyl (10)					0.04809 J	0.00995 UJ	0.05547 J	
3,4-Dichlorobiphenyl (12)					0.0136 J	0.01991 UJ	0.01996 UJ	
2,2',3'-Trichlorobiphenyl (16)					1.77308 J	1.66 J	1.1837 J	
2,2',4-Trichlorobiphenyl (17)					2.3594 J	2.17283 J	1.76036 J	

US EPA ARCHIVE DOCUMENT

Table A-19
Summary Statistics and Analytical Results for White Sucker - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-WS-4003-0000-01-W 6/21/2001	LPX-WS-4004-0000-01-W 6/21/2001	LPX-WS-4005-0000-01-W 6/21/2001	LPX-WS-4006-0000-01-W 6/21/2001	LPX-WS-4007-0000-01-W 6/21/2001	LPX-WS-4008-0000-01-W 6/21/2001	LPX-WS-4009-0000-01-W 6/21/2001	LPX-WS-4010-0000-01-W 6/21/2001
2,2',5-Trichlorobiphenyl (18)					3.31766 J	3.2223 J	2.37212 J	
2,2',6-Trichlorobiphenyl (19)					0.50026 J	0.46317 J	0.43454 J	
2,3,3'-Trichlorobiphenyl (20)					20.93972 J	16.61148 J	12.1426 J	
2,3,4'-Trichlorobiphenyl (22)					2.64631 J	2.0035 J	2.33134 J	
2,3,6-Trichlorobiphenyl (24)					0.53652 J	0.47962 J	0.36704 J	
2,3',4-Trichlorobiphenyl (25)					0.21729 J	0.17573 J	0.13643 J	
2,3',5-Trichlorobiphenyl (26)					1.08452 J	1.03186 J	0.69486 J	
2,4',5-Trichlorobiphenyl (31)					4.49168 J	4.50948 J	3.99927 J	
2,4',6-Trichlorobiphenyl (32)					1.93656 J	1.67284 J	1.08301 J	
2,2',3,3'-Tetrachlorobiphenyl (40)					12.36714 J	9.35151 J	6.34008 J	
2,2',3,4'-Tetrachlorobiphenyl (42)					8.18426 J	6.05143 J	5.70407 J	
2,2',3,5-Tetrachlorobiphenyl (43)					18.35292 J	18.68031 J	12.96165 J	
2,2',3,5'-Tetrachlorobiphenyl (44)					31.08492 J	26.28486 J	7.06521 J	
2,2',3,6-Tetrachlorobiphenyl (45)					2.70416 J	2.2984 J	1.94652 J	
2,2',3,6'-Tetrachlorobiphenyl (46)					0.86487 J	0.71192 J	0.65629 J	
2,2',4,5-Tetrachlorobiphenyl (48)					3.04497 J	2.55197 J	2.11028 J	
2,2',4,5'-Tetrachlorobiphenyl (49)					23.84478 J	21.70398 J	14.81116 J	
2,2',4,6-Tetrachlorobiphenyl (50)					2.86022 J	2.3266 J	1.58856 J	
2,3,3',4'-Tetrachlorobiphenyl (56)					6.97816 J	4.9995 J	5.39854 J	
2,3,3',6-Tetrachlorobiphenyl (59)					2.39412 J	2.14002 J	15.04476 J	
2,3,4,4'-Tetrachlorobiphenyl (60)					4.23045 J	3.1876 J	3.19007 J	
2,3,4,5-Tetrachlorobiphenyl (61)					44.10044 J	37.84616 J	32.14628 J	
2,3,4',5-Tetrachlorobiphenyl (63)					1.22387 J	1.16262 J	0.8928 J	
2,3,4',6-Tetrachlorobiphenyl (64)					13.13471 J	10.50538 J	10.04053 J	
2,3',4,4'-Tetrachlorobiphenyl (66)					52.90614 J	42.8732 J	27.56763 J	
3,3',4,4'-Tetrachlorobiphenyl (77)					0.81957 J	0.59637 J	0.64822 J	
3,4,4',5-Tetrachlorobiphenyl (81)					1.80606 J	0.09953 UJ	0.09978 UJ	
2,2',3,3',4-Pentachlorobiphenyl (82)					12.03038 J	6.7802 J	8.42585 J	
2,2',3,3',5-Pentachlorobiphenyl (83)					62.33564 J	61.76368 J	51.07994 J	
2,2',3,3',6-Pentachlorobiphenyl (84)					18.11699 J	12.07974 J	12.23555 J	
2,2',3,4,4'-Pentachlorobiphenyl (85)					25.92432 J	19.89105 J	6.87232 J	
2,2',3,4,5-Pentachlorobiphenyl (86)					86.31006 J	64.32228 J	55.97736 J	
2,2',3,4,6-Pentachlorobiphenyl (88)					14.95588 J	11.01286 J	9.1997 J	
2,2',3,4,6'-Pentachlorobiphenyl (89)					0.71252 J	0.47939 J	0.45716 J	
2,2',3,4',5-Pentachlorobiphenyl (90)					100.02849 J	87.0948 J	70.20954 J	
2,2',3,5,5'-Pentachlorobiphenyl (92)					13.12733 J	11.91885 J	10.01659 J	
2,2',3,5,6-Pentachlorobiphenyl (93)					58.54335 J	42.9383 J	36.3734 J	
2,3,3',4,4'-Pentachlorobiphenyl (105)					27.14543 J	23.5233 J	15.78211 J	
2,3,3',4,5-Pentachlorobiphenyl (106)					12.74205	10.98138 J	37.12125 J	

