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BROWNFIELDS TARGETED SITE ASSESSMENT
FINAL REPORT

STANDARD TIMES FIELD
NEW BEDFORD, MASSACHUSETTS

May 2000

Prepared By:

Metcalf & Eddy
30 Harvard Mill Square
Wakefield, Massachusetts

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1.0 INTRODUCTION

The Brownfields Targeted Site Assessment (BTSA) report for the property known as Standard Times Field has been prepared in accordance with Metcalf & Eddy's (M&E's) EPA-approved Final Field Task Work Plan (FTWP; 1999c) for conducting BTSAs under EPA's Response Action Contract (RAC). The Standard Times Field property is located off South Front Street in New Bedford, Massachusetts (Figure 1-1).

The overall objectives of the BTSA for the Standard Times Field property are to:

1) assess the types and general extent of contamination on the site
2) evaluate the risks posed by the contamination, based on future use/redevelopment options
3) develop potential alternatives for cleanup based on future use/redevelopment options

The BTSA report presents information and conclusions in support of the objectives listed above.

The BTSA for the Standard Times Field property was initiated by obtaining and reviewing all reasonably available information that was relevant to an environmental assessment of the site including the site's ownership history, use and operations history, and regulatory history. In addition, pertinent information on surrounding or nearby properties was reviewed. The primary sources of information included the city of New Bedford's BTSA application, record searches/file reviews of the city's municipal offices and the Massachusetts Department of Environmental Protection (MADEP) Lakeville office, an environmental database search of federal and state regulatory agencies, historical topographic maps and Sanborn Fire Insurance maps, and several environmental reports on the site and nearby properties. The information was summarized in a Background Summary Memorandum (M&E, 1999a) prepared for the site and is presented in this report where appropriate.

The information provided herein is designed to meet the objectives of the BTSA developed for the site (Section 2.7). No portion of the site is currently listed as a waste site under the Massachusetts Contingency Plan (MCP; 310 CMR 40.0000) pursuant to the Massachusetts Oil and Hazardous Material Release Prevention and Response Act (M.G.L. Chapter 21E); however, the information presented in the report incorporates many of the requirements of a Phase I report as defined under 310 CMR 40.0483.

2.0 SITE INFORMATION AND OBJECTIVES

Information presented in this section is largely summarized from the Background Summary Memorandum (M&E, 1999a) prepared for the site. Field observations made by M&E during site

visits and field work as well as information obtained through conversations with city personnel are also included.

2.1 Location

The Standard Times Field property is located in the city of New Bedford (Figure 2-1), off South Front Street, and is bordered by parking areas parallel to Gifford Street to the south, and the Acushnet River to the east. New Bedford Radio, Inc. and various commercial properties border the site to the north. Residential and commercial properties along South Front Street border the site along the western boundary. The site is approximately 25.5 acres in size. The site coordinates are 41°37'16.0"11 latitude and 70°55'3.7" longitude.

2.2 Site Description and Use

The site is currently owned by the city of New Bedford. It is primarily vacant, and there are no current formal operations or uses conducted on the property. The city is currently overseeing the development of the property into a 10-lot subdivision intended for future use as a marine-related industrial area.

Former use of the site included mill work during a period between the 1880s to 1930s. From the 1930s to 1940s, the site was owned by the city of New Bedford. During this period there are no records of use; however, the mill buildings had been demolished, likely sometime between 1923 and 1935. The site was owned by E. Anthony & Sons, Inc. from 1946 to 1966. The only record of use during that time was by the U.S. Army Corps of Engineers in 1963, who used the site as a staging area for the construction of the hurricane barrier in the Acushnet River. There were several owners from the late 1960s up to 1998, when the city of New Bedford became the current owner. There are no records of site use during the period prior to city acquisition.

2.3 Site Features and Utilities

Site features that are relevant to the BTSA are shown in Figure 2-1. Historical Sanborn Fire Insurance maps dated 1888 through 1924 indicate mill structures and associated uses at the site. Of particular interest, these older maps show a "gas holder" and an associated building (that may have been part of a coal gasification plant) in the northeast corner of the site, a transformer in the south section, a coal bin along the northern site boundary, and a 150,000-gallon buried fuel tank in the southeast corner of the site (in the vicinity of the current baseball field). There are no records of the buried tank being removed or abandoned. The Sanborn map for 1950 indicates that the numerous mill buildings and coal bin that occupied most of the site had been removed by that time, although no records of the removal of the building structures were located. Since the 1950s, Sanborn maps and city records indicate that there have not been any permanent structures on the site and that the property has remained undeveloped open area.

As part of the subdivision development, the city is in the process of extending Blackmer Street towards the river and constructing a smaller cul-de-sac road (Silva Street) off the Blackmer Street extension. The city is installing utilities, including new storm water and sewage lines and underground electrical service, along these roads. Existing storm water and sewer lines cross the center of the site from west to east, extending from Blackmer Street towards the Acushnet River. According to historical information, another storm water line extends along the northern boundary of the site.

Early mill plans (New Bedford, 2000) indicate that there were a number of saltwater wells on the site; however, no physical evidence of the wells was mentioned in previous reports or was observed by M&E.

2.4 Current Site Conditions

As stated in Section 2.2, the vacant site has been an undeveloped open area since the 1930s. The current site conditions described in this section are based on observations made by M&E personnel during the May 26, 1999 site visit and field work in the fall of 1999. Through the spring and early fall of 1999, prior to the start of on-site construction, the central and southern portions of the site were relatively flat. The central section of the site is an area of compacted sand and gravel, used as a staging area for equipment and materials by the city. Unpaved roads provided vehicular access to the center of the site and to other areas of the site. The baseball field in the southwest section of the site appears to be regularly maintained.

The south-southeastern section of the site was characterized by tall, thick growths of grasses and shrubs. Ponded water and thick wetland vegetation (primarily reeds) were observed in this area. At the southeastern corner, the topography rises and a dirt bike track with evidence of recent use was observed. Just to the northeast of the dirt track, there was a circular burned area approximately 15 to 20 feet in diameter with tires and empty automotive/boat fuel tanks.

A sandy beach (50- to 100-feet wide at the time of the site visit) marks the eastern site boundary along the Acushnet River. There was a drop-off between the land surface and the sandy beach, ranging from 1 foot to over 8 feet in some places.

In the northern portion of the site, the surface is very irregular and rough, with evidence of extensive alteration over the years. In this section, mounds and ditches have been created by large piles of excavated earth and large boulders. Some of the earthen mounds were intermixed with concrete, building demolition remains (brick, roofing shingles, tile), and asphalt debris along with tires, metal, and municipal rubbish. Mounds in the central north section of the site appeared to be relatively recent, while older mounds in the more northern and northeast sections of the site were overgrown with well-established wooded areas, thick scrub brush, and tall vegetation.

In the northeastern corner of the site, one small area of stressed vegetation was observed. Stained gravel, coal ash, and capacitor debris was noted in the area. In addition, an area with stressed

vegetation was noted just north of the northeast corner boundary, near the areas where the alleged gas machine and gas holder were former located.

Construction for preparation of the subdivision was on-going through the fall, when M&E conducted field work. As a result, the terrain in the central and southern portions of the site changed from conditions observed in spring and early fall 1999. Further changes in terrain are expected as work on the subdivision proceeds and the lots are sold to private owners.

The city does not currently store or allow the storage of any hazardous materials at the site. Asbestos-containing materials and lead-based paint may have been used at one time within the mill buildings. Visual observations made during the site visit noted the possible presence of these constituents in debris piles located across the site and on the ground surface.

2.5 Summary of Previous Environmental Assessments

Several limited environmental assessments have been conducted on the site. Additional details can be found in the Background Summary Memorandum (M&E, 1999a). The results of the assessments are summarized in this section. It should be noted that the boundaries defining the property for previous investigations were slightly larger than the site is currently defined.

A 21E Environmental Assessment conducted by (Kurz, 1986) consisted of a file review, site visit, and limited soil and groundwater sampling across the Standard Times Field property. The subsurface investigation included 20 test pits from which selected soil and groundwater samples were analyzed for volatile organic compounds (VOCs), PCBs, and oil and grease content. Two soil samples indicated the presence of relatively low levels of PCBs (0.8 and 1.9 ppm), and two soil samples indicated the presence of oil and grease (3,490 ppm and 7,070 ppm). The PCBs that were detected were encountered near the radio tower on the property bordering the site to the west. No VOCs were detected in grab groundwater samples collected from test pits.

An assessment was conducted near the southwest corner of the site, in the vicinity of the baseball field and basketball court (NUS, 1989). The study was limited to a records search and site observations. No samples were collected or analyzed.

In 1991 and 1993, further environmental assessments of the site were performed (GZA, 1991 and 1993). Soil and groundwater samples collected from test pits in 1991 and 1993 were analyzed for VOCs. The soil samples were also analyzed for PCBs and petroleum hydrocarbons. Two of the soil samples were collected close to the locations where PCBs were previously found by Kurz (1986). The analyses did not report PCBs in soil, but did confirm the presence of petroleum hydrocarbons (fuel oil and asphalt). During the 1993 assessment, piles of construction debris, concrete and asphalt were observed to be randomly scattered across the site. In addition, municipal rubbish dumping along roadways was observed.

2.6 Adjacent Properties

Several adjacent properties were discovered to have previous releases of oil and hazardous materials. In particular, releases of oil from leaking underground storage tanks were reported for two nearby (almost adjacent) properties: Mutual Oil Station at 56 Potomska Street and Southeast Transit Authority (STA) at 65 Potomska Street. These properties are both located near the northwest corner of the site.

The Mutual Service Station is located within approximately 600 feet of the northwest corner of the site (across South Front Street) and has operated as a fuel service station since 1968. Several underground storage tanks (USTs) have been placed and replaced on this property, including gasoline, unleaded gasoline, diesel, and kerosene tanks. In 1989, the MADEP issued a Notice of Responsibility to Mutual for the release of oil and hazardous materials (leaking gasoline UST) on the property. The presence of separate-phase product was reported in groundwater monitoring wells on the property in 1990. A groundwater treatment and soil vapor extraction remediation system was installed in 1993 and was operated into 1996. According to a Response Action Outcome (RAO) dated June 1996, data from the site indicate a trend of lower contaminant concentrations. Oil and hazardous material concentrations in the groundwater were below MCP Method 1 GW-2 levels. The RAO indicated that the site conditions met a level of No Significant Risk in accordance with the MCP. The likely flow of groundwater from this property is in a southeast direction, towards the Standard Times Field site and the Acushnet River.

The STA is located within approximately 900 feet of the northwest corner of the site. The MADEP files reported that soil contamination was observed at the STA location in 1988 during the removal of USTs (gasoline, diesel fuel, and motor oil). Sampling and analyses indicated the presence of petroleum hydrocarbons in soil and groundwater from the former tank locations. An undocumented amount of soil was removed from the property. A Notice of Responsibility was issued to STA by the MADEP in March of 1998 indicating the need to address the presence of separate phase product in the groundwater. Approximately 1,000 tons of additional contaminated soil was removed from the STA location in 1998.

2.7 Site-Specific Objectives

The primary objectives and technical approach for the BTSA at Standard Times Field were developed based on review of available site and background information, along with observations and information gathered during the May 26, 1999 site visit and in discussions with EPA and the city and MADEP Points-of-Contact (POCs) for the site. The purpose of the BTSA was to conduct a site investigation to determine the nature of contamination at the site, and to a limited degree, evaluate the extent of contamination. In general, the site investigation was focused towards known or suspected contamination source areas and areas where the potential exists for the greatest risks to be posed based on the proposed future use/redevelopment of the site (Section 2.2). Field and analytical data were collected to provide limited information with respect to hydrogeologic conditions, to supplement existing site information from previous environmental assessments, and

to support characterization of risk and development of cleanup alternatives and cost estimates. At the request of the city, risks have also been assessed for soil by subdivision lot. However, delineation of the full extent of contamination, or a detailed risk assessment and alternatives evaluation, were not within the scope of work that was conducted. The technical approach, which is detailed in the Final FTWP (M&E, 1999c) developed for the site, was conducted in coordination with MCP guidance where feasible.

3.0 SITE INVESTIGATION

This section summarizes the field investigation that was conducted at the site by M&E in the fall of 1999 and discusses the findings of the investigation. Information from previous environmental studies on the site is incorporated with the findings of this site investigation to provide a more comprehensive understanding of conditions

The primary focus of the field investigation was to collect current information about the environmental condition of the site for use by the city of New Bedford. The field activities were performed in accordance with the M&E FTWP and Generic-BTSA Sampling and Analysis Plan (SAP) for the site (1999c and 1999a, respectively). The field investigation was focused on potential contamination source areas and areas that may pose the greatest risk. The investigations that were conducted, and the specific focus if applicable, were:

- a geophysical survey to locate the possible buried tank in the southwest corner of the site
- test pit excavations to confirm the presence and location of the buried tank (based on geophysical survey data) and to ascertain the approximate location and possible configuration of the former coal bin (near the northern site perimeter, south of the New Bedford Radio Station Tower)
- installation and sampling of four temporary shallow overburden wells (located hydrogeologically downgradient or in potential source areas and screened across the groundwater table)
- surface soil sampling at 11 locations (1 to 2 locations per subdivision lot)

Figure 3-1 presents the field investigation locations. An M&E representative was onsite during all field activities and oversaw subcontractors performing designated field work. Specific details of the different field activities are discussed in the appropriate sections that follow.

Prior to initiating any investigation work, the city POC identified boundary markers for M&E and assisted M&E in locating areas for test pits and surface soil sampling. Lot boundaries were previously marked by city engineers for the on-going construction work. A grading/utility plan for the site (SITEC, 1998) and GPS equipment were used to approximate the boundary locations

not already marked. A backhoe operated by a city employee was used to perform minor clearing and grading to improve access to several areas of investigation.

3.1 Geophysical Survey and Test Pit Excavations

A geophysical survey was conducted in the southwest corner of the site (baseball field in Lot 9) where the 150,000-gallon UST was suspected to be located (Figure 3-1). The survey was conducted on September 28, 1999 by Hager GeoScience, Inc. of Waltham, Massachusetts. A combination of electromagnetic (EM) terrain conductivity and ground penetrating radar (GPR) techniques were used. EM terrain conductivity was used to survey the entire investigation area of approximately 180 by 240 feet. GPR was performed in areas of EM anomalies. The instrumentation and procedures used are detailed in the geophysical report presented in Appendix A.

Preliminary results of the geophysical survey indicated an anomaly that was the possible UST. The geophysical data indicated that the structure consists of concrete with rebar. The final results of the survey are provided in the geophysical report (Appendix A).

On September 29, 1999, the targeted area was excavated using a backhoe operated by the city of New Bedford. Two large test pits, designated Tank 1 and Tank 2, were excavated. The excavation uncovered a cylindrical concrete structure that fits the physical description of the suspected buried tank (New Bedford, 2000). The surface of the concrete structure was located at 1 to 2 feet below grade. The excavation revealed that the structure is at least 6 feet in height. The presence of groundwater at 6 feet below grade interfered with additional excavation to determine the total height of the structure. A hole was discovered at the center of the structure. This hole may have been a former cover or manhole as indicated by the round shape and a partial metal ring. Rebar was evident around this hole. Soil within the hole had a heavy fuel odor, and there was visual evidence of a tar-like substance. A sample of the soil/tar-like substance from within the hole was collected. Laboratory results confirmed the presence of petroleum hydrocarbons. PCBs were not detected in the sample. The groundwater adjacent to the western wall of the structure appeared to have a slight sheen on its surface, although no product was detected using field methods. Subsequent to excavation activities, it was determined that the tank was located just outside of the site boundaries.

A second area was excavated along the northern perimeter of the site to try to locate the former coal bin (Figure 3-1). Two shallow test pits, TP-01 and TP-02, were excavated with a backhoe operated by a city employee on September 27, 1999. The test pits were excavated to the top of groundwater at approximately 6 feet below grade. Physical evidence of coal was observed in the two test pits, from 1- to 2-feet below grade. At this depth, a dark, dry, dense peat-like layer with coal pieces was observed. Concrete rubble was also noted at this depth in TP-02. The top 1 foot of TP-01 and TP-02 consisted of sand intermixed with vegetation, primarily roots. The limits of the coal layer were estimated to be an area of about 100-by-50 feet, adjacent to the property line at Lot 2, south of the radio tower.

Two shallow test pits, TP-03 and TP-04, were excavated in a third area located at the northeastern section of the site, within the limits of the area with stressed vegetation. The upper layers of both test pits included sandy materials from 0 to 2 feet. From 2 to 4 feet, both test pits contained sandy material with debris, which included roofing material, brick, and wood fragments. Some capacitor-like materials were also observed in TP-04. A sulfur-like odor was also noted during excavation of TP-04. Wood planks were observed at the bottom of TP-03, indicating that perhaps a pier or support may have existed in this area at one time.

Upon completion of all excavation activities, the test pits were filled in and leveled to grade. Excavation logs are located in Appendix B.

3.2 Surface Soil Sampling

Eleven surface soil samples were collected with the aid of a city-operated backhoe on September 28, 1999. One sample was collected per lot, with the exception of Lots 3 and 4, where two samples were collected. The surface soil samples are identified with the designation "SS" on Figure 3-1. For the lots where more than one sample was collected, the designation "A" and "B" were added after the location number.

Generally, a sample was collected where visual observations or field screening suggested that a potential contaminant source may exist (Table 3-1). Prior to sample collection, the excavation hole and excavated soil were screened with a photoionization detector (PID) for organic vapors. Headspace screening methods were used for the excavated soil. With the exception of the volatile petroleum hydrocarbon (VPH) fraction, the samples were composited from soil removed directly from the walls of the excavation hole, 0 to 3 feet below grade. The VPH fraction was collected by twisting a pre-weighed syringe directly into the soil, then discharging the contents into a vial pre-filled with methanol. Following collection of the VPH fraction, the remaining sample containers were filled with composited soil. The samples were immediately placed in a cooler with ice, after which the samples were recorded onto a chain-of-custody (CoC) form and submitted for laboratory analysis of the parameters listed in Table 3-2. Surface soil analytical data are presented and discussed in Section 4.4.

In addition, three samples of debris were collected for asbestos analysis in the vicinity of bare soil/stressed vegetation (Figure 3-1), near well location GW-01 and surface soil sample SS-04B on Lot 3. One sample of roofing tar material was collected from a debris pile (comprised mostly of roofing materials and soil). One sample of a transite-type material and one sample of a tile-like material were collected from the ground surface. The transite-type material tested positive for asbestos materials.

3.3 Temporary Well Installation, Monitoring, and Sampling

Four temporary shallow overburden wells were installed and developed on September 29, 1999. The wells are identified with the designation "GW" on Figure 3-1. The wells were drilled and

installed by GeoTek Engineering, Inc. using an Earth Probe 2000 direct-push rig. The holes for the well were advanced with a 1-inch-OD steel rod and point. Once at the desired depth, generally determined by refusal, the rod was removed. Soil was not collected from the resulting borehole for stratigraphy identification or chemical analysis. Table 3-3 summarizes the rationale for location placement of each of the wells.

A 1-inch-OD schedule 40 PVC pipe with continuous-slotted screen (0.010 inch), capped at the bottom end, was carefully lowered into the borehole. The PVC well was gently tapped to the desired depth, cut off level to grade, and capped. A stainless steel flush-mounted lock box was installed over the top of the well for security. Installation details are shown on well installation logs located in Appendix C. It should be noted that GW-01 and GW-04 were installed further from their proposed locations than expected. In both cases, this occurred because refusal was encountered at very shallow depths (2 to 4 feet), despite repeated attempts. As a result, GW-01 was located further southwest and GW-04 was located further east than originally proposed.

Following installation of all four wells, the wells were developed by M&E. Development was accomplished by slowly removing groundwater using low-flow purging methods and recording field parameters (i.e., pH, specific conductance, dissolved oxygen, oxidation-reduction potential, temperature, and turbidity). Only one well volume was removed from two of the wells (GW-01 and GW-04) because of very low recharge rates. Less than one well volume was removed from GW-03.

Groundwater levels were measured and the wells were sampled by M&E the day following installation, September 30, 1999. Groundwater level measurements were taken prior to purging and sampling activities. Measurements were taken from a notch at the top of the well. Groundwater elevations were calculated using survey data and are presented in Table 3-4.

The wells were sampled with peristaltic pumps and dedicated tubing using low-flow sampling procedures. Because of low recharge, the intake end of the tubing was positioned near the bottom of the well. Each well was purged at a slow rate, with regular monitoring of drawdown of the water table and regulation of the flow rate. During purging, the water passed through a YSI Model 610-DM flow-through cell for continuous measurement of pH, conductivity, dissolved oxygen (DO), oxidation-reduction potential (Eh), and temperature. Turbidity measurements were taken at regular intervals using a turbidimeter. Minimal purging prior to sampling occurred for most of the wells because of poor recharge. Field parameters were measured again upon completion of sample collection.

Groundwater samples were collected into sample containers directly from the outflow port of the tubing. During sample collection, 40-ml vials used for VPH analysis were filled first and checked to insure that no air bubbles were present. Following collection of the VPH fraction, the remaining sample containers were filled. Sample volume for metals were field filtered (0.45 μm) at GW-01, GW-02, and GW-04 because turbidities remained greater than 25 NTU after purging. Each sample container was labeled, preserved, and placed in a cooler with ice, after which the

samples were recorded onto a chain-of-custody (CoC) form and submitted for laboratory analysis of the parameters listed in Table 3-2. Upon completion of sampling activities, the wells were abandoned in-place (filled with bentonite).

Upon completion of the sampling effort (and abandonment of the temporary wells), it was realized that two of the wells (GW-02 and GW-04) required re-installation and re-sampling for organic parameters. Re-installation of these wells was completed on November 1, 1999 in the same manner as the initial installation. The re-installed wells are identified with the designation "RE" after the well number. As a result of on-going construction activities at the site, the areas in the vicinity of the original well locations had undergone changes. Where level ground had been, construction materials (e.g., culverts, large concrete drains) and piles of excavated soil and asphalt were now located. The re-installed wells were situated as close to their original locations as possible. On November 2, 1999, the re-installed wells were developed, sampled, and abandoned in-place following the same procedures as the original wells. During the sampling of well GW-02RE, a thin, petroleum-like sheen was detected on the groundwater; however, headspace readings for organic vapors revealed no measurements above background.

Well sampling sheets for each of the wells are located in Appendix D. Groundwater analytical data are presented and discussed in Section 4.4.

3.4 Survey for Locations and Elevations

M&E used GPS field equipment to record relative locations of the test pits, surface soil samples, temporary wells, and additional site features. The positions were recorded on September 29 and 30, 1999 and November 2, 1999. A surveying level and rod were used by M&E to measure elevations at the top of the temporary wells relative to a local datum. The GPS locations were mapped on the Land Plan provided by the SITEC (1998), which serves the base map for all of the site figures in the report.

3.5 Analytical Program

Table 3-5 summarizes the samples submitted for laboratory analysis during the field investigation. Quality control (QC) samples were also taken and submitted for laboratory analysis to monitor and evaluate laboratory and sampling performance. The field QC samples collected, which are also listed on Table 3-5, included trip blanks, field duplicates, matrix spike/matrix spike duplicate samples, and performance evaluation (PE) samples.

Samples were analyzed using a combination of EPA's Contract Laboratory Program (CLP) for Routine Analytical Services (RAS) and directly-subcontracted laboratories. The methodologies selected for analysis of samples by the directly-subcontracted laboratory were consistent with standard EPA or MADEP methods. Samples collected for analysis of organic parameters using RAS methods were submitted to Southwest Laboratory of Broken Arrow, Oklahoma, and samples being analyzed for inorganic parameters using RAS methods were submitted to Sentinel, Inc. of

Huntsville, Alabama. With the exception of the analysis for asbestos containing material (ACM), M&E directly subcontracted the Woods Hole Group of Raynham, Massachusetts to perform all of the remaining analyses. The ACM analysis was performed by Proscience Analytical Services of Woburn, Massachusetts.

M&E conducted a limited QC review/validation of analytical laboratory data in accordance with the EPA-approved FTWP (M&E, 1999c). The review/validation provides an overview of the laboratory and field QC data by identifying potential QC issues and assessing common QC criteria that might affect reporting and usability of the environmental data as well as ensuring that the laboratory has met minimum data acceptance criteria established by M&E. Although the limited review/validation was based on EPA Region I Tier guidelines (U.S. EPA, 1996), it was more limited in scope. The review/validation performed by M&E consisted of completing Tier II-like forms only for applicable criteria parameters, assessing data usability, and summarizing the results in abbreviated Tier II-like memoranda. The validation memoranda are included in Appendix E.

Lmited review of the results from the asbestos analysis and the UST soil sample was performed because these data were collected for identification purposes only, and not used for risk characterization. The review memoranda are included in Appendix E.

Data found to be suspect during the validation/review process were qualified. Laboratory data forms were marked up to indicate any validation qualifications that supersede laboratory qualifiers and are included in the data validation memoranda (Appendix E). The final validation qualifiers are consistent with EPA validation guidelines. Positive and nondetect results that were shown to have serious QC problems were rejected and flagged with an "R." Positive results that were shown to exhibit poor precision or accuracy were qualified as approximated and flagged with a "J." Nondetect results that were flagged with a "UJ" if the associated QC data did not meet applicable criteria. Nonqualified positive results were found to meet all validation criteria. Nondetect results that were found to meet the validation criteria were shown as the quantitative limit or detection limit followed by a "U" qualifier.

Surface soil and groundwater analytical data are presented and discussed in Section 4.4. Approximated and nonqualified results were used in further evaluations, but the qualified data were first reviewed to establish their usability. Rejected values were considered to be unusable results for subsequent evaluations. Overall, less than 3% of all the analytical data generated in support of this report were rejected as a result of validation actions.

4.0 SUMMARY OF FINDINGS

The findings from the BTSA conducted by M&E for the site, as well as pertinent information from previous studies and sources, are presented and discussed in this section.

4.1 General Topography

The topography of the site is relatively flat with a mild east-southeast slope towards the Acushnet River. Surface water drainage appears to follow the natural topography of the site and flows towards the river, although ponding of water is evident, particularly in wetland areas (Figure 2-1) and areas with substantial mounding and depressions (Section 2.4).

4.2 Subsurface Geologic Conditions and Features

As previously described, the results of previous environmental studies at the site (Kurz, 1986 and GZA, 1991 and 1993) indicate that the soil sequence across much of the site varies. Some of the test pit logs suggested possible fill at some locations, ranging from 2- to 8- feet in depth and overlying a layer of peat or natural deposits of sand and gravel. The fill typically consisted of sand and gravel containing brick and shingle fragments, cinders, asphalt, and concrete rubble in some areas. The peat layer, which varies in thickness from 1 to 2 feet, is underlain by natural deposits of sand and gravel or bedrock. Depths to bedrock ranged from 6 to 9.5 feet across much of the site. In the northwest corner, bedrock depths may be as shallow as 2 to 4 feet below ground surface, based on depths of refusal encountered during repeated attempts to install GW-04 further west and northwest of its final location. A similar situation was encountered during the installation of GW-01, which was originally sited closer to the northeast corner of the site perimeter.

Kurz (1986) indicated that some of the site was filled, presumably with dredged materials from the harbor, during construction in 1963 of the hurricane barrier at the end of the Acushnet River, a short distance from the southeastern corner of the site. However, records documenting the placement of fill (or dredged materials) have not been found by M&E or previous file searches (GZA, 1991). The materials in the fill appear to be more indicative of demolition debris, perhaps from the removed mill structures, than of materials dredged from the river. One exception to this is a gray plastic silt material that was logged in a test pit excavated in the southeast corner of the site, near the river. GZA (1991) suggested that this material may represent hydraulic fill.

According to EDR (1999) and Zen (1983), bedrock at the site is a Precambrian biotite gneiss of the Blackstone Group.

The only known subsurface features on the site consist of storm water, sewer, and utility lines (Section 2.3). A large cylindrical structure, appearing to be the 150,000-gallon buried tank, was located in the baseball field, but was determined to be off the site (Section 3.1). Soil in the tank suggests that it was filled and abandoned in place, but this was not confirmed. Evidence of petroleum contamination near the tank was observed in groundwater and soil from the excavation. Along the northern site perimeter (Lot 2), evidence of the coal storage was found from 1 to 2 feet below grade (Section 3.1) in the suspected location of the former coal bin. Based on the physical evidence observed during excavations, it appears that the coal may have set directly on the ground or on a temporary structure such as wooden slabs, brick floor, or a concrete slab. Other evidence

of buried wood and brick debris (1 to 3 feet) was noted in Lots 3 and 4. It is likely that this debris was part of former building walls and foundations or piers and supports.

4.3 Hydrogeologic Conditions

Groundwater depths measured during this investigation were similar to those found previously (GZA, 1991); depths ranged from 8.5 feet below the ground surface along the western side of the site to 4 feet below ground surface along the eastern side of the site. Groundwater elevations measured during this investigation (Section 3.3) indicate the direction of groundwater flow is east-southeast towards the Acushnet River and harbor. It is likely that the groundwater is tidally influenced to some degree. Review of the MADEP Bureau of Waste Site Cleanup (BWSC) site scoring map for the site (Appendix F) indicate that the site is not within an Interim Wellhead Protection Area or within 500 feet of a public water supply. The BWSC map also indicates that the site is not within 500 feet of a surface water body used as a public water supply. No known private water supply wells are within 500 feet of the site.

4.4 Nature and Extent of Contamination

The field and analytical data from the field effort conducted by M&E are presented and discussed by media in this section. Where appropriate, data from previous environmental studies at the site are discussed.

Analytical results for surface soil are summarized in Table 4-1. Analytical results for groundwater are summarized in Table 4-2. The tables present detected data by analytical fraction. For each fraction, an analyte is presented if it was detected in at least one sample for that media.

On each table the MCP reportable concentrations (RCs) applicable to the site and to the samples are presented for relative comparison to detected concentrations for detected analytes. This information is provided to evaluate whether a release of oil and/or hazardous material has occurred at the site that requires MADEP notification (MCP 40.03000) based on the reporting category that best characterizes the use of the site.

Surface Soil. Eleven surface soil samples were collected at the site (Figure 3-1). Sample collection procedures were described in Section 3.2. Tables 3-1 describes the rationale for selection of each sampling location and provides a brief description of the sample appearance. Table 3-2 summarizes the analyses conducted on each sample. Detected analytical data and reportable concentrations (RC) are shown on Table 4-1. The reporting category RCS-1 applies to surface soil samples collected on Lots 1B, 8, and 9 (SS-02, SS-09, and SS-10) because the sampled locations are within 500 feet of a residentially-zoned and used property. The reporting category RCS-2 applies to all of the other surface soil samples collected from the site since the sampled locations are not at or within 500 feet of a residential dwelling or a residentially-zoned property, school, playground, recreational area or park; or within the geographic boundaries of

a groundwater resource categorized as RCGW-1 (see groundwater results). Surface soil concentrations exceeding RCs are shown in bold on Table 4-1.

Specific VOCs and VPHs were not detected at any of the surface soil locations based on VPH analysis.

Aliphatic and aromatic hydrocarbon fractions were found at many of the surface soil locations based on EPH analysis. Concentrations for the hydrocarbon fractions were below the applicable RCs at all locations.

Numerous polycyclic aromatic hydrocarbons (PAHs) were found in all of the surface soil samples. Two sets of PAH data are shown in Table 4-1 because of overlap between two analytical methods: EPH and RAS semivolatile organic analysis. Data are reasonably comparable between the two data sets for concentrations detected above the sample-specific detection limits. Concentrations of individual PAH compounds were above the applicable RCs on five lots: Lot 2 (SS-03), Lot 3 (SS-04A and B), Lot 4 (SS-05A and B), Lot 5 (SS-06), and Lot 6 (SS-07). It should also be noted that PAHs other than those analyzed for (reported as tentatively identified compounds) were also detected in many of the samples. The highest PAH concentrations tended to occur on Lots 3 and 4. The PAHs are most likely related to historical use involving the burning and storage of coal or coal products, and possibly fill and the use and storage of asphalt on the site. Maps/plans of the site from when mill operations were active, show the presence of numerous coal piles across the site, possible operation of a coal gasification plant near the northeast corner of the site (offsite), and a former coal bin. In particular, coal ash was observed by M&E in the bare soil/stress vegetation area on Lot 3, where SS-04B was collected.

In addition to PAHs, dibenzofuran and carbazole (no RCs available) were found at most of the surface soil locations. These compounds are often found in samples with elevated PAH concentrations that result from coal sources.

At least one pesticide was detected in a surface soil sample from each lot; however, individual concentrations were below the applicable RCs in all samples. The highest concentrations tended to occur in SS-04B, Lot 3, the area with bare soil/stressed vegetation.

PCBs, Aroclor-1254, were detected on five lots: Lot 1B (SS-02), Lot 3 (SS-04B), Lot 5 (SS-06), Lot 6 (SS-07), and Lot 8 (SS-09). All of the detected PCB concentrations were below the applicable RCs. Aroclor-1254 was previously detected in soil on the site (Kurz, 1986). One of the previous locations (TP-19) was adjacent to the bike track, near Lot 6. The other previous location (TP-6) was near the central section of the site, possibly near the sample collected on Lot 5. The soil sample from Lot 3 (SS-04B) was collected from the area with bare soil/stressed vegetation where M&E observed used capacitors. The source(s) of the PCBs is not readily apparent; however, the Sanborn maps indicate that at one time, there was a transformer on the property. The source of PCBs may also be attributed to fill, if brought in from off-site areas or from the river.

All of the 23 metals analyzed for were detected in at least one of the 11 surface soil samples. The eight RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) were detected in most of the samples. Concentrations varied widely for many metals, with elevated concentrations for heavy metals on several lots. The only exceedance of the applicable metal RC was for lead on Lot 3 (SS-04A). Contaminated fill, if brought onto the site, may be a potential source of some of the metals found at elevated concentrations. Cyanide was not detected in any of the surface soil samples.

In summary, PAHs, most likely from past coal use and asphalt, are widespread in surface soil across the site. PAH concentrations exceeded applicable RCs on Lots 2 through 6. In particular, one surface soil location, SS-04B (Lot 3), exhibited elevated PAH concentrations compared to other surface soils. PCBs were detected in surface soil on three lots (1B, 3, and 6). Like PAHs, the highest PCB concentrations occurred at SS-04B on Lot 3. The only RC exceeded for metals was lead on Lot 3 (SS-04A). It should also be noted that some of the building debris found across the site may contain asbestos (Section 3.2).

Groundwater. Groundwater samples were collected from six temporary wells (for a total of four data sets) installed at the site (Figure 3-1). Sample collection procedures were described in Section 3.3. Table 3-2 summarizes the analysis conducted on each sample. Detected analytical data and reportable concentrations (RC) are shown on Table 4-2. The reporting category RCGW-2 applies to all groundwater samples collected from the site since the site is not within a current drinking water source area or a potential drinking water source area. Groundwater concentrations exceeding RCs are shown in bold on Table 4-2.

Volatile organic compounds (VOCs) were detected in groundwater at two well locations: the aliphatic hydrocarbon fraction in GW-01 and toluene in GW-03. Concentrations were below the RCGW-2 values for both analytes. It should be noted that no VOCs were detected in GW-04 even though a petroleum-like sheen was observed in the purge water during sampling (Section 3.3).

Two PAH compounds and the EPH C_{11}-C_{22} aromatic hydrocarbon fraction were detected in GW-01 and EPH C_9-C_{12} aliphatic hydrocarbon fraction were detected in GW-02. The detected concentrations were below the RCGW-2 values for these analytes.

One pesticide was detected in GW-02 (*gamma*-chlordane) and in GW-0-4 (heptachlor). Several pesticides were detected in GW-01 (*alpha*-BHC; heptachlor; 4,4'-DDE and 4,4'-DDT; and *gamma*-chlordane). Pesticides were not analyzed for in GW-03. None of the detected pesticides was above the RCGW-2 value.

The only PCB detected in groundwater was Aroclor-1254 in GW-01 at 2.6 μg/l. The detected concentration was above the RCGW-2 value of 0.3 μg/l. Generally, PCBs are not readily soluble in aqueous environments, preferring to sorb onto soil particles. Review of turbidity values directly prior to and following sample collection (2 to 6 NTU) at this well indicates that there were few solids in the sample and suggest that the detected value is a colloidal or dissolved form that

can easily migrate through groundwater. Furthermore, GW-01 is located near the bare soil/stressed vegetation area on Lot 3, the same area where used capacitors and PCBs were detected in surface soil sample SS-04B. PCBs were not analyzed for in GW-03.

A number of metals were detected in groundwater at all wells. Generally, basic cations (calcium, magnesium, sodium, and potassium) were present in the highest concentrations. The most elevated metals concentrations occurred at GW-03 (Lot 7), where the available RCGW-2 values were exceeded for antimony, cadmium, nickel, and silver. The elevated metals concentrations at GW-03 would be expected, to some degree, since groundwater from all wells except GW-03 were field filtered for metals due to elevated turbidities. This suggests that the elevated concentrations could be attributed to solids within the sample, as it was not filtered despite an elevated turbidity level (Appendix D) because of very limited sample volume due to poor recharge of this well.

The only detection of cyanide in groundwater was found in GW-04 (Lot 1B), and it exceeded the RCGW-2 value of 10 μg/l. It should be noted that the presence and certainty of this result are questionable based on review of laboratory QC criteria (Appendix E), since cyanide was reported as nondetected in a laboratory duplicate of the sample from GW-04. As a result of validation, the detected cyanide value was estimated and qualified with a "J" because of the conflicting duplicate analysis information. Therefore, the presence of this compound in the sample is uncertain.

In summary, no VOC or petroleum hydrocarbons were detected in GW-04 (Lot 1B). This suggests that petroleum-related contaminants from the fuel release at Mutual Oil Station (across the street from the northwest corner of the site) have not migrated onto the site in shallow groundwater. At each of the other three wells, there was some organic contamination found, though it was different at each well. Aliphatic hydrocarbons were detected in GW-01 (Lot 7), whereas toluene was detected at GW-03 (Lot 9). PCBs, PAHs, and several pesticides were found at GW-01 (Lot 3).

The organics detected in GW-04 (Lot 1B) and GW-01 (Lot 7) may be from an off-site source, since there are no known on-site sources of these compounds. The source of the aliphatic hydrocarbon fraction found in GW-02 (Lot 7) may be attributed to the concrete structure, assumed to be the 150,000-gallon buried tank. GW-02 is hydrogeologically downgradient of the structure, and evidence of petroleum-contamination from the structure was observed during test pit excavation (Section 3.1). Since the Lisbon Auto Repair Shop is hydrogeologically upgradient of GW-03 (Lot 9) and may have used/uses cleaning fluids, solvents, etc., that contain chemicals like toluene, the shop may be a potential source of the toluene found in GW-01 (Lot 7).

On the other hand, the organics detected in GW-01 (Lot 3) are similar to those found in the surface soil (SS-04B) collected within the same bare soil/stressed vegetation area. The physical characteristics of this area, coupled with the chemical data suggest that discrete dumping may have occurred at this location.

The only well where RCGW-2 values for metals were exceeded was GW-03 (Lot 7). The metals for which the RC values were exceeded are antimony, cadmium, nickel, and silver. Metals concentrations at GW-03 are likely more elevated compared to the three other wells that were sampled because the potential for higher solids within the sample volume analyzed. Review of laboratory data suggests that the cyanide detected in GW-04 (Lot 1B) may not be accurate.

5.0 RISK CHARACTERIZATION

The methods used to perform a preliminary risk characterization of the environmental surface soil and groundwater analytical data, as well as the findings of the preliminary risk characterization, are presented and discussed in this section.

5.1 Risk Characterization Methodology

A preliminary risk characterization of the surface soil and groundwater analytical data has been performed through a comparison of exposure point concentrations (EPCs) to applicable MCP Method 1 Standards. In order to calculate EPCs for soil and groundwater, sampling locations with sample and field duplicate results (i.e., SS-09, GW-02, and GW-04) were averaged to derive a single set of data for each sampling location. In calculating average values, one-half the sample quantitation limit was used for any non-detect results. EPCs for surface soil were derived for each subdivision lot. For lots where a single soil sample was collected, the detected contaminant concentrations were selected as the EPCs. For lots where two surface soil samples were collected (i.e., Lots 3 and 4), analytical results from the two samples were averaged, treating non-detect results as previously described, to derive EPCs. For groundwater, the analytical results for each temporary monitoring well were selected as the EPCs. Surface soil EPCs by lot, and groundwater EPCs by well, are presented on Tables 5-1 and 5-2, respectively.

Applicable Method 1 soil and groundwater standards were selected based on site-specific information regarding anticipated future site uses and known groundwater characteristics which were used to classify soil and groundwater into MCP soil and groundwater categories. The BWSC Site Scoring Map is presented in Appendix F. For groundwater, the site is not within an area that meets the criteria for classification into the GW-1 category (i.e., a current or future source of drinking water). However, since average annual depth to groundwater at the site is less than 15 feet below ground surface, structures will likely be built on the land above the groundwater, and groundwater likely discharges to a surface water receiving body (i.e., the Acushnet River). Therefore, the GW-2 and GW-3 groundwater categories were selected as appropriate to characterize groundwater risks to future human on-site receptors and potential ecological receptors in the environs of the Acushnet River. The MCP Method 1 standards for GW-2 groundwater were developed by MADEP to address the potential migration of volatile materials from groundwater to indoor air. The MCP Method 1 standards for GW-3 groundwater provide for protection against migration and discharge of groundwater contaminants to surface water at concentrations above Ambient Water Quality Criteria for freshwater and marine environments.

The site is currently undergoing development for marine-related industry. Therefore, the MCP S-2 soil category was selected as the most appropriate to characterize potential on-site risks to future industrial receptors contacting surface soil contaminants. The MCP Method 1 standards for category S-2 soils were developed by MADEP to be protective of adult exposures to soil contaminants during work-related activities and also to be protective of childhood exposures to soil contaminants of low intensity and frequency (e.g., passive recreational exposures).

Based on the soil and groundwater category classification for the site, surface soil EPCs for each lot were compared to MCP Method 1 S-2/GW-2 and S-2/GW-3 soil standards, and groundwater EPCs for each temporary monitoring well were compared to MCP Method 1 GW-2 and GW-3 groundwater standards. The S-2/GW-2 and S-2/GW-3 soil standards are presented on Table 5-1. GW-2 and GW-3 groundwater standards are presented on Table 5-2.

Method 2 standards were not developed for contaminants lacking MCP Method 1 standards. Instead, EPCs for contaminants lacking MCP Method 1 standards were qualitatively discussed relative to background levels, if appropriate and available, to standards developed for other contaminants with similar toxicological and/or fate and transport characteristics, or to guidelines developed by other regulatory agencies for a detected contaminant.

5.2 Findings

Surface Soil. Surface soil EPCs exceeding MCP Method 1 soil standards are shown in bold on Table 5-1. No exceedances of soil standards were noted for Lots 1B, 7, 8, and 9. For Lot 2, slight exceedances of the MCP Method 1 soil standards for benzo(a)pyrene (700 μg/kg) and dibenzo(a,h)anthracene (700 μg/kg) were noted (770 and 820 μg/kg, respectively). A number of exceedances of MCP Method 1 standards were noted for Lots 3, 4, 5, and 6, including benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and dibenzo(a,h)anthracene. In addition, the chrysene EPC for Lot 4 (10,300 μg/kg) slightly exceeds its Method 1 standard (10,000 μg/kg), and the lead EPC for Lot 3 (2,010 mg/kg) exceeds its Method 1 standard (600 mg/kg). As discussed in Section 4.4, the presence of PAHs and lead in surface soils may be related to the historical use and activities on the site.

Calcium, iron, magnesium, potassium, and sodium are essential nutrients, which were detected in on-site soils, lack MCP Method 1 soil standards. Because they are essential nutrients and present at relatively low environmental concentrations, it is unlikely that these analytes would present a risk to human or environmental receptors. In addition, the detected inorganic analytes aluminum, cobalt, copper, and manganese lack MCP Method 1 soil standards. However, MADEP has published background levels for these analytes in soil (aluminum 13,000 mg/kg; cobalt 4.4 mg/kg; copper 38 mg/kg; manganese 300 mg/kg). A comparison of the detected levels of these four analytes to their respective MADEP background levels demonstrates that each analyte is present at levels consistent with or only slightly above its background level.

MCP Method 1 soil standards are also lacking for the organic contaminants dibenzofuran, carbazole, *beta*-BHC, endosulfan sulfate, endrin ketone, and endrin aldehyde. The detected concentrations of these analytes may be qualitatively compared to MCP Method 1 soil standards developed for compounds with similar toxicological and/or fate and transport characteristics or to guidelines developed by other regulatory agencies for the detected contaminant. For this comparison, standards for: (1) endrin (S-2/GW-2 standard of 10,000 μg/kg and S-2/GW-3 standard of 1,000 μg/kg) have been selected for endrin ketone and endrin aldehyde; (2) endosulfan (S-2/GW-2 standard of 400,000 μg/kg and S-2/GW-3 standard of 5 μg/kg) have been selected for endosulfan sulfate; and (3) *gamma*-BHC (S-2/GW-2 standard of 600 μg/kg and S-2/GW-3 standard of 500 μg/kg) have been selected for *beta*-BHC. None of the EPCs for these compounds exceeds the surrogate Method 1 standard. Since no appropriate surrogates were identified for dibenzofuran and carbazole, the surface soil EPCs for these analytes have been qualitatively compared to the lower of the industrial soil risk-based concentration or the soil screening level (protective of leaching to groundwater, assuming dilution and attenuation) presented by EPA Region 9. All dibenzofuran surface soil EPCs are less than the screening level for dibenzofuran (510,00 μg/kg; risk-based concentration adjusted to a hazard index of 0.1). However, surface soil EPCs for Lots 3, 4, 5, and 6 exceed the screening level for carbazole (600 μg/kg; soil screening level).

Groundwater. Groundwater EPCs exceeding MCP Method 1 groundwater standards are shown in bold on Table 5-2. No exceedances of groundwater standards were noted for temporary monitoring well GW-02. For GW-01, an exceedance of the MCP Method 1 groundwater standards for PCB Aroclor-1254 (0.3 μg/l) was noted (EPC of 2.6 μg/l). A slight exceedance of the MCP Method 1 groundwater standard for cyanide (10 μg/l) was noted for GW-04 (EPC of 11.1 μg/l). However, as discussed in Section 4.4, the presence of cyanide in the GW-04 sample is uncertain. A number of inorganic exceedances of MCP Method 1 standards were noted for GW-03, including antimony, cadmium, nickel, and silver. It should be noted that field filtering was not performed on the groundwater sample from GW-03 prior to metals analysis.

Calcium, iron, magnesium, potassium, and sodium are essential nutrients, which were detected in on-site groundwater, but lack MCP Method 1 groundwater standards. Because they are essential nutrients and all, except sodium, are present at relatively low environmental concentrations, it is unlikely that these analytes would present a risk to human or environmental receptors. In addition, the detected metals aluminum, cobalt, copper, and manganese lack MCP Method 1 groundwater standards. No published MADEP background levels or appropriate risk-based concentrations are available to compare to the detected concentrations of these analytes. MCP Method 1 groundwater standards are also lacking for the *alpha*-BHC. The detected concentrations of this analyte may be qualitatively compared to the MCP Method 1 groundwater standards developed for a compound with similar toxicological and/or fate and transport characteristics. For this comparison, standards for *gamma*-BHC (GW-3 standard of 0.8 μg/l) have been selected for *alpha*-BHC. None of the EPCs for *alpha*-BHC exceed its surrogate Method 1 groundwater standard.

6.0 CONCLUSIONS AND RECOMMENDATIONS

This section presents the conclusions and recommendations for the BTSA investigation conducted at the Standard Times Field. The conclusions and recommendations are based on the intended future use of the site, which is to develop a 10-lot subdivision to support marine-related industry. Currently, the site preparation of the subdivision is being conducted by the city of New Bedford for this purpose.

The site is currently not listed as a waste site under the MCP. The BTSA was structured to provide environmental data that could be used to meet many of the requirements needed to assess the site relative to the MCP.

6.1 Conclusions

Information about historical use and operations at the site, ownership history, current site conditions, previous environmental studies at the site, and site-specific objectives are discussed in Section 2.0. The conclusions presented below focus on only the investigation and evaluation conducted as part of M&E's BTSA at the site.

- Groundwater flow direction, inferred from groundwater elevation measurements at four temporary monitoring wells, is east-southeast towards the Acushnet River.

- A large cylindrical concrete/rebar structure was located using geophysical techniques in the suspected area of the 150,000-gallon buried tank. The location was determined to be outside of the site boundaries. Test pits were excavated along the top of the tank and the western wall. Evidence of petroleum contamination in the immediate vicinity of the structure was visually observed during excavations. Petroleum hydrocarbons were detected in a soil/tar-like sample submitted for analysis from an opening on top of the structure.

- Evidence of coal layer 1 to 2 feet below grade was found in the suspected area of the former coal bin.

- Some of the building debris that is scattered across the site may contain asbestos. Asbestos was detected in a transite-type material on Lot 3.

- Aliphatic and aromatic hydrocarbon fractions, PAHs, pesticides, PCBs, and metals were detected in surface soils across the site. Applicable RCs (RCS-1 and RCS-2) and MCP Method 1 soil standards for industrial use were exceeded for PAHs in surface soils on Lots 2 through 6 and for lead in surface soils on Lot 3.

  - Since there is considerable evidence of historical coal use on the site, the site would qualify for exemption from notification for the PAH exceedances only.

- The lead exceedance on Lot 3 requires notification and further investigation. The source of the elevated lead level in this area is not known.

- The risk exceedances suggest that further investigation may be warranted at Lots 2 through 6 prior to industrial development.

- A limited number of organic compounds were detected in groundwater samples collected from four temporary monitoring wells installed across the site. The only organic compound that exceeded RCGW-2 values and MCP Method 1 groundwater standards for category GW-3 in groundwater was PCBs at GW-01 (Lot 3). A number of metals were detected; highest concentrations were found in the unfiltered sample from GW-03 (Lot 9). RCGW-2 values and MCP Method 1 groundwater standards for category GW-3 were exceeded for antimony, cadmium, nickel, and silver at GW-03 (Lot 9). RCGW-2 values and MCP Method 1 groundwater standards for category GW-3 were exceeded for cyanide at GW-04 (Lot 1B); however, the presence of cyanide detection is uncertain.

  - The PCB exceedance on Lot 3 and the metals exceedances on Lot 9 require notification and further investigation.

  - The risk exceedances suggest that further investigation may be warranted concerning potential impacts at the Acushnet River.

6.2 Recommendations

- Notification to MADEP is required because of applicable RC exceedances in surface soil and/or groundwater. Although it may involve more paperwork, it is suggested that separate notifications be made for different areas of the site. This will allow further assessments to be more focused and may facilitate a Response Action Outcome (RAO) for each specific area as it is investigated and/or remediated. A scope of work for Phase II investigation(s) and Tier Classification will need to be prepared and submitted in association with the notification paperwork.

  - Notification of PAH, PCB, and lead exceedances on Lot 3

  - Prepare separate notifications for Lot 3; one for area of SS-04A and one for area of SS-04B

  - Notification of metals exceedances on Lot 9

- Although there is not a need to notify the MADEP of subdivision lots with only PAH exceedances for RCs in surface soil (2 and 4 through 6) because of the coal/coal ash/wood ash exemption, further assessment and evaluation of risk is suggested.

- Consider applying minimal deed restrictions on subdivision lots with a reporting category of S-2 (Lots 2 through 6), to prevent future residential use.

- Precautions should be taken to ensure protection of personnel safety while conducting construction work on the site, particularly around building debris, where some materials may contain asbestos. Building debris materials such as roofing shingles, wall board, ceiling and floor tiles should be tested for ACMs prior to removal to determine proper disposal.

6.3 Limitations

No warranty, whether expressed or implied, is given with respect to this report or any opinions herein. It is expressly understood that this report and opinions expressed herein are based upon site conditions reported to M&E, observed by M&E, and as they existed only at the time this BTSA was conducted. Without limiting the foregoing, this report, any opinions or conclusions stated herein, and its attachments are subject to the complete General Statement of Limitations and Conditions provided in Appendix G, which are incorporated by reference into, and are an integral part of, this report submittal. This report has been prepared on behalf of, and for the exclusive use of, the U.S. Environmental Protection Agency. Any use of or reliance on M&E's report by a third party, even with M&E's consent, shall be at such party's own risk.

7.0 REFERENCES

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FIGURES

US EPA ARCHIVE DOCUMENT



SOURCE: USGS TOPOGRAPHIC MAP
NEW BEDFORD SOUTH, MA., 1977

2000 0 2000
SCALE IN FEET

FIGURE 1-1. SITE LOCATION MAP
STANDARD TIMES FIELD
FRONT STREET
NEW BEDFORD, MASSACHUSETTS

01/6402

N/F
WARREN FIVE CENTS
SAVINGS BANK

"NEW BEDFORD RADIO STATION TOWER"

APPROXIMATE LOCATION
OF FORMER COAL BIN

APPROXIMATE LOCATION OF
FORMER GAS MACHINE
AND GAS HOLDER

50' WIDE
ACCESS/UTILITY
EASEMENT

LOT 1A

LOT 1B

LOT 2

LOT 3

ZONE B

ZONE B

ZONE C

RESIDENTIAL

RESIDENTIAL

RESIDENTIAL

RESIDENTIAL

FRONT STREET (PUBLIC)

BLACKMER STREET

ACUSHNET RIVER

PROPOSED 20' WIDE
DRAINAGE EASEMENT

AREA OF
STRESSED VEGETATION,
BARE SOIL

ZONE C

LOT 5

ZONE C

ZONE C

LOT 4

RESIDENTIAL

LISBON
AUTO REPAIR

RESIDENTIAL

LOT 9

LOT 8

SILVA STREET

PARCEL "A"

APPROXIMATE MEAN HIGH WATER LINE

ZONE A1
ELEV. 6.0 MSL

100' BUFFER ZONE

ZONE A1
ELEV. 6.0 MSL

EXISTING
PARKING
LOT

EXISTING
BASEBALL FIELD

ZONE C

AREA OF
BURNED
VEGETATION
AND DEBRIS

AREA OF
SUSPECTED BURIED
150,000 GALLON TANK

LOT 7

UNITED
SOCIAL CLUB

LOT 6

100' BUFFER ZONE

APPROXIMATE LOCATION
FORMER TRANSFORMER

AREA OF
DIRT BIKE PATH

N

LEGEND

SUBDIVISION LOT BOUNDARY

ZONE A — FLOOD ZONE DESIGNATIONS

WETLANDS

SOURCE OF BASEMAP: (SITEC, 1998)
GRADE/UTILITY PLAN–SOUTH TERMINAL
OCTOBER 21, 1998

Note:
All BTSA locations are approximated based on GPS data obtained by Metcalf & Eddy.

M&E
AQUA ALLIANCE

METCALF & EDDY

FIGURE 2–1. SITE BASE MAP
FALL 1999
STANDARD TIMES FIELD
NEW BEDFORD, MASSACHUSETTS

SCALE: 1"=120'		1/18/00	CZNBB001	

STDB - 08-04-93 20655NBB\C

US EPA ARCHIVE DOCUMENT

N/F
WARREN FIVE CENTS
SAVINGS BANK

"NEW BEDFORD RADIO STATION TOWER"

TP-01
SS-03
TP-02

APPROXIMATE LOCATION
OF FORMER COAL BIN

APPROXIMATE LOCATION OF
FORMER GAS MACHINE
AND GAS HOLDER

INFERRED GROUNDWATER
FLOW DIRECTION

SS-02
GW-04
GW-04RE

LOT 1A
LOT 1B
LOT 2
LOT 3

ZONE B

50' WIDE
ACCESS/UTILITY
EASEMENT

SS-04A
TP-03
TP-04
SS-04B
GW-01

ZONE B

ACUSHNET RIVER

STREET (PUBLIC)

RESIDENTIAL
RESIDENTIAL
RESIDENTIAL
RESIDENTIAL

ZONE C

BLACKMER STREET

RESIDENTIAL

FRONT STREET

LISBON
AUTO REPAIR

RESIDENTIAL

SS-10
GW-03

LOT 9
LOT 8
LOT 5
LOT 4

ZONE C
ZONE C
ZONE C

PROPOSED 20' WIDE
DRAINAGE EASEMENT

AREA OF
STRESSED VEGETATION,
BARE SOIL

SILVA STREET

SS-06

ZONE A1
ELEV. 6.0 MSL

SS-05A

100'
BUFFER ZONE

ZONE A1
ELEV. 6.0 MSL

APPROXIMATE MEAN HIGH WATER LINE

PARCEL "A"

N

EXISTING
PARKING
LOT

EXISTING
BASEBALL FIELD

SS-09

ZONE C

TANK-03

AREA OF
BURNED
VEGETATION
AND DEBRIS

SS-05B

SS-07

LOT 7

GEOPHYSICAL SURVEY

SS-08

UNITED
SOCIAL CLUB

TANK-02

GW-02RE

LOT 6

100'
BUFFER ZONE

TANK-01

GW-02

APPROXIMATE LOCATION
FORMER TRANSFORMER

AREA OF
DIRT BIKE PATH

APPROXIMATE LOCATION
OF 150,000 GAL. TANK

LEGEND

———	SUBDIVISION LOT BOUNDARY
ZONE A	FLOOD ZONE DESIGNATIONS
	WETLANDS
GW-03	TEMPORARY WELL LOCATION
SS-10	SURFACE SOIL LOCATION
TP-01 OR TANK-01	TEST PIT LOCATION

SOURCE OF BASEMAP: (SITEC, 1998)
GRADE/UTILITY PLAN-SOUTH TERMINAL
OCTOBER 21, 1998

Note:
All BTSA locations are approximated based on GPS data obtained by Metcalf & Eddy.