US EPA ARCHIVE DOCUMENT

Table A-19
Summary Statistics and Analytical Results for White Sucker - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-WS-4003-0000-01-W 6/21/2001	LPX-WS-4004-0000-01-W 6/21/2001	LPX-WS-4005-0000-01-W 6/21/2001	LPX-WS-4006-0000-01-W 6/21/2001	LPX-WS-4007-0000-01-W 6/21/2001	LPX-WS-4008-0000-01-W 6/21/2001	LPX-WS-4009-0000-01-W 6/21/2001	LPX-WS-4010-0000-01-W 6/21/2001
2,3,3',4',5'-Pentachlorobiphenyl (108)					3.53374 J	2.21902 J	2.39336 J	
2,3,3',4',6-Pentachlorobiphenyl (110)					144.53526 J	98.08364 J	54.42027 J	
2,3,4,4',5-Pentachlorobiphenyl (114)					2.27399 J	1.32961 J	1.49479 J	
2,3',4,4',5-Pentachlorobiphenyl (118)					126.82654 J	120.56547 J	74.09379 J	
3,3',4,4',5-Pentachlorobiphenyl (126)					0.25238 J	0.23747 J	0.09952 J	
2,2',3,3',4,4'-Hexachlorobiphenyl (128)					38.1667	27.56226 J	16.11036 J	
2,2',3,3',4,5-Hexachlorobiphenyl (129)					212.03484	184.04232 J	96.47376 J	
2,2',3,3',4,5'-Hexachlorobiphenyl (130)					13.02348 J	9.63561 J	5.57121 J	
2,2',3,3',4,6-Hexachlorobiphenyl (131)					2.0126 J	2.09394 J	1.05748 J	
2,2',3,3',4,6'-Hexachlorobiphenyl (132)					54.41169 J	35.79497 J	23.07429 J	
2,2',3,3',5,6-Hexachlorobiphenyl (134)					7.10846	3.8685 J	2.37958 J	
2,2',3,3',5,6'-Hexachlorobiphenyl (135)					13.0758	19.09956 J	10.05705 J	
2,2',3,3',6,6'-Hexachlorobiphenyl (136)					8.70498 J	6.16353 J	3.45942 J	
2,2',3,4,4',5-Hexachlorobiphenyl (137)					20.44934	17.7425 J	9.77952 J	
2,2',3,4,5,5'-Hexachlorobiphenyl (141)					16.47617 J	13.86051 J	7.91512 J	
2,2',3,4,5',6-Hexachlorobiphenyl (144)					3.10038 J	3.31056 J	1.52675 J	
2,2',3,4',5,5'-Hexachlorobiphenyl (146)					13.1864	15.95748 J	9.57914 J	
2,2',3,4',5,6-Hexachlorobiphenyl (147)					101.43014	81.94076 J	44.3865 J	
2,2',4,4',5,5'-Hexachlorobiphenyl (153)					84.3727	100.6528 J	62.651 J	
2,3,3',4,4',5-Hexachlorobiphenyl (156)					13.48578	12.79442 J	7.76356 J	
2,3,3',4,4',6-Hexachlorobiphenyl (158)					16.37627 J	15.89593 J	8.73738 J	
2,3',4,4',5,5'-Hexachlorobiphenyl (167)					6.10057 J	5.42459 J	3.25965 J	
3,3',4,4',5,5'-Hexachlorobiphenyl (169)					0.13813 J	0.09953 UJ	0.09978 UJ	
2,2',3,3',4,4',5-Heptachlorobiphenyl (170)					27.40167 J	19.09521 J	9.53936 J	
2,2',3,3',4,4',6-Heptachlorobiphenyl (171)					7.76388	5.93256 J	2.74958 J	
2,2',3,3',4,5,5'-Heptachlorobiphenyl (172)					3.00058 J	2.71278 J	1.49735 J	
2,2',3,3',4,5,6'-Heptachlorobiphenyl (174)					12.58246 J	7.5331 J	3.85943 J	
2,2',3,3',4,5',6-Heptachlorobiphenyl (175)					0.4928 J	0.46315 J	0.21956 J	
2,2',3,3',4,6,6'-Heptachlorobiphenyl (176)					1.78914 J	1.41451 J	0.48481 J	
2,2',3,3',4,5',6'-Heptachlorobiphenyl (177)					11.79837 J	7.48308 J	3.78289 J	
2,2',3,3',5,5',6-Heptachlorobiphenyl (178)					2.88723 J	2.68864 J	1.14405 J	
2,2',3,4,4',5,5'-Heptachlorobiphenyl (180)					27.74674	25.57802 J	14.87992 J	
2,2',3,4,4',5,6'-Heptachlorobiphenyl (182)					0.09877 J	0.19906 UJ	0.19956 UJ	
2,2',3,4,4',5',6-Heptachlorobiphenyl (183)					6.42137 J	6.56204 J	3.4802 J	
2,2',3,4,4',6,6'-Heptachlorobiphenyl (184)					0.03072 J	0.03495 J	0.01309 J	
2,2',3,4,5,5',6-Heptachlorobiphenyl (185)					1.11325 J	1.00268 J	0.46831 J	
2,2',3,4',5,5',6-Heptachlorobiphenyl (187)					16.51752 J	17.83585 J	9.5184 J	
2,3,3',4,4',5,5'-Heptachlorobiphenyl (189)					0.48418 J	0.47608 J	0.25369 J	
2,3,3',4,4',5,6-Heptachlorobiphenyl (190)					3.91034 J	3.33572 J	1.92367 J	

US EPA ARCHIVE DOCUMENT

Table A-19
Summary Statistics and Analytical Results for White Sucker - Lyman Mill

Data Evaluation Report
Centredale Manor Restoration Project Superfund Site
North Providence, RI