M&E AQUA ALLIANCE

METCALF & EDDY

FIGURE 3-1. FIELD INVESTIGATION LOCATIONS
FALL 1999
STANDARD TIMES FIELD
NEW BEDFORD, MASSACHUSETTS

SCALE: 1"=120'		1/18/00	CZNBB003	

STDB - 08-04-93 20655NBB\C

TABLES

TABLE 3-1. SURFACE SOIL LOCATION SELECTION RATIONALE – STANDARD TIMES FIELD, FALL 1999 BTSA

Lot No.	Location ID	Rationale for Location Selection	Physical Description of Hole/Soil Sample
1B	SS-02	• most upgradient location for entire site (assumed groundwater flow direction) • possible impact area from off-site sources (Mutual Oil Station); no visual evidence of potential contaminant areas observed	• 0 to 1½ feet, dark loam • 1½ to 2 feet, sandy gravel • 2 to 3 feet, medium graded sand
2	SS-03	• located within estimated area of former coal bin	• 0 to ½ feet, sandy loam • ½ to 1 feet, clay with gravel • 1 to 1½ feet, sand with coal fragments over a layer of cobbles (possible road or foundation) • 1½ to 2 feet, sand • 2 to 3 feet, dark, dense sand with clay
3	SS-04A	• arbitrary location; no visual evidence of potential contaminant areas observed	• 0 to ½ feet, sandy loam • ½ to 3 feet, dense sand with gravel • 3 feet, dark dense clay layer (6 inches thick) • 3 to 4 feet, dense sandy clay below the clay layer
	SS-04B	• located within area of stressed vegetation, bare soil, capacitor debris, and coal ash	• 0 to 1 feet, sandy loam • 1 to 2 feet, sand • 2 to 2½ feet, layer of bricks • 2½ to 3 feet, dark, poorly graded sand and some coal ash with a sweet odor • cobbles and debris (brick and wood) were mixed throughout each layer
4	SS-05A	• arbitrary location; no visual evidence of potential contaminant areas observed	• 0 to 3 feet, loam with some sand, small quantity of bricks, wetland plant roots evident • 3 to 4 feet, greyish, dense sand
	SS-05B	• location within area of burned vegetation and debris including automotive/boat fuel tanks, tires, and glass fragments	• 0 to ½ feet, sandy loam • ½ to 3 feet, sandy clay with cobbles and some brick debris • 3 feet, dense sand layer
5	SS-06	• arbitrary location, placed; no visual evidence of potential contaminant areas observed	• 0 to 1 feet, dark sandy loam • 1 to 3 feet, dense sand with cobbles (some greyish sand mixed in)
6	SS-07	• arbitrary location; no visual evidence of potential contaminant areas observed	• 0 to 2 feet, fine sand with loam • 2 to 3 feet, sandy clay • 3 feet, ledge or boulder
7	SS-08	• arbitrary location, placed downgradient of suspected UST	• 0 to 1½ feet, loamy sand • 1.5 to 3 feet, poorly graded sand (beach sand)
8	SS-09	• arbitrary location; no visual evidence of potential contaminant areas observed	• 0 to 2 feet, sandy clay • 2 to 3 feet, dark, dense clay
9	SS-10	• arbitrary location, placed downgradient of auto body shop	• 0 to 1 feet, loamy sand • 1 to 3 feet, medium graded sand, some gravel

TABLE 3-2. SUMMARY OF SAMPLING LOCATIONS AND ANALYSES

LOT NO.	LOCATION ID	PARAMETERS*						
		VPH	EPH	SVOC	PEST	PCB	METALS	CYANIDE
SURFACE SOIL:								
1B	SS-02	x	x	x	x	x	x	x
2	SS-03	x	x	x	x	x	x	x
3	SS-04A	x	x	x	x	x	x	x
3	SS-04B	x	x	x	x	x	x	x
4	SS-05A	x	x	x	x	x	x	x
4	SS-05B	x	x	x	x	x	x	x
5	SS-06	x	x	x	x	x	x	x
6	SS-07	x	x	x	x	x	x	x
7	SS-08	x	x	x	x	x	x	x
8	SS-09	x	x	x	x	x	x	x
9	SS-10	x	x	x	x	x	x	x
GROUNDWATER:								
1B	GW-04	x	x	-	x	x	x	x
3	GW-01	x	x	-	x	x	x	x
7	GW-02	x	x	-	x	x	x	x
9	GW-03	x	x	-	**	**	x	x

NOTES:

* - Refer to Table 3-5 for analytical methodology

** - Sample volume not collected for this analysis due to poor recharge

VPH - Volatile Petroleum Hydrocarbons

EPH - Extractable Petroleum Hydrocarbons

PEST - Pesticides

PCB - Polychlorinated biphenyls

TABLE 3-3. TEMPORARY WELL LOCATION SELECTION RATIONALE – STANDARD TIMES FIELD, FALL 1999 BTSA

Lot No.	Location ID	Rationale for Location Selection
1B	GW-04	• located in the hydrogeologically-inferred downgradient direction of Mutual Oil Station • attempts to locate further northwest failed because of shallow refusal depths encountered (2 to 3 feet)
3	GW-01	• located within area of bare soil and stressed vegetation • attempts to locate further northeast failed because of difficult terrain and shallow refusal depths
7	GW-02	• located hydrogeologically-inferred downgradient direction of buried concrete structure (assumed to be 150,000-gallon buried tank)
3	GW-03	• located hydrogeologically-inferred downgradient direction of Lisbon Auto Repair Shop

TABLE 3-4. GROUNDWATER ELEVATION MEASUREMENTS

Lot No.	Location ID	Depth groundwater (ft bgs)	Relative Elevation* (feet)
1B	GW-04	6.15	7.21
3	GW-01	3.14	6.86
	GW-03	7.31	7.89
7	GW-02	5.90	7.10

*Top of well elevation is relative to an on-site reference point
ft bgs - feet below ground surface

TABLE 3-5. SAMPLE ANALYSES AND QUANTITIES COLLECTED

Analysis/Parameter*	Locations/ Field Samples	Field-Collected QC Samples				Total Samples
		Trip Blanks	Field Duplicates	MS	MSD	
Surface Soil Samples						
RAS						
Semivolatile Organic Compounds (OLM04.1)	11	0	1	1	1	14
Inorganics - Metals/Cyanide (ILM04.0)	11	0	1	1	0	13
Pesticides/PCBs (OLM04.1)	11	0	1	1	1	14
Directly Subcontracted						
Volatile Petroleum Hydrocarbons (VPH; MADEP)	11	1	1	0	0	13
Extractable Petroleum Hydrocarbons (EPH; MADEP)	11	0	1	0	0	12
Soil Samples - Ground Surface Debris						
Directly Subcontracted						
Asbestos (40CFR, Chap.1)	3	0	0	0	0	3
Product Sample - Buried Tank						
Directly Subcontracted						
GC/FID Fingerprint (SW8100)	1	0	0	0	0	1
PCBs (SW8082)	1	0	0	0	0	1
Groundwater						
RAS						
Metals (ILM04.0)	4	0	1	1	0	6
Cyanide (ILMO4.0)	3	0	1	1	0	5
Pesticides (OLMO4.1)	5	0	2	1	1	9
PCBs (OLM04.1)	5	0	2	1	1	9
Directly Subcontracted						
Volatile Petroleum Hydrocarbons (VPH; MADEP)	6	2	2	1	1	12
Extractable Petroleum Hydrocarbons (EPH; MADEP)	6	0	2	1	1	10

NOTES:

* - RAS method numbers indicate the most recent CLP Statement of Work revision. Previous versions may be used by the CLP laboratory. Methods for subcontracted laboratory analyses are presented paranthetically, with references listed below.

Directly Subcontracted Methods:

40CFR: Analysis is based upon *Analysis of Bulk Asbestos in Building Materials* as defined in 40 CFR.

SW846: Test Methods for Evaluating Solid Wastes, Third Edition, Update 3, U.S.EPA, December 1996.

CLP - Contract Laboratory Program

RAS - Routine Analytical Services

GC/FID - Gas Chromatograph/Flame Ionization Detector

MS/MSD - Matrix Spike/Matrix Spike Duplicate

US EPA ARCHIVE DOCUMENT

TABLE 4-1. SUMMARY OF ANALYTICAL DATA – SURFACE SOILS *
BTSA INVESTIGATION – STANDARD TIMES FIELD – FALL 1999

LOT NUMBER	1B	8		9		2	3		4		
LOCATION NAME	SS-02	SS-09		SS-10		SS-03	SS-04A	SS-04B	SS-05A	SS-05B	
SAMPLE DEPTH (ft bgs)	0.0 - 3.0	0.0 - 3.0		0.0 - 3.0	Reportable	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	Reportable
M&E SAMPLE ID	SS0201STF	SS0901STF	SSK0901STF	SS1001STF	Concentrations	SS0301STF	SS0401STF	SS0402STF	SS0501STF	SS0502STF	Concentrations
DATE SAMPLED	09/28/99	09/28/99	09/28/99	09/28/99	**	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	**
COMMENTS			FD		RCS-1						RCS-2
PARAMETER/ANALYTE											
VOLATILE PETROLEUM HYDROCARBONS - MADEP-VPH-98-1 (µg/kg)											
None Detected											
EXTRACTABLE PETROLEUM HYDROCARBONS - MADEP-EPH-98-1 (µg/kg)											
C_9-C_{18} Aliphatics (1)	3,200 U	3,100 U	3,200 U	2,900 U	1,000,000	3,500 U	3,200	3,400 U	3,300 U	3,400 U	2,500,000
C_{19}-C_{36} Aliphatics (1)	4,200 U	4,200 U	4,200 U	3,900 U	2,500,000	4,600 U	50,000	19,000	32,000	19,000	5,000,000
C_{11}-C_{22} Aromatics (1,2)	9,000 U	8,900 U	9,000 U	8,300 U	200,000	23,000	180,000	120,000	290,000	75,000	2,000,000
Naphthalene	530 U	520 U	530 U	490 U	4,000	580 U	520 U	570 U	1,300	570 U	1,000,000
2-Methylnapthalene	530 U	520 U	530 U	490 U	4,000	580 U	520 U	570 U	720	570 U	1,000,000
Acenaphthylene	530 U	520 U	530 U	490 U	100,000	580 U	520 U	570 U	1,100	570 U	1,000,000
Acenaphthene	530 U	520 U	530 U	490 U	20,000	580 U	520 U	570 U	2,000	570 U	2,500,000
Fluorene	530 U	520 U	530 U	490 U	400,000	580 U	570	570 U	2,600	570 U	2,000,000
Phenanthene	530 U	520 U	530 U	490 U	100,000	1,500	7,800	6,800	20,000	1,500	100,000
Anthracene	530 U	520 U	530 U	490 U	1,000,000	580 U	2,100	1,600	4,000	570 U	1,000,000
Fluoranthene	530 U	520 U	530 U	490 U	1,000,000	1,600	16,000	13,000	24,000	3,000	1,000,000
Pyrene	530 U	520 U	530 U	490 U	700,000	1,500	17,000	13,000	28,000	3,900	2,000,000
Benzo(a)anthracene	530 U	520 U	530 U	490 U	700	780	**8,600**	**6,000**	**12,000**	**2,000**	1,000
Chrysene	530 U	520 U	530 U	490 U	7,000	850	7,400	5,200	**12,000**	2,000	10,000
Benzo(b)fluoranthene	530 U	520 U	530 U	490 U	700	580	**7,700**	**5,700**	**9,300**	**2,100**	1,000
Benzo(k)fluoranthene	530 U	520 U	530 U	490 U	7,000	770	4,600	5,300	8,700	1,800	10,000
Benzo(a)pyrene	530 U	520 U	530 U	490 U	700	**770**	**8,200**	**5,800**	**11,000**	**2,200**	700
Indeno(1,2,3-cd)pyrene (3)	530 U	520 U	530 U	490 U	700	820	**7,500**	**7,000**	**10,000**	**2,500**	1,000
Dibenzo(a,h)anthracene (3)	530 U	520 U	530 U	490 U	700	**820**	**7,500**	**7,000**	**10,000**	**2,500**	700
Benzo(g,h,I)perylene	530 U	520 U	530 U	490 U	1,000,000	580 U	5,300	5,000	7,400	2,000	2,500,000
SEMIVOLATILE ORGANIC COMPOUNDS - RAS (µg/kg)											
Naphthalene	360 U	350 U	340 U	18 J	4,000	140 J	450 J	510 J	1,300 J	430 J	1,000,000
2-Methylnaphthalene	360 UJ	350 UJ	340 UJ	340 UJ	4,000	49 J	440 J	250 J	480 J	3,800 UJ	1,000,000
Acenaphthylene	29 J	350 U	340 U	340 U	100,000	59 J	1,200 J	700 J	1,700 J	1,400 J	1,000,000
Acenaphthene	28 J	350 U	340 U	340 U	20,000	140 J	470 J	1,200 J	2,100 J	640 J	2,500,000
Dibenzofuran	19 J	350 U	340 U	340 U	100,000	110 J	370 J	710 J	1,600 J	410 J	1,000,000
Fluorene	27 J	350 U	340 U	340 U	400,000	140 J	1,600 J	1,400 J	2,200 J	820 J	2,000,000
Phenanthrene	360	22 J	27 J	84 J	100,000	1,100	11,000	14,000	18,000	7,000	100,000
Anthracene	83 J	350 U	340 U	25 J	1,000,000	250 J	3,300	4,200	5,600	2,200 J	1,000,000
Carbazole	42 J	350 U	340 U	340 U	–	150 J	770 J	2,000 J	2,400 J	670 J	–
Fluoranthene	650	41 J	72 J	170 J	1,000,000	1,400	14,000	21,000	24,000	12,000	1,000,000
Pyrene	530	35 J	60 J	140 J	700,000	1,100	20,000	19,000	22,000	12,000	2,000,000
Benzo(a)anthracene	290 J	23 J	37 J	91 J	700	640	**8,900**	**10,000**	**14,000**	**6,200**	1,000
Chrysene	320 J	27 J	35 J	96 J	7,000	700	8,400	9,900	**14,000**	6,600	10,000
Benzo(b)fluoranthene	250 J	21 J	33 J	76 J	700	580	**7,700**	**9,100**	**12,000**	**5,300**	1,000
Benzo(k)fluoranthene	340 J	25 J	33 J	92 J	7,000	620	5,000	**11,000**	**11,000**	6,100	10,000
Benzo(a)pyrene	310 J	21 J	36 J	92 J	700	650	**7,800**	**11,000**	**14,000**	**7,100**	700

US EPA ARCHIVE DOCUMENT

TABLE 4-1. SUMMARY OF ANALYTICAL DATA – SURFACE SOILS *
BTSA INVESTIGATION – STANDARD TIMES FIELD – FALL 1999

LOT NUMBER	1B	8		9		2	3		4		
LOCATION NAME	SS-02	SS-09		SS-10		SS-03	SS-04A	SS-04B	SS-05A	SS-05B	
SAMPLE DEPTH (ft bgs)	0.0 - 3.0	0.0 - 3.0		0.0 - 3.0	Reportable	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	Reportable
M&E SAMPLE ID	SS0201STF	SS0901STF	SSK0901STF	SS1001STF	Concentrations	SS0301STF	SS0401STF	SS0402STF	SS0501STF	SS0502STF	Concentrations
DATE SAMPLED	09/28/99	09/28/99	09/28/99	09/28/99	**	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	**
COMMENTS			FD		RCS-1						RCS-2
Indeno(1,2,3-cd)pyrene	190 J	350 U	22 J	59 J	700	370 J	4,200	7,400	7,900	4,300	700
Dibenz(a,h)anthracene	65 J	350 U	340 U	28 J	700	190 J	2,100	2,500 J	3,200 J	1,500 J	700
Benzo(g,h,i)perylene	190 J	19 J	24 J	66 J	1,000,000	400	4,700	8,300	9,100	5,300	2,500,000
PESTICIDES - RAS (µg/Kg)											
beta-BHC	3.9 J	1.8 UJ	1.8 UJ	1.7 UJ	10,000	1.9 UJ	R	R	2.0 UJ	2.0 UJ	100,000
Heptachlor	R	0.29 J	0.62 J	0.69 J	100	1.9 U	1.8 U	1.9 U	2.0 U	2.0 U	200
4,4'-DDE	20 J	3.4 U	3.5 U	3.3 U	2,000	3.7 U	R	82 J	R	R	2,000
Endrin	R	3.4 UJ	3.5 UJ	3.3 UJ	600	7.7 J	R	3.7 UJ	R	3.8 UJ	50
Endosulfan II	4.0 J	3.4 U	3.5 U	3.3 U	50	3.7 U	3.6 J	3.7 U	3.8 U	3.8 U	50
4,4'-DDD	3.4 U	3.4 U	3.5 U	3.3 U	2,000	R	R	3.7 U	3.8 U	73 J	3,000
Endosulfan sulfate (4)	13 J	3.4 U	3.5 U	3.3 U	50	R	R	22 J	12 J	8.0 J	50
4,4'-DDT	75	6.7 J	4.4 J	4.7 J	2000	11 J	R	300 J	R	R	2,000
Methoxychlor	40	18 UJ	18 UJ	17 UJ	30,000	53 J	18 UJ	180 J	R	R	30,000
Endrin ketone (5)	3.4 U	3.4 U	3.5 U	3.3 U	600	17 J	47 J	60 J	56 J	R	1,000
Endrin aldehyde	R	3.4 U	3.5 U	3.3 U	10,000	7.0 J	5.5 J	R	50 J	12 J	100,000
alpha-Chlordane	8.6 J	1.8 U	1.8 U	1.7 U	1,000	1.9 U	1.80 U	R	2.0 U	2.0 U	2,000
gamma-Chlordane	R	1.8 U	1.8 U	1.7 U	1,000	1.9 U	2.6 J	R	R	3.7 J	2,000
PCBS - RAS (µg/kg)											
Aroclor-1254	380 J	41	37	33 U	2,000	37 U	36 U	1,700 J	38 U	38 U	2,000
METALS - RAS (mg/kg)											
Aluminum	5,110	3,390	3,070	2,020	--	3,860	3,720	3,950	3,680	3,880	--
Antimony	0.48 J	0.49 UJ	0.47 UJ	0.46 UJ	10	0.51 UJ	21.4 J	0.54 UJ	0.49 UJ	0.52 UJ	40
Arsenic	1.3	1.7	1.6	1.0	30	14.3	5.5	14.7	7.1	6.6	30
Barium	18.3	8.1	7.1	10.4	1,000	55.1	165	125	86.8	28.9	2,500
Beryllium	0.02 U	0.04 U	0.06 U	0.04 U	1	0.12 U	0.11 U	0.59	0.11 U	0.09 U	0.8
Cadmium	0.09 U	0.09 U	0.09 U	0.08 U	30	0.09 U	1.9	0.34 U	0.09 U	0.09 U	80
Calcium	559	556	497	966	--	737	4,900	6,110	1,400	1,500	--
Chromium	4.4	7.1	6.2	3.8	1,000	4.5	9.1	5.7	9.1	8.5	2,500
Cobalt	1.5	1.8	1.5	1.2	500	2.7	3.5	3.5	3.1	2.3	5,000
Copper	4.7	7.3	5.2	6.7	1,000	16.5	47.7	57.5	32.8	28.5	10,000
Iron	5,770	6,370	5,600	3,400	--	9,730	17,400	10,700	16,600	12,400	--
Lead	30.0 J	5.4 J	5.1 J	13.4 J	300	105 J	3,640 J	379 J	151 J	99.7 J	600
Magnesium	834	1,260	1,100	858	--	929	1,290	1,880	1,280	943	--
Manganese	91.8	65.9	61.4	51.8	--	65.9	141	122	121	85.7	--
Mercury	0.06 UJ	0.06 UJ	0.05 UJ	0.05 UJ	20	0.05 UJ	0.07 UJ	0.27 J	0.41 J	0.08 UJ	60
Nickel	2.8	3.8	3.2	3.0	300	5.1	7.6	8.0	8.0	5.5	700
Potassium	253	556	442	256	--	985	324	480	433	308	--
Selenium	0.39 U	0.55 U	0.39 U	0.39 U	400	1.7 U	0.96 U	2.8	1.1 U	1.1 U	2,500
Silver	0.13 U	0.13 U	0.09 U	0.08 U	100	0.23 U	0.82	0.15 U	0.31 U	0.23 U	200
Sodium	94.0	132	98.2	117	--	255	129	305	132	114	--
Vanadium	8.6	10.1	8.5	4.9	400	9.2	11.7	14.9	22.8	11.5	2,000
Zinc	20.0	14.4	13.1	13.2	2,500	58.9	327	142	85.1	55.8	2,500

US EPA ARCHIVE DOCUMENT

TABLE 4-1. SUMMARY OF ANALYTICAL DATA -- SURFACE SOILS *
BTSA INVESTIGATION -- STANDARD TIMES FIELD -- FALL 1999

LOT NUMBER	1B	8		9		2	3		4		
LOCATION NAME	SS-02	SS-09		SS-10		SS-03	SS-04A	SS-04B	SS-05A	SS-05B	
SAMPLE DEPTH (ft bgs)	0.0 - 3.0	0.0 - 3.0		0.0 - 3.0	Reportable	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	Reportable
M&E SAMPLE ID	SS0201STF	SS0901STF	SSK0901STF	SS1001STF	Concentrations	SS0301STF	SS0401STF	SS0402STF	SS0501STF	SS0502STF	Concentrations
DATE SAMPLED	09/28/99	09/28/99	09/28/99	09/28/99	**	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	**
COMMENTS			FD		RCS-1						RCS-2
INORGANICS - RAS (mg/kg)											
None Detected											
LAB SAMPLE ID											
Volatile Petroleum Hydrocarbons	43026-12	43026-9	43026-10	43026-11		43026-1	43026-2	43026-3	43026-4	43026-5	
Extractable Petroleum Hydrocarbons	43026-12	43026-9	43026-10	43026-11		43026-1	43026-2	43026-3	43026-4	43026-5	
Semivolatile Organic Compounds	APF79	APF88	APF89	APF90		APF80	APF81	APF82	APF83	APF84	
Pesticides/PCBs	APF79	APF88	APF89	APF90		APF80	APF81	APF82	APF83	APF84	
Inorganics (Metals/Cyanide)	MALP88	MALP97	MALP98	MALP99		MALP89	MALP90	MALP91	MALP92	MALP93	

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TABLE 4-1. SUMMARY OF ANALYTICAL DATA – SURFACE SOILS *
BTSA INVESTIGATION – STANDARD TIMES FIELD – FALL 1999

	5	6	7	8		9	
LOCATION NAME	SS-06	SS-07	SS-08	SS-09		SS-10	
SAMPLE DEPTH (ft bgs)	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0		0.0 - 3.0	Reportable
M&E SAMPLE ID	SS0601STF	SS0701STF	SS0801STF	SS0901STF	SSK0901STF	SS1001STF	Concentrations
DATE SAMPLED	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	**
COMMENTS					FD		RCS-2
PARAMETER/ANALYTE							
VOLATILE PETROLEUM HYDROCARBONS - MADEP-VPH-98-1 (µg/kg)							
None Detected							
EXTRACTABLE PETROLEUM HYDROCARBONS - MADEP-EPH-98-1 (µg/kg)							
C_9-C_{18} Aliphatics (1)	3,200 U	3,200 U	2,900 U	3,100 U	3,200 U	2,900 U	2,500,000
C_{19}-C_{36} Aliphatics (1)	14,000	7,500	3,900 U	4,200 U	4,200 U	3,900 U	5,000,000
C_{11}-C_{22} Aromatics (1,2)	60,000	49,000	8,900	8,900 U	9,000 U	8,300 U	2,000,000
Naphthalene	540 U	530 U	480 U	520 U	530 U	490 U	1,000,000
2-Methylnapthalene	540 U	530 U	480 U	520 U	530 U	490 U	1,000,000
Acenaphthylene	540 U	530 U	480 U	520 U	530 U	490 U	1,000,000
Acenaphthene	540 U	530 U	480 U	520 U	530 U	490 U	2,500,000
Fluorene	540 U	530 U	480 U	520 U	530 U	490 U	2,000,000
Phenanthene	1,900	3,400	480 U	520 U	530 U	490 U	100,000
Anthracene	540 U	820	480 U	520 U	530 U	490 U	1,000,000
Fluoranthene	3,200	4,900	480 U	520 U	530 U	490 U	1,000,000
Pyrene	3,800	4,800	480 U	520 U	530 U	490 U	2,000,000
Benzo(a)anthracene	**1,800**	**2,200**	480 U	520 U	530 U	490 U	1,000
Chrysene	1,900	2,100	480 U	520 U	530 U	490 U	10,000
Benzo(b)fluoranthene	**1,700**	**1,900**	480 U	520 U	530 U	490 U	1,000
Benzo(k)fluoranthene	1,200	1,600	480 U	520 U	530 U	490 U	10,000
Benzo(a)pyrene	**1,800**	**2,100**	480 U	520 U	530 U	490 U	700
Indeno(1,2,3-cd)pyrene (3)	**1,800**	**2,100**	480 U	520 U	530 U	490 U	1,000
Dibenzo(a,h)anthracene (3)	**1,800**	**2,100**	480 U	520 U	530 U	490 U	700
Benzo(g,h,I)perylene	1,300	1,400	480 U	520 U	530 U	490 U	2,500,000
SEMIVOLATILE ORGANIC COMPOUNDS - RAS (µg/kg)							
Naphthalene	500 J	280 J	330 U	350 U	340 U	18 J	1,000,000
2-Methylnaphthalene	170 J	3,700 UJ	330 UJ	350 UJ	340 UJ	340 UJ	1,000,000
Acenaphthylene	540 J	560 J	330 U	350 U	340 U	340 U	1,000,000
Acenaphthene	770 J	580 J	330 U	350 U	340 U	340 U	2,500,000
Dibenzofuran	570 J	370 J	330 U	350 U	340 U	340 U	1,000,000
Fluorene	840 J	540 J	330 U	350 U	340 U	340 U	2,000,000
Phenanthrene	7,600	5,400	35 J	22 J	27 J	84 J	100,000
Anthracene	1,800 J	1,400 J	330 U	350 U	340 U	25 J	1,000,000
Carbazole	880 J	650 J	330 U	350 U	340 U	340 U	--
Fluoranthene	9,400	8,900	70 J	41 J	72 J	170 J	1,000,000
Pyrene	8,600	8,200	56 J	35 J	60 J	140 J	2,000,000
Benzo(a)anthracene	**4,200**	**4,700**	33 J	23 J	37 J	91 J	1,000
Chrysene	4,400	4,900	35 J	27 J	35 J	96 J	10,000
Benzo(b)fluoranthene	**3,100 J**	**4,600**	24 J	21 J	33 J	76 J	1,000
Benzo(k)fluoranthene	4,400	5,200	48 J	25 J	33 J	92 J	10,000
Benzo(a)pyrene	**4,300**	**5,500**	31 J	21 J	36 J	92 J	700

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TABLE 4-1. SUMMARY OF ANALYTICAL DATA – SURFACE SOILS *
BTSA INVESTIGATION – STANDARD TIMES FIELD – FALL 1999

	5	6	7	8		9	
LOCATION NAME	SS-06	SS-07	SS-08	SS-09		SS-10	
SAMPLE DEPTH (ft bgs)	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0		0.0 - 3.0	Reportable
M&E SAMPLE ID	SS0601STF	SS0701STF	SS0801STF	SS0901STF	SSK0901STF	SS1001STF	Concentrations
DATE SAMPLED	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	**
COMMENTS					FD		RCS-2
Indeno(1,2,3-cd)pyrene	2,400 J	3,300 J	25 J	350 U	22 J	59 J	700
Dibenz(a,h)anthracene	950 J	1,300 J	330 U	350 U	340 U	28 J	700
Benzo(g,h,i)perylene	2,600 J	3,800	25 J	19 J	24 J	66 J	2,500,000
PESTICIDES - RAS (µg/Kg)							
beta-BHC	1.8 UJ	1.7 UJ	1.7 UJ	1.8 UJ	1.8 UJ	1.7 UJ	100,000
Heptachlor	1.8 U	1.7 U	1.7 U	0.29 J	0.62 J	0.69 J	200
4,4'-DDE	38 J	R	3.3 U	3.4 U	3.5 U	3.3 U	2,000
Endrin	3.6 UJ	3.4 UJ	3.3 UJ	3.4 UJ	3.5 UJ	3.3 UJ	50
Endosulfan II	3.6 U	3.4 U	3.3 U	3.4 U	3.5 U	3.3 U	50
4,4'-DDD	R	R	3.3 U	3.4 U	3.5 U	3.3 U	3,000
Endosulfan sulfate (4)	3.6 U	R	3.3 U	3.4 U	3.5 U	3.3 U	50
4,4'-DDT	R	49 J	2.3 J	6.7 J	4.4 J	4.7 J	2,000
Methoxychlor	18 UJ	17 UJ	17 UJ	18 UJ	18 UJ	17 UJ	30,000
Endrin ketone (5)	21	10	3.3 U	3.4 U	3.5 U	3.3 U	1,000
Endrin aldehyde	3.6 U	3.4 U	3.3 U	3.4 U	3.5 U	3.3 U	100,000
alpha-Chlordane	1.8 U	1.7 U	1.7 U	1.8 U	1.8 U	1.7 U	2,000
gamma-Chlordane	1.8 U	R	1.7 U	1.8 U	1.8 U	1.7 U	2,000
PCBS - RAS (µg/kg)							
Aroclor-1254	360 J	380	33 U	41	37	33 U	2,000
METALS - RAS (mg/kg)							
Aluminum	3,940	3,650	2,620	3,390	3,070	2,020	–
Antimony	0.47 UJ	0.49 UJ	0.45 UJ	0.49 UJ	0.47 UJ	0.46 UJ	40
Arsenic	3.9	3.5	1.3	1.7	1.6	1.0	30
Barium	54.2	37.5	8.1	8.1	7.1	10.4	2,500
Beryllium	0.09 U	0.11 U	0.06 U	0.04 U	0.06 U	0.04 U	0.8
Cadmium	0.09 U	0.09 U	0.08 U	0.09 U	0.09 U	0.08 U	80
Calcium	1,180	1,070	468	556	497	966	–
Chromium	10.6	6.4	4.3	7.1	6.2	3.8	2,500
Cobalt	2.6	2.2	1.4	1.8	1.5	1.2	5,000
Copper	20.8	15.5	4.4	7.3	5.2	6.7	10,000
Iron	6,130	6,290	4,500	6,370	5,600	3,400	–
Lead	134 J	66.4 J	5.0 J	5.4 J	5.1 J	13.4 J	600
Magnesium	1,460	1,190	891	1,260	1,100	858	–
Manganese	76.5	84.5	58.2	65.9	61.4	51.8	–
Mercury	0.09 UJ	0.05 UJ	0.05 UJ	0.06 UJ	0.05 UJ	0.05 UJ	60
Nickel	6.8	4.8	3.4	3.8	3.2	3.0	700
Potassium	466	433	251	556	442	256	–
Selenium	0.42 U	0.49 U	0.42 U	0.55 U	0.39 U	0.39 U	2,500
Silver	0.17 U	0.13 U	0.16 U	0.13 U	0.09 U	0.08 U	200
Sodium	94.9	122	95.9	132	98.2	117	–
Vanadium	10.6	11.1	5.8	10.1	8.5	4.9	2,000
Zinc	69.5	39.3	11.9	14.4	13.1	13.2	2,500

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TABLE 4-1. SUMMARY OF ANALYTICAL DATA -- SURFACE SOILS *
BTSA INVESTIGATION -- STANDARD TIMES FIELD -- FALL 1999

	5	6	7	8		9	
LOCATION NAME	SS-06	SS-07	SS-08	SS-09		SS-10	
SAMPLE DEPTH (ft bgs)	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0		0.0 - 3.0	Reportable
M&E SAMPLE ID	SS0601STF	SS0701STF	SS0801STF	SS0901STF	SSK0901STF	SS1001STF	Concentrations
DATE SAMPLED	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	**
COMMENTS					FD		RCS-2
INORGANICS - RAS (mg/kg)							
None Detected							
LAB SAMPLE ID							
Volatile Petroleum Hydrocarbons	43026-6	43026-7	43026-8	43026-9	43026-10	43026-11	
Extractable Petroleum Hydrocarbons	43026-6	43026-7	43026-8	43026-9	43026-10	43026-11	
Semivolatile Organic Compounds	APF85	APF86	APF87	APF88	APF89	APF90	
Pesticides/PCBs	APF85	APF86	APF87	APF88	APF89	APF90	
Inorganics (Metals/Cyanide)	MALP94	MALP95	MALP96	MALP97	MALP98	MALP99	

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TABLE 4-1 NOTES:

ft bgs - feet below ground surface

FD - Field Duplicate

J - Quantitation is approximate due to limitations identified in the quality control review.

R - Value is rejected.

U - Value reported is the sample-specific detection limit.

UJ - Sample-specific detection limit is approximate due to limitations identified in the quality control review.

-- No Reportable Concentration

MADEP Criteria

S-1 Reportable Concentrations, 310 CMR 40.0000 Subpart P Massachusetts Oil and Hazardous Material List

S-2 Reportable Concentrations, 310 CMR 40.0000 Subpart P Massachusetts Oil and Hazardous Material List

* - Validated data presented. Analyte presented if it was detected in at least one sample from this grouping.

** - Values shown for standards are in the same units as the analytical data.

1. Hydrocarbon range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2. C_{11}-C_{22} Aromatic hydrocarbons exclude the concentration of target PAH analytes.
3. Values reported reflect their sum.
4. Reportable concentration for Endosulfan shown.
5. Reportable concentration for Endrin and Metabolites shown.

TABLE 4-2. SUMMARY OF ANALYTICAL DATA – GROUNDWATER *
BTSA INVESTIGATION – STANDARD TIMES FIELD – FALL 1999

LOT NUMBER	1B		3	7		9	
LOCATION NAME	GW-04 ***		GW-01	GW-02 ***		GW-03	
SAMPLE DEPTH (ft bgs) **	0-10 / 3-8.5		0-7	0-10 / 3-8		1-11	
M&E SAMPLE ID	GW0201STF & GW-02RE	GWK-02RE	FGW0401STF	FGW0801STF & GW-08RE	GWK0801STF	GW1001STF	Reportable Concentrations ****
DATE SAMPLED	/30&11/02/99	11/02/99	09/30/99	9/30&11/02/99	09/30/99	09/30/99	
COMMENTS		FD			FD		RCGW-2
PARAMETER/ANALYTE							
VOLATILE PETROLEUM HYDROCARBONS - MADEP-VPH-98-1 (µg/l)							
C_9-C_{12} Aliphatics (1,2)	100 U	100 U	120	100 U		100 U	1,000
Toluene	15 U	15 U	15 U	15 U		190	6,000
EXTRACTABLE PETROLEUM HYDROCARBONS - MADEP-EPH-98-1 (µg/l)							
C_{19}-C_{36} Aliphatics (1)	50 U	48 U	41 U	150		41 U	20,000
C_{11}-C_{22} Aromatics (1,3)	110 U	100 U	220 J	110 U		87 U	30,000
Naphthalene	6.2 U	6.0 U	8.1 J	6.2 U		5.1 U	6,000
2-Methylnapthalene	6.2 U	6.0 U	14 J	6.2 U		5.1 U	3,000
PESTICIDES - RAS (µg/l)							
alpha-BHC	0.050 U	0.050 U	0.26	0.050 U		(5)	5,000
Heptachlor	0.031 J	0.021 J	0.059 J	0.050 U		(5)	1
4,4'-DDE	0.10 U	0.10 U	0.16	0.10 U		(5)	100
4,4'-DDT	0.10 U	0.10 U	0.15 J	0.10 U		(5)	0.3
gamma-Chlordane	0.050 U	0.050 U	0.050 U	0.023 J		(5)	2
PCBS - RAS (µg/l)							
Aroclor-1254	1.0 U	1.0 U	**2.6 J**	1.0 U		(5)	0.3
METALS - RAS (µg/l) (4)							
Aluminum	66.7 U		98.4 U	51.4 U	46.3 U	2,530	--
Antimony	2.2 UJ		2.2 UJ	2.2 UJ	2.2 UJ	**352 J**	300
Arsenic	2.1 U		2.8 U	3.8 U	2.9 U	46.1	400
Barium	40.4		756	10.4 U	9.3 U	2,830	30,000
Beryllium	0.10 U		0.20 U	0.10 U	0.10 U	47.3	50
Cadmium	0.40 U		2.4	0.40 U	0.40 U	**53.0**	10
Calcium	56,000		508,000	88,700	86,500	494,000	--
Chromium	0.70		0.30 U	0.30 U	0.30 U	196	2,000
Cobalt	0.60 U		0.60 U	0.80 B	0.70	505	--
Copper	2.0 U		R	2.0 U	2.0 U	293	100,000
Iron	6,650		2,770	1,410	1,450	3,650	--
Lead	1.0 U		1.0 U	1.0 U	1.0 U	18.6	30
Magnesium	8,650		312,000	22,100	20,800	304,000	--
Manganese	373		550	940	878	1,030	--
Nickel	0.80 J		0.70 U	1.4 J	1.4 J	**522**	80
Potassium	6,360		120,000	18,100	16700	117,000	--
Selenium	1.8 U		1.8 U	1.8 U	1.8 U	9.8	80
Silver	0.40 U		0.40 UJ	0.40 U	0.40 U	**58.8**	7
Sodium	8,940		2,310,000	63,200	58,700	2,220,000	--
Thallium	2.0 U		2.0 U	2.3	2.0 U	50.1	400
Vanadium	0.90		0.80 UJ	0.80 U	0.80 U	503	2,000
Zinc	16.3 U		16.3 U	16.3 U	16.3 U	480	900
INORGANICS - RAS (µg/l)							
Cyanide	**11.1 J**		0.90 UJ	0.93 J	0.90 UJ	(5)	10
LAB SAMPLE ID							
Volatile Petroleum Hydrocarbons	43199-2	43199-3	43032-2	43199-4		43032-3	
Extractable Petroleum Hydrocarbons	43199-2	43199-3	43032-2	43199-4		43032-3	
Pesticides/PCBs	AQL49	AQL50	APG52	AQL51			
Inorganics (Metals/Cyanide)	MALQ07		MALQ02	MALQ04	MALQ06	MALQ03	

TABLE 4-2 NOTES:

ft bgs - feet below ground surface

FD - Field Duplicate

J - Quantitation is approximate due to limitations identified in the quality control review.

NA - Not Applicable (MCP footnote)

R - Value is rejected.

U - Value reported is the sample-specific detection limit.

UJ - Sample-specific detection limit is approximate due to limitations identified in the quality control review.

-- No Reportable Concentration

MADEP Criteria

GW-2 Reportable Concentrations, 310 CMR 40.0000 Subpart P Massachusetts Oil and Hazardous Material List

* - Validated data presented. Analyte presented if it was detected in at least one sample from this grouping.

** - Screened interval depth.

*** - Inorganic data from 9/30/99 sampling effort; organic data from 11/02/99 sampling effort.

**** - Values shown for standards are in the same units as the analytical data.

1. Hydrocarbon range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2. C_9-C_{12} Aliphatic hydrocarbons exclude the concentration of target analytes eluting in that range and the concentration of C_9-C_{10} aromatic hydrocarbons.
3. C_{11}-C_{22} Aromatic hydrocarbons exclude the concentration of target PAH analytes.
4. Groundwater samples for metals were field filtered, with the exception of GW-03.
5. Sample volume not collected for this analysis due to poor recharge.

US EPA ARCHIVE DOCUMENT

TABLE 5-1. SUMMARY OF RISK SCREENING – SURFACE SOILS *
BTSA INVESTIGATION – STANDARD TIMES FIELD – FALL 1999

LOT NUMBER	1B	2	3	4	5	6	7	8	9	MCP Method 1 Soil Standards **	
LOCATION NAME	SS-02	SS-03	SS-04A/B	SS-05A/B	SS-06	SS-07	SS-08	SS-09	SS-10		
SAMPLE DEPTH (ft bgs)	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0		
M&E SAMPLE ID	SS0201STF	SS0301STF	SS0401STF	SS0501STF	SS0601STF	SS0701STF	SS0801STF	SS0901STF	SS1001STF		
DATE SAMPLED	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99		
COMMENTS										S-2/GW-2	S-2/GW-3
PARAMETER/ANALYTE											
VOLATILE PETROLEUM HYDROCARBONS - MADEP-VPH-98-1 (µg/kg)											
None Detected											
EXTRACTABLE PETROLEUM HYDROCARBONS - MADEP-EPH-98-1 (µg/kg)											
C_9-C_{18} Aliphatics	ND	ND	2,450	ND	ND	ND	ND	ND	ND	2,500,000	2,500,000
C_{19}-C_{36} Aliphatics	ND	ND	34,500	25,500	14,000	7,500	ND	ND	ND	5,000,000	5,000,000
C_{11}-C_{22} Aromatics	ND	23,000	150,000	182,500	60,000	49,000	8,900	ND	ND	2,000,000	2,000,000
Naphthalene	ND	ND	ND	793	ND	ND	ND	ND	ND	1,000,000	1,000,000
2-Methylnapthalene	ND	ND	ND	503	ND	ND	ND	ND	ND	1,000,000	1,000,000
Acenaphthylene	ND	ND	ND	693	ND	ND	ND	ND	ND	2,500,000	1,000,000
Acenaphthene	ND	ND	ND	1,143	ND	ND	ND	ND	ND	2,500,000	2,500,000
Fluorene	ND	ND	428	1,443	ND	ND	ND	ND	ND	2,000,000	2,000,000
Phenanthene	ND	1,500	7,300	10,750	1,900	3,400	ND	ND	ND	2,500,000	100,000
Anthracene	ND	ND	1,850	2,143	ND	820	ND	ND	ND	2,500,000	2,500,000
Fluoranthene	ND	1,600	14,500	13,500	3,200	4,900	ND	ND	ND	2,000,000	1,000,000
Pyrene	ND	1,500	15,000	15,950	3,800	4,800	ND	ND	ND	2,000,000	2,000,000
Benzo(a)anthracene	ND	780	**7,900**	**7,000**	**1,800**	**2,200**	ND	ND	ND	1,000	1,000
Chrysene	ND	850	6,300	7,000	1,900	2,100	ND	ND	ND	10,000	10,000
Benzo(b)fluoranthene	ND	580	**6,700**	**5,700**	**1,700**	**1,900**	ND	ND	ND	1,000	1,000
Benzo(k)fluoranthene	ND	770	4,950	5,250	1,200	1,600	ND	ND	ND	10,000	10,000
Benzo(a)pyrene	ND	**770**	**7,000**	**6,600**	**1,800**	**2,100**	ND	ND	ND	700	700
Indeno(1,2,3-cd)pyrene	ND	820	**7,250**	**6,250**	**1,800**	**2,100**	ND	ND	ND	1,000	1,000
Dibenzo(a,h)anthracene	ND	**820**	**7,250**	**6,250**	**1,800**	**2,100**	ND	ND	ND	700	700
Benzo(g,h,I)perylene	ND	ND	5,150	4,700	1,300	1,400	ND	ND	ND	2,500,000	2,500,000
SEMIVOLATILE ORGANIC COMPOUNDS - RAS (µg/kg)											
Naphthalene	ND	140 J	480	865	500 J	280 J	ND	ND	18 J	1,000,000	1,000,000
2-Methylnaphthalene	ND	49 J	345	1,190	170 J	ND	ND	ND	ND	1,000,000	1,000,000
Acenaphthylene	29 J	59 J	950	1,550	540 J	560 J	ND	ND	ND	2,500,000	1,000,000
Acenaphthene	28 J	140 J	835	1,370	770 J	580 J	ND	ND	ND	2,500,000	2,500,000
Dibenzofuran	19 J	110 J	540	1,005	570 J	370 J	ND	ND	ND	--	--
Fluorene	27 J	140 J	1,500	1,510	840 J	540 J	ND	ND	ND	2,000,000	2,000,000
Phenanthrene	360	1,100	12,500	12,500	7,600	5,400	35 J	25 J	84 J	2,500,000	100,000
Anthracene	83 J	250 J	3,750	3,900	1,800 J	1,400 J	ND	ND	25 J	2,500,000	2,500,000
Carbazole	42 J	150 J	13,850	1,535	880 J	650 J	ND	ND	ND	--	--
Fluoranthene	650	1,400	17,500	18,000	9,400	8,900	70 J	57 J	170 J	2,000,000	1,000,000
Pyrene	530	1,100	19,500	17,000	8,600	8,200	56 J	48 J	140 J	2,000,000	2,000,000
Benzo(a)anthracene	290 J	640	**9,450**	**10,100**	**4,200**	**4,700**	33 J	30 J	91 J	1,000	1,000
Chrysene	320 J	700	9,150	**10,300**	4,400	4,900	35 J	31 J	96 J	10,000	10,000
Benzo(b)fluoranthene	250 J	580	**8,400**	**8,650**	**3,100 J**	**4,600**	24 J	27 J	76 J	1,000	1,000
Benzo(k)fluoranthene	340 J	620	8,000	8,550	4,400	5,200	48 J	29 J	92 J	10,000	10,000
Benzo(a)pyrene	310 J	650	**9,400**	**10,550**	**4,300**	**5,500**	31 J	29 J	92 J	700	700
Indeno(1,2,3-cd)pyrene	190 J	370 J	**5,800**	**6,100**	**2,400 J**	**3,300 J**	25 J	ND	59 J	1,000	1,000

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TABLE 5-1. SUMMARY OF RISK SCREENING -- SURFACE SOILS *
BTSA INVESTIGATION -- STANDARD TIMES FIELD -- FALL 1999

LOT NUMBER	1B	2	3	4	5	6	7	8	9	MCP Method 1 Soil Standards **	
LOCATION NAME	SS-02	SS-03	SS-04A/B	SS-05A/B	SS-06	SS-07	SS-08	SS-09	SS-10		
SAMPLE DEPTH (ft bgs)	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0	0.0 - 3.0		
M&E SAMPLE ID	SS0201STF	SS0301STF	SS0401STF	SS0501STF	SS0601STF	SS0701STF	SS0801STF	SS0901STF	SS1001STF		
DATE SAMPLED	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99	09/28/99		
COMMENTS										S-2/GW-2	S-2/GW-3
Dibenz(a,h)anthracene	65 J	190 J	2,300	2,350	950 J	1,300 J	ND	ND	28 J	700	700
Benzo(g,h,i)perylene	190 J	400	6,500	7,200	2,600 J	3,800	25 J	22 J	66 J	2,500,000	2,500,000
PESTICIDES - RAS (µg/kg)											
beta-BHC	3.9 J	ND	R	ND	ND	ND	ND	ND	ND	--	--
Heptachlor	R	ND	ND	ND	ND	ND	ND	0.46 J	0.69 J	200	200
4,4'-DDE	20 J	ND	82 J	R	38 J	R	ND	ND	ND	2,000	2,000
Endrin	R	7.7 J	ND	ND	ND	ND	ND	ND	ND	10,000	1,000
Endosulfan II	4.0 J	ND	2.7	ND	ND	ND	ND	ND	ND	400,000	50
4,4'-DDD	ND	R	ND	37	R	R	ND	ND	ND	3,000	3,000
Endosulfan sulfate	13 J	R	22 J	10	ND	R	ND	ND	ND	--	--
4,4'-DDT	75	11 J	300 J	R	R	49 J	2.3 J	5.6 J	4.7 J	2,000	2,000
Methoxychlor	40	53 J	95	R	ND	ND	ND	ND	ND	300,000	30,000
Endrin ketone	ND	17 J	54	56 J	21	10	ND	ND	ND	--	--
Endrin aldehyde	R	7.0 J	5.5 J	31	ND	ND	ND	ND	ND	--	--
alpha-Chlordane	8.6 J	ND	ND	ND	ND	ND	ND	ND	ND	2,000	2,000
gamma-Chlordane	R	ND	2.6 J	3.7 J	ND	R	ND	ND	ND	2,000	2,000
PCBS - RAS (µg/kg)											
Aroclor-1254	380 J	ND	859	ND	360 J	380	ND	39	ND	2,000	2,000
METALS - RAS (mg/kg)											
Aluminum	5,110	3,860	3,835	3,780	3,940	3,650	2,620	3,230	2,020	--	--
Antimony	0.48 J	ND	10.8	ND	ND	ND	ND	ND	ND	40	40
Arsenic	1.3	14.3	10.1	6.9	3.9	3.5	1.3	1.7	1.0	30	30
Barium	18.3	55.1	145	57.9	54.2	37.5	8.1	7.6	10.4	2,500	2,500
Beryllium	ND	ND	0.32	ND	ND	ND	ND	ND	ND	1	1
Cadmium	ND	ND	1.0	ND	ND	ND	ND	ND	ND	80	80
Calcium	559	737	5,505	1,450	1,180	1,070	468	527	966	--	--
Chromium	4.4	4.5	7.4	8.8	10.6	6.4	4.3	6.7	3.8	2,500	2,500
Cobalt	1.5	2.7	3.5	2.7	2.6	2.2	1.4	1.7	1.2	--	--
Copper	4.7	16.5	52.6	30.7	20.8	15.5	4.4	6.3	6.7	--	--
Iron	5,770	9,730	14,050	14,500	6,130	6,290	4,500	5,985	3,400	--	--
Lead	30.0 J	105 J	2,010	125.4	134 J	66.4 J	5.0 J	5.3 J	13.4 J	600	600
Magnesium	834	929	1,585	1,112	1,460	1,190	891	1,180	858	--	--
Manganese	91.8	65.9	132	103.4	76.5	84.5	58.2	63.7	51.8	--	--
Mercury	ND	ND	0.15	0.23	ND	ND	ND	ND	ND	60	60
Nickel	2.8	5.1	7.8	6.8	6.8	4.8	3.4	3.5	3.0	700	700
Potassium	253	985	402	371	466	433	251	499	256	--	--
Selenium	ND	ND	1.6	ND	ND	ND	ND	ND	ND	2,500	2,500
Silver	ND	ND	0.45	ND	ND	ND	ND	ND	ND	200	200
Sodium	94.0	255	217	123	94.9	122	95.9	115	117	--	--
Vanadium	8.6	9.2	13.3	17.2	10.6	11.1	5.8	9.3	4.9	2,000	2,000
Zinc	20.0	58.9	235	70.5	69.5	39.3	11.9	13.8	13.2	2,500	2,500
INORGANICS - RAS (mg/kg)											
None Detected											

US EPA ARCHIVE DOCUMENT

TABLE 5-1 NOTES:

ft bgs - feet below ground surface

ND - Not detected above the sample-specific detection limit.

J - Quantitation is approximate due to limitations identified in the quality control review.

R - Value is rejected.

-- No MCP standard

MADEP Criteria

MCP Method 1 Soil Category S-2 Standards, Table 3

* - Validated data presented. Analyte presented if it was detected in at least one sample from this grouping.

** - Values shown for standards are in the same units as the analytical data.

TABLE 5-2. SUMMARY OF RISK SCREENING -- GROUNDWATER *
BTSA INVESTIGATION -- STANDARD TIMES FIELD -- FALL 1999

LOT NUMBER	1B	3	7	9		
LOCATION NAME	GW-04 ***	GW-01	GW-02 ***	GW-03		
SAMPLE DEPTH (ft bgs) **	0-10 / 3-8.5	0-7	0-10 / 3-8	1-11	MCP Method 1 Groundwater Standards ****	
M&E SAMPLE ID	GW0201STF & GW-02RE	FGW0401STF	GWK0801STF	GW1001STF		
DATE SAMPLED	/30&11/02/99	09/30/99	09/30/99	09/30/99		
COMMENTS					GW-2	GW-3
PARAMETER/ANALYTE						
VOLATILE PETROLEUM HYDROCARBONS - MADEP-VPH-98-1 (µg/l)						
C_9-C_{12} Aliphatics	ND	120	ND	ND	1,000	20,000
Toluene	ND	ND	ND	190	6,000	50,000
EXTRACTABLE PETROLEUM HYDROCARBONS - MADEP-EPH-98-1 (µg/l)						
C_{19}-C_{36} Aliphatics	ND	ND	150	ND	NA	20,000
C_{11}-C_{22} Aromatics	ND	220 J	ND	ND	50,000	30,000
Naphthalene	ND	8.1 J	ND	ND	6,000	6,000
2-Methylnapthalene	ND	14 J	ND	ND	10,000	3,000
PESTICIDES - RAS (µg/l)						
alpha-BHC	ND	0.26	ND	(2)	–	–
Heptachlor	0.026	0.059 J	ND	(2)	NA	1
4,4'-DDE	ND	0.16	ND	(2)	NA	100
4,4'-DDT	ND	0.15 J	ND	(2)	NA	0.3
gamma-Chlordane	ND	ND	0.023 J	(2)	NA	2
PCBS - RAS (µg/l)						
Aroclor-1254	ND	**2.6 J**	ND	(2)	NA	0.3
METALS - RAS (µg/l) (1)						
Aluminum	ND	ND	ND	2,530	–	–
Antimony	ND	ND	ND	**352 J**	NA	300
Arsenic	ND	ND	ND	46.1	NA	400
Barium	40.4	756	ND	2,830	NA	30,000
Beryllium	ND	ND	ND	47.3	NA	50
Cadmium	ND	2.4	ND	**53.0**	NA	10
Calcium	56,000	508,000	87,600	494,000	–	–
Chromium	0.70	ND	ND	196	NA	2,000
Cobalt	ND	ND	0.75	505	–	–
Copper	ND	R	ND	293	–	–
Iron	6,650	2,770	1,430	3,650	–	–
Lead	ND	ND	ND	18.6	NA	30
Magnesium	8,650	312,000	21,450	304,000	–	–
Manganese	373	550	909	1,030	–	–
Nickel	0.80 J	ND	1.4 J	**522**	NA	80
Potassium	6,360	120,000	17,400	117,000	–	–
Selenium	ND	ND	ND	9.8	NA	80
Silver	ND	ND	ND	**58.8**	NA	7
Sodium	8,940	2,310,000	60,950	2,220,000	–	–
Thallium	ND	ND	1.7	50.1	NA	400
Vanadium	0.90	ND	ND	503	NA	2,000
Zinc	ND	ND	ND	480	NA	900
INORGANICS - RAS (µg/l)						
Cyanide	**11.1 J**	ND	0.69	(2)	NA	10

TABLE 5-2 NOTES:

ft bgs - feet below ground surface

ND - Not detected above sample-specific detection limit.

J - Quantitation is approximate due to limitations identified in the quality control review.

NA - Not Applicable (MCP footnote)

R - Value is rejected.

-- No MCP standard

MADEP Criteria

MCP Method 1 Groundwater Standards, Table 1

* - Validated data presented. Analyte presented if it was detected in at least one sample from this grouping.

** - Screened interval depth.

*** - Inorganic data from 9/30/99 sampling effort; organic data from 11/02/99 sampling effort.

**** - Values shown for standards are in the same units as the analytical data.

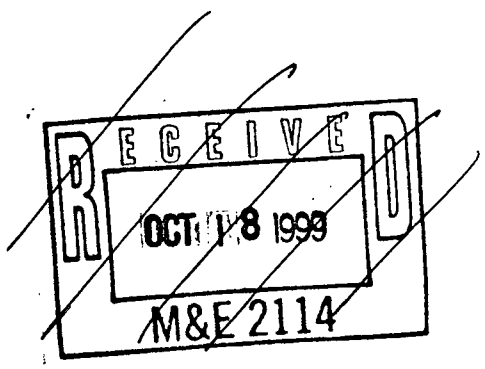
1. Groundwater samples for metals were field filtered, with the exception of GW-03.
2. Sample volume not collected for this analysis due to poor recharge.

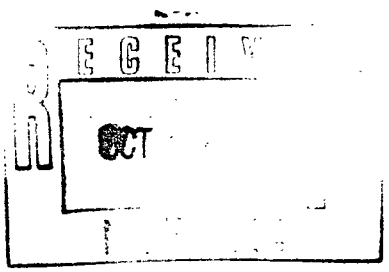
APPENDIX A. GEOPHYSICAL SURVEY REPORT

GEOPHYSICAL SURVEY
STANDARD TIMES FIELD SITE
NEW BEDFORD, MASSACHUSETTS

Hager GeoScience, Inc.

GEOPHYSICAL SURVEY
STANDARD TIMES FIELD SITE
NEW BEDFORD, MASSACHUSETTS





Prepared for:

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File 99033
October 1999

Hager GeoScience, Inc.

INTRODUCTION

Metcalf & Eddy, Inc. (M&E) contracted with Hager GeoScience, Inc. (HGI) of Waltham, Massachusetts to perform a geophysical survey at a Brownfield site in New Bedford, Massachusetts under Brownfields Work Assignment #043-SISI-01ZZ. The site, known as the Standard Times Field Site, is located along South Front Street in downtown New Bedford, between Delano and Gifford Streets. The location of the site is shown in Figure 1.

The objective of the survey was to locate an underground storage tank (UST) possibly present at the site and, if located, to stake its location in the field.

PROCEDURE

HGI personnel performed the geophysical survey on September 28, 1999. An M&E representative, who was present during the survey, designated the survey area and its location. The location was selected to focus on a UST shown on a 1924 Sanborn Map, with the approximate UST location scaled off relative to current features. The grid for the survey area, a baseball field, was laid out using a fiberglass tape and spray paint; home plate was designated Station 0N, 0E.

The geophysical survey was performed using a combination of electromagnetic (EM) terrain conductivity and ground penetrating radar (GPR). The techniques and their limitations are discussed in more detail in a separate section at the end of this report. EM terrain conductivity was used to survey the entire designated survey area, with focused GPR performed in areas of EM anomalies. Figure 2 is a base map prepared from HGI field notes showing the locations of the survey traverses.

EM Terrain Conductivity

The EM survey was performed using a GEM-300 multi-frequency electromagnetic profiler. The GEM-300 uses multiple EM frequencies to enhance the detection of targets at varying depths. The GEM measures both the in-phase and quadrature-phase (conductivity) response of buried objects to an induced electromagnetic field. Metal objects are generally detected from the in-phase data, while variations in ground (soil and water) conductivity are more apparent in the quadrature-phase data.

EM traverses were made in north-south and east-west directions at a spacing of 10 feet. Data along each traverse were collected continuously and simultaneously at frequencies of 9990 and

7530 Hz. After completion of the fieldwork, the EM data were downloaded to a PC, processed, and contour plots prepared using SURFER® for Windows software.

Ground Penetrating Radar

The GPR survey was performed using a Geophysical Survey Systems, Inc., SIR System 2 digital ground penetrating radar system with 400 MHz antenna and survey wheel. The range was set at 80 nanoseconds (ns), for an estimated depth penetration of 12 to 15 feet. The operator carried the electronics and battery in a harness connected to the antenna by a 3-meter cable. The GPR data were displayed on a color monitor and simultaneously recorded on a hard drive for later processing and interpretation.

RESULTS

Preliminary results of the survey were reported to the M&E representative at the site and a possible UST-related target outlined with stakes in the field. The staked area is plotted to scale on Figure 2, as well as two utilities interpreted on the basis of the GPR data. Contour plots of data from the EM survey are shown in Plates 1 and 2. Data from both east-west and north-south traverses have been contoured; values are shown in parts per million (ppm).

EM Terrain Conductivity

Plate 1 (Area 1): Plate 1 shows contoured EM data from the southern portion of the survey area (Area 1 in Figure 2). Because in-phase and quadrature-phase contour plots were very similar, only the contour plots for in-phase data are shown. A large anomaly was detected in the southern half of EM Survey Area 1 between approximately 120E and 190E. The contour plots for data from the east-west traverses in this area show two additional small anomalies in the southwest corner. The negative anomaly near Station 0N, 0E may be related to the presence of home plate at that location, if it has associated metal. The other, positive anomaly may be related to the fence immediately to its south. However, these hypotheses are speculative.

Plate 2 (Area 2): Plate 2 shows contoured EM data from the northern portion of the survey area (Area 2 in Figure 2). Because the quadrature-phase plots provide additional information not found in the in-phase plots, this plate includes contours of both in-phase and quadrature-phase data. The quadrature-phase contour plots for EM Survey Area 2 show a distinct linear anomaly trending north-south and centered at 25E that is not visible in the in-phase plots. Since the feature producing this anomaly does not have an in-phase signature, we interpret it as a buried former foundation or possibly a large non-metallic utility.

Ground Penetrating Radar

GPR confirmed that a large anomaly identified in EM Survey Area 1 is composed of concrete with rebar and extends from approximately 120E to 190E. A portion of a GPR record from a traverse across the anomaly is shown in Figure 3. Since a UST might be present beneath the concrete, its location was staked in the field.

The GPR survey in the vicinity of the concrete structure detected several possible utilities, which have been plotted to scale in Figure 2.

Since no anomaly was detected in the in-phase data for EM Survey Area 2, no GPR was performed in that area.

THE GEOPHYSICAL TECHNIQUES

GROUND PENETRATING RADAR

Description of the Method

The principle of ground penetrating radar (GPR) is the same as that of weather radar, except that GPR transmits electromagnetic energy into the ground, and the energy is reflected back to the surface from interfaces between materials with contrasting electrical (dielectric and conductivity) and physical properties. The greater the contrast between two materials in the subsurface, the stronger the reflection observed on the GPR record. The depth of GPR signal penetration depends on the properties of the subsurface materials and the frequency of the antenna used to collect radar data. The lower the antenna frequency, the deeper the signal penetration but the lower the signal resolution.

We collect GPR data using a Geophysical Survey Systems SIR System 2 digital ground penetrating radar unit, which consists of a 486 computer connected to a transmit/receive antenna. Radar data are collected in discrete measurements (stacking) or continuous profile mode while moving the antenna across the ground and displayed in color on the computer monitor; they are simultaneously recorded on a 500 Mbyte hard drive for later processing and interpretation using proprietary RADAN® software. Hard copies of the data may also be printed in the field on a thermal printer.

Data Analysis and Interpretation

The horizontal scale of the GPR record shows distance along the survey traverse. In the continuous data collection mode, the horizontal scale on each GPR record is determined by the antenna speed. When a survey wheel is used, as at this site, the GPR record is automatically marked at specified intervals (chosen as one foot for this survey) along the survey line. The vertical scale of the radar records is determined by the recording interval. The recording interval represents the maximum two-way travel time in which data are recorded. The conversion of two-way travel time to depth depends on the propagation velocity of the GPR signal, which is site specific. In the absence of site-specific subsurface information about stratigraphy, we estimate propagation velocities from handbook values and experience at similar sites.

The size, shape, and amplitude of GPR reflections are used to interpret GPR data. Metal objects such as USTs and utilities produce reflections with high amplitude and distinctive hyperbolic shapes in GPR records when traverses are made perpendicular to their long axes. Clay or concrete pipes and boulders may produce radar signatures of similar shape but lower amplitude. The boundaries between saturated and unsaturated materials, sand and clay, and bedrock and

overburden, generally also produce strong reflections.

Limitations of the Method

GPR signal penetration is site specific, determined by the dielectric properties of local soil and fill materials. GPR signals propagate well in resistive materials such as sand and gravel; however, soils containing clay, ash- or cinder-laden fill, or fill saturated with brackish or otherwise conductive groundwater cause GPR signal attenuation and loss of target resolution (i.e., limited detection of small objects). Concrete containing rebar or mesh also inhibits signal penetration.

Interpreted depths of objects detected using GPR are based on on-site calibration, handbook values, and/or estimated GPR signal propagation velocities from similar sites. GPR velocities and depth estimates may vary if the medium of investigation or soil water content is not uniform throughout the site. (Electromagnetic waves do not travel as fast through water as air, so the distance to a reflector below the water table may appear farther than in actuality.)

Utilities are interpreted on the basis of reflectors of similar size and depth that show a linear trend, but GPR cannot unambiguously determine that all such reflectors are related. Fiberglass USTs or utilities composed of plastic or clay may be difficult to detect, as well as objects underneath reinforced concrete pads.

Changes in the speed at which the GPR antenna is moved between stations causes slight variations in distance interpolations, and hence in interpreted object positions.

The GPR antenna produces a cone-shaped signal pattern that emanates approximately 45 degrees from horizontal fore and aft of the antenna. Therefore, buried objects may be detected before the antenna is located directly over them, and GPR anomalies may appear larger than actual target dimensions.

GPR is an interpretive method, based on the subjective identification of reflection patterns that may not uniquely identify a subsurface target. The results must be verified by borings, test pits, or site utility plans.

EM TERRAIN CONDUCTIVITY

Description of the Method

The EM technique operates on the principle that secondary electric and magnetic currents can be induced in metal objects and conductive bodies, such as USTs, utilities, and leachate, when an electric field is applied. This instrumentation measures the secondary magnetic field strength relative to the primary magnetic field and converts it directly into a conductivity value. Both the quadrature-phase (conductivity) and in-phase components of the secondary electric field are measured and values plotted in parts per million (ppm). In general, the quadrature-phase (conductivity) data provide information about soil and groundwater conditions, while the in-phase data provide information about metal objects. The instrument response is more affected by near-surface than by deeper material.

We collect terrain conductivity data using a GEM-300 multi-frequency electromagnetic profiler. The GEM-300 is an electromagnetic induction-type instrument that measures terrain conductivity without electrodes or direct soil contact. The instrument is a hand-held, bistatic EM sensor that operates in the frequency-domain mode. It is field-programmable to operate at simultaneous, multiple frequencies between 325 and 19975 Hz. The GEM sensor contains a transmitter and receiver coil separated by about 5.5 feet, along with a third "bucking coil" that removes the primary field from the receiver coil. All coils are molded into a single board in a fixed geometry.

A removable signal-processing console is attached to the board, from which data are downloaded to a computer and processed. The GEM-300 is capable of detecting underground targets and features to a depth of 26 feet.

Data Analysis and Interpretation

Terrain conductivity surveys are commonly used to determine the lateral extent of fill and detect buried metal objects, utilities, and conductive leachate plumes. Typically, terrain conductivity values measured on fill materials are irregular and highly variable over short distances due to metal and the heterogeneous materials in the subsurface. The edge of fill materials is marked by a change to smoothly varying terrain conductivity values that represent native soils.

At sites free of metal objects and other cultural interference, the soil lithology and/or the conductivity of the ground water control the terrain conductivity measured at a particular location. In the presence of metal, conductivity values are often negative ("polarity reversals") and highly irregular. However, the exact identification of objects cannot be determined from the terrain conductivity data alone. The in-phase component helps confirm the location of metal

objects when correlated with conductivity data. Irregular or high positive or negative in-phase values may be caused by metal objects and help define their lateral extent.

Leachate plumes are generally recognized by relatively smoothly varying, but anomalously elevated, conductivity values, compared to background values for a given site. The value of the in-phase component resulting from conductive plumes generally shows little or no variation.

Limitations of the Method

EM conductivity values are influenced by proximity to aboveground metal objects, such as fences, vehicles, or buildings. Magnetic fields produced along overhead power lines also interfere with terrain conductivity readings.

The shape and amplitude of conductivity and in-phase anomalies do not uniquely describe a buried object or material. Rather, they are influenced by the orientation of EM survey lines and the buried object(s) relative to north, and the orientation of the EM sensor relative to this buried object(s). To better locate the source(s) of EM conductivity and in-phase anomalies, data are frequently collected in two perpendicular directions.

High ambient conductivity readings (from a conductivity plume, sludge, or naturally occurring geologic condition) may mask anomalous conductivity values caused by metal objects. Evaluating the in-phase component of the data minimizes this effect.

Closely buried utilities may produce anomalies that interfere with each other. Hence, in areas where numerous utilities are present, the observed anomaly may result from an interference pattern and may not uniquely describe the location of a specific utility. Further, anomalies often appear larger than the object that produces them.

Smaller utilities, or utilities constructed from reinforced concrete, may be masked by larger utilities constructed of metal. Nonmetallic fill such as unreinforced concrete rubble and utilities constructed from PVC, clay, or unreinforced concrete will not be detected.

US EPA ARCHIVE DOCUMENT

Geophysical Survey
Standard Times Field Site
New Bedford, Massachusetts

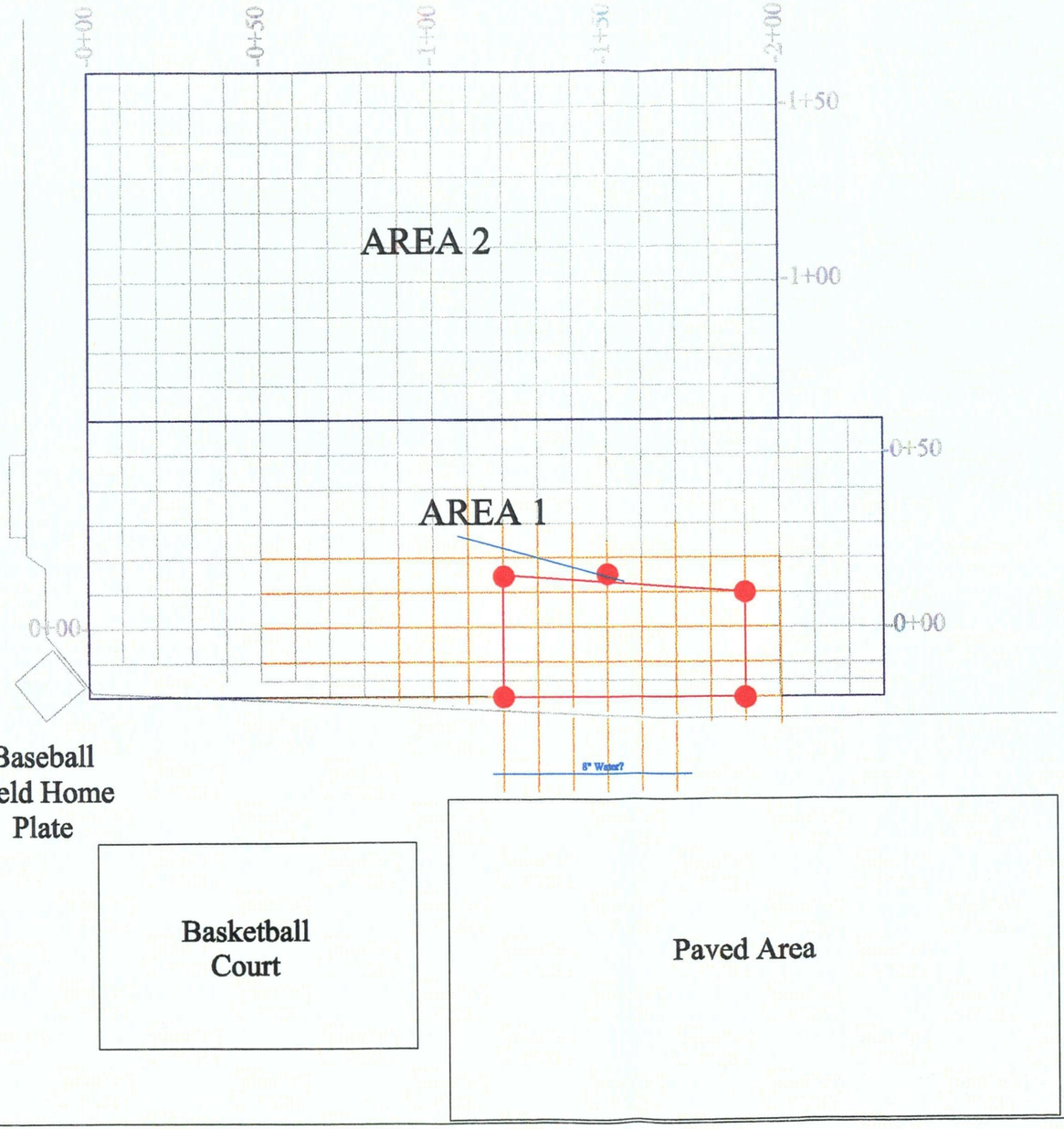
File 99033



Figure 1. Location of the Standard Times Field Site, New Bedford, Massachusetts. Scale: 1 inch equals approx. 0.5 mi.

Hager GeoScience, Inc.

US EPA ARCHIVE DOCUMENT



LEGEND

- GPR Traverse
- EM Traverse
- EM Survey Areas (Plates 1 and 2)
- Target Marked in the Field
- Interpreted Utility (GPR)

0 20 40
FEET

Figure 2

OCTOBER 1999	FILE NO. 99033

EM AND GPR TRAVERSE
LOCATIONS AND STAKED TARGETS
STANDARD TIMES FIELD SITE
NEW BEDFORD, MASSACHUSETTS

HAGER GEOSCIENCE, INC.

US EPA ARCHIVE DOCUMENT

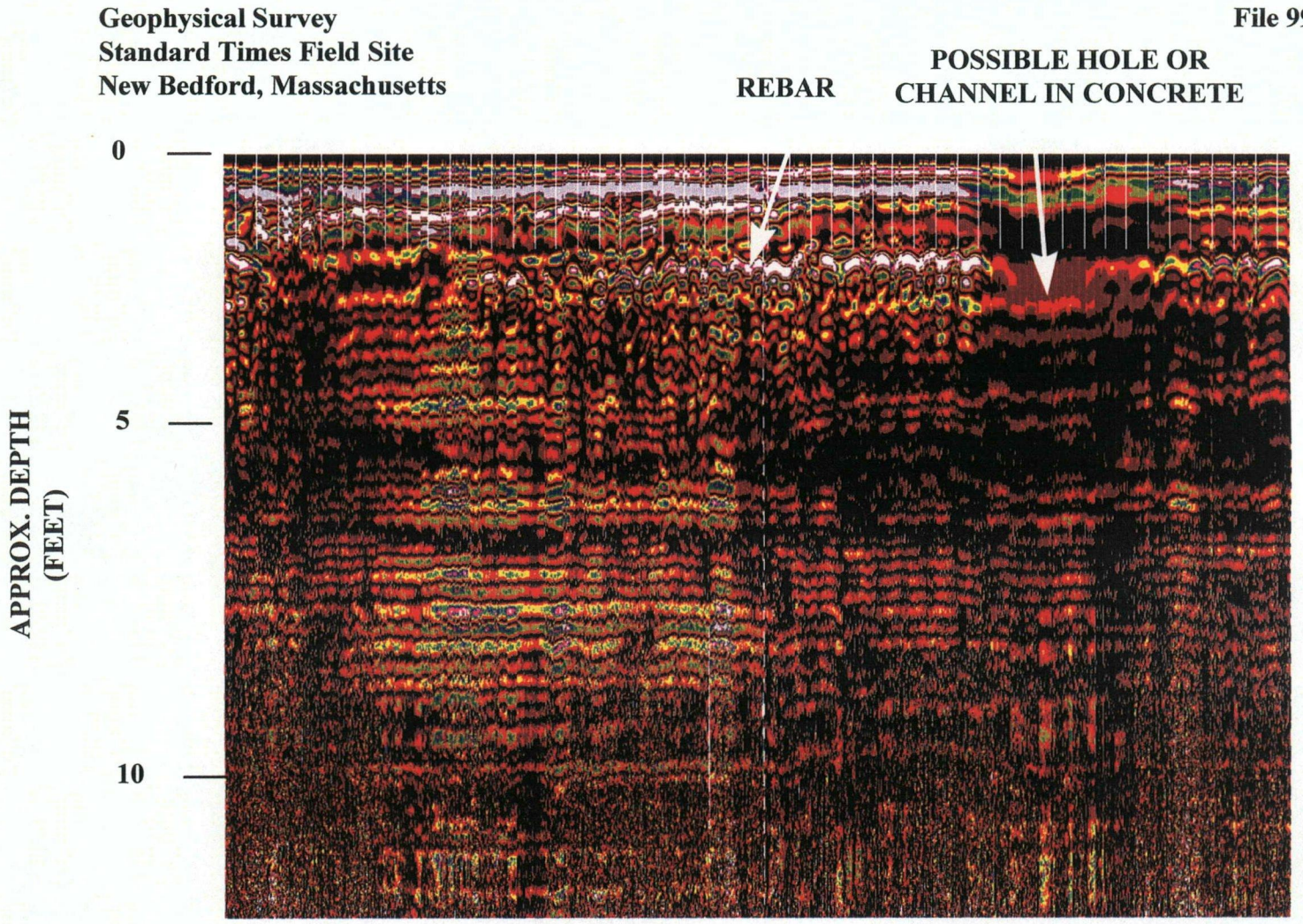
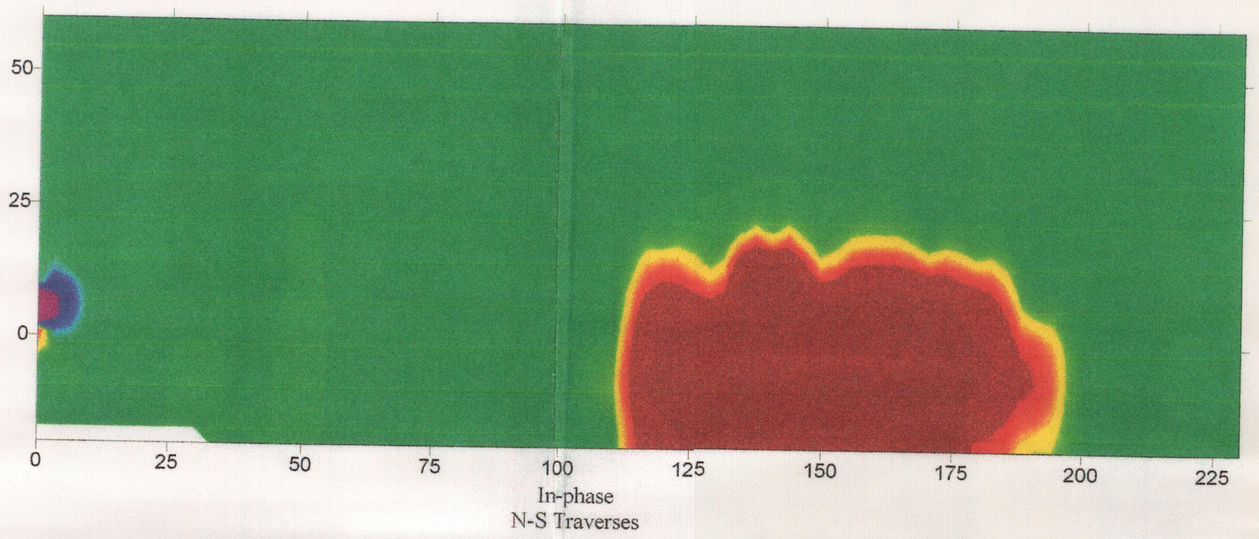
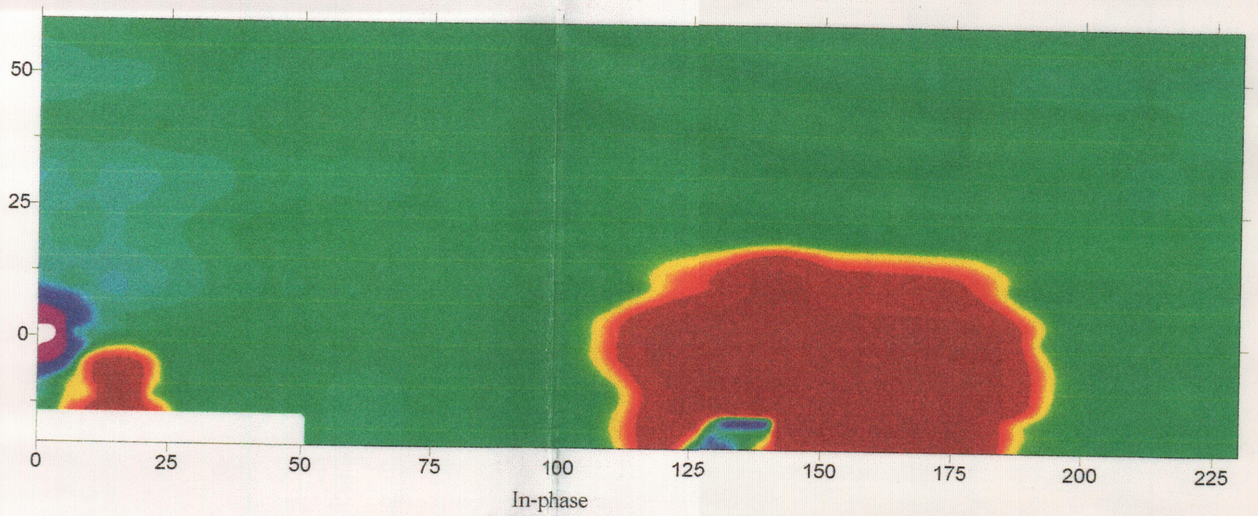


Figure 3. GPR record of portion of Traverse 170E across possible concrete vault at Standard Times Field Site. Ticks at top of record are one-foot distance marks produced by survey wheel. Depths are approximate and not linear, based on GPR signal velocities determined from handbook values and from experience at similar sites.



In-phase
N-S Traverses



In-phase
E-W Traverses

ppm

4000
3600
3200
2800
2400
2000
1600
1200
800
400
0
-400
-800
-1200
-1600
-2000
-2400
-2800
-3200
-3600
-4000

N

0 25 50 75 100

Feet

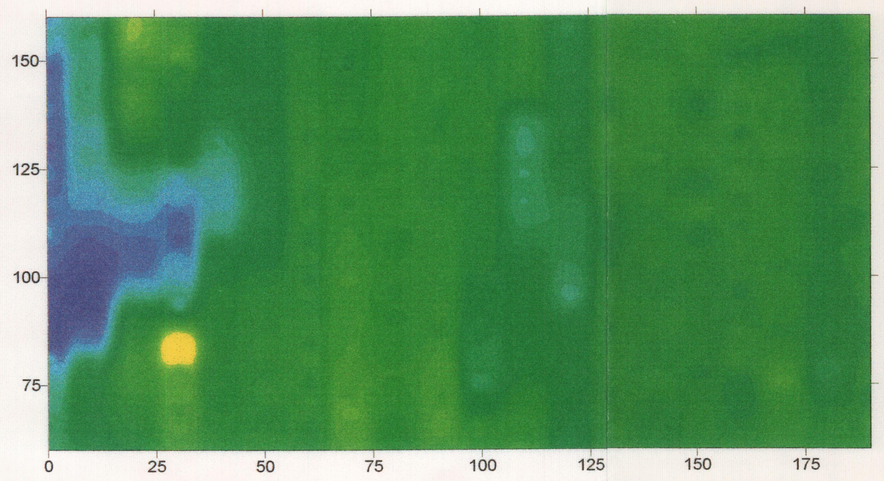
PLATE 1

October 1999	FILE NO. 99033

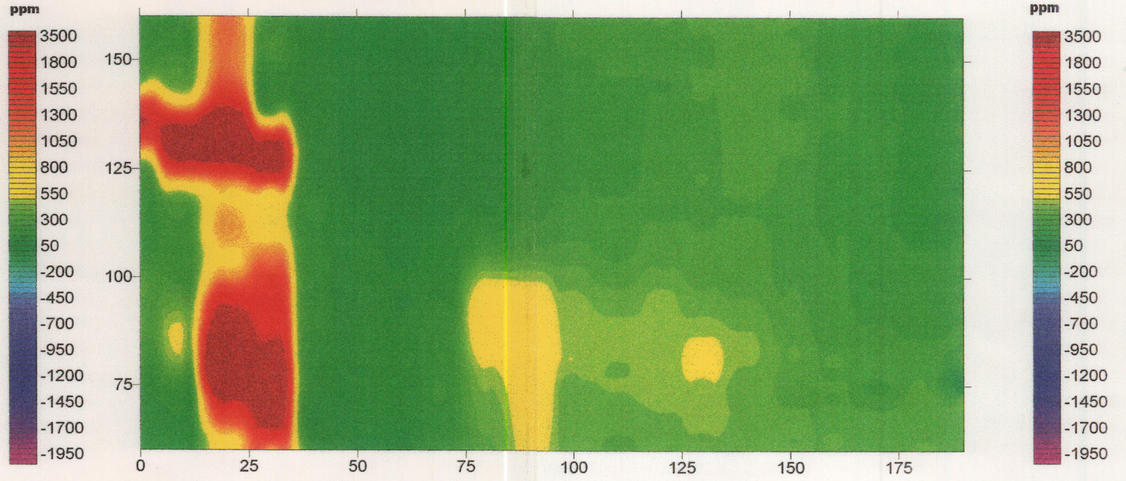
AREA 1
EM CONTOUR PLOTS, 7530 Hz
STANDARD TIMES FIELD SITE
NEW BEDFORD, MA

SCALE (1 IN =2 5 FT)

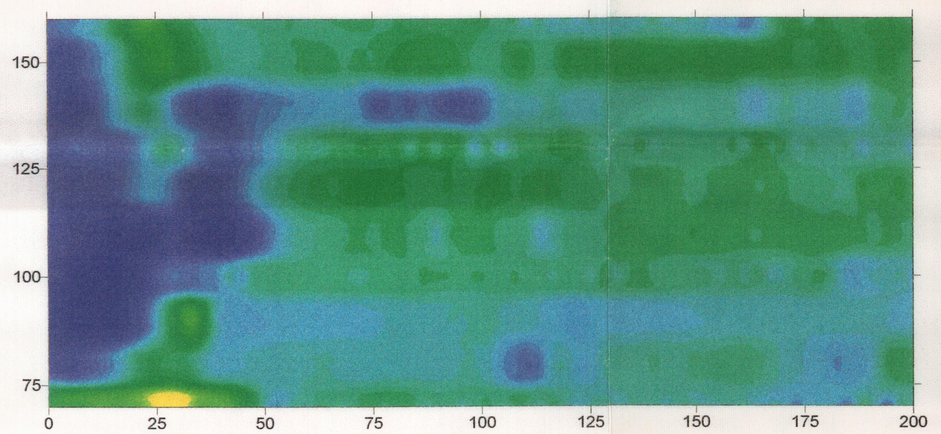
HAGER GEOSCIENCE, INC.



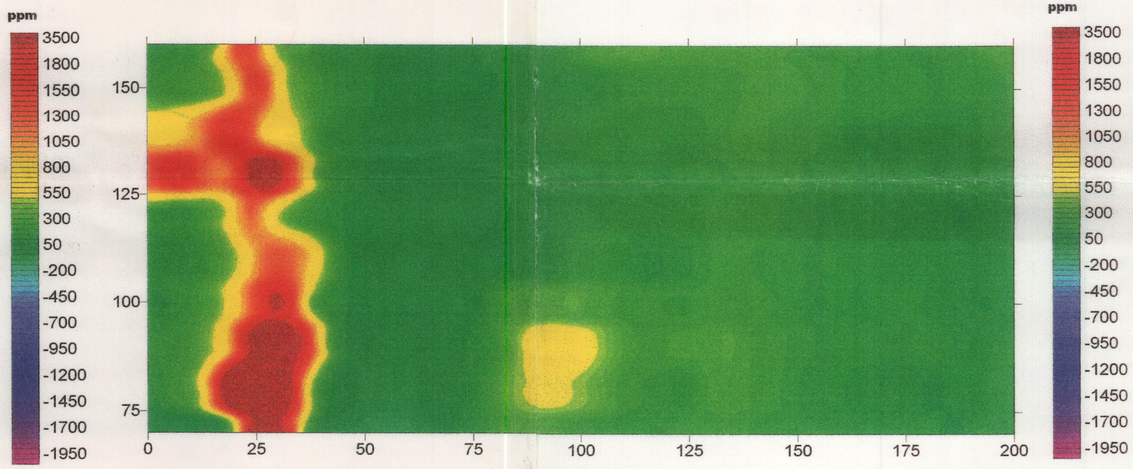
In-phase
N-S Direction



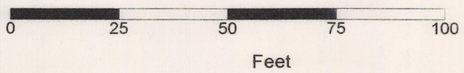
Quadrature-phase
N-S Direction



In-phase
E-W Direction



Quadrature-phase
E-W Direction



Feet

IN

PLATE 2

October 1999	FILE NO. 99033

AREA 2
EM CONTOUR PLOTS, 9990 Hz
STANDARD TIMES FIELD SITE
NEW BEDFORD, MA

SCALE (1 IN = 25 FT)

HAGER GEOSCIENCE, INC.

APPENDIX B. TEST PIT EXCAVATION LOGS

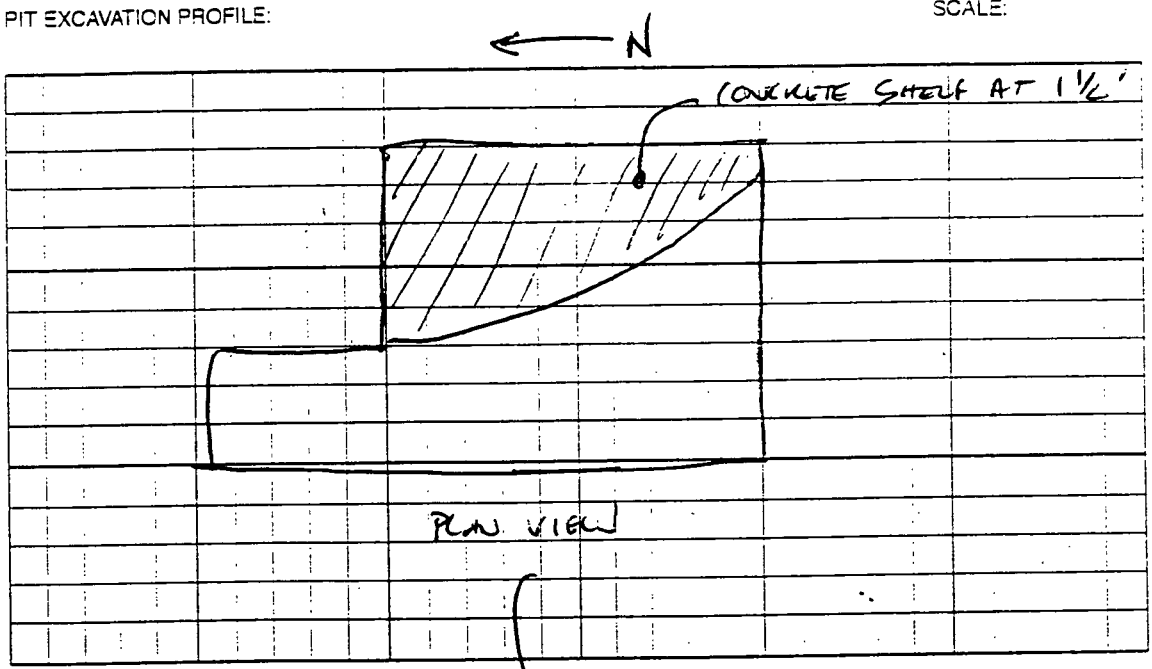
Metcalf & Eddy, Inc.
Engineers

Excavation Profile Log

PROJECT: STANDARD TIMES		SHEET: 2 OF 4	TEST PIT NO.: TANK-1
SITE LOCATION: NEW BEDFORD	JOB NO.: 020255-0002		
	GRID LOCATION: BRUSHED	GROUND ELEV.:	TOTAL DEPTH: 7ft
CONTRACTOR: MPE/CITY	ENG/GEO: N. THURBER		BEGUN: 0830
EQUIPMENT: BACKHOE	OPERATOR: CITY (KANDY)		FINISHED: 0930
PIT/TRENCH DIMENSIONS: 10' x 10'	WEATHER: OVERCAST, 70°F		GROUNDWATER (DEPTH): 7ft
SAMPLING METHOD: SUBAN'L – GW CORRECTIVE ACTION PROJECT	DECON. USED: DRY BRUSH W/ SUPPLY WATER SPRAY		TOP OF ROCK (DEPTH):

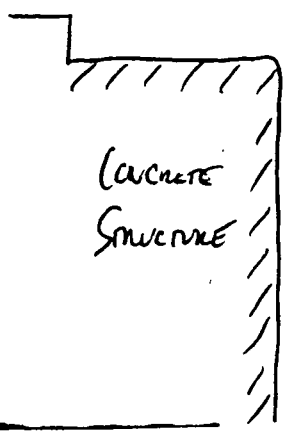
TEST PIT EXCAVATION PROFILE:

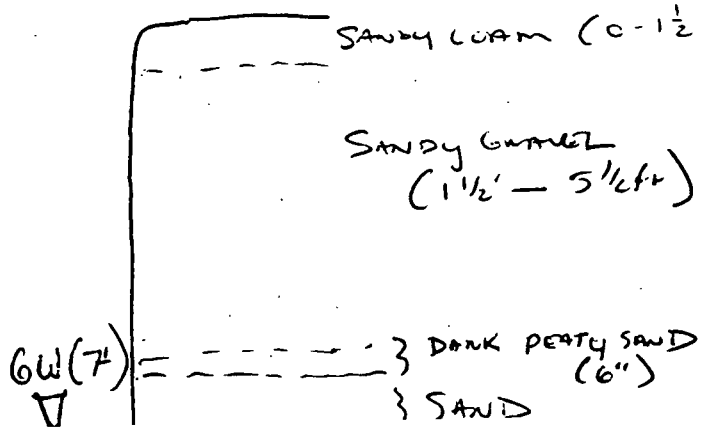
SCALE:



LOCATION OF TEST PITS:

SAMPLE COORDINATES:

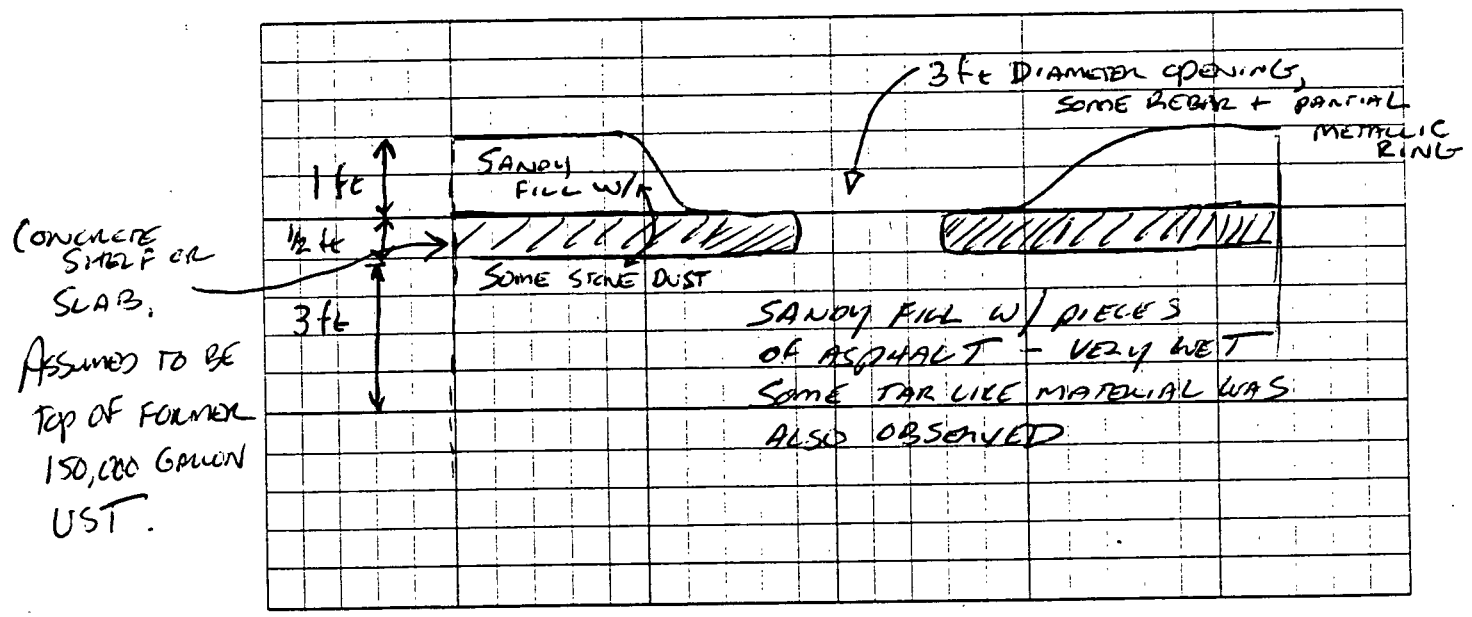




Metcalf & Eddy, Inc.
Engineers

Excavation Profile Log

PROJECT: STANDARD GTIMES		SHEET: 3 OF 4	TEST PIT NO.: TANK-2
SITE LOCATION: NEW BEDFORD	JOB NO.: 020655-0002		
	GRID LOCATION: BALL FIELD	GROUND ELEV.:	TOTAL DEPTH: 3 ft
CONTRACTOR: M&E / CITY	ENG/GEO: N. THURBER		BEGUN: 0930
EQUIPMENT: BACKHOE	OPERATOR: CITY		FINISHED: 1030
PIT/TRENCH DIMENSIONS: 4 x 4 x 3' DEEP	WEATHER: OVERCAST, 70°F		GROUNDWATER (DEPTH): *3 ft (INSIDE TANK)
SAMPLING METHOD:	DECON. USED: DRY BRUSH W/ SOAPY WATER SPRAY		TOP OF ROCK (DEPTH): 1 ft TO CONCRETE TANK
TEST PIT EXCAVATION PROFILE:			SCALE:



LOCATION OF TEST PITS: ALONG RIGHT FIELD FAIR LINE OF BALL FIELD
SEE BTSA REPORT FIGURE

~~SAMPLE COORDINATES:~~

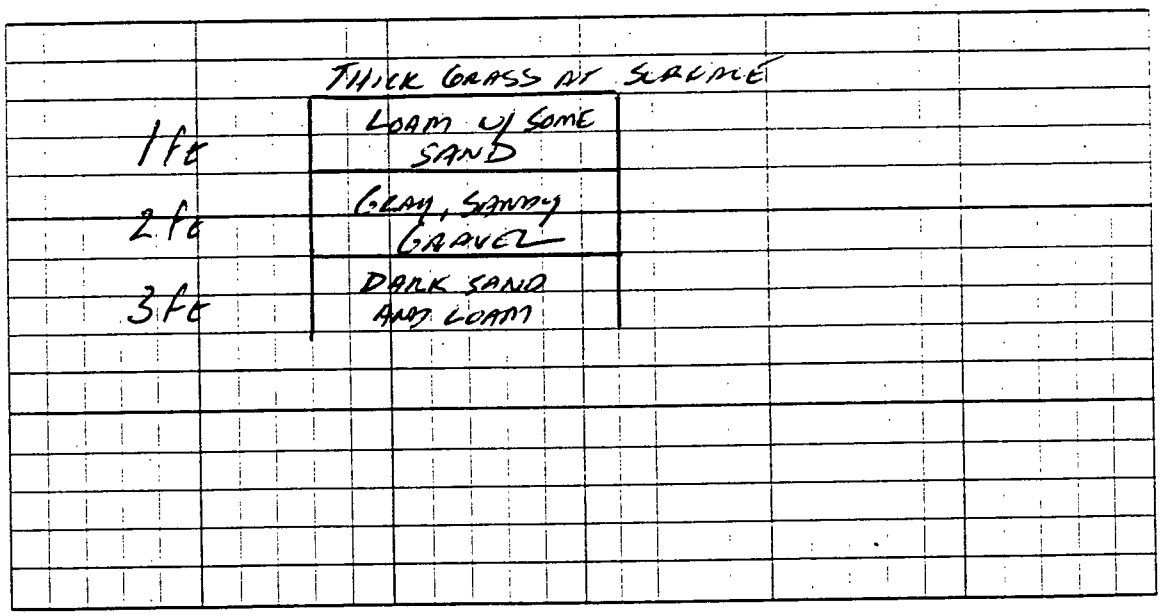
* GROUNDWATER – UPON REMOVAL OF 3 ft OF SATURATED SANDY FILL FROM WITHIN OPENING, THE WATER LEVEL ROSE TO 1 FOOT BELOW THE TOP OF THE CONCRETE SHELF / SLAB (2 FEET BELOW GROUND SURFACE)

Metcalf & Eddy, Inc.
Engineers

Excavation Profile Log

PROJECT: Standard Times		SHEET: 4 OF 4	TEST PIT NO.: Tank X/3
SITE LOCATION: New Bedford	JOB NO.: 020655-0002		
	GRID LOCATION: Ball Field	GROUND ELEV.: —	TOTAL DEPTH: 3 feet
CONTRACTOR: ME/City	ENG/GEO: N. Thurber		BEGUN: 1030
EQUIPMENT: Backhoe	OPERATOR: Randy/City		FINISHED: 1045
PIT/TRENCH DIMENSIONS: 3 x 4 x 3 feet deep	WEATHER: Overcast, 70°F		GROUNDWATER (DEPTH): Not observed
SAMPLING METHOD: No sampling	DECON. USED: Dry Brush, Soapy water spray		TOP OF ROCK (DEPTH): Not observed

TEST PIT EXCAVATION PROFILE: SCALE:



LOCATION OF TEST PITS: Near center field in ball field (See BISA Report Figure)

SAMPLE COORDINATES:

Test pit was dug to check the extent of the concrete tank boundaries. No evidence of concrete or impacted soils were observed.

Metcalf & Eddy, Inc.
Engineers

Excavation Profile Log

PROJECT: STANDARD TIMES		SHEET: 1 OF 1	TEST PIT NO.: TP-01
SITE LOCATION: NEW BEDFORD, MA	JOB NO.: 0 20655-0002		
	GRID LOCATION: COAL BIN	GROUND ELEV.: —	TOTAL DEPTH: 6.5 ft
CONTRACTOR: M&E/City	ENG/GEO: N. THURBER	BEGUN: 0930	
EQUIPMENT: BACKHOE	OPERATOR: City (FRANK)	FINISHED: 0945	
PIT/TRENCH DIMENSIONS: 6 x 4 x 6	WEATHER: CLEAR, 70°F	GROUNDWATER (DEPTH): 6 ft	
SAMPLING METHOD: NONE	DECON. USED: DRY BRUSH, SOAP + WATER SPRAY	TOP OF ROCK (DEPTH): NONE SEEN	

TEST PIT EXCAVATION PROFILE: SCALE: 1 SQ = 1/2 ft

BRUSH AT TOP

1 ft	MEDIUM GRADED SAND W/ ROOTS
2 ft	DENSE SOIL W/ COAL FRAGMENTS
3 ft	SANDY GRAVEL W/ SOME MIXED REDISH/BROWN SAND, TO BOTTOM @ 6.5 ft
4 ft	
5 ft	
6 ft	▽ GROUNDWATER @ 6 ft (NO SHEEN ON GROUNDWATER)

LOCATION OF TEST PITS: LOCATION OF SUSPECTED COAL BIN NEAR

SAMPLE COORDINATES: RADIO TOWER

(ABOUT 75' FROM LOT 1 + 2 CORNERS)

* NO HEADSPACE READINGS ABOVE BACKGROUND
NO ODOR, SLIGHT COAL ODOR IN LAYER W/ COAL FRAGMENTS

Metcalf & Eddy, Inc.
Engineers

Excavation Profile Log

PROJECT: Standard Times		SHEET: 1 OF 1	TEST PIT NO.: TP-02
SITE LOCATION: New Bedford, MA	JOB NO.: 020655-0002		
	GRID LOCATION: Coal Bin	GROUND ELEV.: —	TOTAL DEPTH: 6.5 ft
CONTRACTOR: M+E/City	ENG/GEO: N. Thaxter		BEGUN: 0950
EQUIPMENT: Backhoe	OPERATOR: City (Frank)		FINISHED: 1015
PIT/TRENCH DIMENSIONS: 6 x 4 x 6½	WEATHER: Clear, 70°F		GROUNDWATER (DEPTH): 6½'
SAMPLING METHOD: None	DECON. USED: Dry Brush, Soapy Water Spray		TOP OF ROCK (DEPTH): None

TEST PIT EXCAVATION PROFILE: SCALE:

Blast at Top

1ft	Medium Graded Sand w/ roots
2ft	Dense Silt w/ coal fragments
3ft	Sandy Gravel w/ mixed red/brown sand
4ft	
5ft	
6ft	▽ Groundwater @ 6ft

LOCATION OF TEST PITS: ~~100 ft from~~

SAMPLE ~~COORDINATES~~: 20 ft from Lot 1+2 corners

* No sheen on groundwater

No odor (other than mild coal-type odor)

Metcalf & Eddy, Inc.
Engineers

Excavation Profile Log

PROJECT: STANDARD TIMES 9/27/99		SHEET: 1 OF 1	TEST PIT NO.: TP-03
SITE LOCATION: NEW BEDFORD	JOB NO.: 02065-0002		
	GRID LOCATION: LOT 3, NEAR STRESSED VEGETATION	GROUND ELEV.: —	TOTAL DEPTH:
CONTRACTOR: M&E / CITY	ENG/GEO: N. THUNBER	BEGUN: 10:45	
EQUIPMENT: BACKHOE	OPERATOR: CITY (FRANK)	FINISHED: 11:00	
PIT/TRENCH DIMENSIONS: 6 X 4 X 5 ft depth	WEATHER: CLEAR, 70°	GROUNDWATER (DEPTH): 4 ft	
SAMPLING METHOD: NONE	DECON. USED: DRY BRUSH, SOAP + WATER SPRAY	TOP OF ROCK (DEPTH): —	

TEST PIT EXCAVATION PROFILE: SCALE: 1 sq = 1/2 ft²

0' NO VEGETATION / SANDY

1 ft	SANDY LOAM, SOME DEBRIS -
2 ft	BRICK, WOOD, ROOFING
3 ft	MEDIUM GRADED SAND - WOOD +
4 ft	BRICK DEBRIS ← GROUNDWATER @ 4 ft
5 ft	(+ WOOD PLANKS) FOUND 4-5 FEET

LOCATION OF TEST PITS: THIS TEST PIT WAS LOCATED IN AREA OF

SAMPLE ~~COORDINATES~~: STRESSED VEGETATION ON EASTERN BOUNDARY OF THE SITE.

Metcalf & Eddy, Inc.
Engineers

Excavation Profile Log

PROJECT: STANDARD TIMES 9/27/99		SHEET: 1 OF 1	TEST PIT NO.: TP-04
SITE LOCATION: NEW BEDFORD	JOB NO.: 02655-002		
	GRID LOCATION: LOT 3	GROUND ELEV.: —	TOTAL DEPTH: 5ft
CONTRACTOR: M&E / CITY	ENG/GEO: N. THURBER		BEGUN: 11:00
EQUIPMENT: BACKHOE	OPERATOR: CITY (FRANK)		FINISHED: 11:15
PIT/TRENCH DIMENSIONS: 4x 6x4x5 ft depth	WEATHER: CLEAR, 70°F		GROUNDWATER (DEPTH) 4ft
SAMPLING METHOD: NONE	DECON. USED: DRY BRUSH, SOAP + WATER SPRAY		TOP OF ROCK (DEPTH) —

TEST PIT EXCAVATION PROFILE: SCALE: 1 Square = 1 ft

NO VEGETATION AT SURFACE

1ft	SANDY LOAM W/ SOME DEBRIS, MOSTLY BRICK
2ft	
3ft	DEFINED LAYER OF BRICK BETWEEN 2 & 3 FEET
4ft	← GROUNDWATER @ 4ft
5ft	SANDY MATERIAL W/ DEBRIS (SIMILAR)

* A SULFUR-LIKE ODOR WAS DETECTED AT 4ft

LOCATION OF TEST PITS: NEAR EASTERN BOUNDARY WITHIN AREA OF STRESSED VEGETATION — 10 ft FROM TP-03

SAMPLE COORDINATES:

APPENDIX C. WELL INSTALLATION LOGS

TEMPORARY WELL/PIEZOMETER GEOLOGIC AND INSTALLATION LOG

METCALF & EDDY, INC. 30 Harvard Mill Square Wakefield, MA 01880 (617) 246-5200	**SITE LOCATION** Standard Times Field New Bedford, MA	**BORING/WELL ID** CW-01

DRILL CONTRACTOR: GeoTek
DRILLER: Joe Bell
ENG/GEO: M. Gallagher
START DATE: 9/29/99
FINISH DATE: 9/29/99

DRILLING METHOD: Direct-push
DRILL RIG: Earth Probe 2000
SAMPLING METHOD: NA
PIPE MATERIAL: Sch 40 PVC
PIPE SIZE: 1" OD
SCREEN LENGTH: 7ft
DRILLING FLUID: NA

PAGE 1 of 1

DVPMT
~~SAMPLING~~ METHOD: Peristaltic/low flow

Riser: Flush mounted

Depth	Sample No./ Interval	Blow Cnts (per 6")	Well/ Screen Install	Rec. Length (inches)	PID (ppm)	Water Table	Field Classification	Stratigraphic Description
0 ft	NA	NA		NA			PID - ϕ HOLE	
						▽	- ϕ Breathing zone NA	
						2.98ft		
5 ft								
			screen					
			bottom					
10 ft			7 ft					
15 ft								
20 ft								
25 ft								
30 ft								
35 ft								

TEMPORARY WELL/PIEZOMETER GEOLOGIC AND INSTALLATION LOG

METCALF & EDDY, INC.	SITE LOCATION	BORING/WELL ID
30 Harvard Mill Square Wakefield, MA 01880 (617) 246-5200	Standard Times Field New Bedford, MA	GW-02

DRILL CONTRACTOR: GeoTek
DRILLER: Joe Bell
ENG/GEO: M Gallagher
START DATE: 9/29/99
FINISH DATE: 9/29/99

DRILLING METHOD: Direct-Push
DRILL RIG: Earth Probe 2000
SAMPLING METHOD: NA
PIPE MATERIAL: Sch 40 PVC
PIPE SIZE: 1" OD
SCREEN LENGTH: 10 ft
DRILLING FLUID: NA

PAGE 1 of 1

DVPmT
~~SAMPLING~~ METHOD: Peristaltic / Low flow

Riser: Flush Mounted

Depth	Sample No./ Interval	Blow Cnts (per 6")	Well/ Screen Install	Rec. Length (inches)	PID (ppm)	Water Table	Field Classification	Stratigraphic Description
0 ft					1-hole			NA
	NA	NA		NA				
5 ft								
					∅	▽ 6 ft		
10 ft							Screen Bottom	
			Bottom 10 ft					
15 ft								
20 ft								
25 ft								
30 ft								
35 ft								

TEMPORARY WELL/PIEZOMETER GEOLOGIC AND INSTALLATION LOG

METCALF & EDDY, INC.
30 Harvard Mill Square
Wakefield, MA 01880
(617) 246-5200

SITE LOCATION: Standard Times Field, New Bedford, MA

BORING/WELL ID: GW-03

DRILL CONTRACTOR: GeoTek
DRILLER: J. Bell
ENG/GEO: M. Gallagher
START DATE: 9/29/99
FINISH DATE: 9/29/99
~~SAMPLING~~ DUPMT METHOD: peristaltic/low flow

DRILLING METHOD: Direct Push
DRILL RIG: Earth Probe 2000
SAMPLING METHOD: NA
PIPE MATERIAL: Sch 40 PVC
PIPE SIZE: 1" OD
SCREEN LENGTH: 10 Ft
DRILLING FLUID: NA
Riser: Flush mounted

PAGE: 1 of 1

Depth	Sample No./ Interval	Blow Cnts (per 6")	Well/ Screen Install	Rec. Length (inches)	PID (ppm)	Water Table	Field Classification	Stratigraphic Description
0 ft			top 1 ft		0			NA
	NA	NA		NA				
5 ft								
					0	▽ 8 ft		
10 ft								
			bottom 11 ft					
15 ft								
20 ft								
25 ft								
30 ft								
35 ft								

TEMPORARY WELL/PIEZOMETER GEOLOGIC AND INSTALLATION LOG

METCALF & EDDY, INC. 30 Harvard Mill Square Wakefield, MA 01880 (617) 246-5200	SITE LOCATION Standard Times Field New Bedford, MA	BORING/WELL ID GW-04

DRILL CONTRACTOR: GeoTek
DRILLER: J. Bell
ENG/GEO: M Gallagher
START DATE: 9/29/99
FINISH DATE: 9/29/99
SAMPLING METHOD: DUPMT Peristaltic / low flow

DRILLING METHOD: Direct Push
DRILL RIG: Earth Probe 8000
SAMPLING METHOD: NA
PIPE MATERIAL: Sch 40 PVC
PIPE SIZE: 1" OD
SCREEN LENGTH: 10 Ft
DRILLING FLUID:
Riser: Flush mounted

PAGE 1 of 1

Depth	Sample No./ Interval	Blow Cnts (per 6")	Well/ Screen Install	Rec. Length (inches)	PID (ppm)	Water Table	Field Classification	Stratigraphic Description
0 ft					0		NA	NA
	NA	NA		NA				
5 ft					0	▽ 6ft		
10 ft			Bottom 10 Ft					
15 ft								
20 ft								
25 ft								
30 ft								
35 ft								

TEMPORARY WELL/PIEZOMETER GEOLOGIC AND INSTALLATION LOG

METCALF & EDDY, INC.	SITE LOCATION	BORING/WELL ID
30 Harvard Mill Square Wakefield, MA 01880 (617) 246-5200	Standard Times Field New Bedford, MA	GW-02RE

DRILL CONTRACTOR: GeoTek
DRILLER: J. Bell
ENG/GEO: B. Wyskowski
START DATE: 11/1/99
FINISH DATE: 11/1/99
DVPMT
~~SAMPLING~~ METHOD: NONE

DRILLING METHOD: Direct Push
DRILL RIG: Earth Probe 2000
SAMPLING METHOD: NA
PIPE MATERIAL: Sch 40 PVC
PIPE SIZE: 1" OD
SCREEN LENGTH: 8ft
DRILLING FLUID: NA
RISER: Flush mounted

PAGE 1 of 1

Depth	Sample No./ Interval	Blow Cnts (per 6")	Well/ Screen Install	Rec. Length (inches)	PID (ppm)	Water Table	Field Classification	Stratigraphic Description
0 ft					Ø		SUDAN IV - neg	
	NA	NA		NA				
5 ft						▽ 5.2ft		
10 ft			Bottom 8ft					
15 ft								
20 ft								
25 ft								
30 ft							Notes: No visible staining of soils on rod	
35 ft								

TEMPORARY WELL/PIEZOMETER GEOLOGIC AND INSTALLATION LOG

METCALF & EDDY, INC.	SITE LOCATION	BORING/WELL ID
30 Harvard Mill Square Wakefield, MA 01880 (617) 246-5200	Standard Times Field New Bedford, MA 02850	GW-04RE

DRILL CONTRACTOR: GeoTek
DRILLER: J. Bell
ENG/GEO: B. Wisklowski
START DATE: 11/1/99
FINISH DATE: 11/1/99
~~SAMPLING~~ DVPMT METHOD: none

DRILLING METHOD: Direct Push
DRILL RIG: Earth Probe 2000
SAMPLING METHOD: NA
PIPE MATERIAL: Sch 40 PVC
PIPE SIZE: 1" OD
SCREEN LENGTH: 8.5 ft
DRILLING FLUID: NA
Riser: Flush Mounted

PAGE 1 of 1

Depth	Sample No./ Interval	Blow Cnts (per 6")	Well/ Screen Install	Rec. Length (inches)	PID (ppm)	Water Table	Field Classification	Stratigraphic Description
0 ft						∅	SUDAN IV Neg	
	NA	NA		NA				
5 ft						▽ 5.7 ft		
10 ft			bottom 8.5 ft					
15 ft								
20 ft								
25 ft								
30 ft								
35 ft								

NO visible staining of soils or rock

APPENDIX D. WELL SAMPLING DATA SHEETS

US EPA ARCHIVE DOCUMENT

TABLE D-1. FIELD PARAMETERS - STANDARD TIMES FIELD - FALL 1999

LOCATION ID	SAMPLING DATE	FLOW RATE		pH		ORP		TEMPERATURE		SPECIFIC CONDUCTIVITY		DISSOLVED OXYGEN		TURBIDITY	
		INITIAL	FINAL			INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
		(ml/min)	(ml/min)	INITIAL	FINAL	(mV)	(mV)	(°C)	(°C)	(µmhos/cm)	(µmhos/cm)	(mg/l)	(mg/l)	(NTU)	(NTU)
GW-01	30-Sep-99	400	400	6.52	6.55	-101	-243	18.01	18.29	18931	16129	1.60	0.62	167	2.68
GW-02	30-Sep-99	230	240	6.72	6.70	-72.7	-69.7	17.54	17.22	854	839	0.90	0.71	168	158
GW-02RE	02-Nov-99	80	NM	6.73	6.83	-487	-225	16.62	15.07	533	541	4.02	4.16	170	175
GW-03	30-Sep-99	NM	NM	8.14	NM	-69.9	NM	18.05	NM	479	NM	3.95	NM	898	NM
GW-04	30-Sep-99	220	NM	7.25	6.09	-77.4	-51.5	15.90	15.69	463	431	1.08	0.42	1355	NM
GW-04RE	02-Nov-99	<50	<50	6.97	7.20	86.5	67.1	17.80	16.80	640	614	7.02	8.00	30	16

NOTES:

ORP - Oxidation-Reduction Potential

NTU - Nephelometric Turbidity Unit

MONITORING WELL SAMPLING WORKSHEET

Loc Name: Brownfields-Std Times Loc No.: 020655 0002 Samplers: M Gallagher

Well ID: GW 01 Date Sampled: 9/30/99 Arrival Time: 1130 Depart Time: 1330

Well secure upon arrival? (Yes) No PID Readings ppm: 0.0 (Breathing Zone) 0.0 (Well Headspace)

Well Diameter _____ inches = I.D. = _____ ft. dia.

Depth of well from T.O.C.: _____ ft Depth of well from T.O.P.C.: _____ ft

Depth of water from T.O.C.: 3.15 ft Depth of water from T.O.P.C.: _____ ft

Feet of standing water _____ ft Feet of standing water _____ ft

Volume of standing water _____ gal Volume of standing water _____ gal

Purging Method: peristaltic Purge Time Start: 1150 End: 1230

	Time	Water Level feet	pH	Eh mV	Sp. Cond. µS/cm	Temp °C	DO mg/L	Turbidity NTU	Flow Rate ml/min
Initial Reading	1155	3.15	6.52	-100.7	18931	18.01	1.60	167	400
Final Reading	1325	3.15	6.55	-243	16129	18.29	0.62	2.68	400

Sample Collection: Time Start: 1230 End: 1320 Samples Preserved: (Yes) No

Sample Characteristics (circle all applicable)

Describe odor:	none	sulfide	fishy	musty	petroleum		_____
Describe color:	colorless	black	brown	orange	red		_____
Describe appearance:	turbid	silty	sand	clay	floaters	sheen	_____
	clear	multiphase	foaming	slimy	algae		_____

Organic Layer? None Length? — Floating or Sinking or Other? —

Comments _____

Refer to page _____ of the corresponding field log book.

Metcalf & Eddy, Inc.
30 Harvard Mill Square
Wakefield, MA 01990
(781) 246-5200

M&E
AQUA ALLIANCE

MONITORING WELL SAMPLING WORKSHEET (ADDITIONAL PAGES)

Proj. Name: Brownfld Std Times Job No.: 020655-0002 Samplers: M Gallagher

Well ID: GW01 Date Sampled: 9/30/99

Time (military)	Water Level (feet)	pH	ORP (mv)	S Conductance (µmhos/cm)	Temp (°C)	DO (mg/l)	Turbidity (NTU)	Flow Rate (ml/min)
1200	3.15	6.52	-100.7	~~15~~ 17601	18.01	1.60	83.2	400
1205	3.15	6.50	-135.1	16270	18.24	0.86	6.73	400
1208	3.15	6.50	-157.9	16102	19.27	0.46	4.17	400
1211	3.15	6.50	-167.3	15980	18.27	0.38	3.06	400
1214	3.15	6.49	-177.4	15968	18.25	0.33	2.66	400
1217	3.15	6.49	-182.9	15928	18.28	0.32	2.26	400
1220	3.15	6.49	-190.9	15870	18.26	0.32	2.17	400
1223	3.15	6.49	-199.4	15807	18.25	0.31	2.20	400
1226	3.15	6.49	-208.1	15797	18.27	0.31	2.06	400

MONITORING WELL SAMPLING WORKSHEET

Job Name: ~~[redacted]~~ Brunfld Std Times Job No.: ~~[redacted]~~ 020155-0002 Samplers: DS+MR

Well ID: ~~GW08-DS~~ GW02 Date Sampled: 9/30/99 Arrival Time: 1340 Depart Time: 1630

Well secure upon arrival? (Yes) No PID Readings from: 0.0 Breathing Zone 0.0 Well Headspace

Well Diameter _____ inches ÷ 12 = _____ ft dia.

Depth of well from T.O.C.: _____ ft Depth of well from T.O.P.C.: _____ ft

Depth of water from T.O.C. 5.85 ft Depth of water from T.O.P.C. _____ ft

Feet of standing water _____ ft Feet of standing water _____ ft

Volume of standing water _____ gal Volume of standing water _____ gal

Purging Method _____ Purge Time Start _____ End _____

	Time	Water Level feet	pH	Eh mV	Sp. Cond. µS/cm	Temp °C	DO mg/L	Turbidity NTU	Flow Rate ml/min
Initial Reading	1400	6.55	6.72	-72.7	854	17.54	0.90	168.3	230
Final Reading	1604	6.70	6.70	-69.7	839	17.22	0.71	158.3	240

Sample Collection: Time Start: 1500 End: 1600 Samples Preserved? (Yes) No

Sample Characteristics (circle all applicable)

Describe odor:	(none)	sulfide	fishy	musty	petroleum		_____
Describe color:	colorless	black	brown	orange	red		_____
Describe appearance:	turbid	silty	sand	clay	floaters	sheen	_____
	clear	multiphase	foaming	slimy	algae		_____

Organic Layer? NONE Length? / Floating or Sinking or Other? /

Comments test papers neg

Refer to page _____ of the corresponding field log book.

MONITORING WELL SAMPLING WORKSHEET (ADDITIONAL PAGES)

Job Name: Brwnfld STF Job No.: 020635 Samplers: DStorey

Well ID: ~~GW08 01 STF 05~~ GW02 Date Sampled: 9/30/99

Time (military)	Water Level (feet)	✓ pH	✓ Eh (mv)	✓ Conductivity (us/cm)	✓ Temp (°C)	DO (mg/l)	Turbidity NTU)	Flow Rate ml/min
14:08	6.60	6.65	-66.3	856	17.26	0.57	138.1	235
14:13	6.60	6.64	-64.5	857	17.06	048	123.2	240
14:18	6.64	6.62	-62.8	854	16.93	0.43	118.9	240
14:24	6.64	6.61	-61.6	852	16.88	0.43	117.6	240
14:30	6.64	6.61	-61.2	850	16.83	0.39	118.9	240
14:35	6.64	6.60	-60.4	849	16.87	0.39	125.3	240
14:40	6.65	6.61	-60.1	847	16.85	0.36	130.3	245
14:45	6.65	6.62	-59.6	846	17.09	0.42	122.3	245
14:50	6.65	6.61	-59.5	846	17.03	0.41	119.5	245

MONITORING WELL SAMPLING WORKSHEET

Job Name: B/F - STF Job No.: 020655-002 Samplers: NT / CL

Well ID: ~~WP-03RE~~ DS ~~Samples~~ GW-02RE Date Sampled: 11/2/99 Arrival Time: 0830 Depart. Time: 1330

Well secure upon arrival? (Yes) / No PID Readings (ppm) 0 Breathing Zone 0 Well Headspace

Well Diameter: _____ inches ÷ 12 = _____ ft (dia)

Depth of well from T.O.C. _____ ft

Depth of water from T.O.C. _____ ft

Feet of standing water _____ ft

Volume of standing water _____ gal

Depth of well from T.O.PVC. _____ ft

Depth of water from T.O.PVC 4.83' ft

Feet of standing water _____ ft

Volume of standing water _____ gal

Purging Method Peristaltic

Purge: Time Start * End *

	Time	Water Level (feet)	pH	ORP (mV)	Sp. Cond. (µs/cm)	Temp (°C)	DO (mg/l)	Turbidity (NTU)	Flow Rate (ml/min)
Initial Reading	1101	4.77	6.73	-487	533	16.62	4.02	170	80 ml/min
Final Reading	1457	2.30	6.83	-225	541	15.07	4.16	175	—

Sample Collection: Time Start: 1110 End: 1455 Samples Preserved: (Yes) / No

Sample Characteristics (circle all applicable)

Describe odor:	(none)	sulfide	fishy	musty	petroleum	
Describe color:	(colorless)	black	brown	orange	red	
Describe appearance:	(turbid)	silty	sand	clay	floaters	sheen
	clear	multiphase	foaming	slimy	algae	

Organic Layer? _____ Length? _____ Floating or Sinking or Other? _____

Comments Sample IDs ~~WP-3RE~~ GW-02RE
Field Dup for VPH, EPH, ~~subsy~~ PP GW15-02RE @ 1910
Development: * DRAWDOWN COULD NOT BE MAINTAINED AT 80 ML/MIN. ALLOWED WELL TO RE-CHARGE AFTER 45 MINUTES OF DEVELOPMENT 1 HOUR FOR RECHARGE

Refer to page _____ of the corresponding field log book.