PARAMETER	LPX-WS-4003-0000-01-W 6/21/2001	LPX-WS-4004-0000-01-W 6/21/2001	LPX-WS-4005-0000-01-W 6/21/2001	LPX-WS-4006-0000-01-W 6/21/2001	LPX-WS-4007-0000-01-W 6/21/2001	LPX-WS-4008-0000-01-W 6/21/2001	LPX-WS-4009-0000-01-W 6/21/2001	LPX-WS-4010-0000-01-W 6/21/2001
2,3,3',4,4',5',6-Heptachlorobiphenyl (191)					0.61708 J	0.58652 J	0.30994 J	
2,2',3,3',4,4',5,5'-Octachlorobiphenyl (194)					4.48987 J	3.70752 J	2.23061 J	
2,2',3,3',4,4',5,6-Octachlorobiphenyl (195)					1.93784 J	1.46338 J	0.66437 J	
2,2',3,3',4,4',5,6'-Octachlorobiphenyl (196)					2.71753 J	2.16887 J	1.38958 J	
2,2',3,3',4,4',6,6'-Octachlorobiphenyl (197)					0.14095 J	0.147 J	0.09168 J	
2,2',3,3',4,5,5',6-Octachlorobiphenyl (198)					16.57656	14.67692 J	8.31008 J	
2,2',3,3',4,5,6,6'-Octachlorobiphenyl (200)					0.67054 J	0.4242 J	0.18685 J	
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (201)					0.98082 J	1.01681 J	0.4897 J	
2,2',3,4,4',5,5',6-Octachlorobiphenyl (203)					5.90437 J	5.60478 J	4.16882 J	
2,3,3',4,4',5,5',6-Octachlorobiphenyl (205)					0.22639 J	0.194 J	0.10931 J	
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl					15.84419 J	15.65683 J	9.05943 J	
2,2',3,3',4,4',5,6,6'-Nonachlorobiphenyl					1.27702 J	1.32167 J	0.82561 J	
Decachlorobiphenyl (209)					9.67813 J	9.27123 J	4.77757 J	
PCB Congeners, Total					1791.22665	1518.78936 J	1023.47631 J	
Toxicity Equivalency (PCB)					0.0503	0.0454	0.0237	
Other (%)								
Lipid_percent	5.36	7.09	12.1	7.63	10	7.79	6.77	5.84

NOTES:
SQL - Sample Quanitation Limit
HCX - 1,2,4,5,7,8-Hexachloroxanthene
TCX - 2,3,6,7-Tetrachloroxanthene
OCDD - Octachlorinated dibenzodioxin
OCDF - Octachlorinated dibenzofuran
Toxicity Equivalency (Dioxins, Furans, HCX) based on application of mammalian toxicity equivalency factors (Van den Berg, et al., 1998) to measured concentrations of dioxins, furans, and by application of USEPA HCX toxicity equivalency factor (0.0002) based on personal communication from USEPA, Chau Vu, May 22, 2002.
Toxicity Equivalency (PCB) based on application of mammalian toxicity equivalency factors to measured concentrations (Van den Berg, et al., 1998) of dioxin-like PCB congeners. Dioxin-like PCB congeners include PCBs 81, 77, 126, 169, 105, 114, 118, 123, 156, 157, 167, and 189.

Van den Berg, M., et al., 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environ. Health Persp.* **106**(12):775-792.

Samples ending with:
W - whole body

Table 4-1 of *Draft Final Exposure and Human Health Reassessment of 2,3,7,8-Tetrachlorodibenzo-p-Dioxin (TCDD) and Related Compounds* (USEPA, September 2000)

US EPA ARCHIVE DOCUMENT

US EPA ARCHIVE DOCUMENT

Table 4-1. Available Biota to Sediment Accumulation Factors, BSAF, for dioxin-like compounds.

Reference/Congener	Fish Species	Water Body	# Sed. Samples # Fish Samples	BSAF	Comments
Kuehl, et al., 1987	Carp	Wisconsin River	1/1		Laboratory flow through experiment using Wisconsin River sediment and Lake Superior water; BSAFs determined from one "representative" sediment sample and one "composited" fish sample; sediment organic carbon and fish lipid contents given in article; no other details provided.
2378-TCDD				0.27	
2378-TCDF				0.06	
12378-PCDD				0.06	
1234/678-HxCDD				0.035	
123678-HxCDF				0.037	
1234678-HpCDD				0.0048	
1234678-HpCDF				0.0033	
US EPA, 1990b		Lake Ontario			Comprehensive field study on bioaccumulation of 2378-TCDD in Lake Ontario; BSAFs are estimated given 55 sediment samples and specific number of fish samples as noted; report evaluates matching fish with sediment data from sites where fish were caught
2378-TCDD	Brown Trout		55/81	0.03	
2378-TCDD	Lake Trout		55/81	0.07	
2378-TCDD	Smallmouth Bass		55/14	0.05	
2378-TCDD	White Perch		55/38	0.20	
2378-TCDD	Yellow Perch		55/77	0.03	
Parkerton, 1991		Passaic River			7 "resident" fish species were best represented by carp; "migratory" species were eel and striped bass; TCDD contamination attributed to historical industrial input, particularly a 2,4,5-T plant operation from 1940s to 60s.
2378-TCDD	Resident Fish		61/11	0.081	
2378-TCDD	Migratory fish		61/15	0.009	
2378-TCDD	Blue Crab		61/14	0.055	