FIGURE C-2. MONITORING WELL SAMPLING WORKSHEET

Filled VPH, VPH FD
½ l EPH - allowed to recharge
withdrew ½ l, allowed to recharge, etc, etc

15 min
1200 -

MONITORING WELL SAMPLING WORKSHEET

Job Name: Brownfields Std Times Job No.: 020655-0002 Samplers: M Gallagher

Well ID: GW03 Date Sampled: 9/30/99 Arrival Time: 1030 Depart Time: 1230

Well secure upon arrival: (Yes) No PID Readings: 0.0 (Breathing Zone) 0.0 (Well Headspace)

Well Diameter _____ inches × 12 = _____ ft dia.

Depth of well from T.O.C.: _____ ft	Depth of well from T.O. Pipe: _____ ft
Depth of water from T.O.C.: 7.31 ft	Depth of water from T.O. Pipe: _____ ft
Feet of standing water: _____ ft	Feet of standing water: _____ ft
Volume of standing water: _____ gal	Volume of standing water: _____ gal

Purging Method: peristaltic Purge: Time Start: 1055 End: 1105

	Time	Water Level feet	pH	Eh mV	Sp. Cond. µS/cm	Temp °C	DO mg/L	Turbidity NTU	Flow Rate L/min
Initial Reading	11:00	7.31	8.14	-69.9	479	18.05	3.95	898	NM
Final Reading	____	____	____	____	____	____	____	____	____

Sample Collection: Time Start: 1105 End: 1145 Samples Preserved: (Yes) No

Sample Characteristics (circle all applicable)

Describe odor:	none	sulfide	fishy	musty	petroleum		_____
Describe color:	colorless	black	brown	orange	red		_____
Describe appearance:	turbid	silty	sand	clay	floaters	sheen	_____
	clear	multiphase	foaming	slimy	algae		_____

Organic Layer? NONE Length? — Floating or Sinking or Other? —

Comments: No recharge sampled immediately
No 2nd page

Refer to page _____ of the corresponding field log book.

MONITORING WELL SAMPLING WORKSHEET

Job Name: Brumfld Std Tmco Job No.: 020655-0002 Samplers: Other

Well ID: ~~GW02~~ 05 GW04 Date Sampled: 9/30/99 Arrival Time: 1030 Depart. Time: 1320

Well secure upon arrival? (Yes) No PID Readings from: 0.0 Breathing Zone 0.0 Well Headspace

Well Diameter: _____ inches x 12 = _____ ft. dia.

Depth of well from T.O.C.: _____ ft Depth of well from T.O.P.C.: _____ ft

Depth of water from T.O.C.: 6.15 ft Depth of water from T.O.P.C.: _____ ft

Feet of standing water: _____ ft Feet of standing water: _____ ft

Volume of standing water: _____ gal Volume of standing water: _____ gal

Purging Method: peristaltic Purge Time Start: 1100 End: 1150

	Time	Water Level feet	pH	Eh mV	Sp. Cond. µS/cm	Temp °C	DO mg/L	Turbidity NTU	Flow Rate ml/min
Initial Reading	1100	6.15	7.25	-77.4	463	15.90	1.08	1355	220
Final Reading	1305	6.41	6.09	-51.5	431	15.69	0.42	NM	NM

Sample Collection: Time Start: 1200 End: 1300 Samples Preserved: (Yes) No

Sample Characteristics (circle all applicable)

Describe odor:	(none)	sulfide	fishy	musty	petroleum		_____
Describe color:	colorless	black	(brown)	orange	red		_____
Describe appearance:	(turbid)	silty	sand	clay	floaters	sheen	_____
	clear	multiphase	foaming	slimy	algae		_____

Organic Layer: None Length? _____ Floating or Sinking or Other? _____

Comments: test papers neg

Refer to page _____ of the corresponding field log book.

Metcalf & Eddy, Inc.
30 Harvard Mill Square
Wakefield, MA 01990
(781) 246-5200

M&E AQUA ALLIANCE

MONITORING WELL SAMPLING WORKSHEET (ADDITIONAL PAGES)

Proj. Name: Bruntlf Std Time Job No.: 020644-0002 Samplers: DFTMG

Well ID: ~~GW07-DS~~ GW04 Date Sampled: 9/30/99

Time (military)	Water Level (feet)	pH	ORP (mv)	Conductance (µmhos/cm)	Temp (°C)	DO (mg/l)	Turbidity (NTU)	Flow Rate (ml/min)
1110	6.15	6.23	-64.0	427	15.67	0.33	134.6	240
1120	6.30	6.12	-51.6	427	15.84	0.29	104.1	195
1130	6.37	6.07	-57.0	432	15.85	0.27	111.7	210
1140	6.37	6.05	-53.4	431	15.81	0.26	108.4	210
1145	6.37	6.04	-57.3	431	15.85	0.25	106.3	210
1150	6.37	6.04	-57.6	430	15.85	0.25	109.2	210

Metcalf & Eddy, Inc.
30 Harvard Mill Square
Wakefield, MA 01990
(781) 246-5200

M&E AQUA ALLIANCE

MONITORING WELL SAMPLING WORKSHEET

Proj. Name: B/E - STF Job No.: 020655.0002 Samplers: NT

Well ID: ~~MW-2RE~~ DS Date Sampled: 11/2/99 Arrival Time: 1130 Depart. Time: 1615

GW-04 RE

Well secure upon arrival? (Yes) / No PID Readings (ppm) Ø (Breathing Zone) Ø (Well Headspace) SLIGHT SHEEN + FUEL ODOR IN pump DISCHARGE BUCKET

Well Diameter: 1 inches ÷ 12 = _____ ft (dia)

Depth of well from T.O.C. 7.8 ft (ASINT Rem Dep) Depth of well from T.O.PVC. 7.8 ft

Depth of water from T.O.C. 5.13 ft Depth of water from T.O.PVC 5.13 ft

Feet of standing water _____ ft Feet of standing water _____ ft

Volume of standing water _____ gal Volume of standing water _____ gal

Purging Method Low Flow Purge: Time Start 11:40 End 12:45 (INTERMITTENT - NEVER REACHED EQUAL FLOW)

	Time	Water Level (feet)	pH	ORP (mV)	Sp. Cond. (µmhos/cm)	Temp (°C)	DO (mg/l)	Turbidity (NTU)	Flow Rate (ml/min)
Initial Reading	1245	7'	6.97	86.5	640	17.8	7.82	30	<50
Final Reading	1500	6.8'	7.2	67.1	614	16.8	8.0	16.0	<50

Sample Collection: Time Start: 1300 End: 1530 Samples Preserved: (Yes) / No

Sample Characteristics (circle all applicable)

Describe odor:	none	sulfide	fishy	musty	(petroleum)	SLIGHT
Describe color:	(colorless)	black	brown	orange	red	– MOSTLY CLEAR AFTER INITIAL PURGE
Describe appearance:	turbid	silty	sand	clay	floaters	(sheen) – SLIGHT FILM
	clear	multiphase	foaming	slimy	algae	

Organic Layer? _____ Length? _____ Floating or Sinking or Other? _____

Comments Sample ID GW-04RE + DRAWDOWN COULD NOT BE MAINTAINED AT 80 ml/min, WELL ALLOWED TO RECHARGE BETWEEN SAMPLES

US EPA ARCHIVE DOCUMENT

APPENDIX E. DATA VALIDATION MEMORANDA

M&E
AQUA ALLIANCE

MEMORANDUM

PROJECT NO:	J-020655-0002-005	**DATE:**	December 17, 1999
TO:	Standard Times Field Site File (BTSA)	**OFFICE:**	Wakefield
FROM:	C. Lapite	**COMPANY:**	Metcalf & Eddy
REVIEWED BY:	L. Cook		
CC:	B. Wyskowski, N. Thurber (memo only)		

SUBJECT: Limited QC Review/Modified Tier II-Like Review
Review of MADEP TPH by GC/FID Analytical Results
Woods Hole Group, Raynham, Massachusetts
ETR Number 43032

On September 29, 1999, one soil sample was collected at the Standard Times Field BTSA site, located in New Bedford, Massachusetts by Metcalf & Eddy field personnel. The sampling was performed as part of the BTSA RAC WA #043-SISI-01ZZ. The sample was submitted to Woods Hole Group laboratory, located in Raynham, Massachusetts for the analysis of Total Petroleum Hydrocarbons (TPH) by gas chromatography/flame ionization detector (GC/FID) (Modified Method 8100), and for PCBs by modified Method 8082. The sample was received by the laboratory on October 1, 1999. The data package was received in the M&E Office on October 21, 1999. Included in Attachment I is a copy of the chain-of-custody (COC) record.

M&E reviewed the data in accordance with the EPA-approved Final Field Task Plan for the site and guidance received from EPA Work Assignment Manager, Mr. James Byrne, in a September 17, 1999 letter to M&E Work Assignment Manager, Barb Wyskowski. Data review was abbreviated, as the samples were analyzed for qualitative information, not quantitative. The data review included:

*	•	Preservation and Technical Holding Times
*	•	Blanks
	•	Surrogate Compounds
NR	•	Matrix Spike (MS)/Matrix Spike Duplicates (MSD)
NR	•	Field Duplicates
NR	•	Laboratory Duplicates
*	•	Laboratory Fortified Blank (LFB) and/or Laboratory Control Sample (LCS)

*	=	All criteria met for this parameter
NA	=	Not Applicable and/or no information was provided by the laboratory
NR	=	Not requested

Included in Attachment II are the result summary sheets. No data qualification was required as a result of this data review.

Blank Analysis Results

A review of laboratory blank analysis results indicate the presence of laboratory contamination for the compounds listed below. Positive sample results reported with concentrations less than five times the highest blank concentration for that compound are considered to be false positive results. However, the VPH range C_9-C_{12} aliphatics was not detected in any of the samples in this SDG, therefore, no qualifications were applied to the data.

Compound	Blank Action Limit (µg/kg)	Action
C_9-C_{12} aliphatics	26,500	none, this VPH range was not detected in the samples

EPA-NE
Data Validation Worksheet Cover Page - Page 1

Site Name Standard Times Field
Reference No. J-020655-002-005

REGION I ORGANIC DATA VALIDATION

The following data package has been validated:

Lab Name Woods Hole Group
Case/Project No. ETR # 43036
SDG No. Lab ID # 43036-1
No. of Samples/Matrix 12 Soil + 1TB

SOW/Method No. MADEP VPH/EPH
Sampling Date(s) 9/28/99
Shipping Date(s) 9/29/99
Date Rec'd by lab ↓

Traffic Report Sample Nos. SS0301STF, SS0301STFDUP, SS0401STF, SS0402STF, SS0501STF, SS0502STF, SS0601STF, SS0701STF, SS0801STF, SS0901STF, SSK0901STF, SS1001STF, SS0201STF
Trip Blank No. SSTB0101 (VPH only)
Equipment Blank No. none
Bottle Blank No. none
Field Duplicate Nos. SS0901STF, SSK0901STF
PES Nos. none

The Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, revision 12/96 was used to evaluate the data and/or approved modifications to the EPA-NE Functional Guidelines were used to evaluate the data and are attached to this cover page. (attach modified criteria from EPA approved QAPjP or amendment to QAPjP).

A Tier II or Tier III evaluation was used to validate the data (circle one). If a Tier II validation with a partial Tier III was used, then identify samples, parameters, etc. that received partial Tier III validation

modified Tier I / Tier II

The data were evaluated based upon the following parameters:

- Cooler T = 4°C
- samples covered in method

LLK 10/1/99
ok NA ok - Overall Evaluation of Data
ok - Data Completeness (CSF Audit - Tier I)
ok - Preservation & Technical Holding Times
NA - GC/MS & GC/ECD Instrument Performance Check
NS - Initial & Continuing Calibrations
X - Blanks
ok - Surrogate Compounds
NA - Internal Standards
ok - Matrix Spike/Matrix Spike Duplicate

ok - Fract. Check Soln
ok - Field Duplicates
ok - Sensitivity Check (LCS)
NR - PE Samples/Accuracy Check
NE - Target Compound Identification
NE - Compound Quantitation and Reported
NE - Quantitation Limits
NA - TICs
NA - Semivolatile and Pesticide/PCB Cleanup
NE - System Performance

NR - not requested
* QC issues see attached worksheet page(s)

Region I Definitions and Qualifiers:

NS - not supplied
NR - not requested as a deliverable
NA - not applicable for method and/or modified Tier II/III
NE - not evaluated

A - Acceptable Data
J - Numerical value associated with compound is an estimated quantity.
R - The data are rejected as unusable. The R replaces the numerical value or sample quantitation limit.
U - Compound not detected at that numerical sample quantitation limit.
UJ - The sample quantitation limit is an estimated quantity.
TB, BB, EB - Compound detected in aqueous trip blank, aqueous bottle blank, or aqueous equipment blank associated with soil/sediment samples.

Validator's Name Lisa Kelly Krowiak Company Name Metcalf & Eddy Phone Number 781-246-5200

Date Validation Started 12/10/99 Date Validation Completed 10/4/99

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V. BLANK ANALYSIS

List the blank contamination below.

Concentration Level: Low

Sampler: D. M. Orge Company: Metcalf + Eddy

Contacted: Yes (No) Date: _____

1. Laboratory: Method, Storage and Instrument Blanks

Date Extracted	Date Analyzed	Parameter/ Matrix	Sample No. (Blank Type)	Instrument/ Column	Compound	Conc. (units)
-	10/8/99	VPH/soil	Method Blank	-	C_9-C_{12} Aliphatics	5300 ug/kg
	10/12/99	no VPH detected			Unadjusted C_9-C_{12} aliph.	5300 ug/kg

2. Field: Equipment (Rinsate), Trip and Bottle Blanks

Date Extracted	Date Analyzed	Parameter/ Matrix	Sample No. (Blank Type)	Instrument/ Column	Compound	Conc. (units)
	no	VPH detected in	TB.			

Validator: _____ Date: 12/11/99

US EPA ARCHIVE DOCUMENT

3. **Blank Actions** - List the maximum concentrations of blank compounds.

Compound	Type of Blank	Date Blank Sampled/Originated	Max. Conc. (units)	Action Level (units)	Sample QL ug/kg	Samples Affected	Action
C4-C10 aliphatics	MB	10/8/99	5300 ug/kg	26500 ug/kg	5200	~~all~~ none all ND LMK 12/11/99	—

Comments: _____

_____

Validator: Lisa Kulp-Krom S Date: 12/11/99

Attachment I

Chains-of-Custody

US EPA ARCHIVE DOCUMENT

43026

M&E Metcalf & Eddy

CHAIN OF CUSTODY FORM

Job/Project Name: Standard Tires | Job/Project Location: New Bedford, MA | Job/Project Number: 0286055-0007

Samplers: (Signatures) PH MGL | Recorder: (Signature) [signature] | Date: 9/29/99

Lab (Samples Sent To): Woodshole

	SAMPLING		SAMPLE NUMBER	~~SAMPLE LOCATION~~	MATRIX			COMPOSITE/GRAB	PRESERVATIVE (Y/N)	ANALYSIS REQUESTED														COMMENTS
	Date	Time			Water	Soil	Product			VPH	EPH												Total # Bottles	
26-1	9/28/99	15:20	SS0301STF			X		G	Y	X	X												2	
-2	9/28/99	14:50	SS0401STF			X		G	Y	X	X												2	
-3		1400	SS0402STF			X		G	Y	X	X												2	
-4		~~13:40~~ 12:55	SS0501STF			X		G	Y	X	X												2	
-5		13:40	SS0502STF			X		G	Y	X	X												2	
-6		12:45	SS0601STF			X		G	Y	X	X												2	
-7		12:20	SS0701STF			X		G	Y	X	X												2	
-8		12:00	SS0801STF			X		G	Y	X	X												2	
-9		11:30	SS0901STF			X		G	Y	X	X												2	
-10		11:35	SSK0901STF			X		G	Y	X	X												2	Field Dup of SS0901STF
-11		11:00	SS1001STF			X		G	Y	X	X												2	
-12		10:15	SS0201STF			X		G	Y	X	X												2	

Relinquished By: (Signature)	Date:	Time:	~~Relinquished~~ Received By: (Signature)	Relinquished By: (Signature)	Date:	Time:	Received By: (Signature)
DiTomo	9/29/99	14:00	Ed Bartlett	Ed Bartlett	9/29/99	3:10	[signature]
Relinquished By: (Signature)	Date:	Time:	Relinquished By: (Signature)	Relinquished By: (Signature)	Date:	Time:	Received By: (Signature)
Relinquished By: (Signature)	Date:	Time:	Received for Lab By: (Signature)	Date:	Time:	Comments: Pres: VPH: methanol + ice EPH: ice methanol sample: ice	

Method of Shipment: Courier

Distribution: **Original** to Lab. **Copy 1** to Field Files, **Copy 2** to Project Manager

Form 274 (Rev. 5/89)

US EPA ARCHIVE DOCUMENT

2 of 2

43026

Metcalf & Eddy

CHAIN OF CUSTODY FORM

Job/Project Name: Standard Times	Job/Project Location: New Bedford MA	Job/Project Number: 020655 0007
Samplers: (Signatures) DStMgr	Recorder: (Signature) DStMgr	Date: 9/29/99
Lab (Samples Sent To): Woods Hole		

SAMPLING Date	SAMPLING Time	SAMPLE NUMBER	SAMPLE LOCATION	MATRIX: Water	MATRIX: Soil	MATRIX: Methanol	MATRIX:	MATRIX:	COMPOSITE/GRAB	PRESERVATIVE (Y/N)	ANALYSIS REQUESTED: VPH							ANALYSIS REQUESTED: Total #	COMMENTS
13 9/28/99	10:00	SSTB0101				X			G	Y	X							1	Trip Blank
		Temperature	Blank																

Relinquished By: (Signature) DStMgr	Date: 9/29/99 Time: 14:00	Relinquished By: (Signature) Received Ed Reitter	Relinquished By: (Signature) Ed Reitter	Date: 9/29/99 Time: 3:10	Received By: (Signature)
Relinquished By: (Signature)	Date: Time:	Relinquished By: (Signature)	Relinquished By: (Signature)	Date: Time:	Received By: (Signature)
Relinquished By: (Signature)	Date: Time:	Received for Lab By: (Signature)	Date: Time:	Comments: Preserve: ~~HCl~~ OS 9/29/99 see previous page	
Method of Shipment: courier					

Distribution: **Original** to Lab. **Copy 1** to Field Files, **Copy 2** to Project Manager

Form 274 (Rev. 5/89)

Attachment II

Sample Result Summary Sheets

Woods Hole Group
Environmental Laboratories
375 Paramount Drive • Suite B
Raynham, MA 02767-5154 • USA
Phone: 508-822-9300
Fax: 508-822-3288

VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43026

Metcalf & Eddy

Lab ID Number: 43026-13

Project: Standard Times

Associated Blank: VS1007B2

Sample ID: SSTB0101			09/28/99 @1000(MeOH)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
9/29/1999	25 g	100%	10/8/1999	1	AL

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/Kg

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	18000	U
C_9-C_{12} Aliphatics [1,3]	5200	U
C_9-C_{10} Aromatics [1]	10000	U
Unadjusted C_5-C_8 Aliphatics [1]	18000	U
Unadjusted C_9-C_{12} Aliphatics [1]	5200	U

No edits
unless USR
12/17/99

TARGETED VPH ANALYTES in µg/Kg

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	260	U
Benzene	C_5 - C_8	260	U
Toluene	C_5 - C_8	780	U
Ethylbenzene	C_9 - C_{12}	260	U
m & p Xylene	C_9 - C_{12}	520	U
o-Xylene	C_9 - C_{12}	520	U
Naphthalene	N/A	520	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	116%	70%-130%	120%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

Woods Hole Group
Environmental Laboratories
375 Paramount Drive • Suite B
Raynham, MA 02767-5154 • USA
Phone: 508-822-9300
Fax: 508-822-3288

VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43026

Metcalf & Eddy

Lab ID Number: 43026-12

Project: Standard Times

Associated Blank: VS1007B2

Sample ID: SS0201STF			09/28/99 @1015(Soil)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
9/29/1999	23.98 g	91%	10/8/1999	1	AL

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/Kg

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	21000	U
C_9-C_{12} Aliphatics [1,3]	5900	U
C_9-C_{10} Aromatics [1]	12000	U
Unadjusted C_5-C_8 Aliphatics[1]	21000	U
Unadjusted C_9-C_{12} Aliphatics[1]	5900	U

N, calcs confirmed LK 12/17/99

TARGETED VPH ANALYTES in µg/Kg

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	300	U
Benzene	C_5 - C_8	300	U
Toluene	C_5 - C_8	890	U
Ethylbenzene	C_9 - C_{12}	300	U
m & p Xylene	C_9 - C_{12}	590	U
o-Xylene	C_9 - C_{12}	590	U
Naphthalene	N/A	590	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	105%	70%-130%	108%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

US EPA ARCHIVE DOCUMENT

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43026

Metcalf & Eddy

Lab ID Number: 43026-1

Project: Standard Times

Associated Blank: VS1012B1

Sample ID: SS0301STF			09/28/99 @1520(Soil)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
9/29/1999	22.48 g	84%	10/12/1999	1	AL

No edits can for LFR 12/17/99

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/Kg

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	24000	U
C_9-C_{12} Aliphatics [1,3]	6900	U
C_9-C_{10} Aromatics [1]	14000	U
Unadjusted C_5-C_8 Aliphatics [1]	24000	U
Unadjusted C_9-C_{12} Aliphatics [1]	6900	U

TARGETED VPH ANALYTES in µg/Kg

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	350	U
Benzene	C_5 - C_8	350	U
Toluene	C_5 - C_8	1000	U
Ethylbenzene	C_9 - C_{12}	350	U
m & p Xylene	C_9 - C_{12}	690	U
o-Xylene	C_9 - C_{12}	690	U
Naphthalene	N/A	690	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	77%	70%-130%	88%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43026

Metcalf & Eddy

Lab ID Number: 43026-2

Project: Standard Times

Associated Blank: VS1007B2

Sample ID: SS0401STF			09/28/99 @1450(Soil)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
9/29/1999	23.7 g	91%	10/8/1999	1	AL

No edits can for LSK 12/17/99

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/Kg

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	21000	U
C_9-C_{12} Aliphatics [1,3]	6000	U
C_9-C_{10} Aromatics [1]	12000	U
Unadjusted C_5-C_8 Aliphatics[1]	21000	U
Unadjusted C_9-C_{12} Aliphatics[1]	6000	U

TARGETED VPH ANALYTES in µg/Kg

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	300	U
Benzene	C_5 - C_8	300	U
Toluene	C_5 - C_8	900	U
Ethylbenzene	C_9 - C_{12}	300	U
m & p Xylene	C_9 - C_{12}	600	U
o-Xylene	C_9 - C_{12}	600	U
Naphthalene	N/A	600	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	106%	70%-130%	108%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43026

Metcalf & Eddy

Lab ID Number: 43026-3

Project: Standard Times

Associated Blank: VS1007B2

Sample ID: SS0402STF			09/28/99 @1400(Soil)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
9/29/1999	22.72 g	85%	10/8/1999	1	AL

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/Kg

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	24000	U
C_9-C_{12} Aliphatics [1,3]	6700	U
C_9-C_{10} Aromatics [1]	13000	U
Unadjusted C_5-C_8 Aliphatics[1]	24000	U
Unadjusted C_9-C_{12} Aliphatics[1]	6700	U

No edits
Comp for LKS
12/17/99

TARGETED VPH ANALYTES in µg/Kg

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	340	U
Benzene	C_5 - C_8	340	U
Toluene	C_5 - C_8	1000	U
Ethylbenzene	C_9 - C_{12}	340	U
m & p Xylene	C_9 - C_{12}	670	U
o-Xylene	C_9 - C_{12}	670	U
Naphthalene	N/A	670	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	104%	70%-130%	108%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43026

Metcalf & Eddy

Lab ID Number: 43026-4

Project: Standard Times

Associated Blank: VS1007B2

No edits
LM for LKK
12/17/99

Sample ID: SS0501STF			09/28/99 @1255(Soil)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
9/29/99	23.71 g	87%	10/8/99	1	AL

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/Kg

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	22000	U
C_9-C_{12} Aliphatics [1,3]	6300	U
C_9-C_{10} Aromatics [1]	13000	U
Unadjusted C_5-C_8 Aliphatics[1]	22000	U
Unadjusted C_9-C_{12} Aliphatics[1]	6300	U

TARGETED VPH ANALYTES in µg/Kg

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	310	U
Benzene	C_5 - C_8	310	U
Toluene	C_5 - C_8	940	U
Ethylbenzene	C_9 - C_{12}	310	U
m & p Xylene	C_9 - C_{12}	630	U
o-Xylene	C_9 - C_{12}	630	U
Naphthalene	N/A	630	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	103%	70%-130%	106%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43026

Metcalf & Eddy

Lab ID Number: 43026-5

Project: Standard Times

Associated Blank: VS1007B2

Sample ID: SS0502STF			09/28/99 @1340(Soil)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
9/29/1999	23.08 g	82%	10/8/1999	1	AL

N. edits on form 12/17/99

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/Kg

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	24000	U
C_9-C_{12} Aliphatics [1,3]	6800	U
C_9-C_{10} Aromatics [1]	14000	U
Unadjusted C_5-C_8 Aliphatics [1]	24000	U
Unadjusted C_9-C_{12} Aliphatics [1]	6800	U

TARGETED VPH ANALYTES in µg/Kg

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	340	U
Benzene	C_5 - C_8	340	U
Toluene	C_5 - C_8	1000	U
Ethylbenzene	C_9 - C_{12}	340	U
m & p Xylene	C_9 - C_{12}	680	U
o-Xylene	C_9 - C_{12}	680	U
Naphthalene	N/A	680	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	101%	70%-130%	106%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43026

Metcalf & Eddy

Lab ID Number: 43026-6

Project: Standard Times

Associated Blank: VS1007B2

Sample ID: SS0601STF			09/28/99 @1245(Soil)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
9/29/1999	23.19 g	91%	10/8/1999	1	AL

No edits on file for LKS 12/17/99

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/Kg

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	21000	U
C_9-C_{12} Aliphatics [1,3]	6100	U
C_9-C_{10} Aromatics [1]	12000	U
Unadjusted C_5-C_8 Aliphatics [1]	21000	U
Unadjusted C_9-C_{12} Aliphatics [1]	6100	U

TARGETED VPH ANALYTES in µg/Kg

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	310	U
Benzene	C_5 - C_8	310	U
Toluene	C_5 - C_8	920	U
Ethylbenzene	C_9 - C_{12}	310	U
m & p Xylene	C_9 - C_{12}	610	U
o-Xylene	C_9 - C_{12}	610	U
Naphthalene	N/A	610	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	106%	70%-130%	109%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43026

Metcalf & Eddy

Lab ID Number: 43026-7

Project: Standard Times

Associated Blank: VS1007B2

Sample ID: SS0701STF			09/28/99 @1220(Soil)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
9/29/1999	24.74 g	89%	10/8/1999	1	AL

No edits ok for LKS 12/17/99

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/Kg

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	21000	U
C_9-C_{12} Aliphatics [1,3]	5900	U
C_9-C_{10} Aromatics [1]	12000	U
Unadjusted C_5-C_8 Aliphatics [1]	21000	U
Unadjusted C_9-C_{12} Aliphatics [1]	5900	U

TARGETED VPH ANALYTES in µg/Kg

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	300	U
Benzene	C_5 - C_8	300	U
Toluene	C_5 - C_8	890	U
Ethylbenzene	C_9 - C_{12}	300	U
m & p Xylene	C_9 - C_{12}	590	U
o-Xylene	C_9 - C_{12}	590	U
Naphthalene	N/A	590	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	103%	70%-130%	106%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43026

Metcalf & Eddy

Lab ID Number: 43026-8

Project: Standard Times

Associated Blank: VS1007B2

Sample ID: SS0801STF			09/28/99 @1200(Soil)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
9/29/1999	23.6 g	97%	10/8/1999	1	AL

No results CM for LKK 12/7/99

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/Kg

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	20000	U
C_9-C_{12} Aliphatics [1,3]	5700	U
C_9-C_{10} Aromatics [1]	11000	U
Unadjusted C_5-C_8 Aliphatics[1]	20000	U
Unadjusted C_9-C_{12} Aliphatics[1]	5700	U

TARGETED VPH ANALYTES in µg/Kg

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	280	U
Benzene	C_5 - C_8	280	U
Toluene	C_5 - C_8	850	U
Ethylbenzene	C_9 - C_{12}	280	U
m & p Xylene	C_9 - C_{12}	570	U
o-Xylene	C_9 - C_{12}	570	U
Naphthalene	N/A	570	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	111%	70%-130%	115%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43026

Metcalf & Eddy

Lab ID Number: 43026-9

Project: Standard Times

Associated Blank: VS1007B2

Sample ID: SS0901STF			09/28/99 @1130(Soil)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
9/29/1999	24.51 g	91%	10/8/1999	1	AL

No results on for LK's 12/17/99

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/Kg

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	20000	U
C_9-C_{12} Aliphatics [1,3]	5900	U
C_9-C_{10} Aromatics [1]	12000	U
Unadjusted C_5-C_8 Aliphatics [1]	20000	U
Unadjusted C_9-C_{12} Aliphatics [1]	5900	U

TARGETED VPH ANALYTES in µg/Kg

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	290	U
Benzene	C_5 - C_8	290	U
Toluene	C_5 - C_8	880	U
Ethylbenzene	C_9 - C_{12}	290	U
m & p Xylene	C_9 - C_{12}	590	U
o-Xylene	C_9 - C_{12}	590	U
Naphthalene	N/A	590	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	106%	70%-130%	110%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43026

Metcalf & Eddy

Lab ID Number: 43026-10

Project: Standard Times

Associated Blank: VS1007B2

Sample ID: SSK0901STF			09/28/99 @1135(Soil)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
9/29/1999	24.35 g	89%	10/8/1999	1	AL

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/Kg

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	21000	U
C_9-C_{12} Aliphatics [1,3]	6000	U
C_9-C_{10} Aromatics [1]	12000	U
Unadjusted C_5-C_8 Aliphatics[1]	21000	U
Unadjusted C_9-C_{12} Aliphatics[1]	6000	U

No edits ok for CLP 12/17/99

TARGETED VPH ANALYTES in µg/Kg

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	300	U
Benzene	C_5 - C_8	300	U
Toluene	C_5 - C_8	900	U
Ethylbenzene	C_9 - C_{12}	300	U
m & p Xylene	C_9 - C_{12}	600	U
o-Xylene	C_9 - C_{12}	600	U
Naphthalene	N/A	600	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	109%	70%-130%	114%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43026

Metcalf & Eddy

Lab ID Number: 43026-11

Project: Standard Times

Associated Blank: VS1007B2

Sample ID: SS1001STF			09/28/99 @1100(Soil)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
9/29/1999	23.42 g	96%	10/8/1999	1	AL

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/Kg

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	20000	U
C_9-C_{12} Aliphatics [1,3]	5800	U
C_9-C_{10} Aromatics [1]	12000	U
Unadjusted C_5-C_8 Aliphatics [1]	20000	U
Unadjusted C_9-C_{12} Aliphatics [1]	5800	U

No edits on file 11/17/99

TARGETED VPH ANALYTES in µg/Kg

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	290	U
Benzene	C_5 - C_8	290	U
Toluene	C_5 - C_8	860	U
Ethylbenzene	C_9 - C_{12}	290	U
m & p Xylene	C_9 - C_{12}	580	U
o-Xylene	C_9 - C_{12}	580	U
Naphthalene	N/A	580	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	116%	70%-130%	118%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

Standard Times

ETR Number: 43026
Lab ID Number: 43026-1
Associated Blank: ES1004B1

Sample ID: SS0301STF :[ ]09/28/99 @1520(Soil)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
9/29/99	SOIL	10.36 g	84%	10/4/99	Aromatic:	10/8/99	1	TQ
					Aliphatic:	10/8/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/Kg

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	3500	U
C19-C36 Aliphatics [1]	4600	U
C11-C22 Aromatics [1,2]	23000	
Unadjusted C11-C22 Aromatics [1]	32000	

No edits confirmed 12/17/99

TARGETED PAH ANALYTES in µg/Kg

Analyte	Amount	Qualifier
Naphthalene	580	U
2-Methylnaphthalene	580	U
Acenaphthylene	580	U
Acenaphthene	580	U
Fluorene	580	U
Phenanthrene	1500	
Anthracene	580	U
Fluoranthene	1600	
Pyrene	1500	
Benzo(a)anthracene	780	
Chrysene	850	
Benzo(b)fluoranthene	580	
Benzo(k)fluoranthene	770	
Benzo(a)pyrene	770	
Indeno(1,2,3-cd)pyrene [3]	820	
Dibenzo(a,h)anthracene [3]	820	
Benzo(g,h,i)perylene	580	U

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	65	40% - 140%
	Ortho-terphenyl(OTP)	67	40% - 140%
Fractionation Surrogates	Biphenyl	80	40% - 140%
	2-Fluorobiphenyl	77	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U Analyzed but not found.
* Surrogate value out of acceptable range.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

Standard Times

ETR Number: 43026
Lab ID Number: 43026-2
Associated Blank: ES1004B1

Sample ID: SS0401STF :[ ]09/28/99 @1450(Soil)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
9/29/99	SOIL	10.49 g	91%	10/04/99	Aromatic:	10/8/99	1	TQ
					Aliphatic:	10/8/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/Kg

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	3200	
C19-C36 Aliphatics [1]	50000	
C11-C22 Aromatics [1,2]	180000	
Unadjusted C11-C22 Aromatics [1]	270000	

TARGETED PAH ANALYTES in µg/Kg

Analyte	Amount	Qualifier
Naphthalene	520	U
2-Methylnaphthalene	520	U
Acenaphthylene	520	U
Acenaphthene	520	U
Fluorene	570	
Phenanthrene	7800	
Anthracene	2100	
Fluoranthene	16000	
Pyrene	17000	
Benzo(a)anthracene	8600	
Chrysene	7400	
Benzo(b)fluoranthene	7700	
Benzo(k)fluoranthene	4600	
Benzo(a)pyrene	8200	
Indeno(1,2,3-cd)pyrene [3]	7500	
Dibenzo(a,h)anthracene [3]	7500	
Benzo(g,h,i)perylene	5300	

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	62	40% - 140%
	Ortho-terphenyl(OTP)	67	40% - 140%
Fractionation Surrogates	Biphenyl	76	40% - 140%
	2-Fluorobiphenyl	73	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.

2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.

3 Values reported reflect their sum.

U = Analyzed but not found.

* Surrogate value out of acceptable range.

No edits
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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

Standard Times

ETR Number: 43026
Lab ID Number: 43026-3
Associated Blank: ES1004B1

Sample ID:	SS0402STF	:[ ]09/28/99 @1400(Soil)						
Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
9/29/99	SOIL	10.31 g	85%	10/04/99	Aromatic:	10/8/99	1	TQ
					Aliphatic:	10/8/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/Kg

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	3400	U
C19-C36 Aliphatics [1]	19000	
C11-C22 Aromatics [1,2]	120000	
Unadjusted C11-C22 Aromatics [1]	200000	

TARGETED PAH ANALYTES in µg/Kg

Analyte	Amount	Qualifier
Naphthalene	570	U
2-Methylnaphthalene	570	U
Acenaphthylene	570	U
Acenaphthene	570	U
Fluorene	570	U
Phenanthrene	6800	
Anthracene	1600	
Fluoranthene	13000	
Pyrene	13000	
Benzo(a)anthracene	6000	
Chrysene	5200	
Benzo(b)fluoranthene	5700	
Benzo(k)fluoranthene	5300	
Benzo(a)pyrene	5800	
Indeno(1,2,3-cd)pyrene [3]	7000	
Dibenzo(a,h)anthracene [3]	7000	
Benzo(g,h,i)perylene	5000	

No edits ok for LSK 12/17/99

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	64	40% - 140%
	Ortho-terphenyl(OTP)	61	40% - 140%
Fractionation Surrogates	Biphenyl	71	40% - 140%
	2-Fluorobiphenyl	68	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U = Analyzed but not found.
* Surrogate value out of acceptable range.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

Standard Times

ETR Number: 43026
Lab ID Number: 43026-4
Associated Blank: ES1004B1

Sample ID: SS0501STF :[ ]09/28/99 @1255(Soil)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
9/29/99	SOIL	10.32 g	87%	10/04/99	Aromatic:	10/8/99	1	TQ
					Aliphatic:	10/8/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/Kg

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	3300	U
C19-C36 Aliphatics [1]	32000	
C11-C22 Aromatics [1,2]	290000	
Unadjusted C11-C22 Aromatics [1]	440000	

TARGETED PAH ANALYTES in µg/Kg

Analyte	Amount	Qualifier
Naphthalene	1300	
2-Methylnaphthalene	720	
Acenaphthylene	1100	
Acenaphthene	2000	
Fluorene	2600	
Phenanthrene	20000	
Anthracene	4000	
Fluoranthene	24000	
Pyrene	28000	
Benzo(a)anthracene	12000	
Chrysene	12000	
Benzo(b)fluoranthene	9300	
Benzo(k)fluoranthene	8700	
Benzo(a)pyrene	11000	
Indeno(1,2,3-cd)pyrene [3]	10000	
Dibenzo(a,h)anthracene [3]	10000	
Benzo(g,h,i)perylene	7400	

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SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	65	40% - 140%
	Ortho-terphenyl(OTP)	72	40% - 140%
Fractionation Surrogates	Biphenyl	81	40% - 140%
	2-Fluorobiphenyl	74	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U = Analyzed but not found.
* Surrogate value out of acceptable range.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

Standard Times

ETR Number: 43026
Lab ID Number: 43026-5
Associated Blank: ES1004B1

Sample ID: SS0502STF :[ ]09/28/99 @1340(Soil)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
9/29/99	SOIL	10.66 g	82%	10/04/99	Aromatic:	10/8/99	1	TQ
					Aliphatic:	10/8/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/Kg

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	3400	U
C19-C36 Aliphatics [1]	19000	
C11-C22 Aromatics [1,2]	75000	
Unadjusted C11-C22 Aromatics [1]	98000	

No edits can be made 12/17/99

TARGETED PAH ANALYTES in µg/Kg

Analyte	Amount	Qualifier
Naphthalene	570	U
2-Methylnaphthalene	570	U
Acenaphthylene	570	U
Acenaphthene	570	U
Fluorene	570	U
Phenanthrene	1500	
Anthracene	570	U
Fluoranthene	3000	
Pyrene	3900	
Benzo(a)anthracene	2000	
Chrysene	2000	
Benzo(b)fluoranthene	2100	
Benzo(k)fluoranthene	1800	
Benzo(a)pyrene	2200	
Indeno(1,2,3-cd)pyrene [3]	2500	
Dibenzo(a,h)anthracene [3]	2500	
Benzo(g,h,i)perylene	2000	

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	69	40% - 140%
	Ortho-terphenyl(OTP)	62	40% - 140%
Fractionation Surrogates	Biphenyl	65	40% - 140%
	2-Fluorobiphenyl	63	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U = Analyzed but not found.
* Surrogate value out of acceptable range.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

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Standard Times

ETR Number: 43026
Lab ID Number: 43026-6
Associated Blank: ES1004B1

Sample ID: SS0601STF :[ ]09/28/99 @1245(Soil)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
9/29/99	SOIL	10.2 g	91%	10/04/99	Aromatic:	10/8/99	1	TQ
					Aliphatic:	10/8/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/Kg

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	3200	U
C19-C36 Aliphatics [1]	14000	
C11-C22 Aromatics [1,2]	60000	
Unadjusted C11-C22 Aromatics [1]	80000	

No edits ok for LKK 12/17/99

TARGETED PAH ANALYTES in µg/Kg

Analyte	Amount	Qualifier
Naphthalene	540	U
2-Methylnaphthalene	540	U
Acenaphthylene	540	U
Acenaphthene	540	U
Fluorene	540	U
Phenanthrene	1900	
Anthracene	540	U
Fluoranthene	3200	
Pyrene	3800	
Benzo(a)anthracene	1800	
Chrysene	1900	
Benzo(b)fluoranthene	1700	
Benzo(k)fluoranthene	1200	
Benzo(a)pyrene	1800	
Indeno(1,2,3-cd)pyrene [3]	1800	
Dibenzo(a,h)anthracene [3]	1800	
Benzo(g,h,i)perylene	1300	

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	69	40% - 140%
	Ortho-terphenyl(OTP)	65	40% - 140%
Fractionation Surrogates	Biphenyl	68	40% - 140%
	2-Fluorobiphenyl	65	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U = Analyzed but not found.
* Surrogate value out of acceptable range.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

Standard Times

ETR Number: 43026
Lab ID Number: 43026-7
Associated Blank: ES1004B1

Sample ID: SS0701STF :[ ]09/28/99 @1220(Soil)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
9/29/99	SOIL	10.67 g	89%	10/04/99	Aromatic:	10/8/99	1	TQ
					Aliphatic:	10/8/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/Kg

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	3200	U
C19-C36 Aliphatics [1]	7500	
C11-C22 Aromatics [1,2]	49000	
Unadjusted C11-C22 Aromatics [1]	76000	

TARGETED PAH ANALYTES in µg/Kg

Analyte	Amount	Qualifier
Naphthalene	530	U
2-Methylnaphthalene	530	U
Acenaphthylene	530	U
Acenaphthene	530	U
Fluorene	530	U
Phenanthrene	3400	
Anthracene	820	
Fluoranthene	4900	
Pyrene	4800	
Benzo(a)anthracene	2200	
Chrysene	2100	
Benzo(b)fluoranthene	1900	
Benzo(k)fluoranthene	1600	
Benzo(a)pyrene	2100	
Indeno(1,2,3-cd)pyrene [3]	2100	
Dibenzo(a,h)anthracene [3]	2100	
Benzo(g,h,i)perylene	1400	

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	68	40% - 140%
	Ortho-terphenyl(OTP)	68	40% - 140%
Fractionation Surrogates	Biphenyl	76	40% - 140%
	2-Fluorobiphenyl	74	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U = Analyzed but not found.
* Surrogate value out of acceptable range.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

Standard Times

ETR Number: 43026
Lab ID Number: 43026-8
Associated Blank: ES1004B1

Sample ID: SS0801STF :[ ]09/28/99 @1200(Soil)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
9/29/99	SOIL	10.63 g	97%	10/04/99	Aromatic:	10/8/99	1	TQ
					Aliphatic:	10/8/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/Kg

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	2900	U
C19-C36 Aliphatics [1]	3900	U
C11-C22 Aromatics [1,2]	8900	
Unadjusted C11-C22 Aromatics [1]	8900	

No edits
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TARGETED PAH ANALYTES in µg/Kg

Analyte	Amount	Qualifier
Naphthalene	480	U
2-Methylnaphthalene	480	U
Acenaphthylene	480	U
Acenaphthene	480	U
Fluorene	480	U
Phenanthrene	480	U
Anthracene	480	U
Fluoranthene	480	U
Pyrene	480	U
Benzo(a)anthracene	480	U
Chrysene	480	U
Benzo(b)fluoranthene	480	U
Benzo(k)fluoranthene	480	U
Benzo(a)pyrene	480	U
Indeno(1,2,3-cd)pyrene [3]	480	U
Dibenzo(a,h)anthracene [3]	480	U
Benzo(g,h,i)perylene	480	U

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	66	40% - 140%
	Ortho-terphenyl(OTP)	63	40% - 140%
Fractionation Surrogates	Biphenyl	74	40% - 140%
	2-Fluorobiphenyl	73	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U = Analyzed but not found.
* Surrogate value out of acceptable range.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

Standard Times

ETR Number: 43026
Lab ID Number: 43026-9
Associated Blank: ES1004B1

Sample ID: SS0901STF :[ ]09/28/99 @1130(Soil)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
9/29/99	SOIL	10.58 g	91%	10/04/99	Aromatic:	10/8/99	1	TQ
					Aliphatic:	10/8/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/Kg

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	3100	U
C19-C36 Aliphatics [1]	4200	U
C11-C22 Aromatics [1,2]	8900	U
Unadjusted C11-C22 Aromatics [1]	8900	U

No edits can for LSS 12/17/99

TARGETED PAH ANALYTES in µg/Kg

Analyte	Amount	Qualifier
Naphthalene	520	U
2-Methylnaphthalene	520	U
Acenaphthylene	520	U
Acenaphthene	520	U
Fluorene	520	U
Phenanthrene	520	U
Anthracene	520	U
Fluoranthene	520	U
Pyrene	520	U
Benzo(a)anthracene	520	U
Chrysene	520	U
Benzo(b)fluoranthene	520	U
Benzo(k)fluoranthene	520	U
Benzo(a)pyrene	520	U
Indeno(1,2,3-cd)pyrene [3]	520	U
Dibenzo(a,h)anthracene [3]	520	U
Benzo(g,h,i)perylene	520	U

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	68	40% - 140%
	Ortho-terphenyl(OTP)	64	40% - 140%
Fractionation Surrogates	Biphenyl	73	40% - 140%
	2-Fluorobiphenyl	72	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U = Analyzed but not found.
* Surrogate value out of acceptable range.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

Standard Times

ETR Number: 43026
Lab ID Number: 43026-10
Associated Blank: ES1004B1

Sample ID: SSK0901STF :[ ]09/28/99 @1135(Soil)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
9/29/99	SOIL	10.7 g	89%	10/04/99	Aromatic:	10/8/99	1	TQ
					Aliphatic:	10/8/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/Kg

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	3200	U
C19-C36 Aliphatics [1]	4200	U
C11-C22 Aromatics [1,2]	9000	U
Unadjusted C11-C22 Aromatics [1]	9000	U

No edits
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12/17 99

TARGETED PAH ANALYTES in µg/Kg

Analyte	Amount	Qualifier
Naphthalene	530	U
2-Methylnaphthalene	530	U
Acenaphthylene	530	U
Acenaphthene	530	U
Fluorene	530	U
Phenanthrene	530	U
Anthracene	530	U
Fluoranthene	530	U
Pyrene	530	U
Benzo(a)anthracene	530	U
Chrysene	530	U
Benzo(b)fluoranthene	530	U
Benzo(k)fluoranthene	530	U
Benzo(a)pyrene	530	U
Indeno(1,2,3-cd)pyrene [3]	530	U
Dibenzo(a,h)anthracene [3]	530	U
Benzo(g,h,i)perylene	530	U

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	61	40% - 140%
	Ortho-terphenyl(OTP)	63	40% - 140%
Fractionation Surrogates	Biphenyl	75	40% - 140%
	2-Fluorobiphenyl	74	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U = Analyzed but not found.
* Surrogate value out of acceptable range.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

Standard Times

ETR Number: 43026
Lab ID Number: 43026-11
Associated Blank: ES1004B1

Sample ID: SS1001STF :[ ]09/28/99 @1100(Soil)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
9/29/99	SOIL	10.67 g	96%	10/04/99	Aromatic:	10/8/99	1	TQ
					Aliphatic:	10/8/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/Kg

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	2900	U
C19-C36 Aliphatics [1]	3900	U
C11-C22 Aromatics [1,2]	8300	U
Unadjusted C11-C22 Aromatics [1]	8300	U

TARGETED PAH ANALYTES in µg/Kg

Analyte	Amount	Qualifier
Naphthalene	490	U
2-Methylnaphthalene	490	U
Acenaphthylene	490	U
Acenaphthene	490	U
Fluorene	490	U
Phenanthrene	490	U
Anthracene	490	U
Fluoranthene	490	U
Pyrene	490	U
Benzo(a)anthracene	490	U
Chrysene	490	U
Benzo(b)fluoranthene	490	U
Benzo(k)fluoranthene	490	U
Benzo(a)pyrene	490	U
Indeno(1,2,3-cd)pyrene [3]	490	U
Dibenzo(a,h)anthracene [3]	490	U
Benzo(g,h,i)perylene	490	U

No edits cm for LKK 12/7/99

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	71	40% - 140%
	Ortho-terphenyl(OTP)	67	40% - 140%
Fractionation Surrogates	Biphenyl	72	40% - 140%
	2-Fluorobiphenyl	71	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U = Analyzed but not found.
* Surrogate value out of acceptable range.

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Woods Hole Group
Environmental Laboratories

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Phone: 508-822-9300
Fax: 508-822-3288

ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

Standard Times

ETR Number: 43026
Lab ID Number: 43026-12
Associated Blank: ES1004B1

Sample ID: SS0201STF :[ ]09/28/99 @1015(Soil)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
9/29/99	SOIL	10.35 g	91%	10/04/99	Aromatic:	10/8/99	1	TQ
					Aliphatic:	10/8/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/Kg

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	3200	U
C19-C36 Aliphatics [1]	4200	U
C11-C22 Aromatics [1,2]	9000	U
Unadjusted C11-C22 Aromatics [1]	9000	U

TARGETED PAH ANALYTES in µg/Kg

Analyte	Amount	Qualifier
Naphthalene	530	U
2-Methylnaphthalene	530	U
Acenaphthylene	530	U
Acenaphthene	530	U
Fluorene	530	U
Phenanthrene	530	U
Anthracene	530	U
Fluoranthene	530	U
Pyrene	530	U
Benzo(a)anthracene	530	U
Chrysene	530	U
Benzo(b)fluoranthene	530	U
Benzo(k)fluoranthene	530	U
Benzo(a)pyrene	530	U
Indeno(1,2,3-cd)pyrene [3]	530	U
Dibenzo(a,h)anthracene [3]	530	U
Benzo(g,h,i)perylene	530	U

No edits Ok for USR 12/1/99

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	72	40% - 140%
	Ortho-terphenyl(OTP)	69	40% - 140%
Fractionation Surrogates	Biphenyl	74	40% - 140%
	2-Fluorobiphenyl	73	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U = Analyzed but not found.
* Surrogate value out of acceptable range.

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M&E
AQUA ALLIANCE

MEMORANDUM

PROJECT NO:	J-020655-0002-005	**DATE:**	December 17, 1999
TO:	Standard Times Field Site File (BTSA)	**OFFICE:**	Wakefield
FROM:	L. Kulju Krowitz for	**COMPANY:**	Metcalf & Eddy
REVIEWED BY:	C. Lapite		
CC:	B. Wyskowski, N. Thurber (memo only)		

SUBJECT: Limited QC Review/Modified Tier II-Like Review
Review of MADEP VPH and EPH Analytical Results
Woods Hole Group, Raynham, Massachusetts
ETR Number 43032

On September 29 and 30, 1999, two aqueous samples and one trip blank sample were collected at the Standard Times Field BTSA site, located in New Bedford, Massachusetts by Metcalf & Eddy field personnel. The sampling was performed as part of the BTSA RAC WA #043-SISI-01ZZ. The samples were submitted to Woods Hole Group laboratory, located in Raynham, Massachusetts for the analysis of MADEP volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH). All samples were received by the laboratory on October 1, 1999. The data package was received in the M&E Office on October 21, 1999. Included in Attachment I is a copy of the chain-of-custody (COC) record.

M&E reviewed the data in accordance with the EPA-approved Final Field Task Plan for the site and guidance received from EPA Work Assignment Manager, Mr. James Byrne, in a September 17, 1999 letter to M&E Work Assignment Manager, Barb Wyskowski. The data review included:

*	•	Preservation and Technical Holding Times
NA	•	Initial and Continuing Calibration
*	•	Blanks
*	•	Surrogate Compounds
	•	Matrix Spike (MS)/Matrix Spike Duplicates (MSD)
*	•	Field Duplicates
	•	Laboratory Duplicates
*	•	Laboratory Fortified Blank (LFB) and/or Laboratory Control Sample (LCS)
*	•	Fractionation Check Solution for EPH

*	=	All criteria met for this parameter
NA	=	Not Applicable and/or no information was provided by the laboratory
NR	=	Not requested

Included in Attachment II are the result summary sheets, annotated with the qualifiers detailed in this memorandum.

p:/ne/brwnflds/stantime/43032vph.wpd

Surrogate Recoveries

The TPH analysis of the sample required a 1:10 dilution due to the oily nature of the sample matrix, and an additional 1:10 dilution for analysis. As a result, the surrogate for the TPH analysis was diluted out of range, and no recoveries were reported. No qualification of the data is required.

EPA-NE
Data Validation Worksheet Cover Page - Page 1

Site Name Standard Times Field
Reference No. I-020655-002 -005

REGION I ORGANIC DATA VALIDATION

The following data package has been validated:

Lab Name Woods Hole Group
Case/Project No. ETR: 43032
SDG No. NA
No. of Samples/Matrix 2 aq + LTB

SOW/Method No. MADEP VPH/EPH
Sampling Date(s) 9/30/99 + 9/29/99
Shipping Date(s) 10/1/99
Date Rec'd by lab 10/1/99

Traffic Report Sample Nos. GW040ISTF, FEW100ISTF, ~~GW040ISTE~~ CHK 12/11/99

Trip Blank No. GWTB01 (VPH only)
Equipment Blank No. none
Bottle Blank No.
Field Duplicate Nos. GW-02RE / GWR02RE in Case ETR 43199
PES Nos.

The Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, revision 12/96 was used to evaluate the data and/or approved modifications to the EPA-NE Functional Guidelines were used to evaluate the data and are attached to this cover page: (attach modified criteria from EPA approved QAPjP or amendment to QAPjP).

A Tier II or Tier III evaluation was used to validate the data (circle one). If a Tier II validation with a partial Tier III was used, then identify samples, parameters, etc. that received partial Tier III validation

Modified Tier I / Tier II

The data were evaluated based upon the following parameters:

- Cooler Temp 4°C
- pH < 2

ok - Overall Evaluation of Data
NA ~~ok~~ - Data Completeness (CSF Audit - Tier I)
ok - Preservation & Technical Holding Times
NA - GC/MS & GC/ECD Instrument Performance Check
NE - Initial & Continuing Calibrations
ok - Blanks
ok - Surrogate Compounds
NA - Internal Standards
* ~~ok~~ Matrix Spike/Matrix Spike Duplicate
ok - Field Duplicate
ok - Trans. check std.
* NA ~~Field~~ Duplicates
ok Sensitivity Check (LCS)
NR - PE Samples/Accuracy Check
NE Target Compound Identification
NE Compound Quantitation and Reported Quantitation Limits
NA - TICs
NA - Semivolatile and Pesticide/PCB Cleanup
NE - System Performance

Region I Definitions and Qualifiers:

* - worksheet included QC issues
NE - not evaluated
NR - not requested for analysis
NA - not applicable to method and/or modified Tier I/II

A - Acceptable Data
J - Numerical value associated with compound is an estimated quantity.
R - The data are rejected as unusable. The R replaces the numerical value or sample quantitation limit.
U - Compound not detected at that numerical sample quantitation limit.
UJ - The sample quantitation limit is an estimated quantity.
TB, BB, EB - Compound detected in aqueous trip blank, aqueous bottle blank, or aqueous equipment blank associated with soil/sediment samples.

Validator's Name Lisa Kuljukowitz Company Name Metcalf & Eddy Phone Number 781-246-5200

Date Validation Started 12/11/99 Date Validation Completed 12/14/99

US EPA ARCHIVE DOCUMENT

US EPA ARCHIVE DOCUMENT

EPA-NE - Data Validation Worksheet
VOA/SV - Pest/PCB-VIII

VIII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE - List all MS/MSD analytes that are outside method QC acceptance criteria.

Use a separate worksheet for each MS/MSD pair.

Sample # GW040158FMS Matrix EPH aqueous Concentration Level Low

Parameter	Compound	MS %Rec	MSD %Rec	RPD	Method QC Limits		Concentration			% RSD	Action
					% Rec	RPD	Unspiked Sample	MS	MSD		
EPH	naphthalene	34	NA	NA	40-140	NA					J/UJ
↓	2-methylnaphthalene	26	NA	NA	↓	NA					J/UJ

Validator: Lisa Kulp-Krone Date: 12/11/95

US EPA ARCHIVE DOCUMENT

EPA-NE - Data Validation Worksheet
VOA/SV - Pest/PCB-IX VPH/EPH

Laboratory

IX. ~~FIELD~~ DUPLICATE PRECISION - List all field duplicate analytes that are outside criteria.

Use a separate worksheet for each field duplicate pair.

Sample Number 6W0401STF Duplicate Sample Number 6W0401STFDup Matrix aqueous

Parameter	Compound	Sample Conc. ug/L	Sample QL		Duplicate Conc. ug/L	Duplicate QL		RPD	QC Acceptance Criteria RPD or NA*	Action
			SQL	2xSQL		SQL	2xSQL			
EPH	C_{11}-C_{22} aromatic	~~330~~ 370 UUL 12/11/99	87	174	370	87	174	51	~~35~~ 50 UUL 12/11/99	J(+)
↓	unadjusted C_{11}-C_{22} aromatic	240 UUL 12/11/99	~~248~~ 87	174	370	87	174	43	~~35~~ 50 UUL 12/11/99	J(+) none

* For instances where one duplicate result is ND (or reported less than the sample QL).

Does the MS/MSD data indicate acceptable laboratory precision? (Y) N

Comments: _____

_____

Sampler Name: D. St. Cyr Contractor Name: Metcalf + Eddy Date Contacted: _____

Reason for Contact and resolution obtained: _____

Validator: Susan Kuhn-Kenney Date: 12/11/99

12/96

Attachment I

Chains-of-Custody

US EPA ARCHIVE DOCUMENT

Metcalf & Eddy

CHAIN OF CUSTODY FORM

43032

Job/Project Name: STANDARD TIMES FIELD | Job/Project Location: NEW BEDFORD, MA | Job/Project Number: 020055-0002

Samplers: (Signatures) | Recorder: (Signature) | Date: 9/29/99

Lab (Samples Sent To): WOODSHOLE

SAMPLING Date	SAMPLING Time	SAMPLE NUMBER	~~SAMPLE LOCATION~~	MATRIX Water	MATRIX Soil	COMPOSITE/GRAB	PRESERVATIVE (Y/N)	ANALYSIS REQUESTED: GC/FID MOD CHLORINATED HC	ANALYSIS REQUESTED: PCBS 8082	ANALYSIS REQUESTED: Total #	COMMENTS
9/29/99	1100	TANK-01 -	BALLFIELD		X			X	X	12	FINGERPRINT + PCBs

Relinquished By: (Signature)	Date:	Time:	Relinquished By: (Signature)	Relinquished By: (Signature)	Date:	Time:	Received By: (Signature)
	10/1/99	1000			10/1/99	2:10	
Relinquished By: (Signature)	Date:	Time:	Relinquished By: (Signature)	Relinquished By: (Signature)	Date:	Time:	Received By: (Signature)
	10/1/99	3:50					
Relinquished By: (Signature)	Date:	Time:	Received for Lab By: (Signature)	Date:	Time:	Comments: Pres: Ice	

Method of Shipment: COURIER

Distribution: **Original** to Lab. **Copy 1** to Field Files, **Copy 2** to Project Manager

Form 274 (Rev. 5/89)

Attachment II

Sample Result Summary Sheets

Woods Hole Group
Environmental Laboratories

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43032

Metcalf & Eddy

Lab ID Number: 43032-1

Project: Brownfield/Standard Times

Associated Blank: VW1005B1

Sample ID: GWTB01			09/30/99 @1000(Water)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
10/1/1999	5 mL	N/A	10/5/1999	1	AL

No Edits
CM for LKK
12/20/99

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/L

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	240	U
C_9-C_{12} Aliphatics [1,3]	100	U
C_9-C_{10} Aromatics [1]	70	U
Unadjusted C_5-C_8 Aliphatics [1]	240	U
Unadjusted C_9-C_{12} Aliphatics [1]	100	U

TARGETED VPH ANALYTES in µg/L

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	5	U
Benzene	C_5 - C_8	5	U
Toluene	C_5 - C_8	15	U
Ethylbenzene	C_9 - C_{12}	5	U
m & p Xylene	C_9 - C_{12}	10	U
o-Xylene	C_9 - C_{12}	10	U
Naphthalene	N/A	10	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	118%	70%-130%	125%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43032

Metcalf & Eddy

Lab ID Number: 43032-2

Project: Brownfield/Standard Times

Associated Blank: VW1005B1

Sample ID: GW0401STF			09/30/99 @1230(Water)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
10/1/1999	5 mL	N/A	10/5/1999	1	AL

No edits can be LKS 12/17/99

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/L

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	240	U
C_9-C_{12} Aliphatics [1,3]	120	
C_9-C_{10} Aromatics [1]	70	U
Unadjusted C_5-C_8 Aliphatics[1]	240	U
Unadjusted C_9-C_{12} Aliphatics[1]	120	

TARGETED VPH ANALYTES in µg/L

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	5	U
Benzene	C_5 - C_8	5	U
Toluene	C_5 - C_8	15	U
Ethylbenzene	C_9 - C_{12}	5	U
m & p Xylene	C_9 - C_{12}	10	U
o-Xylene	C_9 - C_{12}	10	U
Naphthalene	N/A	10	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	116%	70%-130%	125%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43032

Metcalf & Eddy

Lab ID Number: 43032-3

Project: Brownfield/Standard Times

Associated Blank: VW1005B1

Sample ID: FGW1001STF			09/30/99 @1100(Water)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
10/1/1999	5 mL	N/A	10/6/1999	1	AL

No edits can for CFK 12/17/99

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/L

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	240	U
C_9-C_{12} Aliphatics [1,3]	100	U
C_9-C_{10} Aromatics [1]	70	U
Unadjusted C_5-C_8 Aliphatics[1]	420	
Unadjusted C_9-C_{12} Aliphatics[1]	100	U

TARGETED VPH ANALYTES in µg/L

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	5	U
Benzene	C_5 - C_8	5	U
Toluene	C_5 - C_8	190	
Ethylbenzene	C_9 - C_{12}	5	U
m & p Xylene	C_9 - C_{12}	10	U
o-Xylene	C_9 - C_{12}	10	U
Naphthalene	N/A	10	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	119%	70%-130%	123%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

Brownfield/Standard Times

ETR Number: 43032
Lab ID Number: 43032-2
Associated Blank: EW1008B1

Sample ID: GW0401STF :[ ]09/30/99 @1230(Water)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
10/1/99	WATER	980 ml	N/A	10/8/99	Aromatic:	10/14/99	1	TQ
					Aliphatic:	10/14/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/L

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	31	U
C19-C36 Aliphatics [1]	41	U
C11-C22 Aromatics [1,2]	220	J
Unadjusted C11-C22 Aromatics [1]	240	J

ULK 12/17/99

TARGETED PAH ANALYTES in µg/L

Analyte	Amount	Qualifier
Naphthalene	8.1	J
2-Methylnaphthalene	14	J
Acenaphthylene	5.1	U
Acenaphthene	5.1	U
Fluorene	5.1	U
Phenanthrene	5.1	U
Anthracene	5.1	U
Fluoranthene	5.1	U
Pyrene	5.1	U
Benzo(a)anthracene	5.1	U
Chrysene	5.1	U
Benzo(b)fluoranthene	5.1	U
Benzo(k)fluoranthene	5.1	U
Benzo(a)pyrene	5.1	U
Indeno(1,2,3-cd)pyrene [3]	5.1	U
Dibenzo(a,h)anthracene [3]	5.1	U
Benzo(g,h,i)perylene	5.1	U

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	67	40% - 140%
	Ortho-terphenyl(OTP)	70	40% - 140%
Fractionation Surrogates	Biphenyl	96	40% - 140%
	2-Fluorobiphenyl	71	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U Analyzed but not found.
* Surrogate value out of acceptable range.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

Brownfield/Standard Times

ETR Number: 43032
Lab ID Number: 43032-3
Associated Blank: EW1008B1

Sample ID:	FGW1001STF	:[ ]09/30/99 @1100(Water)						
Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
10/1/99	WATER	980 ml	N/A	10/08/99	Aromatic:	10/14/99	1	TQ
					Aliphatic:	10/14/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/L

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	31	U
C19-C36 Aliphatics [1]	41	U
C11-C22 Aromatics [1,2]	87	U
Unadjusted C11-C22 Aromatics [1]	87	U

No edits can for USCS 12/17/99

TARGETED PAH ANALYTES in µg/L

Analyte	Amount	Qualifier
Naphthalene	5.1	U
2-Methylnaphthalene	5.1	U
Acenaphthylene	5.1	U
Acenaphthene	5.1	U
Fluorene	5.1	U
Phenanthrene	5.1	U
Anthracene	5.1	U
Fluoranthene	5.1	U
Pyrene	5.1	U
Benzo(a)anthracene	5.1	U
Chrysene	5.1	U
Benzo(b)fluoranthene	5.1	U
Benzo(k)fluoranthene	5.1	U
Benzo(a)pyrene	5.1	U
Indeno(1,2,3-cd)pyrene [3]	5.1	U
Dibenzo(a,h)anthracene [3]	5.1	U
Benzo(g,h,i)perylene	5.1	U

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	70	40% - 140%
	Ortho-terphenyl(OTP)	68	40% - 140%
Fractionation Surrogates	Biphenyl	74	40% - 140%
	2-Fluorobiphenyl	75	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U = Analyzed but not found.
* Surrogate value out of acceptable range.

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ANALYTICAL REPORT
EPA Method 8082 PCBs

Metcalf & Eddy

Brownfield/Standard Times

ETR Number: 43032
Lab ID Number: 43032-4
Associated Blank: PS1012B1

Sample ID: Tank-01 Ball Field :[ ]09/29/99 @1100(Soil)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Date Analyzed	Dilution Factor	Analyst
10/01/99	SOIL	20.26 g	69	10/12/99	10/15/99	1	DES

Compound	Results in: µg/Kg	
Aroclor 1016	180	U
Aroclor 1221	180	U
Aroclor 1232	180	U
Aroclor 1242	180	U
Aroclor 1248	180	U
Aroclor 1254	180	U
Aroclor 1260	180	U

SURROGATE RECOVERY

Surrogate	% Recovery	Acceptance Range	
TMX	52%	30% -150%	
DCB	31%	30% -150%	P

Key:

U = Analyzed for but not detected.

E = Estimated value, concentration exceeds the upper level of the calibration range of the instrument.

P = Greater than 40% RPD between the two channels, the higher value is reported (please see narrative).

I = Greater than 40% RPD between the two channels, the lower value is reported due to matrix interference.

* = Surrogate value out of acceptance range.

Woods Hole Group
Environmental Laboratories

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Raynham, MA 02767-5154 • USA
Phone: 508-822-9300
Fax: 508-822-3288

TOTAL PETROLEUM HYDROCARBONS by GC/FID

Metcalf & Eddy

ETR Number: 43032

Lab ID Number: 43032-4

Project: **Brownfield/Standard Times**

Sample ID: Tank-01 Ball Field 09/29/99 @1100(Soil)

Date Received	Date Extracted	Date Analyzed	Analyzed by	Dilution Factor	Matrix	Associated Blank	% Solids
10/01/99	10/07/99	10/09/99	TQ	100	SOIL	TS1007B1	69%

Parameter	Results in mg/Kg
C9-C18 Hydrocarbons	9100
C19-C36 Hydrocarbons	58000
Total Petroleum Hydrocarbons	67000

Surrogate	Percent Recovery	QC Advisory Limits
5-alpha androstane	DL	25%-120%

Qualitative Identification Results:

This sample has GC/FID characteristics which are similar to lubricating oil.

M&E
AQUA ALLIANCE

MEMORANDUM

PROJECT NO:	J-020655-0002-005	**DATE:**	December 17, 1999
TO:	Standard Times Field Site File (BTSA)	**OFFICE:**	Wakefield
FROM:	L. Kulju Krowitz for	**COMPANY:**	Metcalf & Eddy
REVIEWED BY:	C. Lapite		
CC:	B. Wyskowski, N. Thurber (memo only)		

SUBJECT: Limited QC Review/Modified Tier II-Like Review
MADEP VPH and EPH Analytical Results
Woods Hole Group, Raynham, Massachusetts
ETR Number 43199 Semivolatile and Pesticide/PCB Analytical Results

On November 2, 1999, three aqueous samples and one trip blank sample were collected at the Standard Times Field BTSA site, located in New Bedford, Massachusetts by Metcalf & Eddy field personnel. The sampling was performed as part the BTSA RAC WA #043-SISI-01ZZ. The samples were submitted to Woods Hole Group laboratory, located in Raynham, Massachusetts for the analysis of MADEP volatile petroleum hydrocarbons (VPH) and extractable petroleum hydrocarbons (EPH). All samples were received by the laboratory on November 2, 1999. The data package was received in the M&E Office on November 19, 1999. Included in Attachment I is a copy of the chain-of-custody (COC) record.

M&E reviewed the data in accordance with the EPA-approved Final Field Task Work Plan for the site and the guidance received from EPA Work Assignment Manager, Mr. James Byrne, in a September 17, 1999 letter to M&E Work Assignment Manager, Barb Wyskowski. The data review included:

*	•	Preservation and Technical Holding Times
NA	•	Initial and Continuing Calibration
*	•	Blanks
*	•	Surrogate Compounds
	•	Matrix Spike (MS)/Matrix Spike Duplicates (MSD) (From ETR No. 43032)
*	•	Field Duplicates
*	•	Laboratory Duplicates
*	•	Laboratory Fortified Blank (LFB) and/or Laboratory Control Sample (LCS)
*	•	Fractionation Check Solution for EPH

*	=	All criteria met for this parameter
NA	=	Not Applicable and/or no information was provided by the laboratory
NR	=	Not requested

Included in Attachment II are the result summary sheets.

p:/ne/brwnflds/stantime/43199vph.wpd

Matrix Spike/Matrix Spike Duplicate

The following matrix spike recoveries in the EPH MS/MSD sample GW0401STF, from ETR No. 43032, did not meet acceptable criteria indicating possible matrix interference.

Analyte	%Recovery	Action
naphthalene	34	Estimate positive result in sample GW0401STF
2-methylnaphthalene	26	Estimate positive result in sample GW0401STF

Since the validation action is to qualify data in the unspiked sample, no qualification of data in this SDG is necessary.

There were no qualifications added to the data as a result of the data review.

EPA-NE
Data Validation Worksheet Cover Page - Page 1

Site Name Standard Times Field
Reference No. I-02455-002-005

REGION I ORGANIC DATA VALIDATION

The following data package has been validated:

Lab Name Woods Hole Group
Case/Project No. ETR # 43199
SDG No. —
No. of Samples/Matrix 3 aq.

SOW/Method No. MADEP VPH/EPH
Sampling Date(s) 11/2/99
Shipping Date(s) 11/2/99
Date Rec'd by lab 11/2/99

Traffic Report Sample Nos. GW-02RE - GWK-02RE, GW-08RE

Trip Blank No. TB-991102
Equipment Blank No. none
Bottle Blank No. none
Field Duplicate Nos. GW-02RE GWK-02RE
PES Nos. None

The Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, revision 12/96 was used to evaluate the data and/or approved modifications to the EPA-NE Functional Guidelines were used to evaluate the data and are attached to this cover page: (attach modified criteria from EPA approved QAPjP or amendment to QAPjP).

A Tier II or Tier III evaluation was used to validate the data (circle one). If a Tier II validation with a partial Tier III was used, then identify samples, parameters, etc. that received partial Tier III validation

Modified Tier I / Tier II

The data were evaluated based upon the following parameters:

Cooler T = 4°C ± 2
pH < 2

- ok - Overall Evaluation of Data
- NA - Data Completeness (CSF Audit - Tier I)
- ok - Preservation & Technical Holding Times
- NA - GC/MS & GC/ECD Instrument Performance Check
- NE - Initial & Continuing Calibrations
- ok - Blanks
- ok - Surrogate Compounds
- NA - Internal Standards
- NR - Matrix Spike/Matrix Spike Duplicate Conducted in ETR No 43032 aa
- ok - Fract. Check Soln EPH
- ok - Field Duplicates
- ok - Sensitivity Check (LCS)
- NR - PE Samples/Accuracy Check
- NE - Target Compound Identification
- NE - Compound Quantitation and Reported Quantitation Limits
- NA - TICs
- NA - Semivolatile and Pesticide/PCB Cleanup
- NE - System Performance

Region I Definitions and Qualifiers:

NR - not requested for analysis
NE - not evaluated
NA - not applicable to method and/or Tier I / II DV

A - Acceptable Data
J - Numerical value associated with compound is an estimated quantity.
R - The data are rejected as unusable. The R replaces the numerical value or sample quantitation limit.
U - Compound not detected at that numerical sample quantitation limit.
UJ - The sample quantitation limit is an estimated quantity.
TB, BB, EB - Compound detected in aqueous trip blank, aqueous bottle blank, or aqueous equipment blank associated with soil/sediment samples.

Validator's Name Lisa Kulp Krowitz Company Name Metcalf & Eddy Phone Number 781-246-5200 ext 7608 12/1/99

Date Validation Started 12/1/99 Date Validation Completed 12/1/99

Attachment I

Chains-of-Custody

US EPA ARCHIVE DOCUMENT

Metcalf & Eddy

CHAIN OF CUSTODY FORM

43199

Job/Project Name: BTSA: Standard Times	Job/Project Location: New Bedford, MA	Job/Project Number: 020165-5-0002
Samplers: (Signatures) [signature]	Recorder: (Signature) [signature]	Date: 11/2/99
Lab (Samples Sent To): Woodshole Labs		

SAMPLING Date	SAMPLING Time	SAMPLE NUMBER	~~SAMPLE LOCATION~~	MATRIX: Water	MATRIX: Soil	COMPOSITE/GRAB	PRESERVATIVE (Y/N)	ANALYSIS REQUESTED: VPH	ANALYSIS REQUESTED: EPH	Total # Containers	COMMENTS
											43199
11/2/99	1400	TB-991102		X		G	Y	X		2	Trip Blank -1
11/2/99	1110	GW-02RE		X		G	Y	X	X	5	-2
11/2/99	~~1510~~ 1710 GRZ	GWK-02RE		X		G	Y	X	X	5	Field Duplicate of GW-02RE -3
11/2/99	1300	GW-08RE		X		G	Y	X	X	5	-4
				Cooler Temperature Blank							7.5 °C GRZ

Relinquished By: (Signature) [signature]	Date: 11/2/99 Time: 1655	Relinquished By: (Signature)	Relinquished By: (Signature)	Date: Time: Received By: (Signature) C.R. [signature]
Relinquished By: (Signature)	Date: Time:	Relinquished By: (Signature)	Relinquished By: (Signature)	Date: Time: Received By: (Signature)
Relinquished By: (Signature)	Date: Time:	Received for Lab By: (Signature)	Date: Time:	Comments: Preservative: VPH: HCl, pH < 2 EPH: " " Batch MS/MSD Requested

Method of Shipment: Driven

Distribution: **Original** to Lab. **Copy 1** to Field Files, **Copy 2** to Project Manager

Form 274 (Rev. 5/89)

US EPA ARCHIVE DOCUMENT

Attachment II

Sample Result Summary Sheets

Woods Hole Group
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US EPA ARCHIVE DOCUMENT

VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43199

Metcalf & Eddy

Lab ID Number: 43199-1

Project: BSTA: Standard Times

Associated Blank: VW1105B1

Sample ID: TB-991102			11/02/99 @1400(Water)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
11/2/99	5 mL	N/A	11/5/99	1	AL

No edits
CMF for LKS
12/17/99

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/L

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	240	U
C_9-C_{12} Aliphatics [1,3]	100	U
C_9-C_{10} Aromatics [1]	70	U
Unadjusted C_5-C_8 Aliphatics[1]	240	U
Unadjusted C_9-C_{12} Aliphatics[1]	100	U

TARGETED VPH ANALYTES in µg/L

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	5	U
Benzene	C_5 - C_8	5	U
Toluene	C_5 - C_8	15	U
Ethylbenzene	C_9 - C_{12}	5	U
m & p Xylene	C_9 - C_{12}	10	U
o-Xylene	C_9 - C_{12}	10	U
Naphthalene	N/A	10	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	106%	70%-130%	123%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43199

Metcalf & Eddy

Lab ID Number: 43199-2

Project: BSTA: Standard Times

Associated Blank: VW1105B1

Sample ID: GW-02RE			11/02/99 @1110(Water)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
11/2/99	5 mL	N/A	11/5/99	1	AL

No edits except as noted 12/17/99

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/L

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	240	U
C_9-C_{12} Aliphatics [1,3]	100	U
C_9-C_{10} Aromatics [1]	70	U
Unadjusted C_5-C_8 Aliphatics[1]	240	U
Unadjusted C_9-C_{12} Aliphatics[1]	100	U

TARGETED VPH ANALYTES in µg/L

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	5	U
Benzene	C_5 - C_8	5	U
Toluene	C_5 - C_8	15	U
Ethylbenzene	C_9 - C_{12}	5	U
m & p Xylene	C_9 - C_{12}	10	U
o-Xylene	C_9 - C_{12}	10	U
Naphthalene	N/A	10	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	106%	70%-130%	123%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43199

Metcalf & Eddy

Lab ID Number: 43199-3

Project: BSTA: Standard Times

Associated Blank: VW1105B1

Sample ID: GWK-02RE		11/02/99@1510(Water)			
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
11/2/99	5 mL	N/A	11/5/99	1	AL

No edits
Chk for GK
12/17/99

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/L

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	240	U
C_9-C_{12} Aliphatics [1,3]	100	U
C_9-C_{10} Aromatics [1]	70	U
Unadjusted C_5-C_8 Aliphatics [1]	240	U
Unadjusted C_9-C_{12} Aliphatics [1]	100	U

TARGETED VPH ANALYTES in µg/L

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	5	U
Benzene	C_5 - C_8	5	U
Toluene	C_5 - C_8	15	U
Ethylbenzene	C_9 - C_{12}	5	U
m & p Xylene	C_9 - C_{12}	10	U
o-Xylene	C_9 - C_{12}	10	U
Naphthalene	N/A	10	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	106%	70%-130%	123%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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VOLATILE PETROLEUM HYDROCARBON (VPH) ANALYSIS
MADEP-VPH-98-1 Rev. 0

ETR Number: 43199

Metcalf & Eddy

Lab ID Number: 43199-4

Project: BSTA: Standard Times

Associated Blank: VW1105B1

Sample ID: GW-08RE			11/02/99 @1300(Water)		
Date Received	Sample Amount	% Solids	Date Analyzed	Dilution Factor	Analyst
11/2/99	5 mL	N/A	11/5/99	1	AL

No calib. CM for VPH 12/7/99

VOLATILE PETROLEUM HYDROCARBONS (VPH) in µg/L

Analyte	Amount	Qualifier
C_5-C_8 Aliphatics [1,2]	240	U
C_9-C_{12} Aliphatics [1,3]	100	U
C_9-C_{10} Aromatics [1]	70	U
Unadjusted C_5-C_8 Aliphatics [1]	240	U
Unadjusted C_9-C_{12} Aliphatics [1]	100	U

TARGETED VPH ANALYTES in µg/L

Analyte	Elution Range	Amount	Qualifier
MTBE	C_5 - C_8	5	U
Benzene	C_5 - C_8	5	U
Toluene	C_5 - C_8	15	U
Ethylbenzene	C_9 - C_{12}	5	U
m & p Xylene	C_9 - C_{12}	10	U
o-Xylene	C_9 - C_{12}	10	U
Naphthalene	N/A	10	U

SURROGATE RECOVERY

	PID		FID	
Surrogate	% Recovery	Range	% Recovery	Range
1,4-Difluorobenzene	107%	70%-130%	125%	70%-130%

[1] *Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.*

[2] *C_5-C_8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.*

[3] *C_9-C_{12} Aliphatic Hydrocarbons exclude concentration of Target Analytes eluting in that range AND concentration of C_9-C_{10} Aromatic Hydrocarbons.*

U = Analyzed but not detected.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

BSTA: Standard Times

ETR Number: 43199
Lab ID Number: 43199-2
Associated Blank: EW1108B1

No calc's confirm 12/1/99

Sample ID: GW-02RE :[ ]11/02/99 @1110(Water)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
11/2/99	WATER	800 ml	N/A	11/08/99	Aromatic:	11/15/99	1	TQ
					Aliphatic:	11/15/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/L

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	38	U
C19-C36 Aliphatics [1]	50	U
C11-C22 Aromatics [1,2]	110	U
Unadjusted C11-C22 Aromatics [1]	110	U

TARGETED PAH ANALYTES in µg/L

Analyte	Amount	Qualifier
Naphthalene	6.2	U
2-Methylnaphthalene	6.2	U
Acenaphthylene	6.2	U
Acenaphthene	6.2	U
Fluorene	6.2	U
Phenanthrene	6.2	U
Anthracene	6.2	U
Fluoranthene	6.2	U
Pyrene	6.2	U
Benzo(a)anthracene	6.2	U
Chrysene	6.2	U
Benzo(b)fluoranthene	6.2	U
Benzo(k)fluoranthene	6.2	U
Benzo(a)pyrene	6.2	U
Indeno(1,2,3-cd)pyrene [3]	6.2	U
Dibenzo(a,h)anthracene [3]	6.2	U
Benzo(g,h,i)perylene	6.2	U

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	69	40% - 140%
	Ortho-terphenyl(OTP)	64	40% - 140%
Fractionation Surrogates	Biphenyl	69	40% - 140%
	2-Fluorobiphenyl	67	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.

2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.

3 Values reported reflect their sum.

U = Analyzed but not found.

* Surrogate value out of acceptable range.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

BSTA: Standard Times

ETR Number: 43199
Lab ID Number: 43199-3
Associated Blank: EW1108B1

Sample ID: GWK-02RE :[ ]11/02/99 @1510(Water)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
11/2/99	WATER	830 ml	N/A	11/08/99	Aromatic:	11/15/99	1	TQ
					Aliphatic:	11/15/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/L

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	36	U
C19-C36 Aliphatics [1]	48	U
C11-C22 Aromatics [1,2]	100	U
Unadjusted C11-C22 Aromatics [1]	100	U

No edits OK for LKK 12/17/99

TARGETED PAH ANALYTES in µg/L

Analyte	Amount	Qualifier
Naphthalene	6.0	U
2-Methylnaphthalene	6.0	U
Acenaphthylene	6.0	U
Acenaphthene	6.0	U
Fluorene	6.0	U
Phenanthrene	6.0	U
Anthracene	6.0	U
Fluoranthene	6.0	U
Pyrene	6.0	U
Benzo(a)anthracene	6.0	U
Chrysene	6.0	U
Benzo(b)fluoranthene	6.0	U
Benzo(k)fluoranthene	6.0	U
Benzo(a)pyrene	6.0	U
Indeno(1,2,3-cd)pyrene [3]	6.0	U
Dibenzo(a,h)anthracene [3]	6.0	U
Benzo(g,h,i)perylene	6.0	U

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	72	40% - 140%
	Ortho-terphenyl(OTP)	72	40% - 140%
Fractionation Surrogates	Biphenyl	71	40% - 140%
	2-Fluorobiphenyl	69	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U = Analyzed but not found.
* Surrogate value out of acceptable range.

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ANALYTICAL REPORT
Extractable Petroleum Hydrocarbon (EPH) Analysis
MADEP-EPH-98-1 Rev. 0

Metcalf & Eddy

BSTA: Standard Times

ETR Number: 43199
Lab ID Number: 43199-4
Associated Blank: EW1108B1

Sample ID: GW-08RE :[ ]11/02/99 @1300(Water)

Date Received	Matrix	Sample Amount	% Solids	Date Extracted	Fraction	Date Analyzed	Dilution Factor	Analyzed By
11/2/99	WATER	800 ml	N/A	11/08/99	Aromatic:	11/15/99	1	TQ
					Aliphatic:	11/15/99	1	TQ

EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) in µg/L

Parameter	Amount	Qualifier
C9-C18 Aliphatics [1]	38	U
C19-C36 Aliphatics [1]	150	
C11-C22 Aromatics [1,2]	110	U
Unadjusted C11-C22 Aromatics [1]	110	U

No edits
cm for LKS
12/17/99

TARGETED PAH ANALYTES in µg/L

Analyte	Amount	Qualifier
Naphthalene	6.2	U
2-Methylnaphthalene	6.2	U
Acenaphthylene	6.2	U
Acenaphthene	6.2	U
Fluorene	6.2	U
Phenanthrene	6.2	U
Anthracene	6.2	U
Fluoranthene	6.2	U
Pyrene	6.2	U
Benzo(a)anthracene	6.2	U
Chrysene	6.2	U
Benzo(b)fluoranthene	6.2	U
Benzo(k)fluoranthene	6.2	U
Benzo(a)pyrene	6.2	U
Indeno(1,2,3-cd)pyrene [3]	6.2	U
Dibenzo(a,h)anthracene [3]	6.2	U
Benzo(g,h,i)perylene	6.2	U

SURROGATE RECOVERIES

Type	Surrogate	% Recovery	Acceptance Range
Extraction Surrogates	5-alpha-androstane	68	40% - 140%
	Ortho-terphenyl(OTP)	67	40% - 140%
Fractionation Surrogates	Biphenyl	68	40% - 140%
	2-Fluorobiphenyl	68	40% - 140%

1 Hydrocarbon Range data exclude the area of any surrogate(s) and/or internal standards eluting in that range.
2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.
3 Values reported reflect their sum.
U = Analyzed but not found.
* Surrogate value out of acceptable range.

US EPA ARCHIVE DOCUMENT

M&E
AQUA ALLIANCE

MEMORANDUM

PROJECT NO:	J-020655-0002-005	**DATE:**	December 20, 1999
TO:	Standard Times Field Site File (BTSA)	**OFFICE:**	Wakefield
FROM:	L. Kulju Krowitz	**COMPANY:**	Metcalf & Eddy
REVIEWED BY:	C. Lapite		
CC:	B. Wyskowski, N. Thurber (memo only)		

SUBJECT: Limited QC Review/Modified Tier II-Like Review
Review of Pesticide/PCB Analytical Results
Southwest Laboratory, Broken Arrow, Oklahoma
Case 27544, SDG AQL49

On November 2, 1999, three aqueous samples were collected at the Standard Times Field BTSA site, located in New Bedford, Massachusetts by Metcalf & Eddy field personnel. The sampling was performed as part of the BTSA RAC WA #043-SISI-01ZZ. The samples were submitted to Southwest Laboratory, located in Broken Arrow, Oklahoma for the analysis of pesticides and polychlorinated biphenyls (PCBs). All samples were received by the laboratory on November 3, 1999. The data package was received in the M&E Office on December 17, 1999. Included in Attachment I is a copy of the chain-of-custody (COC) record.

M&E reviewed the data in accordance with the EPA-approved Final Field Task Work Plan for the site and the guidance received from EPA Work Assignment Manager, Mr. James Byrne, in a September 17, 1999 letter to M&E Work Assignment Manager, Barb Wyskowski. The data review included:

*	•	Preservation and Technical Holding Times
*	•	Initial and Continuing Calibration
*	•	Blanks
*	•	Surrogate Compounds
*	•	Matrix Spike (MS)/Matrix Spike Duplicates (MSD)
*	•	Field Duplicates
NA	•	Laboratory Fortified Blank (LFB) and/or Laboratory Control Sample (LCS)
*	•	Pesticide/PCB Cleanup
*	•	Pesticide/PCB Resolution
*	•	Pesticide Breakdown
	•	Compound Quantitation and Reported Quantitation Limits

*	=	All criteria met for this parameter
NA	=	Not applicable and/or no information was provided by the laboratory
NR	=	Not requested

Included in Attachment II are the result summary sheets, annotated with qualifiers, if necessary, as detailed in this memorandum. The complete CSF Sheet is included in Attachment III.

Compound Quantitation and Reported Quantitation Limits

A dual column difference of greater than 25 percent was found for the target compounds listed in the following table:

Sample Number	Compound	Percent Difference (%)
AQL50	heptachlor	47.6

The positive result listed above has been qualified as estimated (J), but a bias could not be determined.

EPA-NE
Data Validation Worksheet Cover Page - Page 1

Site Name Standard Tennis Field
Reference No. I. 020625-0002-005

REGION I ORGANIC DATA VALIDATION

The following data package has been validated:

Lab Name SWL-TULSA
Case/Project No. 27544
SDG No. AQL49
No. of Samples/Matrix 3 aq

SOW/Method No. OLM04.2
Sampling Date(s) 11/2/99
Shipping Date(s) 11/2/99
Date Rec'd by lab 11/3/99

Traffic Report Sample Nos. AQL49 -50, -51

Trip Blank No. none
Equipment Blank No.
Bottle Blank No.
Field Duplicate Nos. Case 27436 from SDG AQF39 AQF88/AQF89 AQL49, AQL50
PES Nos.

The Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, revision 12/96 was used to evaluate the data and/or approved modifications to the EPA-NE Functional Guidelines were used to evaluate the data and are attached to this cover page: (attach modified criteria from EPA approved QAPjP or amendment to QAPjP).

A Tier II or Tier III evaluation was used to validate the data (circle one). If a Tier II validation with a partial Tier III was used, then identify samples, parameters, etc. that received partial Tier III validation

Modified Tier I / Tier II

The data were evaluated based upon the following parameters:

- Cooler T = 2°C
- No MS/MSD required

ok - Overall Evaluation of Data
ok - Data Completeness (CSF Audit - Tier I)
ok - Preservation & Technical Holding Times
NA - GC/MS & GC/ECD Instrument Performance Check
ok - Initial & Continuing Calibrations
ok - Blanks
ok - Surrogate Compounds
NA - Internal Standards
NR - Matrix Spike/Matrix Spike Duplicate

ok NA - Field Duplicates
NA - Sensitivity Check
NA - PE Samples/Accuracy Check
NE - Target Compound Identification
* - Compound Quantitation and Reported Quantitation Limits
NA - TICs
ok - Semivolatile and Pesticide/PCB Cleanup
ok - System Performance
ok - Resolution
ok - PEM
ok - Breakdown
ok - Florisil

NA - not applicable
NR - not required
NE - not evaluated

Region I Definitions and Qualifiers:

A - Acceptable Data
J - Numerical value associated with compound is an estimated quantity.
R - The data are rejected as unusable. The R replaces the numerical value or sample quantitation limit.
U - Compound not detected at that numerical sample quantitation limit.
UJ - The sample quantitation limit is an estimated quantity.
TB, BB, EB - Compound detected in aqueous trip blank, aqueous bottle blank, or aqueous equipment blank associated with soil/sediment samples.

Validator's Name Lisa Kuijn-Knowlton Company Name M+E Phone Number 781-246-5200

Date Validation Started 12/9/99 Date Validation Completed 12/14/99

Check if all criteria are met and no hard copy worksheet provided. Indicate NA if worksheet is not applicable to analytical method. Note: there is no standard worksheet for System Performance, however, the validator must document all system performance issues in the Data Validation Memorandum.

VOA/SV worksheets:

VOA/SV-Pest/PCB	COMPLETE SDG FILE (CSF) AUDIT	NA
VOA/SV-Pest/PCB-I	PRESERVATION AND HOLDING TIMES	
VOA/SV-II	GC/MS INSTRUMENT PERFORMANCE CHECK (TUNING)	
VOA/SV-III	INITIAL CALIBRATION	
VOA/SV-IV	CONTINUING CALIBRATION	
VOA/SV-Pest/PCB-V-A	BLANK ANALYSIS	
VOA/SV-Pest/PCB-V-B	BLANK ANALYSIS	
VOA-VI	VOA SURROGATE SPIKE RECOVERIES	
SV-VI	SV SURROGATE SPIKE RECOVERIES	
VOA/SV-VII	INTERNAL STANDARD PERFORMANCE	
VOA/SV-Pest/PCB-VIII	MATRIX SPIKE/MATRIX SPIKE DUPLICATE	
VOA/SV-Pest/PCB-IX	FIELD DUPLICATE PRECISION	
VOA/SV-Pest/PCB-X	SENSITIVITY CHECK	
VOA/SV-Pest/PCB-XI	ACCURACY CHECK	
VOA/SV-Pest/PCB-XII	TARGET COMPOUND IDENTIFICATION	
VOA/SV-Pest/PCB-XIII	SAMPLE QUANTITATION	
VOA/SV-XIV	TENTATIVELY IDENTIFIED COMPOUNDS	
VOA/SV-XV	SEMIVOLATILE CLEANUP	✓
TABLE II-WORKSHEET	OVERALL EVALUATION OF DATA	

Pest/PCB worksheets:

VOA/SV-Pest/PCB	COMPLETE SDG FILE (CSF) AUDIT	
VOA/SV-Pest/PCB-I	PRESERVATION AND HOLDING TIMES	✓ ok but ~~bad~~ checked 12/17/99 included
Pest/PCB-IIA	GC/ECD INSTRUMENT PERFORMANCE CHECK-RESOLUTION	✓
Pest/PCB-IIB	GC/ECD INSTRUMENT PERFORMANCE CHECK-RETENTION TIMES	✓
Pest/PCB-IIC	GC/ECD INSTRUMENT PERFORMANCE CHECK-ACCURACY CHECK OF INITIAL CALIBRATION	✓
Pest/PCB-IID	GC/ECD INSTRUMENT PERFORMANCE CHECK-PESTICIDE DEGRADATION	✓
Pest/PCB-III	INITIAL CALIBRATION	✓
Pest/PCB-IV	CONTINUING CALIBRATION	✓
VOA/SV-Pest/PCB-V-A	BLANK ANALYSIS	✓
VOA/SV-Pest/PCB-V-B	BLANK ANALYSIS	✓
Pest/PCB-VI	SURROGATE COMPOUNDS: SPIKE RECOVERIES AND RETENTION TIME SHIFT	✓
Pest/PCB-VII	PESTICIDE CLEANUP	✓
VOA/SV-Pest/PCB-VIII	MATRIX SPIKE/MATRIX SPIKE DUPLICATE	✓
VOA/SV-Pest/PCB-IX	FIELD DUPLICATE PRECISION	✓
VOA/SV-Pest/PCB-X	SENSITIVITY CHECK	✓
VOA/SV-Pest/PCB-XI	ACCURACY CHECK	✓
Pest/PCB-XII	COMPOUND IDENTIFICATION	✓
VOA/SV-Pest/PCB-XIII	SAMPLE QUANTITATION	
TABLE II-WORKSHEET	OVERALL EVALUATION OF DATA	✓

I certify that all criteria were met for the worksheets checked above.

Signature: Lisa Kulp-Kromme

Name: Lisa Kulp-Kromme

Date: 12/9/99

PESTICIDE FLORISIL CARTRIDGE SPIKE RECOVERIES (CLP FORM 9A)

List the florisil cartridge spike pesticides that were recovered outside the QC limits (80–120%)

Date	Pesticide	% Recovery

List the actions taken as a result of poor florisil cartridge spike recovery:

PESTICIDE GPC SPIKE RECOVERIES (CLP FORM 9B)

Date	Pesticide	% Recovery

List the actions taken as a result of poor GPC spike recovery below:

PERCENT DIFFERENCE BETWEEN TWO COLUMN QUANTITATIONS (CLP FORMS 10A,10B)

Sample Number	Analyte	%Difference	Action
~~AEQ~~			
AEQ50	heptachlor	47.6	< CRQL already J'd

Attachment I

Chains-of-Custody

US EPA ARCHIVE DOCUMENT

EPA Organic Traffic Report & Chain of Custody Record

United States Environmental Protection Agency
Contract Laboratory Program

(For Organic CLP Analysis)

Case No. 27914

1. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify in Column A)

2. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaHSO4
4. H2SO4
5. Ice only
6. Other (Specify in Column D)
N. Not preserved

2. Region No.: 1
Sampling Co.: Midwest Field Ops

4. Date Shipped: 11/3/99
Carrier: Fed Ex

Sampler (Name): Constance Copeland

Airbill Number: 813805316709 7135-4445

Sampler Signature:

5. Ship To: Intertech Labs of OK, Inc
1700 West Albany Suite C
Broken Arrow, OK 74012

ATTN: Mary Beth

3. Purpose*
Lead: SF, PRP, ST, FED
Early Action: CLEM, PA, REM, RI, SI (X), ESI
Long-Term Action: FS, RD, RA, O&M, NPLD

6. Date Received -- Received by: S Hodson 11/3/99

Laboratory Contract Number:

Unit Price:

7. Transfer to:

Date Received:

Received by:

Contract Number:

Price:

CLP Sample Numbers (from labels)	A Matrix (from Box 1) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 2) / Other:	E RAS Analysis: VOA	BNA	Pest/PCB	High only ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K High Phases: Solids	Water-Miscible Liq.	Water-Immis. Liq.
AQL49	2	L	G	5			X		133674 - 133675	GW-WRE	11/1/99 1120	---	cc			
AQL50	2	L	G	5			X		133676 - 133677	GW-WRE	11/2/99 1910	---	cc			
* AQL51	2	L	G	5			X		133678 - 133679	GW-WRE	11/2/99 1300	---	cc			
					---	---	---		Cooler Temperature Blank		---					

(Field Dup of AQL49)

Shipment for Case Complete? (Y/N)

Page: 1 of 1

Sample(s) to be Used for Laboratory QC: MS/MSD

Additional Sampler Signatures:

Chain of Custody Seal Number(s):

* SDG Final Sample

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	11/3/99 1350				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature) S Hodson	11/3/99	Date / Time 1655	Remarks: Is custody seal intact? Y/N/none — LTC

A21-012-16 REV.

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

EPA Form 9110-2

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

AQL49

364596

Attachment II

Sample Result Summary Sheets

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AQL49

Lab Name: SWL-TULSA Contract: 68-W-99-079

Lab Code: SWOK Case No.: 27544 SAS No.: SDG No.: AQL49

Matrix: (soil/water) WATER Lab Sample ID: 40959.01

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ Decanted: (Y/N) __ Date Received: 11/03/99

Extraction: (Type) SEPF Date Extracted: 11/04/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 11/10/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.4 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.031	J
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

No edits
CR for LRS
12/20/99

11

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AQL50

Lab Name: SWL-TULSA Contract: 68-W-99-079

Lab Code: SWOK Case No.: 27544 SAS No.: SDG No.: AQL49

Matrix: (soil/water) WATER Lab Sample ID: 40959.02

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ Decanted: (Y/N) __ Date Received: 11/03/99

Extraction: (Type) SEPF Date Extracted: 11/04/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 11/10/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.4 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.021	PJ
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

ckw for LKS
12/20/99

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

AQL51

Lab Name: SWL-TULSA Contract: 68-W-99-079

Lab Code: SWOK Case No.: 27544 SAS No.: SDG No.: AQL49

Matrix: (soil/water) WATER Lab Sample ID: 40959.03

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ Decanted: (Y/N) __ Date Received: 11/03/99

Extraction: (Type) SEPF Date Extracted: 11/04/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 11/10/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.050	U
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050	U
58-89-9	gamma-BHC (Lindane)	0.050	U
76-44-8	Heptachlor	0.050	U
309-00-2	Aldrin	0.050	U
1024-57-3	Heptachlor epoxide	0.050	U
959-98-8	Endosulfan I	0.050	U
60-57-1	Dieldrin	0.10	U
72-55-9	4,4'-DDE	0.10	U
72-20-8	Endrin	0.10	U
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.10	U
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.023	J
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	1.0	U
11096-82-5	Aroclor-1260	1.0	U

No edits
OK for USR
12/20/99

Attachment III

CSF Sheet

Evidence Audit Photocopy DG/ESAT 11-15-99 Standard Times 9911013-09A MCE IRI

LABORATORY NAME Southwest Laboratory of Oklahoma
CITY/STATE Broken Arrow, Oklahoma

CASE NO. 27544 SDG NO. AQL49 SDG NOS. TO FOLLOW
SAS NO:

CONTRACT NO. 68-W-99-079
SON NO. 01M04.2

RECEIVED
NOV 16 1999
U.S. EPA-EQA OFFICE

All documents delivered in the Complete SDG File must be original documents where possible.

	PAGE NOs FROM	TO	CHECK LAB	CHECK EPA
1. Inventory Sheet (Form DC-2) (Do not Number)			OK	OK
2. SDG Case Narrative	01	05		✓
3. SDG Cover Sheet/Traffic Report	06	07		✓
4. Volatiles Data				
a. QC Summary				
System Monitoring Compound Summary (Form II VOA)	NA	NA		NA
Matrix Spike/Matrix Spike Duplicate Summary (Form III VOA)				
Method Blank Summary (Form IV VOA)				
GC/MS Instrument Performance Check (Form V VOA)				
Internal Standard Area and RT Summary (Form VIII VOA)				
b. Sample Data				
TCL Results - (Form I VOA-1, VOA-2)				
Tentatively Identified Compounds (Form I VOA-TIC)				
Reconstructed total ion chromatograms (RIC) for each sample				
For each sample:				
Raw Spectra and background-subtracted mass spectra of target compounds identified				
Quantitation reports				
Mass Spectra of all reported TICs with three best library matches				
c. Standards Data (All Instruments)				
Initial Calibration Data (Form VI VOA-1, VOA-2)				
RICs and Quan Reports for all Standards				
Continuing Calibration Data (Form VII VOA-1, VOA-2)				
RICs and Quantitation Reports for all Standards				
d. Raw QC Data				
BFB				
Blank Data				
Matrix Spike/Matrix Spike Duplicate Data				

ORGANICS COMPLETE SDG FILE (CSF) INVENTORY SHEET (cont.)

CASE NO. 27544 SDG NO. AQL49 SDG NOS. TO FOLLOW _____

_____ _____ SAS NO. _____

	PAGE NOs FROM	PAGE NOs TO	CHECK LAB	CHECK EPA
5. **Semivolatiles Data**				
a. QC Summary	NA	NA	OK	NM
Surrogate Percent Recovery Summary (Form II SV)				
MS/MSD Summary (Form III SV)				
Method Blank Summary (Form IV SV)				
GC/MS Instrument Performance Check (Form V SV)				
Internal Standard Area and RT Summary (Form VIII SV)				
b. Sample Data				
TCL Results - (Form I SV-1, SV-2)				
Tentatively Identified Compounds (Form I SV-TIC)				
Reconstructed total ion chromatograms (RIC) for each sample				
For each sample:				
Raw Spectra and background-subtracted mass spectra of target compounds				
Quantitation reports				
Mass Spectra of TICs with three best library matches				
GPC chromatograms (if GPC is required)				
c. Standards Data (All Instruments)				
Initial Calibration Data (Form VI SV-1, SV-2)				
RICs and Quan Reports for all Standards				
Continuing Calibration Data (Form VII SV-1, SV-2)				
RICs and Quantitation Reports for all Standards				
d. Raw QC Data				
DFTPP				
Blank Data				
Matrix Spike/Matrix Spike Duplicate Data				
e. Raw GPC Data				
6. **Pesticides Data**				
a. QC Summary	08	08		✓
Surrogate Percent Recovery Summary (Form II PEST)	NA	NA		NM
MS/MSD Duplicate Summary (Form III PEST)	09	09		✓
Method Blank Summary (Form IV PEST)				

ORGANICS COMPLETE SDG FILE (CSF) INVENTORY SHEET (cont.)

CASE NO. 27544 SDG NO. AQL49 SDG NOS. TO FOLLOW _____

_____ _____ SAS NO. _____

	PAGE NOs FROM	PAGE NOs TO	CHECK LAB	CHECK EPA
6. Pesticides Data (Cont.)	10	19		
b. Sample Data				
TCL Results - Organic Analysis Data Sheet (Form I PEST)			OK	✓
Chromatograms (Primary Column)				✓
Chromatograms from second GC column confirmation				✓
GC Integration report or data system printout				✓
Manual work sheets				✓
For pesticides/Aroclors by GC/MS, Copies of raw spectra and copies of background-subtracted mass spectra of target compounds (samples & standards)				✓
c. Standards Data	21	91		
Initial Calibration of Single Component Analytes (Form VI PEST-1 and PEST-2)				✓
Initial Calibration of Multicomponent Analytes (Form VI PEST-3)				✓
Analyte Resolution Summary (Form VI PEST-4)				✓
Performance Evaluation Mixture (Form VI PEST-5)				✓
Individual Standard Mixture A (FORM VI PEST-6)				✓
Individual Standard Mixture B (FORM VI PEST-7)				✓
Calibration Verification Summary (Form VII PEST-1)				✓
Calibration Verification Summary (Form VII PEST-2)				✓
Analytical Sequence (Form VIII PEST)				✓
Florisil Cartridge Check (Form IX PEST-1)				✓
Pesticide GPC Calibration (Form IX PEST-2)				✓
Pesticide Identification Summary for Single Component Analytes (Form X PEST-1)				✓
Pesticide Identification Summary for Multicomponent Analytes (Form X PEST-2)				✓
Chromatograms and data system printouts A printout of retention times and corresponding peak areas or peak heights				✓
d. Raw QC Data				
Blank Data	92	104		✓
Matrix Spke/Matrix Spike Duplicate Data	NA	NA	✓	NA

ORGANICS COMPLETE SDG FILE (CSF) INVENTORY SHEET (cont.)

CASE NO. 27544 SDG NO. AQL49 SDG NOS. TO FOLLOW _____

_____ _____ SAS NO. _____

	PAGE NOs FROM	PAGE NOs TO	CHECK LAB	CHECK EPA
6. Pesticides Data (Cont.)				
e. Raw GPC Data	NA	NA	OK	NA
f. Raw Florisil Data	105	113		✓
7. Miscellaneous Data				
Original preparation and analysis forms or copies of preparation and analysis logbook pages	115	117		✓
Internal sample and sample extract transfer chain-of-custody records	119	119		✓
Screening records	NA	NA		NA
All instrument output, including strip charts from screening activities (describe or list)				
	NA	NA		NA
	NA	NA		NA
8. EPA Shipping/Receiving Documents				
Airbills (No. of shipments 1)	121	121		✓
Chain-of-Custody Records	122	122		✓
Sample Tags	123	128		✓
Sample Log-in Sheet (Lab & DC1)	129	130		✓
Miscellaneous Shipping/Receiving Records (describe or list)				
memo	131	131		✓
	NA	NA		NA
9. Internal Lab Sample Transfer Records and Tracking Sheets (describe or list)				
	NA	NA		NA
	↓	↓		WD
10. Other Records (describe or list)				
Telephone Communication Log	NA	NA		NA
E-mail	132	132		✓
	NA	NA	↓	NA

11. Comments: _____

ORGANICS COMPLETE SDG FILE (CSF) INVENTORY SHEET (cont.)

CASE NO. 27544 SDG NO. AQL49 SDG NOS. TO FOLLOW _____

_____ _____ SAS NO. _____

Completed by: (CLP Lab)	Imelda M. Williams (Signature)	Imelda M Williams/Data Clerk (Printed Name/Title)	11/15/99 (Date)
Verified by: (CLP Lab)	[signature] (Signature)	Jeff Cummins/Analyst (Printed Name/Title)	11/15/99 (Date)
Audited by: (EPA)	[signature] (Signature)	Lisa Kulp-Kronstz Data Validator (Printed Name/Title)	12/14/99 (Date)

US EPA ARCHIVE DOCUMENT

M&E
AQUA ALLIANCE

MEMORANDUM

PROJECT NO:	J-020655-0002-005	**DATE:**	December 20, 1999
TO:	Standard Times Field Site File (BTSA)	**OFFICE:**	Wakefield
FROM:	L. Kulju Krowitz BKK for	**COMPANY:**	Metcalf & Eddy
REVIEWED BY:	C. Lapite CL		
CC:	B. Wyskowski, N. Thurber (memo only)		

SUBJECT: Limited QC Review/Modified Tier II-Like Review
Semivolatile and Pesticide/PCB Analytical Results
Southwest Laboratory, Broken Arrow, Oklahoma
Case 27436, SDG APF79

On September 28, 1999, 12 soil samples and 4 aqueous samples were collected at the Standard Times Field BTSA site, located in New Bedford, Massachusetts by Metcalf & Eddy field personnel. Due to an error in collection procedures, only one of the four aqueous samples collected is evaluated here. The remaining locations were re-sampled, and are evaluated in Case 27544, SDG AQL49. The sampling was performed as part of the BTSA RAC WA #-043-SISI-01ZZ. The samples were submitted to Southwest Laboratory, located in Broken Arrow, Oklahoma for the analysis of semivolatile organic compounds (SVOCs) and pesticide/polychlorinated biphenyls (PCBs). All samples were received by the laboratory on October 1, 1999. The data package was received in the M&E Office on October 20, 1999. Included in Attachment I is a copy of the chain-of-custody (COC) record.

M&E reviewed the data in accordance with the EPA-approved Final Field Task Work Plan for the site, and the guidance received from EPA Work Assignment Manager, Mr. James Byrne, in a September 17, 1999 letter to M&E Work Assignment Manager, Barb Wyskowski. The data review included:

*	• Preservation and Technical Holding Times
*	• GC/MS Instrument Performance Check
	• Initial and Continuing Calibrations
	• Blanks
	• Surrogate Compounds
*	• Internal Standards
	• Matrix Spike (MS)/Matrix Spike Duplicates (MSD)
*	• Field Duplicates
*	• Laboratory Duplicates
*	• Laboratory Fortified Blank (LFB) and/or Laboratory Control Sample (LCS)
	• Compound Quantitation and Reported Quantitation Limits

*	=	All criteria met for this parameter
NA	=	Not applicable and/or no information was provided by the laboratory
NR	=	Not requested

Included in Attachment II are the result summary sheets, annotated with qualifiers, if necessary, as detailed in this memorandum.

Initial and Continuing Calibrations

The following table summarizes the initial (IC) and continuing calibration (CC) semivolatile organic analysis results that failed to meet the calibration criteria of %D<25 and %RSD<30, respectively:

Instrument	HP70F				
Calibration	IC 8/10/99	CC 10/5/99	CC 10/12/99	IC 10/13/99	CC 10/13/99
Compound	%RSD	%D	%D	%RSD	%D
2,4-dinitrophenol	31.3			30.9	41.8
hexachlorobutadiene				62.5	
2-methylnaphthalene		34.7	38.9		
hexachlorocyclopentadiene		32.8			102.5
2,2'-oxybis(1-chloropropane)			27.5		
bis(2-ethylhexyl)phthalate			27.4		
4,6-dinitro-2-methylphenol					30.7
Associated Samples:	APF79, APF80, APF81, APF82, APF83, APF84, APF85, APF86, APF87, APF88, APF89, APF90, APF90MS, APF90MSD	APF79, APF80, APF82, APF83, APF84, APF85, APF86, APF87, APF88, APF89, APF90, APF90MS, APF90MSD	APF81	APF81DL	APF81DL

%RSD >30, Estimate positive (J) results and nondetect (UJ) results. A bias cannot be determined.
%D >25, Estimate positive (J) results and nondetect (UJ) results. A bias cannot be determined.

The following table summarizes the CC pesticide/PCB analysis results that failed to meet the calibration criteria of %D<25% and 20% for breakdown of 4,4'-DDT or endrin:

Column	RTX-Pest	RTX-Pest2	RTX-Pest	RTX-Pest2
Calibration	10/14/99 1347		10/14/99 1412	
Compound	%D/%breakdown		%D/ %breakdown	
endrin breakdown	22.2	24.2	22.0	23.0
4,4'-DDT breakdown	20.5		21.4	24.5
combined breakdown	42.7	43.1	43.4	47.5
beta-BHC	26.6	33.6	33.6	40.4
endrin	30.1		35.9	31.6
4,4'-DDT	48.7	35.7	49.3	34.2
methoxychlor	45.4		44.4	
Associated Samples	APF79, APF80, APF81, APF82, APF83, APF84, APF85, APF86, APF87, APF88, APF89, APF90			

%D >25%, Estimate positive (J) results and nondetect (UJ) results. A bias cannot be determined.
%breakdown >20%, Estimate positive (J) results and nondetect (UJ) results. A bias cannot be determined.

Blanks

A review of laboratory blank analysis results indicates the presence of laboratory contamination for the SVOCs listed below. Positive sample results reported with concentrations less than the blank action limit for that compound are considered to be false positive results.

Compound	Blank Action Limit (µg/kg)	Affected Samples/Action
di-n-butylphthalate	210	Report CRQL with "U" APF79, APF81
bis(2-ethylhexyl)phthalate	260	Report CRQL with "U" APF79, APF80, APF87, APF88, APF89, APF90

Blank Actions:

* concentration ≤ QL; report QL on summary table as U.
* concentration > QL and < blank action level; report value qualified U.
* concentration > blank action level; report value unqualified.

Surrogate Compounds

The recoveries for the pesticide/PCB surrogate compounds that did not meet the acceptance criteria and the qualifications applied to the samples are summarized in the following table:

Sample ID	Surrogate % Recoveries				Action
	TCX1	TCX2	DCB1	DCB2	
APF79		291	262	165	Estimate positive (J) results, may be biased high
APF81				709	None, only one surrogate out of criteria
APF82			203	1356	Estimate positive (J) results, may be biased high
APF83	576	414	760	2105	Estimate positive (J) results, may be biased high
APF84			298	500	Estimate positive (J) results, may be biased high
APF85				299	None, only one surrogate out of criteria

Matrix Spike/Matrix Spike Duplicates

The pesticide/PCBs that did not meet the acceptance criteria in the MS/MSD analyses of pesticide/PCB aqueous sample APG52 are summarized in the following table:

Compound	MS Recovery (%)	MSD Recovery (%)	QC Limits (%)	Action
gamma-BHC	39	43	56-123	Estimate nondetect (UJ) result in sample APG52, may be a false negative result
heptachlor	28	34	40-131	Estimate positive (J) result in sample APG52, may be biased low
dieldrin	46	48	52-126	none - result considered nondetect due to poor dual column precision
endrin	50	55	56-121	Estimate nondetect (UJ) result in sample APG52, may be a false negative result
4,4'-DDT	28	30	38-127	Estimate positive (J) result in sample APG52, may be biased low

Compound Quantitation and Reported Quantitation Limits

A dual column difference or greater than 25 percent was found for several target compounds. The following table lists the compounds reported and the percent differences:

Sample Number	Compound	Percent Difference (%)	Action
APF79	heptachlor	967	Reject positive result, false positive result
	heptachlor epoxide	372	Reject positive result, false positive result
	endosulfan I	257	Reject positive result, false positive result
	dieldrin	200	Reject positive result, false positive result
	4,4'-DDE	45	Estimate positive result, bias not known
	endrin	155	Reject positive result, false positive result
	endosulfan II	50	Estimate positive result, bias not known

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Sample Number	Compound	Percent Difference (%)	Action
APF79 (cont)	endrin aldehyde	400	Reject positive result, false positive result
	alpha-chlordane	39.5	Estimate positive result, bias not known
	gamma-chlordane	514	Reject positive result, false positive result
APF80	beta-BHC	515	Sample result less than CRQL, report CRQL, result considered nondetect
	endosulfan I	999.9	Reject positive result, false positive result
	dieldrin	999.9	Reject positive result, false positive result
	endrin	68.8	Estimate positive result, bias not known
	4,4'-DDD	325	Reject positive result, false positive result
	endosulfan sulfate	140	Reject positive result, false positive result
APF81	beta-BHC	999.9	Reject positive result, false positive result
	delta-BHC	464	Sample result less than CRQL, report CRQL, result considered to be nondetect
	heptachlor	278	Sample result less than CRQL, report CRQL, result considered to be nondetect
	heptachlor epoxide	200	Sample result less than CRQL, report CRQL, result considered to be nondetect
	endosulfan I	124	Sample result less than CRQL, report CRQL, result considered to be nondetect
	dieldrin	999.9	Reject positive result, false positive result
	4,4'-DDE	999.9	Reject positive result, false positive result
	endrin	332	Reject positive result, false positive result
	endosulfan II	999.9	Sample result less than CRQL, report CRQL, result considered to be nondetect
	4,4'-DDD	241	Reject positive result, false positive result
	endosulfan sulfate	355	Reject positive result, false positive result
	4,4'-DDT	202	Reject positive result, false positive result
	endrin aldehyde	58.2	Estimate positive result, bias not known

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Sample Number	Compound	Percent Difference (%)	Action
APF81 (cont)	alpha-chlordane	173	Sample result less than CRQL, report CRQL, result considered to be nondetect
	gamma-chlordane	61.5	Estimate positive result, bias not known
APF82	beta-BHC	170	none - report result from APF82DL
	heptachlor epoxide	500	Reject positive result, false positive result
	endosulfan I	133	Reject positive result, false positive result
	dieldrin	482	none-report from APF82DL
	4,4'-DDE	60	none-report from APF82DL
	endosulfan sulfate	37	none-report from APF82DL
	4,4'-DDT	9.1	none-report from APF82DL
	methoxychlor	94.4	Estimate positive result, bias not known
	endrin ketone	44.6	none-report from APF82DL
	endrin aldehyde	186	Reject positive result, false positive result
	alpha-chlordane	806	Reject positive result, false positive result
	gamma-chlordane	81.8	Estimate positive result, bias not known
APF82DL	beta-BHC	144	Reject positive result, false positive result
	dieldrin	340	Reject positive result, false positive result
	4,4'-DDE	82.9	Estimate positive result, bias not known
	gamma-chlordane	479	Reject positive result, false positive result
APF83	dieldrin	387	Reject positive result, false positive result
	4,4'-DDE	775	Reject positive result, false positive result
	endrin	100	Reject positive result, false positive result
	endosulfan sulfate	50	Estimate positive result, bias not known
	4,4'-DDT	144	Reject positive result, false positive result
	methoxychlor	583	Reject positive result, false positive result
	endrin ketone	71.4	Estimate positive result, bias not known

Sample Number	Compound	Percent Difference (%)	Action
APF83DL	gamma-chlordane	115	Reject positive result, false positive result
APF84	dieldrin	999.9	Reject positive result, false positive result
	4,4'-DDE	451	Reject positive result, false positive result
	4,4'-DDD	72.4	none - report from APF84DL
	endosulfan sulfate	37.5	Estimate positive result, bias not known
	4,4'-DDT	188	Reject positive result, false positive result
	methoxychlor	155	Reject positive result, false positive result
	endrin ketone	123	Reject positive result, false positive result
	gamma-chlordane	32.4	Estimate positive result, bias not known
APF85	heptachlor epoxide	355	Reject positive result, false positive result
	dieldrin	267	Reject positive result, false positive result
	4,4'-DDE	68.4	Estimate positive result, bias not known
	4,4'-DDD	686	Reject positive result, false positive result
	4,4'-DDT	171	Reject positive result, false positive result
	gamma-chlordane	294	Sample result less than CRQL, report CRQL, result considered to be nondetect
	Aroclor-1254	66.7	Estimate positive result, bias not known
APF86	heptachlor epoxide	330	Reject positive result, false positive result
	dieldrin	227	Reject positive result, false positive result
	4,4'-DDE	150	Reject positive result, false positive result
	4,4'-DDD	999.9	Reject positive result, false positive result
	endosulfan sulfate	669	Reject positive result, false positive result
	gamma-chlordane	115	Reject positive result, false positive result
APF86DL	4,4'-DDT	26.5	Estimate positive result, bias not known

Sample Number	Compound	Percent Difference (%)	Action
APF87	endosulfan I	999.9	Sample result less than CRQL, report CRQL, result considered to be nondetect
	4,4'-DDT	95.7	Estimate positive result, bias not known
APF88	heptachlor	41.4	Estimate positive result, bias not known
	dieldrin	162	Sample result less than CRQL, report CRQL, result considered to be nondetect
	4,4'-DDE	115	Sample result less than CRQL, report CRQL, result considered to be nondetect
APF89	heptachlor	45.2	Estimate positive result, bias not known
	endosulfan I	999.9	Sample result less than CRQL, report CRQL, result considered to be nondetect
	dieldrin	173	Sample result less than CRQL, report CRQL, result considered to be nondetect
	4,4'-DDE	113	Sample result less than CRQL, report CRQL, result considered to be nondetect
	4,4'-DDT	95.5	Estimate positive result, bias not known
	methoxychlor	653	Sample result less than CRQL, report CRQL, result considered to be nondetect
APF90	hetpachlor	59.4	Estimate positive result, bias not known
	dieldrin	121	Sample result less than CRQL, report CRQL, result considered to be nondetect
	4,4'-DDE	111	Sample result less than CRQL, report CRQL, result considered to be nondetect
	4,4'-DDT	78.7	Estimate positive result, bias not known
APG52	delta-BHC	270	Sample result less than CRQL, report CRQL, result considered to be nondetect
	heptachlor	27.1	Estimate positive result, bias not known
	heptachlor epoxide	718	Sample result less than CRQL, report CRQL, result considered to be nondetect

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Sample Number	Compound	Percent Difference (%)	Action
APG52 (cont)	endosulfan I	185	Sample result less than CRQL, report CRQL, result considered to be nondetect
	dieldrin	409	Sample result less than CRQL, report CRQL, result considered to be nondetect
	4,4'-DDT	26.7	Estimate positive result, bias not known
	Aroclor-1254	30.8	Estimate positive result, bias not known

%D >25%, but <100%, and sample result >CRQL, estimate (J) positive result
%D >100%, and sample result >CRQL, reject (R) positive result
%D >25%, but <100%, and sample result <CRQL, remove sample result and replace with CRQL

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EPA-NE
Data Validation Worksheet Cover Page - Page 1

Site Name Standard Times Field
Reference No. J-030455-0002-005

REGION I ORGANIC DATA VALIDATION

The following data package has been validated:

Lab Name SWL-TULSA
Case/Project No. 27436
SDG No. APF79
No. of Samples/Matrix 12 soil SOA 12 soil/4 aq Pest/PCB

SOW/Method No. OLM03.2
Sampling Date(s) 9/28/99
Shipping Date(s) 9/30/99
Date Rec'd by lab 10/1/99

Traffic Report Sample Nos. APF79-80, -81, -82, -83, -84, -85, -86, -87, -88, -89, -90, - APF8X, -52, -53, -54, ~~INK~~ 12/10/99 APF51, -53, -54 were reanalyzed

Trip Blank No. none
Equipment Blank No. none
Bottle Blank No. none
Field Duplicate Nos. APF88, APF89
PES Nos. none

as part of Case 27544 SDG AQL49

The Region I, EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses, revision 12/96 was used to evaluate the data and/or approved modifications to the EPA-NE Functional Guidelines were used to evaluate the data and are attached to this cover page: (attach modified criteria from EPA approved QAPjP or amendment to QAPjP).