US EPA ARCHIVE DOCUMENT

US EPA ARCHIVE DOCUMENT

Table 4-1. (Cont'd)

Reference/Congener	Fish Species	Water Body	# Sed. Samples # Fish Samples	BSAF	Comments
Kjeller, et al, 1990	Pike	Lake Vanern			Results presented at right derived from data in Kjeller, et al (1990); data includes sediment samples from four sites in Lake Vanern and 6 composited (2-5 fish in composite) pike associated with the four sites; pike concentrations reported in article on a lipid basis; Lake Vanern is near a paper mill.
2378-TCDD			4/6	2.94	
12378-PCDD			4/6	1.03	
123478-HxCDD			4/6	0.17	
123678-HxCDD			4/6	0.086	
123789-HxCDD			4/6	0.018	
OCDD			4/6	0.002	
2378-TCDF			4/6	1.40	
1234/78-PCDF			4/6	0.25	
23478-HxCDF			4/6	0.71	
123478/9-HxCDF			4/6	0.036	
123678-HxCDF			4/6	0.065	
123789-HxCDF			4/6	0.27	
234678-HxCDF			4/6	0.047	
1234678-HpCDF			4/6	0.0009	
1234789-HpCDF			4/6	0.023	
1234678-HpCDF			4/6	0.006	
OCDF			4/6	0.0001	

US EPA ARCHIVE DOCUMENT

Table 4-1. (Cont'd)

Reference/Congener	Fish Species	Water Body	# Sed. Samples # Fish Samples	BSAF	Comments
US EPA, 1993b		different bodies	NA		Results compiled in EPA (1993) for 2378-TCDD; details found in these studies:
2378-TCDD	Smelt			0.04	Batterman, et al. (1989)
2378-TCDD	Sculpin			0.12	Batterman, et al. (1989)
2378-TCDD	Herring Gull			0.43	EPA (1990b) and Braune, Norstrom (1989)
2378-TCDD	Bullhead			0.05	Cook (unpublished) as listed in EPA (1993b)
2378-TCDD	Sandworm			0.48	Rubinstein, et al. (1983)
2378-TCDD	Clam			0.93	Rubinstein, et al. (1983)
2378-TCDD	Shrimp			0.73	Rubinstein, et al. (1983)
CDEP, 1992	See "Comment"	23 different bodies			Data supplied by Connecticut DEP; complete data description in Chapter 7 of this
2378-TCDD			346/521	0.86	assessment; study designed to evaluate newly
2378-TCDF			346/521	0.25	operating resource recover facilities. BSAFs
23478-PCDF			346/521	0.47	are calculated based on 521 fish samples
I- TEQ			346/521	0.24	including the species: carp, channel catfish, white catfish, white sucker, brown bullhead, yellow perch

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Table 4-1. (Cont'd)

Reference/Congener	Fish Species	Water Body	# Sed. Samples # Fish Samples	BSAF	BEF	Comments
US EPA, 1995	Lake Trout	Lake Ontario	NA			EPA (1995) claims that the Lake Ontario data from EPA (1990b) was reanalyzed for the suite of dioxin-like congeners. It is not clear why the 2378-TCDD for lake trout was 0.059 in this study but listed as 0.07 for lake trout in EPA (1990b). It is also not clear how many samples of fish and sediment were reanalyzed for the data on the right. Also listed to the left are the "bioequivalency factors", or BEFs, as listed in EPA (1995) and as developed from this data set. See text for more detail.
2378-TCDD				0.059	1.00	
12378-PCDD				0.054	0.92	
123478-HxCDD				0.018	0.31	
123678-HxCDD				0.0073	0.12	
123489-HxCDD				0.0081	0.14	
1234678-HpCDD				0.0031	0.051	
OCDD				.00074	0.012	
2378-TCDF				0.047	0.80	
12378-PCDF				0.013	0.22	
23478-PCDF				0.095	1.6	
123478-HxCDF				0.0045	0.076	
123678-HxCDF				0.011	0.19	
123789-HxCDF				0.037	0.67	
234678-HxCDF				0.04	0.63	
1234678-HpCDF				.00065	0.011	
1234789-HpCDF				0.023	0.39	
OCDF				.00099	0.016	

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Table 4-2. Available Biota to Sediment Accumulation Factors, BSAF, for PCBs.