A Tier II or Tier III evaluation was used to validate the data (circle one). If a Tier II validation with a partial Tier III was used, then identify samples, parameters, etc. that received partial Tier III validation

Modified Tier I / Tier II

The data were evaluated based upon the following parameters:

cooler T = 1, 4, 8 °C

NA - not applicable
NE - not evaluated

ok - Overall Evaluation of Data
ok - Data Completeness (CSF Audit - Tier I)
ok - Preservation & Technical Holding Times
ok - GC/MS & GC/ECD Instrument Performance Check
ok * - Initial & Continuing Calibrations
* - Blanks
ok SOW A/PP - Surrogate Compounds
ok - Internal Standards
ok SOW A/PP - Matrix Spike/Matrix Spike Duplicate
* - Pest breakdown

ok - Pest Resolution
ok - Field Duplicates
NA - Sensitivity Check
NA - PE Samples/Accuracy Check
NE - Target Compound Identification
* - Compound Quantitation and Reported Quantitation Limits
ok - TICs
ok - Semivolatile and Pesticide/PCB Cleanup (Florisil+GPC)
ok - System Performance
ok Pem Pest
* worksheet completed since QC issues

Region I Definitions and Qualifiers:

A - Acceptable Data
J - Numerical value associated with compound is an estimated quantity.
R - The data are rejected as unusable. The R replaces the numerical value or sample quantitation limit.
U - Compound not detected at that numerical sample quantitation limit.
UJ - The sample quantitation limit is an estimated quantity.
TB, BB, EB - Compound detected in aqueous trip blank, aqueous bottle blank, or aqueous equipment blank associated with soil/sediment samples.

Validator's Name Lisa Kulp-Kovar/2 Company Name Metcalf & Eddy Phone Number 781-246-5200

Date Validation Started 12/9/99 Date Validation Completed 12/14/99

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Check if all criteria are met and no hard copy worksheet provided. Indicate NA if worksheet is not applicable to analytical method. Note: there is no standard worksheet for System Performance, however, the validator must document all system performance issues in the Data Validation Memorandum.

VOA/SV worksheets:

VOA/SV-Pest/PCB	COMPLETE SDG FILE (CSF) AUDIT	✓
VOA/SV-Pest/PCB-I	PRESERVATION AND HOLDING TIMES	✓
VOA/SV-II	GC/MS INSTRUMENT PERFORMANCE CHECK (TUNING)	✓
VOA/SV-III	INITIAL CALIBRATION	
VOA/SV-IV	CONTINUING CALIBRATION	
VOA/SV-Pest/PCB-V-A	BLANK ANALYSIS	
VOA/SV-Pest/PCB-V-B	BLANK ANALYSIS	
VOA-VI	VOA SURROGATE SPIKE RECOVERIES	NA
SV-VI	SV SURROGATE SPIKE RECOVERIES	
VOA/SV-VII	INTERNAL STANDARD PERFORMANCE	✓
VOA/SV-Pest/PCB-VIII	MATRIX SPIKE/MATRIX SPIKE DUPLICATE	✓
VOA/SV-Pest/PCB-IX	FIELD DUPLICATE PRECISION	✓
VOA/SV-Pest/PCB-X	SENSITIVITY CHECK	NA
VOA/SV-Pest/PCB-XI	ACCURACY CHECK	NA
VOA/SV-Pest/PCB-XII	TARGET COMPOUND IDENTIFICATION	NA
VOA/SV-Pest/PCB-XIII	SAMPLE QUANTITATION	NA
VOA/SV-XIV	TENTATIVELY IDENTIFIED COMPOUNDS	NA
VOA/SV-XV	SEMIVOLATILE CLEANUP	✓
TABLE II-WORKSHEET	OVERALL EVALUATION OF DATA	✓

Pest/PCB worksheets:

VOA/SV-Pest/PCB	COMPLETE SDG FILE (CSF) AUDIT	
VOA/SV-Pest/PCB-I	PRESERVATION AND HOLDING TIMES	✓
Pest/PCB-IIA	GC/ECD INSTRUMENT PERFORMANCE CHECK-RESOLUTION	✓
Pest/PCB-IIB	GC/ECD INSTRUMENT PERFORMANCE CHECK-RETENTION TIMES	✓
Pest/PCB-IIC	GC/ECD INSTRUMENT PERFORMANCE CHECK-ACCURACY CHECK OF INITIAL CALIBRATION	✓
Pest/PCB-IID	GC/ECD INSTRUMENT PERFORMANCE CHECK-PESTICIDE DEGRADATION	✓
Pest/PCB-III	INITIAL CALIBRATION	✓
Pest/PCB-IV	CONTINUING CALIBRATION	
VOA/SV-Pest/PCB-V-A	BLANK ANALYSIS	✓
VOA/SV-Pest/PCB-V-B	BLANK ANALYSIS	✓
Pest/PCB-VI	SURROGATE COMPOUNDS: SPIKE RECOVERIES AND RETENTION TIME SHIFT	
Pest/PCB-VII	PESTICIDE CLEANUP	✓
VOA/SV-Pest/PCB-VIII	MATRIX SPIKE/MATRIX SPIKE DUPLICATE	
VOA/SV-Pest/PCB-IX	FIELD DUPLICATE PRECISION	✓
VOA/SV-Pest/PCB-X	SENSITIVITY CHECK	NA
VOA/SV-Pest/PCB-XI	ACCURACY CHECK	NA
Pest/PCB-XII	COMPOUND IDENTIFICATION	
VOA/SV-Pest/PCB-XIII	SAMPLE QUANTITATION	NA
TABLE II-WORKSHEET	OVERALL EVALUATION OF DATA	✓

I certify that all criteria were met for the worksheets checked above.

Signature: [signature] Name: Lisa Kulyukowski

Date: 12/14/99

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EPA-NE - Data Validation Worksheet
VOA/SV-III

III. INITIAL CALIBRATION - List all analytes that are outside calibration criteria.

Date of ICAL	Instrument	Parameter	Matrix	Compound	% RSD	RRF	Samples Affected	Action
8/10/99	HP70F	8270C	aq	2,4-dinitrophenol	31.3	ok	APF87 -88 -89 -90 +90RE1/RSD -79, -80, -82, -83, -84, -85, -86 -81	J/UJ
10/13/99	HP70F	8270C	aq	hexachlorobutadiene	62.5	ok	APF81DL, ~~APF8~~ LLK 12/16/99	J/UJ
				2,4 dinitrophenol	30.9	ok	↓	↓

Comments:

Validator: _____ Date: 12/9/99

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EPA-NE - Data Validation Worksheet
VOA/SV-IV

IV. CONTINUING CALIBRATION - List all analytes that are outside calibration criteria.

Date of ICAL	Date of CCAL	Instrument	Parameter	Matrix	Compound	%D	RRF	Samples Affected	Action
8/10/99	10/5/99	HP70F	SVOC		2-methylnaphthalene	34.7	ok	APF87-88, -89, -90, -90RE, 1150, -79 -80, -82, -83, -84, -85, -86, -87RE 12/16/99	J/UJ
↓	↓				hexachlorocyclo pentadiene	32.8	ok	↓	
8/10/99	10/12/99				2,2'-oxybis(1-chloro propane)	27.5	ok	APF87	
					2-methylnaphthalene	38.9	ok		
					bis(2-ethylhexyl) phthalate	27.4	ok		
10/13/99	10/13/99				hexachlorocyclo pentadiene	102.5	ok	APF81DL	
					2,4-dinitrophenol	41.8	ok		
					4,6-dinitro-2-methylphenol	30.7	ok		

Comments:

Validator: Lisa Kulpa-Krom

Date: 12/9/99

12/96

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EPA-NE - Data Validation Worksheet
VOA (SV) Pest/PCB-V-A

V. BLANK ANALYSIS

List the blank contamination below.

Concentration Level: low

Sampler: C. Lapille Company: Metcalf + Eddy Contacted: Yes (No) Date: _____

1. Laboratory: Method, Storage and Instrument Blanks

Date Extracted	Date Analyzed	Parameter/ Matrix	Sample No. (Blank Type)	Instrument/ Column	Compound	Conc. (units)
10/1/99	10/5/99	SVOC soil	SBLK1	HP70F	di-n-butylphthalate	21 ug/kg
↓	↓	↓	↓	↓	bis(2-ethylhexyl)phthalate	24
10/6/99	10/12/99	↓	SBLK2	↓	bis(2-ethylhexyl)phthalate	26

2. Field: Equipment (Rinsate), Trip and Bottle Blanks

Date Extracted	Date Analyzed	Parameter/ Matrix	Sample No. (Blank Type)	Instrument/ Column	Compound	Conc. (units)

Validator: Lisa Kulpikowski Date: 12/9/99

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EPA-NE - Data Validation Worksheet
VOA/SV - Pest/PCB-V-B

3. **Blank Actions** - List the maximum concentrations of blank compounds.

Compound	Type of Blank	Date Blank Sampled/Originated	Max. Conc. (units)	Action Level (units)	Sample QL	Samples Affected	Action
di-n-butylphthalate	MB	10/1/99	21 ug/kg	210 ug/kg		all	U(4)
bis(2-ethylhexyl)phthalate	↓	10/6/99	26 ↓	260 ↓		↓	↓

Comments: _____

Validator: Erica Kulzer-Hanson

Date: 12/9/99

12/96

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EPA-NE - Data Validation Worksheet
~~VOA~~ VI

VI. ~~VOA~~ SURROGATE SPIKE RECOVERIES - List all surrogate compound recoveries that are outside method QC acceptance criteria.
Pest/PCB

Method	Volatile Method QC Acceptance Criteria				
	~~Toluene-d_8~~ TCX1	~~BFB~~ TCX2	~~DCE-d~~ DCB1	Other: DCB2	
OLM03.2	Water 88-110 Soil 84-138	Water 86-115 Soil 59-113	Water 76-114 Soil 70-121		
OLC02.1	NA	80-120	NA		
Other:	30-150	30-150	30-150	30-150	
Sample Number/Matrix	**% Recovery**	**% Recovery**	**% Recovery**	**% Recovery**	**Action**
APF79		291	262	165	J(4)
APF81				709	none
APF82			203	1356	J(4)
APF83	576	414	760	2105	J(4)
APF84			298	500	J(4)
APF85				299	none

Validator: Lisa Kulyk-Kosmos

Date: 12/10/99

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EPA-NE - Data Validation Worksheet
VOA/SV - Pest/PCB-VIII

VIII. MATRIX SPIKE/MATRIX SPIKE DUPLICATE - List all MS/MSD analytes that are outside method QC acceptance criteria.

Use a separate worksheet for each MS/MSD pair.

Sample # APG52 Matrix sg Concentration Level low

Parameter	Compound	MS %Rec	MSD %Rec	RPD	Method QC Limits		Concentration			% RSD	Action
					% Rec	RPD	Unspiked Sample	MS	MSD		
Pest	gamma-BHC	39	43	ok	56-123	ok					J/UJ
	heptachlor	28	34		40-131						
	aldrin	ok	ok		-						
	dieldrin	46	48		52-126						
	endrin	50	55		56-121						
	4,4'-DDT	28	30		38-127						

Validator: Russ Kulp Russ Kulp Date: 12/10/99

PESTICIDE RESOLUTION CHECK
(CLP FORM 6G)

List the resolution between adjacent single peak pesticides in the resolution check mix that are less than 60.0% on either chromatographic column.

Analysis Date	Column	Compounds	%Resolution	Affected Samples

List the validation actions taken below. If there were no positive results for the poorly resolved peaks no action is required.

PESTICIDE CALIBRATION VERIFICATION
(CONTINUING CALIBRATION CLP FORMS 7D,7E)

List the percent difference for the pesticide compounds that exceed 25%. List the percent breakdown for 4,4'-DDT or Endrin that exceed 20.0% or the combined breakdown of these two compounds that exceed 30.0%.

Analysis Date	Column	Compound	%D/Breakdown	Affected Samples	Action
		4,4-DDT breakdown	20.5		
		endrin breakdown	22.2		
10/14/99 1347	RTX-Pest	combined breakdown	42.7	APF99,-80,-81,-82	J/UJ
		beta-BHC	26.6	-83,-84,-85,-86	
		endrin	30.1	-87,-88,-89,-90	
		4,4-DDT	48.7		
		methoxychlor	45.4		
	RTX-Pest 2	endrin	24.2		
		combined breakdown	43.1		
		beta-BHC	33.6		
		4,4-DDT	35.7		
		~~methoxychlor~~	2 ckk 12/10/99		

List the validation actions taken below.

US EPA ARCHIVE DOCUMENT

PESTICIDE RESOLUTION CHECK
(CLP FORM 6G)

List the resolution between adjacent single peak pesticides in the resolution check mix that are less than 60.0% on either chromatographic column.

Analysis Date	Column	Compounds	%Resolution	Affected Samples

List the validation actions taken below. If there were no positive results for the poorly resolved peaks no action is required.

PESTICIDE CALIBRATION VERIFICATION
(CONTINUING CALIBRATION CLP FORMS 7D,7E)

List the percent difference for the pesticide compounds that exceed 25%. List the percent breakdown for 4,4'-DDT or Endrin that exceed 20.0% or the combined breakdown of these two compounds that exceed 30.0%.

Analysis Date	Column	Compound	%D/Breakdown RTX Post	%D/Breakdown RTX Post 2	Affected Samples
10/14/99 14:12	RTX-~~Post~~	~~Beta~~-BHC	33.6	40.4	AAF79, -80, -81, -82,
↓	↓	endrin	35.9	31.6	-83, -84, -85, -86,
		4,4'-DDT	49.3	34.2	-87, -88, -89, -90
		methoxychlor	44.4	ok	
		4,4'-DDT breakdown	21.4	23.0	
		endrin	22.0	24.5	
		combined ↓	43.4	47.5	

List the validation actions taken below.

US EPA ARCHIVE DOCUMENT

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PESTICIDE IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.

APF79

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.01 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
beta-BHC	1	8.56	8.48	8.58	4.7		
	2	8.62	8.54	8.64	3.9	20.5	
Heptachlor	1	9.28	9.22	9.32	3.0		
	2	9.21	9.20	9.30	32	967	R(4)
Heptachlor epoxide	1	11.00	10.91	11.05	5.3		
	2	10.93	10.84	10.98	25	372	R(4)
Endosulfan I	1	11.66	11.61	11.75	9.8		
	2	11.67	11.53	11.67	35	257	R(4)
Dieldrin	1	12.11	12.04	12.18	21		
	2	12.07	12.02	12.16	63	200	R(4)
4,4'-DDE	1	11.58	11.53	11.67	20		
	2	11.87	11.77	11.91	29	45.0	J(4)
Endrin	1	12.50	12.45	12.59	11		
	2	12.66	12.55	12.69	28	155	R(4)
Endosulfan II	1	12.90	12.85	12.99	4.0		
	2	12.93	12.92	13.06	6.0	50.0	J(4)

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF79

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.01 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
Endosulfan sulfate	1	14.48	14.34	14.48	14		
	2	14.04	13.99	14.13	13	7.7	
4,4'-DDT	1	13.08	13.07	13.21	100		
	2	13.38	13.31	13.45	82	22.0	
Methoxychlor	1	14.01	13.91	14.05	47		
	2	14.58	14.51	14.65	40	17.5	
Endrin aldehyde	1	13.71	13.59	13.73	3.4		
	2	13.63	13.51	13.65	17	400	R(4)
alpha-Chlordane	1	11.42	11.37	11.51	12		
	2	11.51	11.44	11.58	8.6	39.5	J(4)
gamma-Chlordane	1	11.20	11.13	11.27	4.4		
	2	11.26	11.18	11.32	27	514	R(4)
	1						
	2						
	1						
	2						

10A

PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.

APF80

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.02 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
beta-BHC	1	8.56	8.48	8.58	8.0		
	2	8.55	8.54	8.64	1.3	515	Report CRQL
Endosulfan I	1	11.68	11.61	11.75	2.3		
	2	11.67	11.53	11.67	39	999.9	R(T)
Dieldrin	1	12.11	12.04	12.18	2.2		
	2	12.03	12.02	12.16	32	999.9	R(T)
Endrin	1	12.45	12.45	12.59	7.7		
	2	12.67	12.55	12.69	13	68.8	J(T)
4,4'-DDD	1	12.59	12.58	12.72	51		
	2	12.80	12.78	12.92	12	325	R(T)
Endosulfan sulfate	1	14.47	14.34	14.48	24		
	2	14.04	13.99	14.13	10	140	R(T)
4,4'-DDT	1	13.14	13.07	13.21	11		
	2	13.39	13.31	13.45	13	18.2	
Methoxychlor	1	13.99	13.91	14.05	53		
	2	14.58	14.51	14.65	56	5.7	

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PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF80

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.02 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
Endrin ketone	1	14.87	14.83	14.97	20		
	2	15.02	14.91	15.05	17	17.6	
Endrin aldehyde	1	13.63	13.59	13.73	7.0		
	2	13.63	13.51	13.65	10	42.9	J(+)
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						

US EPA ARCHIVE DOCUMENT

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PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.

APF81

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.03 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
beta-BHC	1	8.56	8.48	8.58	49		
	2	8.55	8.54	8.64	2.6	999.9	R(+)
delta-BHC	1	8.84	8.82	8.92	0.55		
	2	9.13	9.10	9.20	3.1	464	Report CRQL
Heptachlor	1	9.24	9.22	9.32	1.4		
	2	9.24	9.20	9.30	0.37	278	Report CRQL
Heptachlor epoxide	1	11.00	10.91	11.05	1.7		
	2	10.94	10.84	10.98	5.1	200	Report CRQL
Endosulfan I	1	11.67	11.61	11.75	2.2		
	2	11.58	11.53	11.67	0.98	124	Report CRQL
Dieldrin	1	12.12	12.04	12.18	5.2		
	2	12.03	12.02	12.16	110	999.9	R(+)
4,4'-DDE	1	11.58	11.53	11.67	4.8		
	2	11.87	11.77	11.91	54	999.9	R(+)
Endrin	1	12.45	12.45	12.59	19		
	2	12.66	12.55	12.69	4.4	332	R(+)

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PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF81

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.03 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
Endosulfan II	1	12.91	12.85	12.99	2.2		
	2	13.01	12.92	13.06	27	999.9	Report CRQL
4,4'-DDD	1	12.60	12.58	12.72	140		
	2	12.80	12.78	12.92	41	241	R(4)
Endosulfan sulfate	1	14.40	14.34	14.48	30		
	2	14.05	13.99	14.13	6.6	355	R(4)
4,4'-DDT	1	13.14	13.07	13.21	9.6		
	2	13.38	13.31	13.45	29	202	R(4)
Endrin ketone	1	14.87	14.83	14.97	47		
	2	15.02	14.91	15.05	50	6.4	
Endrin aldehyde	1	13.64	13.59	13.73	5.5		
	2	13.56	13.51	13.65	8.7	58.2	J(4)
alpha-Chlordane	1	11.51	11.37	11.51	0.66		
	2	11.50	11.44	11.58	1.8	173	Report CRQL
gamma-Chlordane	1	11.17	11.13	11.27	4.2		
	2	11.27	11.18	11.32	2.6	61.5	J(4)

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US EPA ARCHIVE DOCUMENT

10A

PESTICIDE IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.

APF82

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.04 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
beta-BHC	1	8.56	8.48	8.58	89		
	2	8.63	8.54	8.64	33	170	Report from APF82DL
Heptachlor epoxide	1	11.00	10.91	11.05	20		
	2	10.94	10.84	10.98	120	500	R(H)
Endosulfan I	1	11.66	11.61	11.75	42		
	2	11.67	11.53	11.67	18	133	R(H)
Dieldrin	1	12.12	12.04	12.18	67		
	2	12.07	12.02	12.16	390	482	Report from APF82DL
4,4'-DDE	1	11.58	11.53	11.67	100		
	2	11.87	11.77	11.91	160	60.0	
Endosulfan sulfate	1	14.40	14.34	14.48	73		
	2	14.06	13.99	14.13	100	37.0	
4,4'-DDT	1	13.09	13.07	13.21	360		
	2	13.39	13.31	13.45	330	9.1	
Methoxychlor	1	14.02	13.91	14.05	180		
	2	14.63	14.51	14.65	350	94.4	J(H)

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF82

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.04 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
Endrin ketone	1	14.87	14.83	14.97	83		
	2	15.03	14.91	15.05	120	44.6	Report from APF82201
Endrin aldehyde	1	13.59	13.59	13.73	140		
	2	13.56	13.51	13.65	49	186	R(4)
alpha-Chlordane	1	11.51	11.37	11.51	48		
	2	11.51	11.44	11.58	5.3	806	R(4)
gamma-Chlordane	1	11.16	11.13	11.27	66		
	2	11.27	11.18	11.32	120	81.8	J(4)
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF82DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.04DL Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
alpha-BHC	1	7.70	7.64	7.74	10		
	2	7.69	7.64	7.74	16	60.0	
beta-BHC	1	8.56	8.48	8.58	100		
	2	8.63	8.54	8.64	41	144	R CH
Heptachlor	1	9.24	9.22	9.32	12		
	2	9.29	9.20	9.30	23	91.7	
Heptachlor epoxide	1	11.00	10.91	11.05	8.0		
	2	10.93	10.84	10.98	120	999.9	
Endosulfan I	1	11.66	11.61	11.75	27		
	2	11.67	11.53	11.67	21	28.6	
Dieldrin	1	12.12	12.04	12.18	75		
	2	12.07	12.02	12.16	330	340	R CH
4,4'-DDE	1	11.58	11.53	11.67	82		
	2	11.87	11.77	11.91	150	82.9	JCH
Endrin	1	12.50	12.45	12.59	14		
	2	12.66	12.55	12.69	38	171	

10B
PESTICIDE IDENTIFICATION SUMMARY
FOR MULTICOMPONENT ANALYTES

EPA SAMPLE NO.
APF82

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.04 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	PEAK	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	MEAN CONCENTRATION	%D	
	1	11.51	11.43	11.57	1484			
Aroclor-1254	2	12.12	12.05	12.19	1150			
	3	12.28	12.21	12.35	1545			
COLUMN 1	4	12.60	12.53	12.67	2667			
	5	13.09	13.02	13.16	1758	1700		
	1	11.27	11.20	11.34	1464			
	2	11.87	11.80	11.94	2942			
	3	12.07	12.00	12.14	3428			
COLUMN 2	4	12.41	12.34	12.48	1095			
	5	13.39	13.31	13.45	2188	2200	29.4	J(+)
	1							
	2							
	3							
COLUMN 1	4							
	5							
	1							
	2							
	3							
COLUMN 2	4							
	5							
	1							
	2							
	3							
COLUMN 1	4							
	5							
	1							
	2							
	3							
COLUMN 2	4							
	5							

At least 3 peaks for each column are required for identification of multicomponent analytes

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF82DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.04DL Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
Endosulfan II	1	12.90	12.85	12.99	16		
	2	12.94	12.92	13.06	8.5	88.2	
Endosulfan sulfate	1	14.39	14.34	14.48	27		
	2	14.05	13.99	14.13	22	22.7	✓
4,4'-DDT	1	13.09	13.07	13.21	350		
	2	13.38	13.31	13.45	300	16.7	✓
Methoxychlor	1	14.01	13.91	14.05	57		
	2	14.62	14.51	14.65	110	93.0	
Endrin ketone	1	14.87	14.83	14.97	60		
	2	15.02	14.91	15.05	66	10.0	✓
gamma-Chlordane	1	11.16	11.13	11.27	19		
	2	11.27	11.18	11.32	110	479	RC4
	1						
	2						
	1						
	2						

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF83

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.05 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
Dieldrin	1	12.13	12.04	12.18	15		
	2	12.08	12.02	12.16	73	387	R(4)
4,4'-DDE	1	11.60	11.53	11.67	16		
	2	11.89	11.77	11.91	140	775	R(4)
Endrin	1	12.57	12.45	12.59	11		
	2	12.68	12.55	12.69	22	100	R(4)
Endosulfan sulfate	1	14.42	14.34	14.48	12		
	2	14.08	13.99	14.13	18	50.0	J(4)
4,4'-DDT	1	13.10	13.07	13.21	41		
	2	13.40	13.31	13.45	100	144	R(4)
Methoxychlor	1	13.95	13.91	14.05	120		
	2	14.55	14.51	14.65	820	583	R(4)
Endrin ketone	1	14.88	14.83	14.97	96		
	2	14.94	14.91	15.05	56	71.4	J(4)
Endrin aldehyde	1	13.60	13.59	13.73	61		
	2	13.58	13.51	13.65	50	22.0	

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF83

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.05 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
gamma-Chlordane	1	11.21	11.13	11.27	44		
	2	11.27	11.18	11.32	49	11.4	Report from APF83DL
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.

APF83DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.05DL Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D
alpha-BHC	1	7.65	7.64	7.74	13	
	2	7.65	7.64	7.74	20	53.8
Heptachlor epoxide	1	11.00	10.91	11.05	4.6	
	2	10.94	10.84	10.98	23	400
Dieldrin	1	12.12	12.04	12.18	20	
	2	12.07	12.02	12.16	79	295
4,4'-DDE	1	11.58	11.53	11.67	17	
	2	11.87	11.77	11.91	170	900
Endrin	1	12.54	12.45	12.59	19	
	2	12.66	12.55	12.69	18	5.6
Endosulfan II	1	12.91	12.85	12.99	10	
	2	13.01	12.92	13.06	96	860
Endosulfan sulfate	1	14.39	14.34	14.48	12	
	2	14.06	13.99	14.13	44	267
4,4'-DDT	1	13.09	13.07	13.21	54	
	2	13.38	13.31	13.45	89	64.8

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF83DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.05DL Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D
Endrin ketone	1	14.87	14.83	14.97	92	
	2	15.02	14.91	15.05	120	30.4
alpha-Chlordane	1	11.50	11.37	11.51	8.4	
	2	11.51	11.44	11.58	8.6	2.4
gamma-Chlordane	1	11.17	11.13	11.27	28	
	2	11.27	11.18	11.32	13	115
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF84

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.06 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
Dieldrin	1	12.11	12.04	12.18	10		
	2	12.04	12.02	12.16	120	999.9	R(4)
4,4'-DDE	1	11.58	11.53	11.67	6.9		
	2	11.87	11.77	11.91	38	451	R(4)
4,4'-DDD	1	12.60	12.58	12.72	150		
	2	12.80	12.78	12.92	87	72.4	~~J(4)~~ Report from APF84DL
Endosulfan sulfate	1	14.39	14.34	14.48	8.0		
	2	14.04	13.99	14.13	11	37.5	J(4)
4,4'-DDT	1	13.09	13.07	13.21	16		
	2	13.38	13.31	13.45	46	188	R(4)
Methoxychlor	1	13.97	13.91	14.05	47		
	2	14.59	14.51	14.65	120	155	R(4)
Endrin ketone	1	14.85	14.83	14.97	49		
	2	15.02	14.91	15.05	22	123	R(4)
Endrin aldehyde	1	13.63	13.59	13.73	12		
	2	13.63	13.51	13.65	12	0.0	

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.

APF84

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.06 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
gamma-Chlordane	1	11.16	11.13	11.27	3.7		
	2	11.27	11.18	11.32	4.9	32.4	J(H)
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF84DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.06DL Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D
Dieldrin	1	12.11	12.04	12.18	18	
	2	12.06	12.02	12.16	42	133
4,4'-DDD	1	12.60	12.58	12.72	73	
	2	12.80	12.78	12.92	73	0.0
4,4'-DDT	1	13.09	13.07	13.21	3.2	
	2	13.38	13.31	13.45	55	999.9
Endrin ketone	1	14.87	14.83	14.97	29	
	2	14.93	14.91	15.05	15	93.3
	1					
	2					
	1					
	2					
	1					
	2					
	1					
	2					

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF85

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.07 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
Heptachlor epoxide	1	10.99	10.91	11.05	2.0		
	2	10.93	10.84	10.98	9.1	355	R(4)
Dieldrin	1	12.11	12.04	12.18	12		
	2	12.05	12.02	12.16	44	267	R(4)
4,4'-DDE	1	11.60	11.53	11.67	38		
	2	11.85	11.77	11.91	64	68.4	J(4)
4,4'-DDD	1	12.60	12.58	12.72	110		
	2	12.84	12.78	12.92	14	686	R(4)
4,4'-DDT	1	13.14	13.07	13.21	35		
	2	13.38	13.31	13.45	95	171	R(4)
Endrin ketone	1	14.87	14.83	14.97	22		
	2	15.02	14.91	15.05	21	4.8	
gamma-Chlordane	1	11.20	11.13	11.27	1.7		
	2	11.27	11.18	11.32	6.7	294	Report CRQL
	1						
	2						

10B

PESTICIDE IDENTIFICATION SUMMARY
FOR MULTICOMPONENT ANALYTES

EPA SAMPLE NO.

APF85

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.07 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	PEAK	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	MEAN CONCENTRATION	%D
	1	11.50	11.43	11.57	150		
Aroclor-1254	2	12.11	12.05	12.19	258		
	3	12.28	12.21	12.35	125		
COLUMN 1	4	12.60	12.53	12.67	1018		
	5	13.09	13.02	13.16	275	360	
	1	11.27	11.20	11.34	128		
	2	11.85	11.80	11.94	1179		
	3	12.03	12.00	12.14	894		
COLUMN 2	4	12.41	12.34	12.48	186		
	5	13.38	13.31	13.45	643	600	66.7 JLH
	1						
	2						
	3						
COLUMN 1	4						
	5						
	1						
	2						
	3						
COLUMN 2	4						
	5						
	1						
	2						
	3						
COLUMN 1	4						
	5						
	1						
	2						
	3						
COLUMN 2	4						
	5						

At least 3 peaks for each column are required for identification of multicomponent analytes

US EPA ARCHIVE DOCUMENT

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF86

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.08 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
Heptachlor epoxide	1	11.00	10.91	11.05	2.0		
	2	10.93	10.84	10.98	8.6	330	R(4)
Dieldrin	1	12.11	12.04	12.18	9.8		
	2	12.06	12.02	12.16	32	227	R(4)
4,4'-DDE	1	11.59	11.53	11.67	12		
	2	11.87	11.77	11.91	30	150	R(4)
4,4'-DDD	1	12.60	12.58	12.72	100		
	2	12.84	12.78	12.92	7.1	999.9	R(4)
Endosulfan sulfate	1	14.48	14.34	14.48	30		
	2	14.05	13.99	14.13	3.9	669	R(4)
4,4'-DDT	1	13.09	13.07	13.21	67		
	2	13.38	13.31	13.45	62	8.1	Report from APF86DL
Endrin ketone	1	14.86	14.83	14.97	12		
	2	15.02	14.91	15.05	10	20.0	
gamma-Chlordane	1	11.16	11.13	11.27	4.0		
	2	11.27	11.18	11.32	8.6	115	R(4)

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF86DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.08DL Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
Heptachlor epoxide	1	11.00	10.91	11.05	2.0		
	2	10.93	10.84	10.98	10	400	
Dieldrin	1	12.12	12.04	12.18	16		
	2	12.06	12.02	12.16	40	150	
4,4'-DDE	1	11.58	11.53	11.67	6.4		
	2	11.87	11.77	11.91	32	400	
4,4'-DDD	1	12.60	12.58	12.72	82		
	2	12.84	12.78	12.92	10	720	
Endosulfan sulfate	1	14.48	14.34	14.48	12		
	2	14.05	13.99	14.13	7.0	71.4	
4,4'-DDT	1	13.09	13.07	13.21	62		
	2	13.38	13.31	13.45	49	26.5	J(H)
Endrin ketone	1	14.87	14.83	14.97	10		
	2	15.02	14.91	15.05	9.1	9.9	
gamma-Chlordane	1	11.15	11.13	11.27	1.6		
	2	11.27	11.18	11.32	13	713	

10A

PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.

APF87

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.09 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
Endosulfan I	1	11.68	11.61	11.75	0.87		
	2	11.67	11.53	11.67	22	999.9	Report CRQL
4,4'-DDT	1	13.09	13.07	13.21	4.5		JKK 10/14/99
	2	13.38	13.31	13.45	2.3	95.7	Report CRQL J(+)
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						

10A

PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.

APF88

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.10 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
Heptachlor	1	9.27	9.22	9.32	0.41		
	2	9.24	9.20	9.30	0.29	41.4	J (H)
Dieldrin	1	12.11	12.04	12.18	1.3		
	2	12.07	12.02	12.16	3.4	162	Report CRQL
4,4'-DDE	1	11.58	11.53	11.67	0.79		
	2	11.87	11.77	11.91	1.7	115	Report CRQL
4,4'-DDT	1	13.09	13.07	13.21	6.7		
	2	13.39	13.31	13.45	6.8	1.5	
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						

10A

PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.

APF89

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.11 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
Heptachlor	1	9.27	9.22	9.32	0.62		JCH
	2	9.25	9.20	9.30	0.90	45.2	~~Report~~ LLK 12/16/99
Endosulfan I	1	11.66	11.61	11.75	0.55		
	2	11.67	11.53	11.67	10	999.9	Report CRQL
Dieldrin	1	12.11	12.04	12.18	1.5		
	2	12.07	12.02	12.16	4.1	173	Report CRQL
4,4'-DDE	1	11.58	11.53	11.67	0.80		
	2	11.87	11.77	11.91	1.7	113	Report CRQL
4,4'-DDT	1	13.09	13.07	13.21	8.6		
	2	13.38	13.31	13.45	4.4	95.5	JCH
Methoxychlor	1	14.01	13.91	14.05	0.73		
	2	14.53	14.51	14.65	5.5	653	Report CRQL
	1						
	2						
	1						
	2						

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APF90

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40521.12 Date(s) Analyzed: 10/14/99 10/14/99

Instrument ID (1): HP_14A Instrument ID (2): HP_14B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
Heptachlor	1	9.26	9.22	9.32	0.69		
	2	9.24	9.20	9.30	1.1	59.4	J (A)
Dieldrin	1	12.11	12.04	12.18	1.4		
	2	12.07	12.02	12.16	3.1	121	Report CRQL
4,4'-DDE	1	11.58	11.53	11.67	0.71		
	2	11.86	11.77	11.91	1.5	111	Report CRQL
4,4'-DDT	1	13.09	13.07	13.21	8.4		
	2	13.38	13.31	13.45	4.7	78.7	J (A)
	1						
	2						
	1						
	2						
	1						
	2						
	1						
	2						

US EPA ARCHIVE DOCUMENT

10A
PESTICIDE IDENTIFICATION SUMMARY
FOR SINGLE COMPONENT ANALYTES

EPA SAMPLE NO.
APG52

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40530.02 Date(s) Analyzed: 10/08/99 10/08/99

Instrument ID (1): HP_03A Instrument ID (2): HP_03B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	COL	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	%D	
alpha-BHC	1	7.85	7.79	7.89	0.32		
	2	7.68	7.64	7.74	0.26	23.1	
delta-BHC	1	9.25	9.20	9.30	0.020		
	2	9.45	9.38	9.48	0.074	270	Report CRQL
Heptachlor	1	9.69	9.69	9.79	0.059		
	2	9.58	9.49	9.59	0.075	27.1	JCH
Heptachlor epoxide	1	11.81	11.74	11.88	0.033		
	2	11.57	11.49	11.63	0.27	718	Report CRQL
Endosulfan I	1	12.62	12.61	12.75	0.037		
	2	12.45	12.33	12.47	0.013	185	Report CRQL
Dieldrin	1	13.17	13.12	13.26	0.055		
	2	12.95	12.92	13.06	0.28	409	Report CRQL
4,4'-DDE	1	12.53	12.49	12.63	0.16		
	2	12.71	12.61	12.75	0.16	0.0	
4,4'-DDT	1	14.26	14.25	14.39	0.15		
	2	14.42	14.35	14.49	0.19	26.7	JCH

10B

PESTICIDE IDENTIFICATION SUMMARY FOR MULTICOMPONENT ANALYTES

EPA SAMPLE NO.

APG52

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Lab Sample ID: 40530.02 Date(s) Analyzed: 10/08/99 10/08/99

Instrument ID (1): HP_03A Instrument ID (2): HP_03B

GC Column (1): RTX-PEST ID: 0.32(mm) GC Column (2): RTX-PEST 2 ID: 0.32(mm

ANALYTE	PEAK	RT	RT WINDOW FROM	RT WINDOW TO	CONCENTRATION	MEAN CONCENTRATION	%D
	1	11.36	11.29	11.43	4.1		
Aroclor-1254	2	12.01	11.95	12.09	2.8		
	3	12.79	12.72	12.86	2.9		
COLUMN 1	4	13.36	13.30	13.44	1.9		
	5	14.26	14.20	14.34	1.3	2.6	
	1	11.57	11.50	11.64	4.7		
	2	12.17	12.10	12.24	5.3		
	3	12.95	12.89	13.03	3.3		
COLUMN 2	4	13.40	13.34	13.48	2.1		
	5	14.42	14.35	14.49	1.4	3.4	30.8 J(+)
	1						
	2						
	3						
COLUMN 1	4						
	5						
	1						
	2						
	3						
COLUMN 2	4						
	5						
	1						
	2						
	3						
COLUMN 1	4						
	5						
	1						
	2						
	3						
COLUMN 2	4						
	5						

At least 3 peaks for each column are required for identification of multicomponent analytes

Attachment I

Chains-of-Custody

US EPA ARCHIVE DOCUMENT

EPA United States Environmental Protection Agency
Contract Laboratory Program

Organic Traffic Report & Chain of Custody Record
(For Organic CLP Analysis)

Case No. 37436

1. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify in Column A)

2. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaHSO4
4. H2SO4
5. Ice only
6. Other (Specify in Column D)
N. Not preserved

2. Region No.: I
Sampling Co.: Metcalf + Eddy
4. Date Shipped: 9/28/99
Carrier: FED EX
Sampler (Name): Mark Stonge
Airbill Number: 813808397554
Sampler Signature: [signature]
5. Ship To: Southwest Labs of Oklahoma, Inc. (918) 251-0545
1700 West Albany, Suite C
Broken Arrow OK 74012
ATTN: Hazel Boyd
3. Purpose*: Lead [ ] SF [ ] PRP [ ] ST [ ] FED; Early Action [ ] CLEM [ ] PA [ ] REM [ ] RI [X] SI [ ] ESI; Long-Term Action [ ] FS [ ] RD [ ] RA [ ] O&M [ ] NPLD
6. Date Received - Received by: 10-1-99 [signature]
Laboratory Contract Number:
Unit Price:
7. Transfer to:
Date Received:
Received by:
Contract Number:
Price:

CLP Sample Numbers (from labels)	A Matrix (from Box 1) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 2) / Other:	E RAS Analysis: VOA	BNA	Pest/PCB	High only ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K High Phases: Solids	Water-Miscible Liq.	Water-Immis. Liq.
APF79	5	L/M	G	5		X	X		133702 ; 133703	SS02015TF	9/28/99 1015	MALP88	DS			
APF80	5	L/M	G	5		X	X		133704 ; 133705	SS03015TF	9/28/99 1500	MALP89	DS			
APF81	5	L/M	G	5		X	X		133907 ; 133908	SS04015TF	9/28/99 1450	MALP90	DS			
APF82	5	L/M	G	5		X	X		133710 ; 133711	SS04025TF	9/28/99 1400	MALP91	DS			
APF83	5	L/M	G	5		X	X		133913 ; 133914	SS05015TF	9/28/99 1250	MALP92	DS			
APF84	5	L/M	G	5		X	X		133916 ; 133917	SS05025TF	9/28/99 1340	MALP93	DS			
APF85	5	L/M	G	5		X	X		133919 ; 133920	SS06015TF	9/28/99 1250	MALP94	DS			
APF86	5	L/M	G	5		X	X		133922 ; 133923	SS07015TF	9/28/99 1220	MALP95	DS			
APF87	5	L/M	G	5		X	X		133925 ; 133926	SS08015TF	9/28/99 1200	MALP96	DS			
APF88	5	L/M	G	5		X	X		133928 ; 133927	SS09015TF	9/28/99 1130	MALP97	DS			

Shipment for Case Complete? (Y/N): Y
Page: 1 of 2
Sample(s) to be Used for Laboratory QC: Use APF10 for MS/MSD
Additional Sampler Signatures:
Chain of Custody Seal Number(s):

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	9/29/99 1700				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	
		[signature]	10-1-99 9:00	8.1°C	

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS
EPA Form 9110-2
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*SEE REVERSE FOR PURPOSE CODE DEFINITIONS
A21-012-16 REV.

APF79

364580

US EPA ARCHIVE DOCUMENT

EPA Organic Traffic Report & Chain of Custody Record

United States Environmental Protection Agency
Contract Laboratory Program

(For Organic CLP Analysis)

Case No. 27936

1. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (Specify in Column A)

2. Preservative (Enter in Column D)
1. HCl
2. HNO3
3. NaHSO4
4. H2SO4
5. Ice only
6. Other (Specify in Column D)
N. Not preserved

2. Region No.: 1
Sampling Co.: Metcalf & Eddy
4. Date Shipped: 9/30/99
Carrier: Fed Ex
Sampler (Name): Derek Stamp
Airbill Number: 812799250237 / 813808357554
Sampler Signature: Derek Stamp
5. Ship To: 1918 051-0345 Southwest Labs of Oklahoma, Inc 1700 West Albany Suite C Broken Arrow OK 74012 ATTN: Harry Berg
6. Date Received -- Received by: 10-1-99
Laboratory Contract Number:
Unit Price:
7. Transfer to:
Date Received:
Received by:
Contract Number:
Price:

3. Purpose
Lead: SF, PRP, ST, FED
Early Action: CLEM, PA, REM, RI, SI (X), ESI
Long-Term Action: FS, RD, RA, O&M, NPLD

CLP Sample Numbers (from labels)	A Matrix (from Box 1) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 2) / Other:	E RAS Analysis: VOA	BNA	Pest/PCB	High only ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K High Phases: Solids	Water-Miscible Liq.	Water-Immis. Liq.
APF89	S	L/M	G	S		X	X		133932, 133933	SSK0401STF	9/28/99 1135	MA PT8	DS	FD		
APF90	S	L/M	G	S		X	X		133934 – 133937	SSK001STF	9/28/99 1100		DS			
									Cooler Temperature 4 Carbs							

Shipment for Case Complete? (Y/N): Y
Page: 2 of 2
Sample(s) to be Used for Laboratory QC: Use APF90, 60 MS/MSD
Additional Sampler Signatures:
Chain of Custody Seal Number(s):

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	9/30/99 1900				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	
			10-1-99 9:08		

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

EPA Form 9110-2

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

A21-012-16 REV.

22

APF79

364581

US EPA ARCHIVE DOCUMENT

EPA — Organic Traffic Report & Chain of Custody Record

United States Environmental Protection Agency
Contract Laboratory Program

(For Organic CLP Analysis)

Case No. 27436

1. Project Code: 020655	Account Code: —	2. Region No.: 1	Sampling Co.: M+E	4. Date Shipped: 10/1/99	Carrier: Fed EX
Regional Information: —		Sampler (Name): DiTMar		Airbill Number: 813808396731 + 813808397598	
Non-Superfund Program: Brownfields		Sampler Signature: DiTMar		5. Ship To: Southwest Labs of Oklahoma, Inc 1700 West Albany Suite C Broken Arrow, OK 74012	
Site Name: Brwnflds Std times		3. Purpose* Lead: SF, PRP, ST, FED; Early Action: CLEM, PA, REM, RI (X), SI, ESI; Long-Term Action: FS, RD, RA, O&M, NPLD		ATTN: Harry Borg	
City, State: NewBedford MA	Site Spill ID: —				

6. Matrix (Enter in Column A): 1. Surface Water; 2. Ground Water; 3. Leachate; 4. Field QC; 5. Soil/Sediment; 6. Oil (High only); 7. Waste (High only); 8. Other (Specify in Column A)

7. Preservative (Enter in Column D): 1. HCl; 2. HNO3; 3. NaHSO4; 4. H2SO4; 5. Ice only; 6. Other (Specify in Column D); N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) / Other:	B Conc.: Low Med High	C Sample Type: Comp. Grab	D Preservative (from Box 7) / Other:	E RAS Analysis: VOA	BNA	Pest/PCB	High only / ARO/TOX	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/Year/Time Sample Collection	I Corresponding CLP Inorganic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank S = Spike D = Duplicate R = Rinsate PE = Perform. Eval. — = Not a QC Sample)
APG51	2	Lm	G	5			X		133944-945	FGW0201STF	9/30/99 1200	MALQ07	DS	
APG52	2	Lm	G	5			X		133948-49, 133952-53	FGW0401STF	9/30/99 1230	MALQ02	DS	MS MSD DS
APG53	2	Lm	G	5			X		133958 133959	FGW0801STF	9/30/99 1500	MALQ04	DS	9/30/99
APG54	2	Lm	G	5			X		133962 133963	FGWK0801STF	9/30/99 1530	MALQ06	DS	Dupe of APG53
									Temperature	Blank				

Shipment for Case Complete? (Y/N): (Y)

Page: 1 of 1

Sample(s) to be Used for Laboratory QC: Use APG52 for MS/MSD

Additional Sampler Signatures:

Chain of Custody Seal Number(s):

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	10/1/99 1730				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks: Is custody seal intact? Y/N/none	

DISTRIBUTION: Blue - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

EPA Form 9110-2

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

A21-012-15 REV.

394583

Attachment II

Sample Result Summary Sheets

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF79

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.01

Sample wt/vol: 30.2 (g/mL) G Lab File ID: F9100514.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

ULK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	360	U
111-44-4	bis(2-Chloroethyl)ether	360	U
95-57-8	2-Chlorophenol	360	U
541-73-1	1,3-Dichlorobenzene	360	U
106-46-7	1,4-Dichlorobenzene	360	U
95-50-1	1,2-Dichlorobenzene	360	U
95-48-7	2-Methylphenol	360	U
108-60-1	2,2'-oxybis(1-Chloropropane)	360	U
106-44-5	4-Methylphenol	360	U
621-64-7	N-Nitroso-di-n-propylamine	360	U
67-72-1	Hexachloroethane	360	U
98-95-3	Nitrobenzene	360	U
78-59-1	Isophorone	360	U
88-75-5	2-Nitrophenol	360	U
105-67-9	2,4-Dimethylphenol	360	U
111-91-1	bis(2-Chloroethoxy)methane	360	U
120-83-2	2,4-Dichlorophenol	360	U
120-82-1	1,2,4-Trichlorobenzene	360	U
91-20-3	Naphthalene	360	U
106-47-8	4-Chloroaniline	360	U
87-68-3	Hexachlorobutadiene	360	U
59-50-7	4-Chloro-3-methylphenol	360	U
91-57-6	2-Methylnaphthalene	360	U
77-47-4	Hexachlorocyclopentadiene	360	U
88-06-2	2,4,6-Trichlorophenol	360	U
95-95-4	2,4,5-Trichlorophenol	910	U
91-58-7	2-Chloronaphthalene	360	U
88-74-4	2-Nitroaniline	910	U
131-11-3	Dimethylphthalate	360	U
208-96-8	Acenaphthylene	29	J
606-20-2	2,6-Dinitrotoluene	360	U
99-09-2	3-Nitroaniline	910	U
83-32-9	Acenaphthene	28	J

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF79

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.01

Sample wt/vol: 30.2 (g/mL) G Lab File ID: F9100514.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	910	U
100-02-7	4-Nitrophenol	910	U
132-64-9	Dibenzofuran	19	J
121-14-2	2,4-Dinitrotoluene	360	U
84-66-2	Diethylphthalate	360	U
7005-72-3	4-Chlorophenyl-phenylether	360	U
86-73-7	Fluorene	27	J
100-01-6	4-Nitroaniline	910	U
534-52-1	4,6-Dinitro-2-methylphenol	910	U
86-30-6	N-Nitrosodiphenylamine (1)	360	U
101-55-3	4-Bromophenyl-phenylether	360	U
118-74-1	Hexachlorobenzene	360	U
87-86-5	Pentachlorophenol	910	U
85-01-8	Phenanthrene	360	
120-12-7	Anthracene	83	J
86-74-8	Carbazole	42	J
84-74-2	Di-n-butylphthalate	360 ~~28~~	~~BJ~~ U
206-44-0	Fluoranthene	650	
129-00-0	Pyrene	530	
85-68-7	Butylbenzylphthalate	360	U
91-94-1	3,3'-Dichlorobenzidine	360	U
56-55-3	Benzo(a)anthracene	290	J
218-01-9	Chrysene	320	J
117-81-7	bis(2-Ethylhexyl)phthalate	360 ~~38~~	~~BJ~~ U
117-84-0	Di-n-octylphthalate	360	U
205-99-2	Benzo(b)fluoranthene	250	J
207-08-9	Benzo(k)fluoranthene	340	J
50-32-8	Benzo(a)pyrene	310	J
193-39-5	Indeno(1,2,3-cd)pyrene	190	J
53-70-3	Dibenz(a,h)anthracene	65	J
191-24-2	Benzo(g,h,i)perylene	190	J

(1) Cannot be seperated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

APF79

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.01

Sample wt/vol: 30.2 (g/mL) G Lab File ID: F9100514.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4

Number TICs found: 22

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	814-78-8	3-BUTEN-2-ONE, 3-METHYL-	1.12	400	JN
2.		UNKNOWN	1.18	330	BJ
3.		UNKNOWN	1.22	78	BJ
4.		UNKNOWN	1.59	130	BJ
5.		UNKNOWN	1.65	92	BJ
6.	141-79-7	3-PENTEN-2-ONE, 4-METHYL-	1.97	2200	ABJN
7.		UNKNOWN	2.16	260	BJ
8.		UNKNOWN	2.35	130	J
9.		UNKNOWN ALDOL CONDENSATE	2.39	3900	AJ
10.		UNKNOWN	3.26	1200	BJ
11.		UNKNOWN	3.45	970	BJ
12.		UNKNOWN	3.56	110	J
13.		UNKNOWN	3.73	490	J
14.		UNKNOWN	4.10	79	J
15.		UNKNOWN	5.06	97	J
16.		UNKNOWN PAH	12.89	83	J
17.	57-10-3	HEXADECANOIC ACID	13.03	95	JN
18.	192-97-2	BENZO[E]PYRENE	18.39	230	JN
19.	14021-23-9	D-FRIEDOOLEAN-14-ENE, 3-METH	20.12	91	JN
20.		UNKNOWN	21.59	830	J
21.		1,2:3,4-DIBENZPYRENE	21.67	74	JN
22.	191-07-1	CORONENE	22.33	73	JN
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

SOUTHWEST LABORATORY OF OKLAHOMA
GC/MS LABORATORY : ALKANE REPORT

REPORT DATE: 10/05/99
DATA FILE: F9100514.D

SAMPLE ID: APF79
LAB ID: 40521.01
MATRIX: SOIL
DATE ANALYZED: 10/05/99

	CAS #	COMPOUND	RT	EST. CONC (ug/Kg)
1)	002216-33-3	OCTANE, 3-METHYL-	2.28	165
2)	001636-43-7	DECANE, 5,6-DIMETHYL-	2.48	249
3)	001072-05-5	HEPTANE, 2,6-DIMETHYL-	2.57	98
4)	000297-24-5	CYCLOOCTACOSANE	17.33	226
5)	000593-45-3	OCTADECANE	18.29	126
6)	000297-03-0	CYCLOTETRACOSANE	18.34	118
7)	000646-31-1	TETRACOSANE	19.21	196

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF80

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.02

Sample wt/vol: 30.8 (g/mL) G Lab File ID: F9100515.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 15 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.7

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	380	U
111-44-4	bis(2-Chloroethyl)ether	380	U
95-57-8	2-Chlorophenol	380	U
541-73-1	1,3-Dichlorobenzene	380	U
106-46-7	1,4-Dichlorobenzene	380	U
95-50-1	1,2-Dichlorobenzene	380	U
95-48-7	2-Methylphenol	380	U
108-60-1	2,2'-oxybis(1-Chloropropane)	380	U
106-44-5	4-Methylphenol	380	U
621-64-7	N-Nitroso-di-n-propylamine	380	U
67-72-1	Hexachloroethane	380	U
98-95-3	Nitrobenzene	380	U
78-59-1	Isophorone	380	U
88-75-5	2-Nitrophenol	380	U
105-67-9	2,4-Dimethylphenol	380	U
111-91-1	bis(2-Chloroethoxy)methane	380	U
120-83-2	2,4-Dichlorophenol	380	U
120-82-1	1,2,4-Trichlorobenzene	380	U
91-20-3	Naphthalene	140	J
106-47-8	4-Chloroaniline	380	U
87-68-3	Hexachlorobutadiene	380	U
59-50-7	4-Chloro-3-methylphenol	380	U
91-57-6	2-Methylnaphthalene	49	J
77-47-4	Hexachlorocyclopentadiene	380	U
88-06-2	2,4,6-Trichlorophenol	380	U
95-95-4	2,4,5-Trichlorophenol	950	U
91-58-7	2-Chloronaphthalene	380	U
88-74-4	2-Nitroaniline	950	U
131-11-3	Dimethylphthalate	380	U
208-96-8	Acenaphthylene	59	J
606-20-2	2,6-Dinitrotoluene	380	U
99-09-2	3-Nitroaniline	950	U
83-32-9	Acenaphthene	140	J

US EPA ARCHIVE DOCUMENT

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF80

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.02

Sample wt/vol: 30.8 (g/mL) G Lab File ID: F9100515.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 15 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.7

UK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
51-28-5	2,4-Dinitrophenol	950	U	J
100-02-7	4-Nitrophenol	950	U	
132-64-9	Dibenzofuran	110	J	
121-14-2	2,4-Dinitrotoluene	380	U	
84-66-2	Diethylphthalate	380	U	
7005-72-3	4-Chlorophenyl-phenylether	380	U	
86-73-7	Fluorene	140	J	
100-01-6	4-Nitroaniline	950	U	
534-52-1	4,6-Dinitro-2-methylphenol	950	U	
86-30-6	N-Nitrosodiphenylamine (1)	380	U	
101-55-3	4-Bromophenyl-phenylether	380	U	
118-74-1	Hexachlorobenzene	380	U	
87-86-5	Pentachlorophenol	950	U	
85-01-8	Phenanthrene	1100		
120-12-7	Anthracene	250	J	
86-74-8	Carbazole	150	J	
84-74-2	Di-n-butylphthalate	380	U	
206-44-0	Fluoranthene	1400		
129-00-0	Pyrene	1100		
85-68-7	Butylbenzylphthalate	380	U	
91-94-1	3,3'-Dichlorobenzidine	380	U	
56-55-3	Benzo(a)anthracene	640		
218-01-9	Chrysene	700		
117-81-7	bis(2-Ethylhexyl)phthalate	380 ~~31~~	~~BJ~~ U	U
117-84-0	Di-n-octylphthalate	380	U	
205-99-2	Benzo(b)fluoranthene	580		
207-08-9	Benzo(k)fluoranthene	620		
50-32-8	Benzo(a)pyrene	650		
193-39-5	Indeno(1,2,3-cd)pyrene	370	J	
53-70-3	Dibenz(a,h)anthracene	190	J	
191-24-2	Benzo(g,h,i)perylene	400		

(1) Cannot be seperated from Diphenylamine

1F

EPA SAMPLE NO.