Reference/Congener	Fish Species	Water Body	BSAF	Comments
EPA (1990b) PCB	trout, salmon, perch, bass	Lake Ontario	1.40, 0.77, 0.52, 0.86, 3.35, 1.42	These BSAF were compiled in EPA (1990b) from several data sources, years of study, and fish species. The summary provided was not specific in terms of BSAFs associated with specific fish species. It is assumed that "PCBs" described in EPA (1990b) meant "total PCBs". There was one BSAF of 0.58 derived in EPA (1990b) for Aroclor 1254
EPA (1995) Total PCBs PCB 105 PCB 118 PCB 156 PCB 180	Trout	Lake Ontario	 1.85 2.70 4.09 3.97 3.78	EPA (1995) used the data of Oliver and Niimi (1988) to derive the BSAFs listed for total PCBs and the PCB congeners. EPA (1995) also lists BSAFs for numerous other non-dioxin-like PCB congeners.
EPA (1995) PCB 77 PCB 105 PCB 118 PCB 126 PCB 167 PCB 180 PCB 189	Trout	Lake Ontario	 0.29 4.49 1.72 3.21 0.69 3.26 0.71	EPA (1995) derived these BSAFs based on their reanalysis of sediment and trout data from the original Lake Ontario study (1990b). EPA (1995) also lists BSAFs for numerous other non-dioxin-like PCB congeners.

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Table 4-2. (cont'd)

Reference/Congener	Fish Species	Water Body	BSAF	Comments
EPA (1995) PCB 77 PCB 105 PCB 118 PCB 167 PCB 180 PCB 189	Brown Trout	Green Bay, WI	 4.12 5.35 4.96 16.0 10.96 3.45	EPA (1995) derived these BSAFs from data on lake trout from the Green Bay. The study from which these data came from was described as EPA's Green Bay/Fox River Mass Balance Study which involved extensive sampling of water, sediment and fish in 1989. No further citation was provided in EPA (1995) for this study.
Parkerton, et al (1993) trichloro-PCB tetrachloro-PCB pentachloro-PCB hexachloro-PCB heptachloro-PCB octachloro-PCB	lake trout, whitefish	Siskiwit Lake	 0.45-2.6 0.71-1.3 3.4-9.4 2.9-20.8 12.5 2.2-12.7	Compiled by Parkerton, et al. (1993) from data in Swackhammer, et al. (1988) and Swackhammer and Hites (1988); Parkerton presents data for individual congeners - summary at left aggregates by chlorination and includes both fish species; only one data point presented by heptachloro-PCB.
Parkerton, et al (1993) Total PCBs	Three species of marine fish	Rio de La Plata, Argentina	 4.40	Determined by Parkerton, et al (1993) from Columbo, et al (1990) on total PCBs. Columbo reference has data on PCBs 5-8, 14, 19, 28-31, 52, 101, 110, 138, 153, 180.

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Table 4-2. (cont'd)

Reference/Congener	Fish Species	Water Body	BSAF	Comments
Parkerton, et al (1993)	flounder, lobster, crab	New Bedford Harbor		Compiled by Parkerton, et al. (1993) from data in BOS (1990); summary at left is the range of values for PCB congener groups, and averaged across the noted species.
dichloro-PCB			0.11-0.59	
trichloro-PCB			0.26-0.65	
tetrachloro-PCB			0.65-1.02	
pentachloro-PCB			1.05-2.08	
hexachloro-PCB			1.29-4.00	
heptachloro-PCB			0.84-2.74	
octachloro-PCB			0.23-1.17	
nonachloro-PCB			0.02-0.38	