APF80

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.02

Sample wt/vol: 30.8 (g/mL) G Lab File ID: F9100515.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 15 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.7

Number TICs found: 30

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	814-78-8	3-BUTEN-2-ONE, 3-METHYL-	1.12	430	JN
2.		UNKNOWN	1.18	460	BJ
3.		UNKNOWN	1.21	110	BJ
4.		UNKNOWN	1.59	170	BJ
5.		UNKNOWN	1.64	120	BJ
6.	141-79-7	3-PENTEN-2-ONE, 4-METHYL-	1.98	2800	ABJN
7.		UNKNOWN	2.16	300	BJ
8.	123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	2.38	4300	ABJN
9.		UNKNOWN	3.46	1100	BJ
10.		UNKNOWN	3.57	120	J
11.		UNKNOWN	3.74	560	J
12.		UNKNOWN	3.90	640	J
13.		UNKNOWN	5.07	120	J
14.	103-82-2	BENZENEACETIC ACID	6.91	120	JN
15.	613-12-7	ANTHRACENE, 2-METHYL-	12.76	120	JN
16.	2531-84-2	PHENANTHRENE, 2-METHYL-	12.90	170	JN
17.	57-10-3	HEXADECANOIC ACID	13.02	160	JN
18.	612-94-2	NAPHTHALENE, 2-PHENYL-	13.25	110	JN
19.	3442-78-2	PYRENE, 2-METHYL-	14.86	130	JN
20.	3351-31-3	CHRYSENE, 3-METHYL-	17.00	130	JN
21.		9-HEXACOSENE	17.34	190	JN
22.	1090-13-7	5,12-NAPHTHACENEDIONE	17.52	140	JN
23.	205-82-3	BENZO[J]FLUORANTHENE	18.15	140	JN
24.	192-97-2	BENZO[E]PYRENE	18.39	390	JN
25.		1,12-BENZPERYLENE	19.83	140	JN
26.	14021-23-9	D-FRIEDOOLEAN-14-ENE, 3-METH	20.11	490	JN
27.		UNKNOWN PAH	20.43	240	J
28.	1058-61-3	STIGMAST-4-EN-3-ONE	21.07	100	JN
29.		UNKNOWN	21.59	310	J
30.		1,2:4,5-DIBENZPYRENE	21.67	130	JN

US EPA ARCHIVE DOCUMENT

SOUTHWEST LABORATORY OF OKLAHOMA
GC/MS LABORATORY : ALKANE REPORT

REPORT DATE: 10/05/99 DATA FILE: F9100515.D

SAMPLE ID: APF80 MATRIX: SOIL
LAB ID: 40521.02 DATE ANALYZED: 10/05/99

	CAS #	COMPOUND	RT	EST. CONC (ug/Kg)
1)	000926-82-9	HEPTANE, 3,5-DIMETHYL-	2.28	209
2)	056820-01-0	TRANS-2,3-EPOXYNONANE	2.34	104
3)	003074-71-3	HEPTANE, 2,3-DIMETHYL-	2.49	291
4)	002213-23-2	HEPTANE, 2,4-DIMETHYL-	2.56	108
5)	000112-58-3	HEXANE, 1,1'-OXYBIS-	3.25	1579
6)	000107-83-5	PENTANE, 2-METHYL-	4.45	1762
7)	000638-67-5	TRICOSANE	17.81	98
8)	000629-92-5	NONADECANE	18.30	189
9)	000297-03-0	CYCLOTETRACOSANE	18.34	139
10)	000112-95-8	EICOSANE	19.20	166

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF81

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.03

Sample wt/vol: 31.3 (g/mL) G Lab File ID: F9101228.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/13/99

Injection Volume: 2.0 (uL) Dilution Factor: 5.0

GPC Cleanup: (Y/N) Y pH: 7.3

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
108-95-2	Phenol	1700	U	
111-44-4	bis(2-Chloroethyl)ether	1700	U	
95-57-8	2-Chlorophenol	1700	U	
541-73-1	1,3-Dichlorobenzene	1700	U	
106-46-7	1,4-Dichlorobenzene	1700	U	
95-50-1	1,2-Dichlorobenzene	1700	U	
95-48-7	2-Methylphenol	1700	U	
108-60-1	2,2'-oxybis(1-Chloropropane)	1700	U	J
106-44-5	4-Methylphenol	1700	U	
621-64-7	N-Nitroso-di-n-propylamine	1700	U	
67-72-1	Hexachloroethane	1700	U	
98-95-3	Nitrobenzene	1700	U	
78-59-1	Isophorone	1700	U	
88-75-5	2-Nitrophenol	1700	U	
105-67-9	2,4-Dimethylphenol	1700	U	
111-91-1	bis(2-Chloroethoxy)methane	1700	U	
120-83-2	2,4-Dichlorophenol	1700	U	
120-82-1	1,2,4-Trichlorobenzene	1700	U	
91-20-3	Naphthalene	450	J	
106-47-8	4-Chloroaniline	1700	U	
87-68-3	Hexachlorobutadiene	1700	U	
59-50-7	4-Chloro-3-methylphenol	1700	U	
91-57-6	2-Methylnaphthalene	440	J	
77-47-4	Hexachlorocyclopentadiene	1700	U	
88-06-2	2,4,6-Trichlorophenol	1700	U	
95-95-4	2,4,5-Trichlorophenol	4400	U	
91-58-7	2-Chloronaphthalene	1700	U	
88-74-4	2-Nitroaniline	4400	U	
131-11-3	Dimethylphthalate	1700	U	
208-96-8	Acenaphthylene	1200	J	
606-20-2	2,6-Dinitrotoluene	1700	U	
99-09-2	3-Nitroaniline	4400	U	
83-32-9	Acenaphthene	470	J	

US EPA ARCHIVE DOCUMENT

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF81

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.03

Sample wt/vol: 31.3 (g/mL) G Lab File ID: F9101228.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/13/99

Injection Volume: 2.0 (uL) Dilution Factor: 5.0

GPC Cleanup: (Y/N) Y pH: 7.3

UNK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	4400	U J
100-02-7	4-Nitrophenol	4400	U
132-64-9	Dibenzofuran	370	J
121-14-2	2,4-Dinitrotoluene	1700	U
84-66-2	Diethylphthalate	1700	U
7005-72-3	4-Chlorophenyl-phenylether	1700	U
86-73-7	Fluorene	1600	J
100-01-6	4-Nitroaniline	4400	U
534-52-1	4,6-Dinitro-2-methylphenol	4400	U
86-30-6	N-Nitrosodiphenylamine (1)	1700	U
101-55-3	4-Bromophenyl-phenylether	1700	U
118-74-1	Hexachlorobenzene	1700	U
87-86-5	Pentachlorophenol	4400	U
85-01-8	Phenanthrene	11000	
120-12-7	Anthracene	3300	
86-74-8	Carbazole	770	J
84-74-2	Di-n-butylphthalate	1700 ~~360~~	~~J~~ U
206-44-0	Fluoranthene	14000	
129-00-0	Pyrene	20000 ~~18000~~	~~E~~
85-68-7	Butylbenzylphthalate	1700	U
91-94-1	3,3'-Dichlorobenzidine	1700	U
56-55-3	Benzo(a)anthracene	8900	
218-01-9	Chrysene	8400	
117-81-7	bis(2-Ethylhexyl)phthalate	1700	U J
117-84-0	Di-n-octylphthalate	1700	U
205-99-2	Benzo(b)fluoranthene	7700	
207-08-9	Benzo(k)fluoranthene	5000	
50-32-8	Benzo(a)pyrene	7800	
193-39-5	Indeno(1,2,3-cd)pyrene	4200	
53-70-3	Dibenz(a,h)anthracene	2100	
191-24-2	Benzo(g,h,i)perylene	4700	

(1) Cannot be seperated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

APF81

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.03

Sample wt/vol: 31.3 (g/mL) G Lab File ID: F9101228.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/13/99

Injection Volume: 2.0 (uL) Dilution Factor: 5.0

GPC Cleanup: (Y/N) Y pH: 7.3

Number TICs found: 30

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	2.25	7600	ABJN
2.	613-12-7	ANTHRACENE, 2-METHYL-	12.51	2300	JN
3.	613-12-7	ANTHRACENE, 2-METHYL-	12.56	2300	JN
4.	203-64-5	4H-CYCLOPENTA[DEF]PHENANTHRE	12.69	3700	JN
5.	610-48-0	ANTHRACENE, 1-METHYL-	12.74	1200	JN
6.	612-94-2	NAPHTHALENE, 2-PHENYL-	13.04	1900	JN
7.	84-65-1	9,10-ANTHRACENEDIONE	13.08	1100	JN
8.	3674-66-6	PHENANTHRENE, 2,5-DIMETHYL-	13.48	1300	JN
9.	3674-66-6	PHENANTHRENE, 2,5-DIMETHYL-	13.53	1100	JN
10.	6628-98-4	PYRENE, 4,5-DIHYDRO-	13.62	1200	JN
11.		UNKNOWN PAH	13.84	2500	J
12.	238-84-6	11H-BENZO[A]FLUORENE	14.65	1200	JN
13.	1090-13-7	5,12-NAPHTHACENEDIONE	17.32	1200	JN
14.		UNKNOWN PAH	17.94	2300	J
15.		UNKNOWN PAH	18.09	1400	J
16.	198-55-0	PERYLENE	18.18	4500	JN
17.		UNKNOWN PAH	18.58	1200	J
18.		UNKNOWN PAH	18.84	2600	J
19.	7616-22-0	.GAMMA.-TOCOPHEROL	18.94	2200	JN
20.	59-02-9	VITAMIN E	19.30	1100	JN
21.	191-26-4	DIBENZO[DEF,MNO]CHRYSENE	19.50	1500	JN
22.		UNKNOWN PAH	19.62	1300	J
23.	215-58-7	BENZO[B]TRIPHENYLENE	19.88	1300	JN
24.		1,2:7,8-DIBENZPHENANTHRENE	19.93	1400	JN
25.	191-26-4	DIBENZO[DEF,MNO]CHRYSENE	20.19	1700	JN
26.		UNKNOWN	20.35	1000	J
27.		1,2:3,4-DIBENZPYRENE	21.39	2200	JN
28.	192-65-4	NAPHTHO[1,2,3,4-DEF]CHRYSENE	21.49	1400	JN
29.	192-65-4	NAPHTHO[1,2,3,4-DEF]CHRYSENE	21.55	1300	JN
30.	192-65-4	NAPHTHO[1,2,3,4-DEF]CHRYSENE	22.02	2900	JN

US EPA ARCHIVE DOCUMENT

SOUTHWEST LABORATORY OF OKLAHOMA
GC/MS LABORATORY : ALKANE REPORT

REPORT DATE: 10/13/99 DATA FILE: F9101228.D

SAMPLE ID: APF81 MATRIX: SOIL
LAB ID: 40521.03 DATE ANALYZED: 10/13/99

	CAS #	COMPOUND	RT	EST. CONC (ug/Kg)
1)	001069-53-0	HEXANE, 2,3,5-TRIMETHYL-	3.75	1106

1B

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

APF81DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.03DL

Sample wt/vol: 31.3 (g/mL) G Lab File ID: F9101324.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/13/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.3

use APF81 except for pyrene LMK 10/20/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	3500	U
111-44-4	bis(2-Chloroethyl)ether	3500	U
95-57-8	2-Chlorophenol	3500	U
541-73-1	1,3-Dichlorobenzene	3500	U
106-46-7	1,4-Dichlorobenzene	3500	U
95-50-1	1,2-Dichlorobenzene	3500	U
95-48-7	2-Methylphenol	3500	U
108-60-1	2,2'-oxybis(1-Chloropropane)	3500	U
106-44-5	4-Methylphenol	3500	U
621-64-7	N-Nitroso-di-n-propylamine	3500	U
67-72-1	Hexachloroethane	3500	U
98-95-3	Nitrobenzene	3500	U
78-59-1	Isophorone	3500	U
88-75-5	2-Nitrophenol	3500	U
105-67-9	2,4-Dimethylphenol	3500	U
111-91-1	bis(2-Chloroethoxy)methane	3500	U
120-83-2	2,4-Dichlorophenol	3500	U
120-82-1	1,2,4-Trichlorobenzene	3500	U
91-20-3	Naphthalene	420	DJ
106-47-8	4-Chloroaniline	3500	U
87-68-3	Hexachlorobutadiene	3500	U
59-50-7	4-Chloro-3-methylphenol	3500	U
91-57-6	2-Methylnaphthalene	440	DJ
77-47-4	Hexachlorocyclopentadiene	3500	U
88-06-2	2,4,6-Trichlorophenol	3500	U
95-95-4	2,4,5-Trichlorophenol	8700	U
91-58-7	2-Chloronaphthalene	3500	U
88-74-4	2-Nitroaniline	8700	U
131-11-3	Dimethylphthalate	3500	U
208-96-8	Acenaphthylene	1200	DJ
606-20-2	2,6-Dinitrotoluene	3500	U
99-09-2	3-Nitroaniline	8700	U
83-32-9	Acenaphthene	530	DJ

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF81DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.03DL

Sample wt/vol: 31.3 (g/mL) G Lab File ID: F9101324.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/13/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.3

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	8700	U
100-02-7	4-Nitrophenol	8700	U
132-64-9	Dibenzofuran	410	DJ
121-14-2	2,4-Dinitrotoluene	3500	U
84-66-2	Diethylphthalate	3500	U
7005-72-3	4-Chlorophenyl-phenylether	3500	U
86-73-7	Fluorene	1500	DJ
100-01-6	4-Nitroaniline	8700	U
534-52-1	4,6-Dinitro-2-methylphenol	8700	U
86-30-6	N-Nitrosodiphenylamine (1)	3500	U
101-55-3	4-Bromophenyl-phenylether	3500	U
118-74-1	Hexachlorobenzene	3500	U
87-86-5	Pentachlorophenol	8700	U
85-01-8	Phenanthrene	13000	D
120-12-7	Anthracene	3400	DJ
86-74-8	Carbazole	760	DJ
84-74-2	Di-n-butylphthalate	370	DJ
206-44-0	Fluoranthene	19000	D
129-00-0	Pyrene	20000	D
85-68-7	Butylbenzylphthalate	3500	U
91-94-1	3,3'-Dichlorobenzidine	3500	U
56-55-3	Benzo(a)anthracene	9300	D
218-01-9	Chrysene	9100	D
117-81-7	bis(2-Ethylhexyl)phthalate	3500	U
117-84-0	Di-n-octylphthalate	3500	U
205-99-2	Benzo(b)fluoranthene	7300	D
207-08-9	Benzo(k)fluoranthene	6800	D
50-32-8	Benzo(a)pyrene	8100	D
193-39-5	Indeno(1,2,3-cd)pyrene	4300	D
53-70-3	Dibenz(a,h)anthracene	1900	DJ
191-24-2	Benzo(g,h,i)perylene	4600	D

(1) Cannot be seperated from Diphenylamine

1F

EPA SAMPLE NO.

APF81DL

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.03DL

Sample wt/vol: 31.3 (g/mL) G Lab File ID: F9101324.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/13/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.3

Number TICs found: 30

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	2.18	7000	ADJN
2.	132-65-0	DIBENZOTHIOPHENE	11.33	1100	DJN
3.	613-12-7	ANTHRACENE, 2-METHYL-	12.39	2400	DJN
4.	613-12-7	ANTHRACENE, 2-METHYL-	12.44	2400	DJN
5.	2531-84-2	PHENANTHRENE, 2-METHYL-	12.57	3400	DJN
6.	613-12-7	ANTHRACENE, 2-METHYL-	12.62	1600	DJN
7.	612-94-2	NAPHTHALENE, 2-PHENYL-	12.92	2000	DJN
8.	3674-66-6	PHENANTHRENE, 2,5-DIMETHYL-	13.36	1300	DJN
9.		UNKNOWN PAH	13.40	1300	DJ
10.	5737-13-3	CYCLOPENTA(DEF)PHENANTHRENON	13.47	1400	DJN
11.		UNKNOWN PAH	13.72	2200	DJ
12.	3442-78-2	PYRENE, 2-METHYL-	14.53	2400	DJN
13.	82-05-3	7H-BENZ[DE]ANTHRACEN-7-ONE	15.39	1400	DJN
14.		UNKNOWN PAH	15.61	1900	DJ
15.	2381-31-9	BENZ[A]ANTHRACENE, 8-METHYL-	16.65	1400	DJN
16.	1090-13-7	5,12-NAPHTHACENEDIONE	17.18	1400	DJN
17.	207-08-9	BENZO[]FLUORANTHENE	17.80	2600	DJN
18.		UNKNOWN	17.97	1200	DJ
19.	192-97-2	BENZO[E]PYRENE	18.04	5500	DJN
20.		UNKNOWN PAH	18.29	1100	DJ
21.		UNKNOWN PAH	18.45	1200	DJ
22.		UNKNOWN PAH	19.36	1900	DJ
23.	191-26-4	DIBENZO[DEF,MNO]CHRYSENE	19.48	2100	DJN
24.	215-58-7	BENZO[B]TRIPHENYLENE	19.75	1300	DJN
25.		UNKNOWN PAH	19.78	1600	DJ
26.	191-26-4	DIBENZO[DEF,MNO]CHRYSENE	20.05	1500	DJN
27.	192-65-4	NAPHTHO[1,2,3,4-DEF]CHRYSENE	21.20	2600	DJN
28.		1,2:4,5-DIBENZPYRENE	21.29	1600	DJN
29.		[3,4:9,10]DIBENZPYRENE	21.36	1400	DJN
30.	192-65-4	NAPHTHO[1,2,3,4-DEF]CHRYSENE	21.81	3400	DJN

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF82

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.04

Sample wt/vol: 32.3 (g/mL) G Lab File ID: F9100517.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 16 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
108-95-2	Phenol	3600	U	
111-44-4	bis(2-Chloroethyl)ether	3600	U	
95-57-8	2-Chlorophenol	3600	U	
541-73-1	1,3-Dichlorobenzene	3600	U	
106-46-7	1,4-Dichlorobenzene	3600	U	
95-50-1	1,2-Dichlorobenzene	3600	U	
95-48-7	2-Methylphenol	3600	U	
108-60-1	2,2'-oxybis(1-Chloropropane)	3600	U	
106-44-5	4-Methylphenol	3600	U	
621-64-7	N-Nitroso-di-n-propylamine	3600	U	
67-72-1	Hexachloroethane	3600	U	
98-95-3	Nitrobenzene	3600	U	
78-59-1	Isophorone	3600	U	
88-75-5	2-Nitrophenol	3600	U	
105-67-9	2,4-Dimethylphenol	3600	U	
111-91-1	bis(2-Chloroethoxy)methane	3600	U	
120-83-2	2,4-Dichlorophenol	3600	U	
120-82-1	1,2,4-Trichlorobenzene	3600	U	
91-20-3	Naphthalene	510	J	
106-47-8	4-Chloroaniline	3600	U	
87-68-3	Hexachlorobutadiene	3600	U	
59-50-7	4-Chloro-3-methylphenol	3600	U	
91-57-6	2-Methylnaphthalene	250	J	
77-47-4	Hexachlorocyclopentadiene	3600	U	H
88-06-2	2,4,6-Trichlorophenol	3600	U	
95-95-4	2,4,5-Trichlorophenol	9200	U	
91-58-7	2-Chloronaphthalene	3600	U	
88-74-4	2-Nitroaniline	9200	U	
131-11-3	Dimethylphthalate	3600	U	
208-96-8	Acenaphthylene	700	J	
606-20-2	2,6-Dinitrotoluene	3600	U	
99-09-2	3-Nitroaniline	9200	U	
83-32-9	Acenaphthene	1200	J	

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF82

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.04

Sample wt/vol: 32.3 (g/mL) G Lab File ID: F9100517.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 16 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.4

LKK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
51-28-5	2,4-Dinitrophenol	9200	U	J
100-02-7	4-Nitrophenol	9200	U	
132-64-9	Dibenzofuran	710	J	
121-14-2	2,4-Dinitrotoluene	3600	U	
84-66-2	Diethylphthalate	3600	U	
7005-72-3	4-Chlorophenyl-phenylether	3600	U	
86-73-7	Fluorene	1400	J	
100-01-6	4-Nitroaniline	9200	U	
534-52-1	4,6-Dinitro-2-methylphenol	9200	U	
86-30-6	N-Nitrosodiphenylamine (1)	3600	U	
101-55-3	4-Bromophenyl-phenylether	3600	U	
118-74-1	Hexachlorobenzene	3600	U	
87-86-5	Pentachlorophenol	9200	U	
85-01-8	Phenanthrene	14000		
120-12-7	Anthracene	4200		
86-74-8	Carbazole	2000	J	
84-74-2	Di-n-butylphthalate	3600	U	
206-44-0	Fluoranthene	21000		
129-00-0	Pyrene	19000		
85-68-7	Butylbenzylphthalate	3600	U	
91-94-1	3,3'-Dichlorobenzidine	3600	U	
56-55-3	Benzo(a)anthracene	10000		
218-01-9	Chrysene	9900		
117-81-7	bis(2-Ethylhexyl)phthalate	3600	U	
117-84-0	Di-n-octylphthalate	3600	U	
205-99-2	Benzo(b)fluoranthene	9100		
207-08-9	Benzo(k)fluoranthene	11000		
50-32-8	Benzo(a)pyrene	11000		
193-39-5	Indeno(1,2,3-cd)pyrene	7400		
53-70-3	Dibenz(a,h)anthracene	2500	J	
191-24-2	Benzo(g,h,i)perylene	8300		

(1) Cannot be seperated from Diphenylamine

1F

EPA SAMPLE NO.

APF82

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.04

Sample wt/vol: 32.3 (g/mL) G Lab File ID: F9100517.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 16 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.4

Number TICs found: 30

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	814-78-8	3-BUTEN-2-ONE, 3-METHYL-	1.11	1100	JN
2.	141-79-7	3-PENTEN-2-ONE, 4-METHYL-	1.97	1600	ABJN
3.	123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	2.37	7500	ABJN
4.		UNKNOWN	3.26	2500	BJ
5.		UNKNOWN	3.46	1300	BJ
6.		UNKNOWN	4.44	2000	BJ
7.	132-65-0	DIBENZOTHIOPHENE	11.66	1000	JN
8.	883-20-5	PHENANTHRENE, 9-METHYL-	12.72	1900	JN
9.	610-48-0	ANTHRACENE, 1-METHYL-	12.76	1800	JN
10.		UNKNOWN PAH	12.90	3000	J
11.	613-12-7	ANTHRACENE, 2-METHYL-	12.94	1300	JN
12.	612-94-2	NAPHTHALENE, 2-PHENYL-	13.25	1600	JN
13.	5737-13-3	CYCLOPENTA(DEF)PHENANTHRENON	13.79	1200	JN
14.		UNKNOWN PAH	14.05	1800	J
15.	3442-78-2	PYRENE, 2-METHYL-	14.86	1600	JN
16.		UNKNOWN PAH	15.95	1000	J
17.	1090-13-7	5,12-NAPHTHACENEDIONE	17.52	1500	JN
18.	205-82-3	BENZO[J]FLUORANTHENE	18.15	2600	JN
19.		UNKNOWN PAH	18.31	1500	J
20.	192-97-2	BENZO[E]PYRENE	18.40	6000	JN
21.		UNKNOWN PAH	18.80	1400	J
22.		UNKNOWN	19.17	1200	J
23.		UNKNOWN PAH	19.83	2700	J
24.		1,2:7,8-DIBENZPHENANTHRENE	20.10	1600	JN
25.		1,2:7,8-DIBENZPHENANTHRENE	20.15	2000	JN
26.		1,12-BENZPERYLENE	20.42	1700	JN
27.		1,2:3,4-DIBENZPYRENE	21.67	3400	JN
28.	192-65-4	NAPHTHO[1,2,3,4-DEF]CHRYSENE	21.77	2400	JN
29.	192-65-4	NAPHTHO[1,2,3,4-DEF]CHRYSENE	21.84	1600	JN
30.	191-07-1	CORONENE	22.34	4600	JN

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF83

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.05

Sample wt/vol: 30.2 (g/mL) G Lab File ID: F9100518.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 13 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.5

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	3800	U
111-44-4	bis(2-Chloroethyl)ether	3800	U
95-57-8	2-Chlorophenol	3800	U
541-73-1	1,3-Dichlorobenzene	3800	U
106-46-7	1,4-Dichlorobenzene	3800	U
95-50-1	1,2-Dichlorobenzene	3800	U
95-48-7	2-Methylphenol	3800	U
108-60-1	2,2'-oxybis(1-Chloropropane)	3800	U
106-44-5	4-Methylphenol	3800	U
621-64-7	N-Nitroso-di-n-propylamine	3800	U
67-72-1	Hexachloroethane	3800	U
98-95-3	Nitrobenzene	3800	U
78-59-1	Isophorone	3800	U
88-75-5	2-Nitrophenol	3800	U
105-67-9	2,4-Dimethylphenol	3800	U
111-91-1	bis(2-Chloroethoxy)methane	3800	U
120-83-2	2,4-Dichlorophenol	3800	U
120-82-1	1,2,4-Trichlorobenzene	3800	U
91-20-3	Naphthalene	1300	J
106-47-8	4-Chloroaniline	3800	U
87-68-3	Hexachlorobutadiene	3800	U
59-50-7	4-Chloro-3-methylphenol	3800	U
91-57-6	2-Methylnaphthalene	480	J
77-47-4	Hexachlorocyclopentadiene	3800	U
88-06-2	2,4,6-Trichlorophenol	3800	U
95-95-4	2,4,5-Trichlorophenol	9500	U
91-58-7	2-Chloronaphthalene	3800	U
88-74-4	2-Nitroaniline	9500	U
131-11-3	Dimethylphthalate	3800	U
208-96-8	Acenaphthylene	1700	J
606-20-2	2,6-Dinitrotoluene	3800	U
99-09-2	3-Nitroaniline	9500	U
83-32-9	Acenaphthene	2100	J

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF83

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.05

Sample wt/vol: 30.2 (g/mL) G Lab File ID: F9100518.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 13 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.5

UK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	9500	U
100-02-7	4-Nitrophenol	9500	U
132-64-9	Dibenzofuran	1600	J
121-14-2	2,4-Dinitrotoluene	3800	U
84-66-2	Diethylphthalate	3800	U
7005-72-3	4-Chlorophenyl-phenylether	3800	U
86-73-7	Fluorene	2200	J
100-01-6	4-Nitroaniline	9500	U
534-52-1	4,6-Dinitro-2-methylphenol	9500	U
86-30-6	N-Nitrosodiphenylamine (1)	3800	U
101-55-3	4-Bromophenyl-phenylether	3800	U
118-74-1	Hexachlorobenzene	3800	U
87-86-5	Pentachlorophenol	9500	U
85-01-8	Phenanthrene	18000	
120-12-7	Anthracene	5600	
86-74-8	Carbazole	2400	J
84-74-2	Di-n-butylphthalate	3800	U
206-44-0	Fluoranthene	24000	
129-00-0	Pyrene	22000	
85-68-7	Butylbenzylphthalate	3800	U
91-94-1	3,3'-Dichlorobenzidine	3800	U
56-55-3	Benzo(a)anthracene	14000	
218-01-9	Chrysene	14000	
117-81-7	bis(2-Ethylhexyl)phthalate	3800	U
117-84-0	Di-n-octylphthalate	3800	U
205-99-2	Benzo(b)fluoranthene	12000	
207-08-9	Benzo(k)fluoranthene	11000	
50-32-8	Benzo(a)pyrene	14000	
193-39-5	Indeno(1,2,3-cd)pyrene	7900	
53-70-3	Dibenz(a,h)anthracene	3200	J
191-24-2	Benzo(g,h,i)perylene	9100	

J

(1) Cannot be seperated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.: APF83

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.05

Sample wt/vol: 30.2 (g/mL) G Lab File ID: F9100518.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 13 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.5

Number TICs found: 30

CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	814-78-8	3-BUTEN-2-ONE, 3-METHYL-	1.12	1600	JN
2.	141-79-7	3-PENTEN-2-ONE, 4-METHYL-	1.97	2600	ABJN
3.	123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	2.38	7100	ABJN
4.		UNKNOWN	4.44	2500	BJ
5.	132-65-0	DIBENZOTHIOPHENE	11.66	1500	JN
6.	613-12-7	ANTHRACENE, 2-METHYL-	12.71	2300	JN
7.	613-12-7	ANTHRACENE, 2-METHYL-	12.76	2500	JN
8.		UNKNOWN PAH	12.89	4500	J
9.	613-12-7	ANTHRACENE, 2-METHYL-	12.94	1500	JN
10.	612-94-2	NAPHTHALENE, 2-PHENYL-	13.24	2200	JN
11.	5737-13-3	CYCLOPENTA(DEF)PHENANTHRENON	13.79	1800	JN
12.		UNKNOWN PAH	14.05	1600	J
13.	3442-78-2	PYRENE, 2-METHYL-	14.85	2200	JN
14.		UNKNOWN PAH	15.95	1500	J
15.	1090-13-7	5,12-NAPHTHACENEDIONE	17.53	1400	JN
16.	205-82-3	BENZO[J]FLUORANTHENE	18.16	2900	JN
17.		UNKNOWN PAH	18.31	1800	J
18.	198-55-0	PERYLENE	18.40	7500	JN
19.		UNKNOWN PAH	18.79	1600	J
20.		UNKNOWN	19.16	1900	J
21.		UNKNOWN PAH	19.74	1900	J
22.	215-58-7	BENZO[B]TRIPHENYLENE	19.83	2400	JN
23.	215-58-7	BENZO[B]TRIPHENYLENE	20.10	1700	JN
24.	215-58-7	BENZO[B]TRIPHENYLENE	20.14	2300	JN
25.		1,12-BENZPERYLENE	20.41	1700	JN
26.		UNKNOWN PAH	21.03	1500	J
27.		1,2:3,4-DIBENZPYRENE	21.67	3200	JN
28.	192-65-4	NAPHTHO[1,2,3,4-DEF]CHRYSENE	21.78	2200	JN
29.	192-65-4	NAPHTHO[1,2,3,4-DEF]CHRYSENE	21.85	1600	JN
30.	191-07-1	CORONENE	22.34	3900	JN

SOUTHWEST LABORATORY OF OKLAHOMA
GC/MS LABORATORY : ALKANE REPORT

REPORT DATE: 10/05/99 DATA FILE: F9100518.D

SAMPLE ID: APF83 MATRIX: SOIL
LAB ID: 40521.05 DATE ANALYZED: 10/05/99

	CAS #	COMPOUND	RT	EST. CONC (ug/Kg)
1)	018589-27-0	HEXANE, 2-IODO-	3.26	2431

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF84

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.06

Sample wt/vol: 30.7 (g/mL) G Lab File ID: F9100519.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 16 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
108-95-2	Phenol	3800	U	
111-44-4	bis(2-Chloroethyl)ether	3800	U	
95-57-8	2-Chlorophenol	3800	U	
541-73-1	1,3-Dichlorobenzene	3800	U	
106-46-7	1,4-Dichlorobenzene	3800	U	
95-50-1	1,2-Dichlorobenzene	3800	U	
95-48-7	2-Methylphenol	3800	U	
108-60-1	2,2'-oxybis(1-Chloropropane)	3800	U	
106-44-5	4-Methylphenol	3800	U	
621-64-7	N-Nitroso-di-n-propylamine	3800	U	
67-72-1	Hexachloroethane	3800	U	
98-95-3	Nitrobenzene	3800	U	
78-59-1	Isophorone	3800	U	
88-75-5	2-Nitrophenol	3800	U	
105-67-9	2,4-Dimethylphenol	3800	U	
111-91-1	bis(2-Chloroethoxy)methane	3800	U	
120-83-2	2,4-Dichlorophenol	3800	U	
120-82-1	1,2,4-Trichlorobenzene	3800	U	
91-20-3	Naphthalene	430	J	
106-47-8	4-Chloroaniline	3800	U	
87-68-3	Hexachlorobutadiene	3800	U	
59-50-7	4-Chloro-3-methylphenol	3800	U	
91-57-6	2-Methylnaphthalene	3800	U	J
77-47-4	Hexachlorocyclopentadiene	3800	U	J
88-06-2	2,4,6-Trichlorophenol	3800	U	
95-95-4	2,4,5-Trichlorophenol	9600	U	
91-58-7	2-Chloronaphthalene	3800	U	
88-74-4	2-Nitroaniline	9600	U	
131-11-3	Dimethylphthalate	3800	U	
208-96-8	Acenaphthylene	1400	J	
606-20-2	2,6-Dinitrotoluene	3800	U	
99-09-2	3-Nitroaniline	9600	U	
83-32-9	Acenaphthene	640	J	

US EPA ARCHIVE DOCUMENT

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF84

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.06

Sample wt/vol: 30.7 (g/mL) G Lab File ID: F9100519.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 16 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.4

UKK 10/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
51-28-5	2,4-Dinitrophenol	9600	U	J
100-02-7	4-Nitrophenol	9600	U	
132-64-9	Dibenzofuran	410	J	
121-14-2	2,4-Dinitrotoluene	3800	U	
84-66-2	Diethylphthalate	3800	U	
7005-72-3	4-Chlorophenyl-phenylether	3800	U	
86-73-7	Fluorene	820	J	
100-01-6	4-Nitroaniline	9600	U	
534-52-1	4,6-Dinitro-2-methylphenol	9600	U	
86-30-6	N-Nitrosodiphenylamine (1)	3800	U	
101-55-3	4-Bromophenyl-phenylether	3800	U	
118-74-1	Hexachlorobenzene	3800	U	
87-86-5	Pentachlorophenol	9600	U	
85-01-8	Phenanthrene	7000		
120-12-7	Anthracene	2200	J	
86-74-8	Carbazole	670	J	
84-74-2	Di-n-butylphthalate	3800	U	
206-44-0	Fluoranthene	12000		
129-00-0	Pyrene	12000		
85-68-7	Butylbenzylphthalate	3800	U	
91-94-1	3,3'-Dichlorobenzidine	3800	U	
56-55-3	Benzo(a)anthracene	6200		
218-01-9	Chrysene	6600		
117-81-7	bis(2-Ethylhexyl)phthalate	3800	U	
117-84-0	Di-n-octylphthalate	3800	U	
205-99-2	Benzo(b)fluoranthene	5300		
207-08-9	Benzo(k)fluoranthene	6100		
50-32-8	Benzo(a)pyrene	7100		
193-39-5	Indeno(1,2,3-cd)pyrene	4300		
53-70-3	Dibenz(a,h)anthracene	1500	J	
191-24-2	Benzo(g,h,i)perylene	5300		

(1) Cannot be seperated from Diphenylamine

1F

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

APF84

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.06

Sample wt/vol: 30.7 (g/mL) G Lab File ID: F9100519.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 16 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.4

Number TICs found: 29

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	814-78-8	3-BUTEN-2-ONE, 3-METHYL-	1.12	1400	JN
2.		UNKNOWN	1.17	900	BJ
3.	141-79-7	3-PENTEN-2-ONE, 4-METHYL-	1.98	4300	ABJN
4.	123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	2.37	9800	ABJN
5.		UNKNOWN	3.26	3300	BJ
6.		UNKNOWN	4.43	3500	BJ
7.	2531-84-2	PHENANTHRENE, 2-METHYL-	12.71	1000	JN
8.	613-12-7	ANTHRACENE, 2-METHYL-	12.76	1000	JN
9.		UNKNOWN PAH	12.89	1900	J
10.	613-12-7	ANTHRACENE, 2-METHYL-	12.94	840	JN
11.	612-94-2	NAPHTHALENE, 2-PHENYL-	13.24	1400	JN
12.		UNKNOWN PAH	14.04	980	J
13.	243-17-4	11H-BENZO[B]FLUORENE	14.86	1600	JN
14.	82-05-3	7H-BENZ[DE]ANTHRACEN-7-ONE	15.72	950	JN
15.		UNKNOWN PAH	15.95	960	J
16.	2381-31-9	BENZ[A]ANTHRACENE, 8-METHYL-	16.99	1000	JN
17.	205-99-2	BENZ[E]ACEPHENANTHRYLENE	18.15	1200	JN
18.		UNKNOWN PAH	18.31	810	J
19.	192-97-2	BENZO[E]PYRENE	18.40	3800	JN
20.		UNKNOWN	19.16	940	J
21.		UNKNOWN PAH	19.83	1500	J
22.		UNKNOWN PAH	20.11	2900	J
23.		UNKNOWN	20.18	840	J
24.		UNKNOWN PAH	20.42	1200	J
25.		UNKNOWN	21.59	1100	J
26.	192-65-4	NAPHTHO[1,2,3,4-DEF]CHRYSENE	21.67	1600	JN
27.	192-51-8	DIBENZO[FG,OP]NAPHTHACENE	21.77	1100	JN
28.	192-65-4	NAPHTHO[1,2,3,4-DEF]CHRYSENE	21.84	800	JN
29.	191-07-1	CORONENE	22.33	2300	JN
30.					

US EPA ARCHIVE DOCUMENT

SOUTHWEST LABORATORY OF OKLAHOMA
GC/MS LABORATORY : ALKANE REPORT

REPORT DATE: 10/05/99 DATA FILE: F9100519.D

SAMPLE ID: APF84 MATRIX: SOIL
LAB ID: 40521.06 DATE ANALYZED: 10/05/99

	CAS #	COMPOUND	RT	EST. CONC (ug/Kg)
1)	001713-33-3	7-OXABICYCLO[4.1.0]HEPTANE, 1-METHY	3.45	1507

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF85

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.07

Sample wt/vol: 31.8 (g/mL) G Lab File ID: F9100520.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.5

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	3400	U
111-44-4	bis(2-Chloroethyl)ether	3400	U
95-57-8	2-Chlorophenol	3400	U
541-73-1	1,3-Dichlorobenzene	3400	U
106-46-7	1,4-Dichlorobenzene	3400	U
95-50-1	1,2-Dichlorobenzene	3400	U
95-48-7	2-Methylphenol	3400	U
108-60-1	2,2'-oxybis(1-Chloropropane)	3400	U
106-44-5	4-Methylphenol	3400	U
621-64-7	N-Nitroso-di-n-propylamine	3400	U
67-72-1	Hexachloroethane	3400	U
98-95-3	Nitrobenzene	3400	U
78-59-1	Isophorone	3400	U
88-75-5	2-Nitrophenol	3400	U
105-67-9	2,4-Dimethylphenol	3400	U
111-91-1	bis(2-Chloroethoxy)methane	3400	U
120-83-2	2,4-Dichlorophenol	3400	U
120-82-1	1,2,4-Trichlorobenzene	3400	U
91-20-3	Naphthalene	500	J
106-47-8	4-Chloroaniline	3400	U
87-68-3	Hexachlorobutadiene	3400	U
59-50-7	4-Chloro-3-methylphenol	3400	U
91-57-6	2-Methylnaphthalene	170	J
77-47-4	Hexachlorocyclopentadiene	3400	U
88-06-2	2,4,6-Trichlorophenol	3400	U
95-95-4	2,4,5-Trichlorophenol	8600	U
91-58-7	2-Chloronaphthalene	3400	U
88-74-4	2-Nitroaniline	8600	U
131-11-3	Dimethylphthalate	3400	U
208-96-8	Acenaphthylene	540	J
606-20-2	2,6-Dinitrotoluene	3400	U
99-09-2	3-Nitroaniline	8600	U
83-32-9	Acenaphthene	770	J

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF85

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.07

Sample wt/vol: 31.8 (g/mL) G Lab File ID: F9100520.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.5

LKK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG		Q
51-28-5	2,4-Dinitrophenol	8600	U	J
100-02-7	4-Nitrophenol	8600	U	
132-64-9	Dibenzofuran	570	J	
121-14-2	2,4-Dinitrotoluene	3400	U	
84-66-2	Diethylphthalate	3400	U	
7005-72-3	4-Chlorophenyl-phenylether	3400	U	
86-73-7	Fluorene	840	J	
100-01-6	4-Nitroaniline	8600	U	
534-52-1	4,6-Dinitro-2-methylphenol	8600	U	
86-30-6	N-Nitrosodiphenylamine (1)	3400	U	
101-55-3	4-Bromophenyl-phenylether	3400	U	
118-74-1	Hexachlorobenzene	3400	U	
87-86-5	Pentachlorophenol	8600	U	
85-01-8	Phenanthrene	7600		
120-12-7	Anthracene	1800	J	
86-74-8	Carbazole	880	J	
84-74-2	Di-n-butylphthalate	3400	U	
206-44-0	Fluoranthene	9400		
129-00-0	Pyrene	8600		
85-68-7	Butylbenzylphthalate	3400	U	
91-94-1	3,3'-Dichlorobenzidine	3400	U	
56-55-3	Benzo(a)anthracene	4200		
218-01-9	Chrysene	4400		
117-81-7	bis(2-Ethylhexyl)phthalate	3400	U	
117-84-0	Di-n-octylphthalate	3400	U	
205-99-2	Benzo(b)fluoranthene	3100	J	
207-08-9	Benzo(k)fluoranthene	4400		
50-32-8	Benzo(a)pyrene	4300		
193-39-5	Indeno(1,2,3-cd)pyrene	2400	J	
53-70-3	Dibenz(a,h)anthracene	950	J	
191-24-2	Benzo(g,h,i)perylene	2600	J	

(1) Cannot be seperated from Diphenylamine

1F

EPA SAMPLE NO.

APF85

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.07

Sample wt/vol: 31.8 (g/mL) G Lab File ID: F9100520.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 9 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.5

Number TICs found: 19

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	814-78-8	3-BUTEN-2-ONE, 3-METHYL-	1.11	1400	JN
2.		UNKNOWN	1.18	790	BJ
3.	141-79-7	3-PENTEN-2-ONE, 4-METHYL-	1.97	3800	ABJN
4.	123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	2.37	6300	ABJN
5.		UNKNOWN	3.25	2300	BJ
6.		UNKNOWN	4.44	1700	BJ
7.	610-48-0	ANTHRACENE, 1-METHYL-	12.72	720	JN
8.	613-12-7	ANTHRACENE, 2-METHYL-	12.76	780	JN
9.		UNKNOWN PAH	12.90	1300	J
10.	612-94-2	NAPHTHALENE, 2-PHENYL-	13.25	750	JN
11.	5737-13-3	CYCLOPENTA(DEF)PHENANTHRENON	13.79	720	JN
12.	2381-21-7	PYRENE, 1-METHYL-	14.86	990	JN
13.	205-82-3	BENZO[J]FLUORANTHENE	18.16	790	JN
14.	192-97-2	BENZO[E]PYRENE	18.40	2300	JN
15.		UNKNOWN PAH	19.83	720	J
16.	215-58-7	BENZO[B]TRIPHENYLENE	20.15	960	JN
17.	123-28-4	PROPANOIC ACID, 3,3'-THIOBIS	21.60	1400	BJN
18.	192-65-4	NAPHTHO[1,2,3,4-DEF]CHRYSENE	21.67	1300	JN
19.	191-07-1	CORONENE	22.34	1300	JN
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SOUTHWEST LABORATORY OF OKLAHOMA
GC/MS LABORATORY : ALKANE REPORT

REPORT DATE: 10/05/99
DATA FILE: F9100520.D

SAMPLE ID: APF85
LAB ID: 40521.07
MATRIX: SOIL
DATE ANALYZED: 10/05/99

	CAS #	COMPOUND	RT	EST. CONC (ug/Kg)
1)	000294-62-2	CYCLODODECANE	9.20	890

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF86

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.08

Sample wt/vol: 30.0 (g/mL) G Lab File ID: F9100521.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 10 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.2

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	3700	U
111-44-4	bis(2-Chloroethyl)ether	3700	U
95-57-8	2-Chlorophenol	3700	U
541-73-1	1,3-Dichlorobenzene	3700	U
106-46-7	1,4-Dichlorobenzene	3700	U
95-50-1	1,2-Dichlorobenzene	3700	U
95-48-7	2-Methylphenol	3700	U
108-60-1	2,2'-oxybis(1-Chloropropane)	3700	U
106-44-5	4-Methylphenol	3700	U
621-64-7	N-Nitroso-di-n-propylamine	3700	U
67-72-1	Hexachloroethane	3700	U
98-95-3	Nitrobenzene	3700	U
78-59-1	Isophorone	3700	U
88-75-5	2-Nitrophenol	3700	U
105-67-9	2,4-Dimethylphenol	3700	U
111-91-1	bis(2-Chloroethoxy)methane	3700	U
120-83-2	2,4-Dichlorophenol	3700	U
120-82-1	1,2,4-Trichlorobenzene	3700	U
91-20-3	Naphthalene	280	J
106-47-8	4-Chloroaniline	3700	U
87-68-3	Hexachlorobutadiene	3700	U
59-50-7	4-Chloro-3-methylphenol	3700	U
91-57-6	2-Methylnaphthalene	3700	U
77-47-4	Hexachlorocyclopentadiene	3700	U
88-06-2	2,4,6-Trichlorophenol	3700	U
95-95-4	2,4,5-Trichlorophenol	9200	U
91-58-7	2-Chloronaphthalene	3700	U
88-74-4	2-Nitroaniline	9200	U
131-11-3	Dimethylphthalate	3700	U
208-96-8	Acenaphthylene	560	J
606-20-2	2,6-Dinitrotoluene	3700	U
99-09-2	3-Nitroaniline	9200	U
83-32-9	Acenaphthene	580	J

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF86

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.08

Sample wt/vol: 30.0 (g/mL) G Lab File ID: F9100521.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 10 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.2

LKK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
51-28-5	2,4-Dinitrophenol	9200	U	J
100-02-7	4-Nitrophenol	9200	U	
132-64-9	Dibenzofuran	370	J	
121-14-2	2,4-Dinitrotoluene	3700	U	
84-66-2	Diethylphthalate	3700	U	
7005-72-3	4-Chlorophenyl-phenylether	3700	U	
86-73-7	Fluorene	540	J	
100-01-6	4-Nitroaniline	9200	U	
534-52-1	4,6-Dinitro-2-methylphenol	9200	U	
86-30-6	N-Nitrosodiphenylamine (1)	3700	U	
101-55-3	4-Bromophenyl-phenylether	3700	U	
118-74-1	Hexachlorobenzene	3700	U	
87-86-5	Pentachlorophenol	9200	U	
85-01-8	Phenanthrene	5400		
120-12-7	Anthracene	1400	J	
86-74-8	Carbazole	650	J	
84-74-2	Di-n-butylphthalate	3700	U	
206-44-0	Fluoranthene	8900		
129-00-0	Pyrene	8200		
85-68-7	Butylbenzylphthalate	3700	U	
91-94-1	3,3'-Dichlorobenzidine	3700	U	
56-55-3	Benzo(a)anthracene	4700		
218-01-9	Chrysene	4900		
117-81-7	bis(2-Ethylhexyl)phthalate	3700	U	
117-84-0	Di-n-octylphthalate	3700	U	
205-99-2	Benzo(b)fluoranthene	4600		
207-08-9	Benzo(k)fluoranthene	5200		
50-32-8	Benzo(a)pyrene	5500		
193-39-5	Indeno(1,2,3-cd)pyrene	3300	J	
53-70-3	Dibenz(a,h)anthracene	1300	J	
191-24-2	Benzo(g,h,i)perylene	3800		

(1) Cannot be seperated from Diphenylamine

1F

EPA SAMPLE NO.

APF86

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.08

Sample wt/vol: 30.0 (g/mL) G Lab File ID: F9100521.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 10 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.2

Number TICs found: 18

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	814-78-8	3-BUTEN-2-ONE, 3-METHYL-	1.12	1200	JN
2.		UNKNOWN	1.17	790	BJ
3.	141-79-7	3-PENTEN-2-ONE, 4-METHYL-	1.97	5700	ABJN
4.	123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	2.37	8700	ABJN
5.		UNKNOWN	3.45	1100	BJ
6.		UNKNOWN HYDROCARBON	4.44	2700	J
7.		UNKNOWN PAH	12.89	770	J
8.	238-84-6	11H-BENZO[A]FLUORENE	14.85	1000	JN
9.	205-99-2	BENZ[E]ACEPHENANTHRYLENE	18.15	1100	JN
10.		UNKNOWN PAH	18.31	830	J
11.	192-97-2	BENZO[E]PYRENE	18.38	2900	JN
12.		UNKNOWN PAH	18.79	780	J
13.		UNKNOWN PAH	19.83	980	J
14.	215-58-7	BENZO[B]TRIPHENYLENE	20.10	810	JN
15.		1,2:4,5-DIBENZPYRENE	21.67	1300	JN
16.		1,2:3,4-DIBENZPYRENE	21.78	920	JN
17.	192-65-4	NAPHTHO[1,2,3,4-DEF]CHRYSENE	21.84	740	JN
18.	191-07-1	CORONENE	22.34	1900	JN
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SOUTHWEST LABORATORY OF OKLAHOMA
GC/MS LABORATORY : ALKANE REPORT

REPORT DATE: 10/06/99 DATA FILE: F9100521.D

SAMPLE ID: APF86 MATRIX: SOIL
LAB ID: 40521.08 DATE ANALYZED: 10/05/99

	CAS #	COMPOUND	RT	EST. CONC (ug/Kg)
1)	003377-86-4	HEXANE, 2-BROMO-	3.26	2492

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF87

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.09

Sample wt/vol: 32.8 (g/mL) G Lab File ID: F9100508.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 3 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.9

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	330	U
111-44-4	bis(2-Chloroethyl)ether	330	U
95-57-8	2-Chlorophenol	330	U
541-73-1	1,3-Dichlorobenzene	330	U
106-46-7	1,4-Dichlorobenzene	330	U
95-50-1	1,2-Dichlorobenzene	330	U
95-48-7	2-Methylphenol	330	U
108-60-1	2,2'-oxybis(1-Chloropropane)	330	U
106-44-5	4-Methylphenol	330	U
621-64-7	N-Nitroso-di-n-propylamine	330	U
67-72-1	Hexachloroethane	330	U
98-95-3	Nitrobenzene	330	U
78-59-1	Isophorone	330	U
88-75-5	2-Nitrophenol	330	U
105-67-9	2,4-Dimethylphenol	330	U
111-91-1	bis(2-Chloroethoxy)methane	330	U
120-83-2	2,4-Dichlorophenol	330	U
120-82-1	1,2,4-Trichlorobenzene	330	U
91-20-3	Naphthalene	330	U
106-47-8	4-Chloroaniline	330	U
87-68-3	Hexachlorobutadiene	330	U
59-50-7	4-Chloro-3-methylphenol	330	U
91-57-6	2-Methylnaphthalene	330	U
77-47-4	Hexachlorocyclopentadiene	330	U
88-06-2	2,4,6-Trichlorophenol	330	U
95-95-4	2,4,5-Trichlorophenol	830	U
91-58-7	2-Chloronaphthalene	330	U
88-74-4	2-Nitroaniline	830	U
131-11-3	Dimethylphthalate	330	U
208-96-8	Acenaphthylene	330	U
606-20-2	2,6-Dinitrotoluene	330	U
99-09-2	3-Nitroaniline	830	U
83-32-9	Acenaphthene	330	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF87

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.09

Sample wt/vol: 32.8 (g/mL) G Lab File ID: F9100508.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 3 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.9

UIL 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	830	U J
100-02-7	4-Nitrophenol	830	U
132-64-9	Dibenzofuran	330	U
121-14-2	2,4-Dinitrotoluene	330	U
84-66-2	Diethylphthalate	330	U
7005-72-3	4-Chlorophenyl-phenylether	330	U
86-73-7	Fluorene	330	U
100-01-6	4-Nitroaniline	830	U
534-52-1	4,6-Dinitro-2-methylphenol	830	U
86-30-6	N-Nitrosodiphenylamine (1)	330	U
101-55-3	4-Bromophenyl-phenylether	330	U
118-74-1	Hexachlorobenzene	330	U
87-86-5	Pentachlorophenol	830	U
85-01-8	Phenanthrene	35	J
120-12-7	Anthracene	330	U
86-74-8	Carbazole	330	U
84-74-2	Di-n-butylphthalate	330	U
206-44-0	Fluoranthene	70	J
129-00-0	Pyrene	56	J
85-68-7	Butylbenzylphthalate	330	U
91-94-1	3,3'-Dichlorobenzidine	330	U
56-55-3	Benzo(a)anthracene	33	J
218-01-9	Chrysene	35	J
117-81-7	bis(2-Ethylhexyl)phthalate	330 ~~18~~	~~BJ~~ U
117-84-0	Di-n-octylphthalate	330	U
205-99-2	Benzo(b)fluoranthene	24	J
207-08-9	Benzo(k)fluoranthene	48	J
50-32-8	Benzo(a)pyrene	31	J
193-39-5	Indeno(1,2,3-cd)pyrene	25	J
53-70-3	Dibenz(a,h)anthracene	330	U
191-24-2	Benzo(g,h,i)perylene	25	J

(1) Cannot be seperated from Diphenylamine

1F

EPA SAMPLE NO.

APF87

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.09

Sample wt/vol: 32.8 (g/mL) G Lab File ID: F9100508.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 3 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.9

Number TICs found: 14

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	563-80-4	2-BUTANONE, 3-METHYL-	1.06	570	BJN
2.	814-78-8	3-BUTEN-2-ONE, 3-METHYL-	1.13	82	JN
3.		UNKNOWN	1.18	110	BJ
4.		UNKNOWN	1.22	67	BJ
5.		UNKNOWN	1.60	150	BJ
6.	141-79-7	3-PENTEN-2-ONE, 4-METHYL-	1.97	3100	ABJN
7.		UNKNOWN	2.17	210	BJ
8.		UNKNOWN	2.35	71	J
9.	123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	2.39	3200	ABJN
10.		UNKNOWN	3.46	1200	BJ
11.		UNKNOWN	3.56	84	J
12.		UNKNOWN	4.44	510	BJ
13.		UNKNOWN AMIDE	15.58	110	BJ
14.	123-28-4	PROPANOIC ACID, 3,3'-THIOBIS	21.59	69	BJN
15.					
16.					
17.					
18.					
19.					
20.					
21.					
22.					
23.					
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29.					
30.					

SOUTHWEST LABORATORY OF OKLAHOMA
GC/MS LABORATORY : ALKANE REPORT

REPORT DATE: 10/05/99 DATA FILE: F9100508.D

SAMPLE ID: APF87 MATRIX: SOIL
LAB ID: 40521.09 DATE ANALYZED: 10/05/99

	CAS #	COMPOUND	RT	EST. CONC (ug/Kg)
1)	002216-30-0	HEPTANE, 2,5-DIMETHYL-	2.29	115
2)	003074-71-3	HEPTANE, 2,3-DIMETHYL-	2.49	159
3)	003221-61-2	OCTANE, 2-METHYL-	2.57	71
4)	002216-34-4	OCTANE, 4-METHYL-	3.25	175

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1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF88

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.10

Sample wt/vol: 31.4 (g/mL) G Lab File ID: F9100509.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 10 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 4.8

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	350	U
111-44-4	bis(2-Chloroethyl)ether	350	U
95-57-8	2-Chlorophenol	350	U
541-73-1	1,3-Dichlorobenzene	350	U
106-46-7	1,4-Dichlorobenzene	350	U
95-50-1	1,2-Dichlorobenzene	350	U
95-48-7	2-Methylphenol	350	U
108-60-1	2,2'-oxybis(1-Chloropropane)	350	U
106-44-5	4-Methylphenol	350	U
621-64-7	N-Nitroso-di-n-propylamine	350	U
67-72-1	Hexachloroethane	350	U
98-95-3	Nitrobenzene	350	U
78-59-1	Isophorone	350	U
88-75-5	2-Nitrophenol	350	U
105-67-9	2,4-Dimethylphenol	350	U
111-91-1	bis(2-Chloroethoxy)methane	350	U
120-83-2	2,4-Dichlorophenol	350	U
120-82-1	1,2,4-Trichlorobenzene	350	U
91-20-3	Naphthalene	350	U
106-47-8	4-Chloroaniline	350	U
87-68-3	Hexachlorobutadiene	350	U
59-50-7	4-Chloro-3-methylphenol	350	U
91-57-6	2-Methylnaphthalene	350	U
77-47-4	Hexachlorocyclopentadiene	350	U
88-06-2	2,4,6-Trichlorophenol	350	U
95-95-4	2,4,5-Trichlorophenol	880	U
91-58-7	2-Chloronaphthalene	350	U
88-74-4	2-Nitroaniline	880	U
131-11-3	Dimethylphthalate	350	U
208-96-8	Acenaphthylene	350	U
606-20-2	2,6-Dinitrotoluene	350	U
99-09-2	3-Nitroaniline	880	U
83-32-9	Acenaphthene	350	U

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US EPA ARCHIVE DOCUMENT

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF88

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.10

Sample wt/vol: 31.4 (g/mL) G Lab File ID: F9100509.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 10 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 4.8

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	880	U
100-02-7	4-Nitrophenol	880	U
132-64-9	Dibenzofuran	350	U
121-14-2	2,4-Dinitrotoluene	350	U
84-66-2	Diethylphthalate	350	U
7005-72-3	4-Chlorophenyl-phenylether	350	U
86-73-7	Fluorene	350	U
100-01-6	4-Nitroaniline	880	U
534-52-1	4,6-Dinitro-2-methylphenol	880	U
86-30-6	N-Nitrosodiphenylamine (1)	350	U
101-55-3	4-Bromophenyl-phenylether	350	U
118-74-1	Hexachlorobenzene	350	U
87-86-5	Pentachlorophenol	880	U
85-01-8	Phenanthrene	22	J
120-12-7	Anthracene	350	U
86-74-8	Carbazole	350	U
84-74-2	Di-n-butylphthalate	350	U
206-44-0	Fluoranthene	41	J
129-00-0	Pyrene	35	J
85-68-7	Butylbenzylphthalate	350	U
91-94-1	3,3'-Dichlorobenzidine	350	U
56-55-3	Benzo(a)anthracene	23	J
218-01-9	Chrysene	27	J
117-81-7	bis(2-Ethylhexyl)phthalate	350 ~~51~~	~~BJ~~ U
117-84-0	Di-n-octylphthalate	350	U
205-99-2	Benzo(b)fluoranthene	21	J
207-08-9	Benzo(k)fluoranthene	25	J
50-32-8	Benzo(a)pyrene	21	J
193-39-5	Indeno(1,2,3-cd)pyrene	350	U
53-70-3	Dibenz(a,h)anthracene	350	U
191-24-2	Benzo(g,h,i)perylene	19	J

(1) Cannot be seperated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

APF88

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.10

Sample wt/vol: 31.4 (g/mL) G Lab File ID: F9100509.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 10 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 4.8

Number TICs found: 22

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	563-80-4	2-BUTANONE, 3-METHYL-	1.06	620	BJN
2.	814-78-8	3-BUTEN-2-ONE, 3-METHYL-	1.13	180	JN
3.		UNKNOWN	1.18	220	BJ
4.		UNKNOWN	1.22	110	BJ
5.	68-12-2	FORMAMIDE, N,N-DIMETHYL-	1.90	71	JN
6.	141-79-7	3-PENTEN-2-ONE, 4-METHYL-	1.98	4100	ABJN
7.		UNKNOWN	2.10	95	BJ
8.		UNKNOWN	2.16	320	BJ
9.		UNKNOWN	2.34	150	J
10.	123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	2.39	4400	ABJN
11.		UNKNOWN	3.46	1700	BJ
12.		UNKNOWN	3.56	160	J
13.		UNKNOWN	3.74	290	J
14.		UNKNOWN	4.10	90	J
15.		UNKNOWN	4.44	1200	BJ
16.		UNKNOWN	5.06	90	J
17.	495-61-4	CYCLOHEXENE, 1-METHYL-4-(5-M	9.54	71	JN
18.	57-10-3	HEXADECANOIC ACID	13.03	96	JN
19.	4337-65-9	HEXANEDIOIC ACID, MONO(2-ETH	15.74	73	JN
20.	27519-02-4	9-TRICOSENE, (Z)-	17.33	120	JN
21.		UNKNOWN HYDROCARBON	20.44	170	J
22.		UNKNOWN	21.59	150	J
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

US EPA ARCHIVE DOCUMENT

SOUTHWEST LABORATORY OF OKLAHOMA
GC/MS LABORATORY : ALKANE REPORT

REPORT DATE: 10/05/99 DATA FILE: F9100509.D

SAMPLE ID: APF88 MATRIX: SOIL
LAB ID: 40521.10 DATE ANALYZED: 10/05/99

	CAS #	COMPOUND	RT	EST. CONC (ug/Kg)
1)	000079-29-8	BUTANE, 2,3-DIMETHYL-	1.60	248
2)	002216-30-0	HEPTANE, 2,5-DIMETHYL-	2.29	138
3)	003074-71-3	HEPTANE, 2,3-DIMETHYL-	2.49	230
4)	000871-83-0	NONANE, 2-METHYL-	2.57	104
5)	002216-33-3	OCTANE, 3-METHYL-	2.64	74
6)	002216-34-4	OCTANE, 4-METHYL-	3.26	647
7)	000629-92-5	NONADECANE	18.29	109
8)	055124-79-3	HEPTADECANE, 9-HEXYL-	19.21	181
9)	000629-92-5	NONADECANE	20.06	195

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF89

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.11

Sample wt/vol: 32.8 (g/mL) G Lab File ID: F9100510.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 10 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	340	U
111-44-4	bis(2-Chloroethyl)ether	340	U
95-57-8	2-Chlorophenol	340	U
541-73-1	1,3-Dichlorobenzene	340	U
106-46-7	1,4-Dichlorobenzene	340	U
95-50-1	1,2-Dichlorobenzene	340	U
95-48-7	2-Methylphenol	340	U
108-60-1	2,2'-oxybis(1-Chloropropane)	340	U
106-44-5	4-Methylphenol	340	U
621-64-7	N-Nitroso-di-n-propylamine	340	U
67-72-1	Hexachloroethane	340	U
98-95-3	Nitrobenzene	340	U
78-59-1	Isophorone	340	U
88-75-5	2-Nitrophenol	340	U
105-67-9	2,4-Dimethylphenol	340	U
111-91-1	bis(2-Chloroethoxy)methane	340	U
120-83-2	2,4-Dichlorophenol	340	U
120-82-1	1,2,4-Trichlorobenzene	340	U
91-20-3	Naphthalene	340	U
106-47-8	4-Chloroaniline	340	U
87-68-3	Hexachlorobutadiene	340	U
59-50-7	4-Chloro-3-methylphenol	340	U
91-57-6	2-Methylnaphthalene	340	U
77-47-4	Hexachlorocyclopentadiene	340	U
88-06-2	2,4,6-Trichlorophenol	340	U
95-95-4	2,4,5-Trichlorophenol	840	U
91-58-7	2-Chloronaphthalene	340	U
88-74-4	2-Nitroaniline	840	U
131-11-3	Dimethylphthalate	340	U
208-96-8	Acenaphthylene	340	U
606-20-2	2,6-Dinitrotoluene	340	U
99-09-2	3-Nitroaniline	840	U
83-32-9	Acenaphthene	340	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF89

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.11

Sample wt/vol: 32.8 (g/mL) G Lab File ID: F9100510.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 10 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.0

LLL 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
51-28-5	2,4-Dinitrophenol	840	U	J
100-02-7	4-Nitrophenol	840	U	
132-64-9	Dibenzofuran	340	U	
121-14-2	2,4-Dinitrotoluene	340	U	
84-66-2	Diethylphthalate	340	U	
7005-72-3	4-Chlorophenyl-phenylether	340	U	
86-73-7	Fluorene	340	U	
100-01-6	4-Nitroaniline	840	U	
534-52-1	4,6-Dinitro-2-methylphenol	840	U	
86-30-6	N-Nitrosodiphenylamine (1)	340	U	
101-55-3	4-Bromophenyl-phenylether	340	U	
118-74-1	Hexachlorobenzene	340	U	
87-86-5	Pentachlorophenol	840	U	
85-01-8	Phenanthrene	27	J	
120-12-7	Anthracene	340	U	
86-74-8	Carbazole	340	U	
84-74-2	Di-n-butylphthalate	340	U	
206-44-0	Fluoranthene	72	J	
129-00-0	Pyrene	60	J	
85-68-7	Butylbenzylphthalate	340	U	
91-94-1	3,3'-Dichlorobenzidine	340	U	
56-55-3	Benzo(a)anthracene	37	J	
218-01-9	Chrysene	35	J	
117-81-7	bis(2-Ethylhexyl)phthalate	340 ~~29~~	~~BJ~~	u
117-84-0	Di-n-octylphthalate	340	U	
205-99-2	Benzo(b)fluoranthene	33	J	
207-08-9	Benzo(k)fluoranthene	33	J	
50-32-8	Benzo(a)pyrene	36	J	
193-39-5	Indeno(1,2,3-cd)pyrene	22	J	
53-70-3	Dibenz(a,h)anthracene	340	U	
191-24-2	Benzo(g,h,i)perylene	24	J	

(1) Cannot be seperated from Diphenylamine

1F

EPA SAMPLE NO.

APF89

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.11

Sample wt/vol: 32.8 (g/mL) G Lab File ID: F9100510.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 10 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.0

Number TICs found: 24

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	563-80-4	2-BUTANONE, 3-METHYL-	1.06	650	BJN
2.	814-78-8	3-BUTEN-2-ONE, 3-METHYL-	1.13	200	JN
3.		UNKNOWN	1.18	210	BJ
4.		UNKNOWN	1.60	330	BJ
5.		UNKNOWN	1.65	76	BJ
6.		UNKNOWN	1.90	110	BJ
7.	141-79-7	3-PENTEN-2-ONE, 4-METHYL-	1.99	5300	ABJN
8.		UNKNOWN	2.17	240	BJ
9.		UNKNOWN	2.35	86	J
10.	123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	2.39	3500	ABJN
11.		UNKNOWN	3.26	760	BJ
12.		UNKNOWN	3.46	1400	BJ
13.		UNKNOWN	3.56	120	J
14.		UNKNOWN	3.74	240	J
15.		UNKNOWN	4.11	72	J
16.		UNKNOWN	4.44	1200	BJ
17.		UNKNOWN	5.06	82	J
18.	495-61-4	CYCLOHEXENE, 1-METHYL-4-(5-M	9.54	150	JN
19.	57-10-3	HEXADECANOIC ACID	13.02	130	JN
20.		UNKNOWN	19.84	110	J
21.		UNKNOWN	20.18	91	J
22.		UNKNOWN PAH	20.44	160	J
23.		UNKNOWN PAH	20.99	80	J
24.		UNKNOWN	21.59	220	J
25.					
26.					
27.					
28.					
29.					
30.					

SOUTHWEST LABORATORY OF OKLAHOMA
GC/MS LABORATORY : ALKANE REPORT

REPORT DATE: 10/05/99 DATA FILE: F9100510.D

SAMPLE ID: APF89 MATRIX: SOIL
LAB ID: 40521.11 DATE ANALYZED: 10/05/99

	CAS #	COMPOUND	RT	EST. CONC (ug/Kg)
1)	002216-30-0	HEPTANE, 2,5-DIMETHYL-	2.29	139
2)	001636-43-7	DECANE, 5,6-DIMETHYL-	2.49	232
3)	002213-23-2	HEPTANE, 2,4-DIMETHYL-	2.57	87
4)	000297-03-0	CYCLOTETRACOSANE	17.34	134
5)	000629-92-5	NONADECANE	18.29	103
6)	000629-94-7	HENEICOSANE	19.20	165
7)	000629-59-4	TETRADECANE	20.05	99

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF90

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.12

Sample wt/vol: 30.7 (g/mL) G Lab File ID: F9100511.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 4 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
108-95-2	Phenol	340	U
111-44-4	bis(2-Chloroethyl)ether	340	U
95-57-8	2-Chlorophenol	340	U
541-73-1	1,3-Dichlorobenzene	340	U
106-46-7	1,4-Dichlorobenzene	340	U
95-50-1	1,2-Dichlorobenzene	340	U
95-48-7	2-Methylphenol	340	U
108-60-1	2,2'-oxybis(1-Chloropropane)	340	U
106-44-5	4-Methylphenol	340	U
621-64-7	N-Nitroso-di-n-propylamine	340	U
67-72-1	Hexachloroethane	340	U
98-95-3	Nitrobenzene	340	U
78-59-1	Isophorone	340	U
88-75-5	2-Nitrophenol	340	U
105-67-9	2,4-Dimethylphenol	340	U
111-91-1	bis(2-Chloroethoxy)methane	340	U
120-83-2	2,4-Dichlorophenol	340	U
120-82-1	1,2,4-Trichlorobenzene	340	U
91-20-3	Naphthalene	18	J
106-47-8	4-Chloroaniline	340	U
87-68-3	Hexachlorobutadiene	340	U
59-50-7	4-Chloro-3-methylphenol	340	U
91-57-6	2-Methylnaphthalene	340	U
77-47-4	Hexachlorocyclopentadiene	340	U
88-06-2	2,4,6-Trichlorophenol	340	U
95-95-4	2,4,5-Trichlorophenol	840	U
91-58-7	2-Chloronaphthalene	340	U
88-74-4	2-Nitroaniline	840	U
131-11-3	Dimethylphthalate	340	U
208-96-8	Acenaphthylene	340	U
606-20-2	2,6-Dinitrotoluene	340	U
99-09-2	3-Nitroaniline	840	U
83-32-9	Acenaphthene	340	U

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US EPA ARCHIVE DOCUMENT

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF90

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.12

Sample wt/vol: 30.7 (g/mL) G Lab File ID: F9100511.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 4 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

UMM 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	840	U J
100-02-7	4-Nitrophenol	840	U
132-64-9	Dibenzofuran	340	U
121-14-2	2,4-Dinitrotoluene	340	U
84-66-2	Diethylphthalate	340	U
7005-72-3	4-Chlorophenyl-phenylether	340	U
86-73-7	Fluorene	340	U
100-01-6	4-Nitroaniline	840	U
534-52-1	4,6-Dinitro-2-methylphenol	840	U
86-30-6	N-Nitrosodiphenylamine (1)	340	U
101-55-3	4-Bromophenyl-phenylether	340	U
118-74-1	Hexachlorobenzene	340	U
87-86-5	Pentachlorophenol	840	U
85-01-8	Phenanthrene	84	J
120-12-7	Anthracene	25	J
86-74-8	Carbazole	340	U
84-74-2	Di-n-butylphthalate	340	U
206-44-0	Fluoranthene	170	J
129-00-0	Pyrene	140	J
85-68-7	Butylbenzylphthalate	340	U
91-94-1	3,3'-Dichlorobenzidine	340	U
56-55-3	Benzo(a)anthracene	91	J
218-01-9	Chrysene	96	J
117-81-7	bis(2-Ethylhexyl)phthalate	340 ~~28~~	~~BJ~~ U
117-84-0	Di-n-octylphthalate	340	U
205-99-2	Benzo(b)fluoranthene	76	J
207-08-9	Benzo(k)fluoranthene	92	J
50-32-8	Benzo(a)pyrene	92	J
193-39-5	Indeno(1,2,3-cd)pyrene	59	J
53-70-3	Dibenz(a,h)anthracene	28	J
191-24-2	Benzo(g,h,i)perylene	66	J

(1) Cannot be seperated from Diphenylamine

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

APF90

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.12

Sample wt/vol: 30.7 (g/mL) G Lab File ID: F9100511.D

Level: (low/med) LOW Date Received: 10/01/99

% Moisture: 4 decanted: (Y/N) N Date Extracted: 10/01/99

Concentrated Extract Volume: 500 (uL) Date Analyzed: 10/05/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4

Number TICs found: 21

CONCENTRATION UNITS:
(ug/L or ug/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	814-78-8	3-BUTEN-2-ONE, 3-METHYL-	1.12	260	JN
2.		UNKNOWN	1.19	200	BJ
3.		UNKNOWN	1.21	90	BJ
4.		UNKNOWN	1.60	340	BJ
5.	141-79-7	3-PENTEN-2-ONE, 4-METHYL-	1.98	5900	ABJN
6.		UNKNOWN	2.17	200	BJ
7.		UNKNOWN	2.35	77	J
8.	123-42-2	2-PENTANONE, 4-HYDROXY-4-MET	2.39	3800	ABJN
9.		UNKNOWN	3.46	1200	BJ
10.		UNKNOWN	3.57	86	J
11.		UNKNOWN	3.74	130	J
12.		UNKNOWN	4.45	1100	BJ
13.		UNKNOWN	5.07	88	J
14.		UNKNOWN AMIDE	13.12	84	J
15.		UNKNOWN AMIDE	14.35	92	BJ
16.		UNKNOWN AMIDE	14.48	130	BJ
17.		UNKNOWN AMIDE	15.58	1400	BJ
18.		UNKNOWN AMIDE	15.71	77	BJ
19.		UNKNOWN	19.80	73	J
20.	514-07-8	D-FRIEDOOLEAN-14-EN-3-ONE	20.44	95	JN
21.	123-28-4	PROPANOIC ACID, 3,3'-THIOBIS	21.58	200	BJN
22.					
23.					
24.					
25.					
26.					
27.					
28.					
29.					
30.					

US EPA ARCHIVE DOCUMENT

SOUTHWEST LABORATORY OF OKLAHOMA
GC/MS LABORATORY : ALKANE REPORT

REPORT DATE: 10/05/99 DATA FILE: F9100511.D

SAMPLE ID: APF90 MATRIX: SOIL
LAB ID: 40521.12 DATE ANALYZED: 10/05/99

	CAS #	COMPOUND	RT	EST. CONC (ug/Kg)
1)	017312-50-4	DECANE, 2,5-DIMETHYL-	2.28	130
2)	003074-71-3	HEPTANE, 2,3-DIMETHYL-	2.49	220
3)	003221-61-2	OCTANE, 2-METHYL-	2.57	75
4)	000112-58-3	HEXANE, 1,1'-OXYBIS-	3.25	717
5)	004291-79-6	CYCLOHEXANE, 1-METHYL-2-PROPYL-	3.41	72
6)	000294-62-2	CYCLODODECANE	11.05	82

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF79

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.01

Sample wt/vol: 31.8 (g/mL) G Lab File ID: _____

% Moisture: 9 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/14/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4 Sulfur Cleanup: (Y/N) N

UKK 12/16/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.8	U
319-85-7	beta-BHC	3.9	J
319-86-8	delta-BHC	1.8	U
58-89-9	gamma-BHC (Lindane)	1.8	U
76-44-8	Heptachlor	~~3.0~~ R	~~P J~~ R
309-00-2	Aldrin	1.8	U
1024-57-3	Heptachlor epoxide	~~5.3~~ R	~~P J~~ R
959-98-8	Endosulfan I	~~9.8~~ R	~~P J~~ R
60-57-1	Dieldrin	~~21~~ R	~~P J~~ R
72-55-9	4,4'-DDE	20	P J
72-20-8	Endrin	~~11~~ R	~~P J~~ R
33213-65-9	Endosulfan II	4.0	P J
72-54-8	4,4'-DDD	3.4	U
1031-07-8	Endosulfan sulfate	13	J
50-29-3	4,4'-DDT	~~82~~ 75	~~P J~~
72-43-5	Methoxychlor	40	J
53494-70-5	Endrin ketone	3.4	U
7421-93-4	Endrin aldehyde	~~3.4~~ R	~~P J~~ R
5103-71-9	alpha-Chlordane	8.6	P J
5103-74-2	gamma-Chlordane	~~4.4~~ R	~~P J~~ R
8001-35-2	Toxaphene	180	U
12674-11-2	Aroclor-1016	34	U
11104-28-2	Aroclor-1221	69	U
11141-16-5	Aroclor-1232	34	U
53469-21-9	Aroclor-1242	34	U
12672-29-6	Aroclor-1248	34	U
11097-69-1	Aroclor-1254	380	J
11096-82-5	Aroclor-1260	34	U

UKK 12/16/99

UKK 12/16/99

UKK 12/16/99

UKK 12/16/99

US EPA ARCHIVE DOCUMENT

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF79DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.01DL

Sample wt/vol: 31.8 (g/mL) G Lab File ID: _____

% Moisture: 9 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/14/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.4 Sulfur Cleanup: (Y/N) N

use only 4,4'-DDT
CLL 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	18	U
319-85-7	beta-BHC	18	U
319-86-8	delta-BHC	18	U
58-89-9	gamma-BHC (Lindane)	18	U
76-44-8	Heptachlor	2.7	DPJ
309-00-2	Aldrin	18	U
1024-57-3	Heptachlor epoxide	7.2	DPJ
959-98-8	Endosulfan I	6.7	DPJ
60-57-1	Dieldrin	22	DPJ
72-55-9	4,4'-DDE	15	DPJ
72-20-8	Endrin	4.9	DPJ
33213-65-9	Endosulfan II	34	U
72-54-8	4,4'-DDD	34	U
1031-07-8	Endosulfan sulfate	34	U
50-29-3	4,4'-DDT	75	DP
72-43-5	Methoxychlor	180	U
53494-70-5	Endrin ketone	34	U
7421-93-4	Endrin aldehyde	34	U
5103-71-9	alpha-Chlordane	5.5	DPJ
5103-74-2	gamma-Chlordane	18	U
8001-35-2	Toxaphene	1800	U
12674-11-2	Aroclor-1016	340	U
11104-28-2	Aroclor-1221	690	U
11141-16-5	Aroclor-1232	340	U
53469-21-9	Aroclor-1242	340	U
12672-29-6	Aroclor-1248	340	U
11097-69-1	Aroclor-1254	390	D
11096-82-5	Aroclor-1260	340	U

US EPA ARCHIVE DOCUMENT

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF80

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.02

Sample wt/vol: 31.1 (g/mL) G Lab File ID: _____

% Moisture: 15 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 10/14/99

Injection Volume: 0.5 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.7 Sulfur Cleanup: (Y/N) N

UKK 12/16/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.9	U
319-85-7	beta-BHC	~~1.3~~ 1.9	~~PJ~~ UJ
319-86-8	delta-BHC	1.9	U
58-89-9	gamma-BHC (Lindane)	1.9	U
76-44-8	Heptachlor	1.9	U
309-00-2	Aldrin	1.9	U
1024-57-3	Heptachlor epoxide	1.9	U
959-98-8	Endosulfan I	R ~~2.3~~	~~P~~ J R
60-57-1	Dieldrin	R ~~2.2~~	~~PJ~~ J R
72-55-9	4,4'-DDE	3.7	U
72-20-8	Endrin	7.7	~~P~~ J
33213-65-9	Endosulfan II	3.7	U
72-54-8	4,4'-DDD	R ~~12~~	~~P~~ J R
1031-07-8	Endosulfan sulfate	R ~~10~~	~~P~~ J R
50-29-3	4,4'-DDT	11	~~P~~ J
72-43-5	Methoxychlor	53	U
53494-70-5	Endrin ketone	17	U
7421-93-4	Endrin aldehyde	7.0	~~P~~ J
5103-71-9	alpha-Chlordane	1.9	U
5103-74-2	gamma-Chlordane	1.9	U
8001-35-2	Toxaphene	190	U
12674-11-2	Aroclor-1016	37	U
11104-28-2	Aroclor-1221	76	U
11141-16-5	Aroclor-1232	37	U
53469-21-9	Aroclor-1242	37	U
12672-29-6	Aroclor-1248	37	U
11097-69-1	Aroclor-1254	37	U
11096-82-5	Aroclor-1260	37	U

UKK 12/16/99

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF80DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.02DL

Sample wt/vol: 31.1 (g/mL) G Lab File ID: _____

% Moisture: 15 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/14/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 5.7 Sulfur Cleanup: (Y/N) N

do not use MK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	19	U
319-85-7	beta-BHC	19	U
319-86-8	delta-BHC	19	U
58-89-9	gamma-BHC (Lindane)	19	U
76-44-8	Heptachlor	19	U
309-00-2	Aldrin	19	U
1024-57-3	Heptachlor epoxide	19	U
959-98-8	Endosulfan I	19	U
60-57-1	Dieldrin	37	U
72-55-9	4,4'-DDE	37	U
72-20-8	Endrin	37	U
33213-65-9	Endosulfan II	37	U
72-54-8	4,4'-DDD	37	U
1031-07-8	Endosulfan sulfate	5.8	DPJ
50-29-3	4,4'-DDT	13	DPJ
72-43-5	Methoxychlor	190	U
53494-70-5	Endrin ketone	10	DPJ
7421-93-4	Endrin aldehyde	37	U
5103-71-9	alpha-Chlordane	19	U
5103-74-2	gamma-Chlordane	19	U
8001-35-2	Toxaphene	1900	U
12674-11-2	Aroclor-1016	370	U
11104-28-2	Aroclor-1221	760	U
11141-16-5	Aroclor-1232	370	U
53469-21-9	Aroclor-1242	370	U
12672-29-6	Aroclor-1248	370	U
11097-69-1	Aroclor-1254	370	U
11096-82-5	Aroclor-1260	370	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF81

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.03

Sample wt/vol: 30.6 (g/mL) G Lab File ID: _____

% Moisture: 9 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/14/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.3 Sulfur Cleanup: (Y/N) N UKK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.8	U
319-85-7	beta-BHC	~~R 2.6~~	~~R~~ J R UKK 12/14/99
319-86-8	delta-BHC	1.8 ~~0.55~~	~~PJ~~ U
58-89-9	gamma-BHC (Lindane)	1.8	U
76-44-8	Heptachlor	1.8 ~~0.37~~	~~PJ~~ U
309-00-2	Aldrin	1.8	U
1024-57-3	Heptachlor epoxide	1.8 ~~1.7~~	~~PJ~~ U
959-98-8	Endosulfan I	1.8 ~~0.98~~	~~PJ~~ U
60-57-1	Dieldrin	~~R 5.2~~	~~P~~ JR UKK 12/16/99
72-55-9	4,4'-DDE	~~R 4.8~~	~~P~~ JR
72-20-8	Endrin	~~R 4.4~~	~~P~~ JR
33213-65-9	Endosulfan II	3.6 ~~2.2~~	~~PJ~~ J
72-54-8	4,4'-DDD	~~R 41~~	~~P~~ JR
1031-07-8	Endosulfan sulfate	~~R 6.6~~	~~P~~ JR
50-29-3	4,4'-DDT	~~R 9.6~~	~~P~~ JR
72-43-5	Methoxychlor	18	U J
53494-70-5	Endrin ketone	47	J
7421-93-4	Endrin aldehyde	5.5	~~P~~ J
5103-71-9	alpha-Chlordane	1.8 ~~0.66~~	~~PJ~~ U
5103-74-2	gamma-Chlordane	2.6	~~P~~ J
8001-35-2	Toxaphene	180	U
12674-11-2	Aroclor-1016	36	U
11104-28-2	Aroclor-1221	72	U
11141-16-5	Aroclor-1232	36	U
53469-21-9	Aroclor-1242	36	U
12672-29-6	Aroclor-1248	36	U
11097-69-1	Aroclor-1254	36	U
11096-82-5	Aroclor-1260	36	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF81DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.03DL

Sample wt/vol: 30.6 (g/mL) G Lab File ID: _____

% Moisture: 9 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 10/14/99

Injection Volume: 0.5 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.3 Sulfur Cleanup: (Y/N) N

do not use KK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	18	U
319-85-7	beta-BHC	18	U
319-86-8	delta-BHC	18	U
58-89-9	gamma-BHC (Lindane)	18	U
76-44-8	Heptachlor	18	U
309-00-2	Aldrin	18	U
1024-57-3	Heptachlor epoxide	18	U
959-98-8	Endosulfan I	2.7	DPJ
60-57-1	Dieldrin	8.4	DPJ
72-55-9	4,4'-DDE	36	U
72-20-8	Endrin	5.2	DJ
33213-65-9	Endosulfan II	36	U
72-54-8	4,4'-DDD	33	DPJ
1031-07-8	Endosulfan sulfate	19	DPJ
50-29-3	4,4'-DDT	26	DJ
72-43-5	Methoxychlor	180	U
53494-70-5	Endrin ketone	57	D
7421-93-4	Endrin aldehyde	4.4	DPJ
5103-71-9	alpha-Chlordane	18	U
5103-74-2	gamma-Chlordane	18	U
8001-35-2	Toxaphene	1800	U
12674-11-2	Aroclor-1016	360	U
11104-28-2	Aroclor-1221	720	U
11141-16-5	Aroclor-1232	360	U
53469-21-9	Aroclor-1242	360	U
12672-29-6	Aroclor-1248	360	U
11097-69-1	Aroclor-1254	360	U
11096-82-5	Aroclor-1260	360	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF82

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.04

Sample wt/vol: 31.8 (g/mL) G Lab File ID: _____

% Moisture: 16 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 10/14/99

Injection Volume: 0.5 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4 Sulfur Cleanup: (Y/N) N

LKK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.9	U
319-85-7	beta-BHC	R ~~44~~ ~~33~~	~~PE~~ R LKK 12/16/99
319-86-8	delta-BHC	1.9	U
58-89-9	gamma-BHC (Lindane)	1.9	U
76-44-8	Heptachlor	1.9	U
309-00-2	Aldrin	1.9	U
1024-57-3	Heptachlor epoxide	R ~~20~~	~~P~~ R
959-98-8	Endosulfan I	R ~~18~~	~~P~~ R
60-57-1	Dieldrin	R ~~95~~ ~~67~~	~~PE~~ R LKK 12/16/99
72-55-9	4,4'-DDE	82 ~~100~~	~~PE~~ J
72-20-8	Endrin	3.7	U J
33213-65-9	Endosulfan II	3.7	U
72-54-8	4,4'-DDD	3.7	U
1031-07-8	Endosulfan sulfate	~~22~~ ~~73~~	~~PE~~ J
50-29-3	4,4'-DDT	300 ~~330~~	~~E~~ J
72-43-5	Methoxychlor	180	~~P~~ J
53494-70-5	Endrin ketone	~~60~~ ~~83~~	~~PE~~ J
7421-93-4	Endrin aldehyde	R ~~49~~	~~P~~ J R LKK 12/16/99
5103-71-9	alpha-Chlordane	R ~~5.3~~	~~P~~ J R
5103-74-2	gamma-Chlordane	R ~~14~~ ~~66~~	~~PE~~ R
8001-35-2	Toxaphene	190	U
12674-11-2	Aroclor-1016	37	U
11104-28-2	Aroclor-1221	75	U
11141-16-5	Aroclor-1232	37	U
53469-21-9	Aroclor-1242	37	U
12672-29-6	Aroclor-1248	37	U
11097-69-1	Aroclor-1254	1700	~~P~~ J
11096-82-5	Aroclor-1260	37	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF82DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.04DL

Sample wt/vol: 31.8 (g/mL) G Lab File ID: _____

% Moisture: 16 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/14/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0 use exceeded cmpds only

GPC Cleanup: (Y/N) Y pH: 7.4 Sulfur Cleanup: (Y/N) N

CLK 12/14/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	10	DPJ
319-85-7	beta-BHC	41	DP
319-86-8	delta-BHC	19	U
58-89-9	gamma-BHC (Lindane)	19	U
76-44-8	Heptachlor	12	DPJ
309-00-2	Aldrin	19	U
1024-57-3	Heptachlor epoxide	8.0	DPJ
959-98-8	Endosulfan I	21	DP
60-57-1	Dieldrin	75	DP
72-55-9	4,4'-DDE	82	DP
72-20-8	Endrin	14	DPJ
33213-65-9	Endosulfan II	8.5	DPJ
72-54-8	4,4'-DDD	37	U
1031-07-8	Endosulfan sulfate	22	DJ
50-29-3	4,4'-DDT	300	D
72-43-5	Methoxychlor	57	DPJ
53494-70-5	Endrin ketone	60	D
7421-93-4	Endrin aldehyde	37	U
5103-71-9	alpha-Chlordane	19	U
5103-74-2	gamma-Chlordane	19	DP
8001-35-2	Toxaphene	1900	U
12674-11-2	Aroclor-1016	370	U
11104-28-2	Aroclor-1221	750	U
11141-16-5	Aroclor-1232	370	U
53469-21-9	Aroclor-1242	370	U
12672-29-6	Aroclor-1248	370	U
11097-69-1	Aroclor-1254	2300	D
11096-82-5	Aroclor-1260	370	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF83

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.05

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 13 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 10/14/99

Injection Volume: 0.5 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.5 Sulfur Cleanup: (Y/N) N

CKK 12/16/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.0	U
319-85-7	beta-BHC	2.0	U J
319-86-8	delta-BHC	2.0	U
58-89-9	gamma-BHC (Lindane)	2.0	U
76-44-8	Heptachlor	2.0	U
309-00-2	Aldrin	2.0	U
1024-57-3	Heptachlor epoxide	2.0	U
959-98-8	Endosulfan I	2.0	U
60-57-1	Dieldrin	R ~~15~~	~~P~~ J R CKK 12/16/99
72-55-9	4,4'-DDE	R ~~16~~	~~P~~ J R
72-20-8	Endrin	R ~~11~~	~~P~~ J R
33213-65-9	Endosulfan II	3.8	U
72-54-8	4,4'-DDD	3.8	U
1031-07-8	Endosulfan sulfate	12	~~P~~ J
50-29-3	4,4'-DDT	R ~~41~~	~~P~~ J R CKK 12/16/99
72-43-5	Methoxychlor	R ~~120~~	~~P~~ J R
53494-70-5	Endrin ketone	56	~~P~~ J
7421-93-4	Endrin aldehyde	50	J
5103-71-9	alpha-Chlordane	2.0	U
5103-74-2	gamma-Chlordane	R ~~13~~ ~~11~~	~~P~~ J R CKK 12/16/99
8001-35-2	Toxaphene	200	U
12674-11-2	Aroclor-1016	38	U
11104-28-2	Aroclor-1221	77	U
11141-16-5	Aroclor-1232	38	U
53469-21-9	Aroclor-1242	38	U
12672-29-6	Aroclor-1248	38	U
11097-69-1	Aroclor-1254	38	U
11096-82-5	Aroclor-1260	38	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF83DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.05DL

Sample wt/vol: 30.0 (g/mL) G Lab File ID: _____

% Moisture: 13 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 10/14/99

Injection Volume: 0.5 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.5 Sulfur Cleanup: (Y/N) N

use only g-chlordane

JMK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	13	DPJ
319-85-7	beta-BHC	20	U
319-86-8	delta-BHC	20	U
58-89-9	gamma-BHC (Lindane)	20	U
76-44-8	Heptachlor	20	U
309-00-2	Aldrin	20	U
1024-57-3	Heptachlor epoxide	4.6	DPJ
959-98-8	Endosulfan I	20	U
60-57-1	Dieldrin	20	DPJ
72-55-9	4,4'-DDE	17	DPJ
72-20-8	Endrin	18	DJ
33213-65-9	Endosulfan II	10	DPJ
72-54-8	4,4'-DDD	38	U
1031-07-8	Endosulfan sulfate	12	DPJ
50-29-3	4,4'-DDT	54	DP
72-43-5	Methoxychlor	200	U
53494-70-5	Endrin ketone	92	DP
7421-93-4	Endrin aldehyde	38	U
5103-71-9	alpha-Chlordane	8.4	DJ
5103-74-2	gamma-Chlordane	13	DPJ
8001-35-2	Toxaphene	2000	U
12674-11-2	Aroclor-1016	380	U
11104-28-2	Aroclor-1221	770	U
11141-16-5	Aroclor-1232	380	U
53469-21-9	Aroclor-1242	380	U
12672-29-6	Aroclor-1248	380	U
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260	380	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF84

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.06

Sample wt/vol: 30.7 (g/mL) G Lab File ID: _____

% Moisture: 16 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/14/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.0	U
319-85-7	beta-BHC	2.0	UJ
319-86-8	delta-BHC	2.0	U
58-89-9	gamma-BHC (Lindane)	2.0	U
76-44-8	Heptachlor	2.0	U
309-00-2	Aldrin	2.0	U
1024-57-3	Heptachlor epoxide	2.0	U
959-98-8	Endosulfan I	2.0	U
60-57-1	Dieldrin	~~10~~	~~P~~ J R
72-55-9	4,4'-DDE	~~6.9~~	~~P~~ J R
72-20-8	Endrin	3.8	UJ
33213-65-9	Endosulfan II	3.8	U
72-54-8	4,4'-DDD	~~73~~ 87	~~PE~~ J
1031-07-8	Endosulfan sulfate	8.0	P J
50-29-3	4,4'-DDT	~~16~~	~~P~~ J R
72-43-5	Methoxychlor	~~47~~	~~P~~ J R
53494-70-5	Endrin ketone	~~22~~	~~P~~ J R
7421-93-4	Endrin aldehyde	12	J
5103-71-9	alpha-Chlordane	2.0	U
5103-74-2	gamma-Chlordane	3.7	~~P~~ J
8001-35-2	Toxaphene	200	U
12674-11-2	Aroclor-1016	38	U
11104-28-2	Aroclor-1221	78	U
11141-16-5	Aroclor-1232	38	U
53469-21-9	Aroclor-1242	38	U
12672-29-6	Aroclor-1248	38	U
11097-69-1	Aroclor-1254	38	U
11096-82-5	Aroclor-1260	38	U

LKK 12/10/99

LKK 12/16/99

LKK 12/16/99

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF84DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.06DL

Sample wt/vol: 30.7 (g/mL) G Lab File ID: _____

% Moisture: 16 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/14/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.4 Sulfur Cleanup: (Y/N) N

use only 4,4'-DDD
ALK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	20	U
319-85-7	beta-BHC	20	U
319-86-8	delta-BHC	20	U
58-89-9	gamma-BHC (Lindane)	20	U
76-44-8	Heptachlor	20	U
309-00-2	Aldrin	20	U
1024-57-3	Heptachlor epoxide	20	U
959-98-8	Endosulfan I	20	U
60-57-1	Dieldrin	18	DPJ
72-55-9	4,4'-DDE	38	U
72-20-8	Endrin	38	U
33213-65-9	Endosulfan II	38	U
72-54-8	4,4'-DDD	73	D
1031-07-8	Endosulfan sulfate	38	U
50-29-3	4,4'-DDT	3.2	DPJ
72-43-5	Methoxychlor	200	U
53494-70-5	Endrin ketone	15	DPJ
7421-93-4	Endrin aldehyde	38	U
5103-71-9	alpha-Chlordane	20	U
5103-74-2	gamma-Chlordane	20	U
8001-35-2	Toxaphene	2000	U
12674-11-2	Aroclor-1016	380	U
11104-28-2	Aroclor-1221	780	U
11141-16-5	Aroclor-1232	380	U
53469-21-9	Aroclor-1242	380	U
12672-29-6	Aroclor-1248	380	U
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260	380	U

1002

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF85

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.07

Sample wt/vol: 30.6 (g/mL) G Lab File ID: _____

% Moisture: 9 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 10/14/99

Injection Volume: 0.5 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.5 Sulfur Cleanup: (Y/N) N

LKK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.8	U
319-85-7	beta-BHC	1.8	UJ
319-86-8	delta-BHC	1.8	U
58-89-9	gamma-BHC (Lindane)	1.8	U
76-44-8	Heptachlor	1.8	U
309-00-2	Aldrin	1.8	U
1024-57-3	Heptachlor epoxide	R ~~2.0~~	~~P~~ J R LKK 12/14/99
959-98-8	Endosulfan I	1.8	U
60-57-1	Dieldrin	R ~~12~~	~~P~~ J R
72-55-9	4,4'-DDE	38	~~P~~ J
72-20-8	Endrin	3.6	UJ
33213-65-9	Endosulfan II	3.6	U
72-54-8	4,4'-DDD	R ~~14~~	~~P~~ J R LKK 12/14/99
1031-07-8	Endosulfan sulfate	3.6	U
50-29-3	4,4'-DDT	R ~~35~~	~~P~~ J R
72-43-5	Methoxychlor	18	UJ
53494-70-5	Endrin ketone	21	
7421-93-4	Endrin aldehyde	3.6	U
5103-71-9	alpha-Chlordane	1.8	U
5103-74-2	gamma-Chlordane	1.8 ~~1.7~~	~~PJ~~ U
8001-35-2	Toxaphene	180	U
12674-11-2	Aroclor-1016	36	U
11104-28-2	Aroclor-1221	72	U
11141-16-5	Aroclor-1232	36	U
53469-21-9	Aroclor-1242	36	U
12672-29-6	Aroclor-1248	36	U
11097-69-1	Aroclor-1254	360	~~P~~ J
11096-82-5	Aroclor-1260	36	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF85DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.07DL

Sample wt/vol: 30.6 (g/mL) G Lab File ID: _____

% Moisture: 9 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 10/14/99

Injection Volume: 0.5 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.5 Sulfur Cleanup: (Y/N) N

do not use 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	18	U
319-85-7	beta-BHC	18	U
319-86-8	delta-BHC	18	U
58-89-9	gamma-BHC (Lindane)	18	U
76-44-8	Heptachlor	18	U
309-00-2	Aldrin	18	U
1024-57-3	Heptachlor epoxide	2.5	DPJ
959-98-8	Endosulfan I	18	U
60-57-1	Dieldrin	18	DPJ
72-55-9	4,4'-DDE	23	DPJ
72-20-8	Endrin	36	U
33213-65-9	Endosulfan II	36	U
72-54-8	4,4'-DDD	5.6	DPJ
1031-07-8	Endosulfan sulfate	36	U
50-29-3	4,4'-DDT	40	DP
72-43-5	Methoxychlor	180	U
53494-70-5	Endrin ketone	16	DJ
7421-93-4	Endrin aldehyde	36	U
5103-71-9	alpha-Chlordane	18	U
5103-74-2	gamma-Chlordane	1.7	DPJ
8001-35-2	Toxaphene	1800	U
12674-11-2	Aroclor-1016	360	U
11104-28-2	Aroclor-1221	720	U
11141-16-5	Aroclor-1232	360	U
53469-21-9	Aroclor-1242	360	U
12672-29-6	Aroclor-1248	360	U
11097-69-1	Aroclor-1254	350	DJP
11096-82-5	Aroclor-1260	360	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF86

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.08

Sample wt/vol: 32.8 (g/mL) G Lab File ID: _____

% Moisture: 10 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/14/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.2 Sulfur Cleanup: (Y/N) N

CKK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.7	U
319-85-7	beta-BHC	1.7	UJ
319-86-8	delta-BHC	1.7	U
58-89-9	gamma-BHC (Lindane)	1.7	U
76-44-8	Heptachlor	1.7	U
309-00-2	Aldrin	1.7	U
1024-57-3	Heptachlor epoxide	~~2.0~~	~~P J~~ R
959-98-8	Endosulfan I	1.7	U
60-57-1	Dieldrin	~~9.8~~	~~P J~~ R
72-55-9	4,4'-DDE	~~12~~	~~P J~~ R
72-20-8	Endrin	3.4	UJ
33213-65-9	Endosulfan II	3.4	U
72-54-8	4,4'-DDD	~~7.1~~	~~P J~~ R
1031-07-8	Endosulfan sulfate	~~3.9~~	~~P J~~ R
50-29-3	4,4'-DDT	~~49~~ 52	~~P~~ J
72-43-5	Methoxychlor	17	UJ
53494-70-5	Endrin ketone	10	
7421-93-4	Endrin aldehyde	3.4	U
5103-71-9	alpha-Chlordane	1.7	U
5103-74-2	gamma-Chlordane	~~4.0~~	~~P J~~ R
8001-35-2	Toxaphene	170	U
12674-11-2	Aroclor-1016	34	U
11104-28-2	Aroclor-1221	68	U
11141-16-5	Aroclor-1232	34	U
53469-21-9	Aroclor-1242	34	U
12672-29-6	Aroclor-1248	34	U
11097-69-1	Aroclor-1254	380	
11096-82-5	Aroclor-1260	34	U

CKK 12/16/99

V

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF86DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.08DL

Sample wt/vol: 32.8 (g/mL) G Lab File ID: _____

% Moisture: 10 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/14/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.2 Sulfur Cleanup: (Y/N) N

use 4,4'-DDT only
UCK 10/16/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	17	U
319-85-7	beta-BHC	17	U
319-86-8	delta-BHC	17	U
58-89-9	gamma-BHC (Lindane)	17	U
76-44-8	Heptachlor	17	U
309-00-2	Aldrin	17	U
1024-57-3	Heptachlor epoxide	2.0	DPJ
959-98-8	Endosulfan I	17	U
60-57-1	Dieldrin	16	DPJ
72-55-9	4,4'-DDE	6.4	DPJ
72-20-8	Endrin	34	U
33213-65-9	Endosulfan II	34	U
72-54-8	4,4'-DDD	10	DPJ
1031-07-8	Endosulfan sulfate	7.0	DPJ
50-29-3	4,4'-DDT	49	DP
72-43-5	Methoxychlor	170	U
53494-70-5	Endrin ketone	9.1	DJ
7421-93-4	Endrin aldehyde	34	U
5103-71-9	alpha-Chlordane	17	U
5103-74-2	gamma-Chlordane	1.6	DPJ
8001-35-2	Toxaphene	1700	U
12674-11-2	Aroclor-1016	340	U
11104-28-2	Aroclor-1221	680	U
11141-16-5	Aroclor-1232	340	U
53469-21-9	Aroclor-1242	340	U
12672-29-6	Aroclor-1248	340	U
11097-69-1	Aroclor-1254	380	D
11096-82-5	Aroclor-1260	340	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF87

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.09

Sample wt/vol: 31.0 (g/mL) G Lab File ID: _____

% Moisture: 3 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/14/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.9 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.7	U
319-85-7	beta-BHC	1.7	U
319-86-8	delta-BHC	1.7	U
58-89-9	gamma-BHC (Lindane)	1.7	U
76-44-8	Heptachlor	1.7	U
309-00-2	Aldrin	1.7	U
1024-57-3	Heptachlor epoxide	1.7	U
959-98-8	Endosulfan I	1.7 0.87	~~PU~~ U
60-57-1	Dieldrin	3.3	U
72-55-9	4,4'-DDE	3.3	U
72-20-8	Endrin	3.3	U
33213-65-9	Endosulfan II	3.3	U
72-54-8	4,4'-DDD	3.3	U
1031-07-8	Endosulfan sulfate	3.3	U
50-29-3	4,4'-DDT	2.3J ~~3.3~~ ~~2.5~~	~~PU~~ U 12/16/99
72-43-5	Methoxychlor	17	U
53494-70-5	Endrin ketone	3.3	U
7421-93-4	Endrin aldehyde	3.3	U
5103-71-9	alpha-Chlordane	1.7	U
5103-74-2	gamma-Chlordane	1.7	U
8001-35-2	Toxaphene	170	U
12674-11-2	Aroclor-1016	33	U
11104-28-2	Aroclor-1221	67	U
11141-16-5	Aroclor-1232	33	U
53469-21-9	Aroclor-1242	33	U
12672-29-6	Aroclor-1248	33	U
11097-69-1	Aroclor-1254	33	U
11096-82-5	Aroclor-1260	33	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF87DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.09DL

Sample wt/vol: 31.0 (g/mL) G Lab File ID: _____

% Moisture: 3 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/13/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.9 Sulfur Cleanup: (Y/N) N

do not use 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	17	U
319-85-7	beta-BHC	17	U
319-86-8	delta-BHC	17	U
58-89-9	gamma-BHC (Lindane)	17	U
76-44-8	Heptachlor	17	U
309-00-2	Aldrin	17	U
1024-57-3	Heptachlor epoxide	17	U
959-98-8	Endosulfan I	17	U
60-57-1	Dieldrin	33	U
72-55-9	4,4'-DDE	33	U
72-20-8	Endrin	33	U
33213-65-9	Endosulfan II	33	U
72-54-8	4,4'-DDD	33	U
1031-07-8	Endosulfan sulfate	33	U
50-29-3	4,4'-DDT	33	U
72-43-5	Methoxychlor	170	U
53494-70-5	Endrin ketone	33	U
7421-93-4	Endrin aldehyde	33	U
5103-71-9	alpha-Chlordane	17	U
5103-74-2	gamma-Chlordane	17	U
8001-35-2	Toxaphene	1700	U
12674-11-2	Aroclor-1016	330	U
11104-28-2	Aroclor-1221	670	U
11141-16-5	Aroclor-1232	330	U
53469-21-9	Aroclor-1242	330	U
12672-29-6	Aroclor-1248	330	U
11097-69-1	Aroclor-1254	330	U
11096-82-5	Aroclor-1260	330	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF88

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.10

Sample wt/vol: 32.0 (g/mL) G Lab File ID: _____

% Moisture: 10 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/14/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 4.8 Sulfur Cleanup: (Y/N) N

LLL 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.8	U
319-85-7	beta-BHC	1.8	U J
319-86-8	delta-BHC	1.8	U
58-89-9	gamma-BHC (Lindane)	1.8	U
76-44-8	Heptachlor	0.29	~~PU~~ J
309-00-2	Aldrin	1.8	U
1024-57-3	Heptachlor epoxide	1.8	U
959-98-8	Endosulfan I	1.8	U
60-57-1	Dieldrin	~~3.4~~ 1.3	~~PU~~ u
72-55-9	4,4'-DDE	~~3.4~~ 0.79	~~PU~~ u
72-20-8	Endrin	3.4	U J
33213-65-9	Endosulfan II	3.4	U
72-54-8	4,4'-DDD	3.4	U
1031-07-8	Endosulfan sulfate	3.4	U
50-29-3	4,4'-DDT	6.7	J
72-43-5	Methoxychlor	18	U J
53494-70-5	Endrin ketone	3.4	U
7421-93-4	Endrin aldehyde	3.4	U
5103-71-9	alpha-Chlordane	1.8	U
5103-74-2	gamma-Chlordane	1.8	U
8001-35-2	Toxaphene	180	U
12674-11-2	Aroclor-1016	34	U
11104-28-2	Aroclor-1221	70	U
11141-16-5	Aroclor-1232	34	U
53469-21-9	Aroclor-1242	34	U
12672-29-6	Aroclor-1248	34	U
11097-69-1	Aroclor-1254	41	
11096-82-5	Aroclor-1260	34	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF88DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.10DL

Sample wt/vol: 32.0 (g/mL) G Lab File ID: _____

% Moisture: 10 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/13/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 4.8 Sulfur Cleanup: (Y/N) N

do not use 12/10/99 cw

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	18	U
319-85-7	beta-BHC	18	U
319-86-8	delta-BHC	18	U
58-89-9	gamma-BHC (Lindane)	18	U
76-44-8	Heptachlor	18	U
309-00-2	Aldrin	18	U
1024-57-3	Heptachlor epoxide	18	U
959-98-8	Endosulfan I	18	U
60-57-1	Dieldrin	34	U
72-55-9	4,4'-DDE	34	U
72-20-8	Endrin	34	U
33213-65-9	Endosulfan II	34	U
72-54-8	4,4'-DDD	34	U
1031-07-8	Endosulfan sulfate	34	U
50-29-3	4,4'-DDT	2.6	DPJ
72-43-5	Methoxychlor	180	U
53494-70-5	Endrin ketone	34	U
7421-93-4	Endrin aldehyde	34	U
5103-71-9	alpha-Chlordane	18	U
5103-74-2	gamma-Chlordane	18	U
8001-35-2	Toxaphene	1800	U
12674-11-2	Aroclor-1016	340	U
11104-28-2	Aroclor-1221	700	U
11141-16-5	Aroclor-1232	340	U
53469-21-9	Aroclor-1242	340	U
12672-29-6	Aroclor-1248	340	U
11097-69-1	Aroclor-1254	50	DJ
11096-82-5	Aroclor-1260	340	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF89

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.11

Sample wt/vol: 31.4 (g/mL) G Lab File ID: _____

% Moisture: 10 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/14/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 5.0 Sulfur Cleanup: (Y/N) N

ikk 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG		Q
319-84-6	alpha-BHC		1.8	U
319-85-7	beta-BHC		1.8	UJ
319-86-8	delta-BHC		1.8	U
58-89-9	gamma-BHC (Lindane)		1.8	U
76-44-8	Heptachlor		0.62	~~PJ~~ J
309-00-2	Aldrin		1.8	U
1024-57-3	Heptachlor epoxide		1.8	U
959-98-8	Endosulfan I	1.8	~~0.55~~	~~PJ~~ U
60-57-1	Dieldrin	~~3.5~~ 1.8	~~1.5~~	~~PJ~~ U
72-55-9	4,4'-DDE	~~3.5~~ 1.8	~~0.80~~	~~PJ~~ U
72-20-8	Endrin		3.5	UJ
33213-65-9	Endosulfan II		3.5	U
72-54-8	4,4'-DDD		3.5	U
1031-07-8	Endosulfan sulfate		3.5	U
50-29-3	4,4'-DDT		4.4	~~P~~ J
72-43-5	Methoxychlor	18	~~0.73~~	~~PJ~~ UJ
53494-70-5	Endrin ketone		3.5	U
7421-93-4	Endrin aldehyde		3.5	U
5103-71-9	alpha-Chlordane		1.8	U
5103-74-2	gamma-Chlordane		1.8	U
8001-35-2	Toxaphene		180	U
12674-11-2	Aroclor-1016		35	U
11104-28-2	Aroclor-1221		71	U
11141-16-5	Aroclor-1232		35	U
53469-21-9	Aroclor-1242		35	U
12672-29-6	Aroclor-1248		35	U
11097-69-1	Aroclor-1254		37	
11096-82-5	Aroclor-1260		35	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF89DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.11DL

Sample wt/vol: 31.4 (g/mL) G Lab File ID: _____

% Moisture: 10 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/13/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 5.0 Sulfur Cleanup: (Y/N) N

do not use UMK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	18	U
319-85-7	beta-BHC	18	U
319-86-8	delta-BHC	18	U
58-89-9	gamma-BHC (Lindane)	18	U
76-44-8	Heptachlor	0.94	DJ
309-00-2	Aldrin	18	U
1024-57-3	Heptachlor epoxide	18	U
959-98-8	Endosulfan I	18	U
60-57-1	Dieldrin	4.1	DPJ
72-55-9	4,4'-DDE	1.6	DPJ
72-20-8	Endrin	35	U
33213-65-9	Endosulfan II	35	U
72-54-8	4,4'-DDD	35	U
1031-07-8	Endosulfan sulfate	35	U
50-29-3	4,4'-DDT	3.4	DPJ
72-43-5	Methoxychlor	180	U
53494-70-5	Endrin ketone	35	U
7421-93-4	Endrin aldehyde	35	U
5103-71-9	alpha-Chlordane	18	U
5103-74-2	gamma-Chlordane	18	U
8001-35-2	Toxaphene	1800	U
12674-11-2	Aroclor-1016	350	U
11104-28-2	Aroclor-1221	710	U
11141-16-5	Aroclor-1232	350	U
53469-21-9	Aroclor-1242	350	U
12672-29-6	Aroclor-1248	350	U
11097-69-1	Aroclor-1254	33	DJ
11096-82-5	Aroclor-1260	350	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF90

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.12

Sample wt/vol: 31.1 (g/mL) G Lab File ID: _____

% Moisture: 4 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 10/14/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.4 Sulfur Cleanup: (Y/N) N

UKK 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.7	U
319-85-7	beta-BHC	1.7	UJ
319-86-8	delta-BHC	1.7	U
58-89-9	gamma-BHC (Lindane)	1.7	U
76-44-8	Heptachlor	0.69	~~PJ~~ J
309-00-2	Aldrin	1.7	U
1024-57-3	Heptachlor epoxide	1.7	U
959-98-8	Endosulfan I	1.7	U
60-57-1	Dieldrin	3.3 ~~1.4~~	~~PJ~~ U
72-55-9	4,4'-DDE	3.3 ~~71~~	~~PJ~~ U
72-20-8	Endrin	3.3	UJ
33213-65-9	Endosulfan II	3.3	U
72-54-8	4,4'-DDD	3.3	U
1031-07-8	Endosulfan sulfate	3.3	U
50-29-3	4,4'-DDT	4.7	~~P~~ J
72-43-5	Methoxychlor	17	UJ
53494-70-5	Endrin ketone	3.3	U
7421-93-4	Endrin aldehyde	3.3	U
5103-71-9	alpha-Chlordane	1.7	U
5103-74-2	gamma-Chlordane	1.7	U
8001-35-2	Toxaphene	170	U
12674-11-2	Aroclor-1016	33	U
11104-28-2	Aroclor-1221	67	U
11141-16-5	Aroclor-1232	33	U
53469-21-9	Aroclor-1242	33	U
12672-29-6	Aroclor-1248	33	U
11097-69-1	Aroclor-1254	33	U
11096-82-5	Aroclor-1260	33	U

1162

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APF90DL

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) SOIL Lab Sample ID: 40521.12DL

Sample wt/vol: 31.1 (g/mL) G Lab File ID: _____

% Moisture: 4 decanted: (Y/N) N Date Received: 10/01/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 10/01/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 10/13/99

Injection Volume: 0.5 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 7.4 Sulfur Cleanup: (Y/N) N

do not use LLC 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	17	U
319-85-7	beta-BHC	17	U
319-86-8	delta-BHC	17	U
58-89-9	gamma-BHC (Lindane)	17	U
76-44-8	Heptachlor	0.87	DPJ
309-00-2	Aldrin	17	U
1024-57-3	Heptachlor epoxide	17	U
959-98-8	Endosulfan I	17	U
60-57-1	Dieldrin	1.6	DPJ
72-55-9	4,4'-DDE	33	U
72-20-8	Endrin	33	U
33213-65-9	Endosulfan II	33	U
72-54-8	4,4'-DDD	33	U
1031-07-8	Endosulfan sulfate	33	U
50-29-3	4,4'-DDT	3.2	DPJ
72-43-5	Methoxychlor	170	U
53494-70-5	Endrin ketone	33	U
7421-93-4	Endrin aldehyde	33	U
5103-71-9	alpha-Chlordane	17	U
5103-74-2	gamma-Chlordane	17	U
8001-35-2	Toxaphene	1700	U
12674-11-2	Aroclor-1016	330	U
11104-28-2	Aroclor-1221	670	U
11141-16-5	Aroclor-1232	330	U
53469-21-9	Aroclor-1242	330	U
12672-29-6	Aroclor-1248	330	U
11097-69-1	Aroclor-1254	330	U
11096-82-5	Aroclor-1260	330	U

1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

APG52

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 27436 SAS No.: SDG No.: APF79

Matrix: (soil/water) WATER Lab Sample ID: 40530.02

Sample wt/vol: 1000 (g/mL) ML Lab File ID: _____

% Moisture: _____ decanted: (Y/N) __ Date Received: 10/02/99

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 10/04/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 10/08/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 6.2 Sulfur Cleanup: (Y/N) Y

UUL 12/10/99

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	Q
319-84-6	alpha-BHC	0.26	
319-85-7	beta-BHC	0.050	U
319-86-8	delta-BHC	0.050 ~~0.020~~	~~PJ~~ U
58-89-9	gamma-BHC (Lindane)	0.050	U J
76-44-8	Heptachlor	0.059	~~P~~ J
309-00-2	Aldrin	0.050	U J
1024-57-3	Heptachlor epoxide	0.050 ~~0.033~~	~~PJ~~ U
959-98-8	Endosulfan I	0.050 ~~0.013~~	~~PJ~~ U
60-57-1	Dieldrin	0.10 ~~0.055~~	~~PJ~~ U
72-55-9	4,4'-DDE	0.16	
72-20-8	Endrin	0.10	U J
33213-65-9	Endosulfan II	0.10	U
72-54-8	4,4'-DDD	0.10	U
1031-07-8	Endosulfan sulfate	0.10	U
50-29-3	4,4'-DDT	0.15	~~P~~ J
72-43-5	Methoxychlor	0.50	U
53494-70-5	Endrin ketone	0.10	U
7421-93-4	Endrin aldehyde	0.10	U
5103-71-9	alpha-Chlordane	0.050	U
5103-74-2	gamma-Chlordane	0.050	U
8001-35-2	Toxaphene	5.0	U
12674-11-2	Aroclor-1016	1.0	U
11104-28-2	Aroclor-1221	2.0	U
11141-16-5	Aroclor-1232	1.0	U
53469-21-9	Aroclor-1242	1.0	U
12672-29-6	Aroclor-1248	1.0	U
11097-69-1	Aroclor-1254	2.6	~~P~~ J
11096-82-5	Aroclor-1260	1.0	U

Attachment III

CSF Sheet

DO/EST 10-18-89. Standard Times - 910008-0A MAE

ORGANICS COMPLETE SDG FILE (CSF) INVENTORY SHEET

LABORATORY NAME SOUTHWEST LABORATORY OF OKLAHOMA
CITY/STATE BROKEN ARROW, OKLAHOMA

CASE NO. 27436 SDG NO. APF79 SDG NOS. TO FOLLOW _____
SAS NO. _____

CONTRACT NO. 68-D5-0026
SOW NO. OLM03.2

RECEIVED
OCT 18 1989
U.S. EPA

All documents delivered in the Complete SDG File must be original documents where possible.

Evidence Audit
Photocopy

	PAGE NOs FROM	PAGE NOs TO	CHECK LAB	CHECK EPA
1. Inventory Sheet (Form DC-2) (Do not number)			QA	BLK
2. SDG Case Narrative	1	19	✓	✓
3. SDG Cover Sheet/Traffic Report	20	23	✓	✓
4. Volatiles Data				
a. QC Summary				
System Monitoring Compound Summary (Form II VOA)	NA	NA		NA
Matrix Spike/Matrix Spike Duplicate Summary (Form III VOA)				
Method Blank Summary (Form IV VOA)				
GC/MS Instrument Performance Check (Form V VOA)				
Internal Standard Area and RT Summary (Form VIII VOA)				
b. Sample Data				
TCL Results - (Form I VOA)				
Tentatively Identified Compounds (Form I VOA-TIC)				
Reconstructed total ion chromatograms (RIC) for each sample				
For each sample:				
Raw spectra and background-subtracted mass spectra of target compounds identified				
Quantitation reports				
Mass spectra of all reported TICs with three best library matches				
c. Standards Data (All Instruments)				
Initial Calibration Data (Form VI VOA)				
RICs and Quan Reports for all Standards				
Continuing Calibration Data (Form VII VOA)				
RICs and Quantitation Reports for all Standards				
d. Raw QC Data				
BFB				
Blank Data				
Matrix Spike/Matrix Spike Duplicate Data				

ORGANICS COMPLETE SDG FILE (CSF) INVENTORY SHEET (Cont.)

CASE NO. 27436 SDG NO. APF79 SDG NOS. TO FOLLOW _____

SAS NO. _____

	PAGE NOs FROM	TO	CHECK LAB	EPA
6. Pesticides (Cont.)	929	1192		
b. Sample Data				
TCL Results - Organic Analysis Data Sheet (Form I PEST)			QA	✓
Chromatograms (Primary Column)				✓
Chromatograms from second GC column confirmation				✓
GC Integration report or data system printout				✓
Manual work sheets				✓
For pesticides/Aroclors confirmed by GC/MS, copies of raw spectra and copies of background-subtracted mass spectra of target compounds (samples & standards)				✓
c. Standards Data	1193	1410		
Initial Calibration of Single Component Analytes (Form VI PEST-1 and PEST-2)				✓
Initial Calibration of Multicomponent Analytes (Form VI PEST-3)				✓
Analyte Resolution Summary (Form VI PEST-4)				✓
Performance Evaluation Mixture (Form VI PEST-5)				✓
Individual Standard Mixture A (Form VI PEST-6)				✓
Individual Standard Mixture B (Form VI PEST-7)				✓
Calibration Verification Summary (Form VII PEST-1)				✓
Calibration Verification Summary (Form VII PEST-2)				✓
Analytical Sequence (Form VIII PEST)				✓
Florisil Cartridge Check (Form IX PEST-1)				✓
Pesticide GPC Calibration (Form IX PEST-2)				✓
Pesticide Identification Summary for Single Component Analytes (Form X PEST-1)				✓
Pesticide Identification Summary for Multicomponent Analytes (Form X PEST-2)				✓
Chromatograms and data system printouts A printout of retention times and corresponding peak areas or peak heights				✓
d. Raw QC Data	1411	1439		✓
Blank Data	1440	1456		✓
Matrix Spike/Matrix Spike Duplicate Data				

ORGANICS COMPLETE SDG FILE (CSF) INVENTORY SHEET (Cont.)

CASE NO. 27436 SDG NO. APF79 SDG NOS. TO FOLLOW _____
_____ _____ SAS NO. _____

11. Comments: _____

Completed by: (CLP Lab)	Emma Morton (Signature)	Emma Morton Data Clerk (Printed Name/Title)	10/15/99 (Date)
Verified by: (CLP Lab)	Gaye Alexander (Signature)	Gaye Alexander Data Clerk (Printed Name/Title)	10-15-99 (Date)
Audited by: (EPA)	Lisa Kuiper-Kromm (Signature)	Lisa Kuiper-Kromm Data Validator (Printed Name/Title)	12/14/99 (Date)

US EPA ARCHIVE DOCUMENT

M&E
AQUA ALLIANCE

MEMORANDUM

PROJECT NO:	J-020655-0002-005	**DATE:**	January 12, 2000
TO:	Standard Times Site File	**OFFICE:**	Wakefield
FROM:	S. Harvey	**COMPANY:**	Metcalf & Eddy
REVIEWED BY:	L. Cook		
CC:	B. Wyskowski, N. Thurber (memo only)		

SUBJECT: Limited QC Review/Modified Tier II-Like Review
Review of Metals and Cyanide Results
Sentinel, Inc., Huntsville, Alabama
RAS Case No. 27436; SDG No. MALQ02

On September 30, 1999, five aqueous samples were collected at the Standard Times BTSA site, located in New Bedford, Massachusetts by Metcalf & Eddy field personnel. The sampling was performed as part of the BTSA RAC WA# 043-SISIS-01ZZ. The samples were submitted to Sentinel, Inc. laboratory, located in Huntsville, Alabama for the analysis of low concentration metals and cyanide. All samples were received by the laboratory on October 1, 1999. The data package was received in the M&E Office on October 18, 1999. Included in Attachment I is a copy of the chain-of-custody (COC) record.

M&E reviewed the data in accordance with the EPA-approved Final Field Task Work Plan for the site and the guidance received from EPA Work Assignment Manager, James Byrne, in a September 17, 1999 letter to M&E Work Assignment Manager, Barb Wyskowski. The data review included:

*	•	Preservation and Technical Holding Times
*	•	Calibration Verification
	•	Blanks
	•	ICP Interference Check Sample
	•	Matrix Spike Recoveries
	•	Laboratory Duplicates
*	•	Field Duplicates
*	•	Laboratory Fortified Blank (LFB) and/or Laboratory Control Sample (LCS)
*	•	Furnace Atomic Absorption Results
	•	ICP Serial Dilution Results
*	•	Detection Limits
*	•	Sample Quantitation

*	=	All criteria met for this parameter.
NA	=	Not Applicable. No information was provided by the laboratory.

Included in Attachment II are the result summary sheets, annotated with the qualifiers detailed in this memorandum.

Blank Analysis Results

A review of laboratory blank analysis results indicate the presence of laboratory contamination for the elements listed below.

Element	Action Limit (ug/l)	Sample(s) Affected
Aluminum	210	MALQ02, MALQ04, MALQ06, MALQ07
Antimony	12.5	None
Arsenic	10.5	MALQ02, MALQ04, MALQ06
Barium	15.5	MALQ04, MALQ06
Beryllium	1.5	MALQ02, MALQ04, MALQ07
Lead	14.5	None
Mercury	-0.5	None
Magnesium	213	None
Potassium	81	None
Selenium	9.5	None
Silver	3.0	None
Cyanide	-12.2	Reject ND MALQ02, MALQ06 J positive MALQ04, MALQ07

Samples which have been listed as being affected for all indicated elements with the exception of cyanide had concentrations of the elements less than 5x the highest blank concentration for that element. The positive result in these samples for the elements indicated (with the exception of cyanide) have been reported as the samples' quantitation limit, and have been qualified as non-detect (U).

Due to the presence of negative cyanide blank contamination at a concentration that exceeded 2xIDL, positive cyanide results are estimated and non-detect cyanide results are rejected. Positive results may be biased low and non-detect results may be false negatives. Sample MALQ03 was not analyzed for cyanide.

US EPA ARCHIVE DOCUMENT

ICP Interference Check Sample Results

Interferant	Element	Sample(s) Affected	Action
Calcium	Copper	MALQ02	Reject ND
Calcium	Silver	MALQ02	Estimate (UJ) ND
Calcium	Vanadium	MALQ02	Estimate (UJ) ND

The positive copper result in sample MALQ02 is rejected due to interference from calcium. It is not possible to determine if the positive copper result is due to the high concentration of calcium in this sample. The non-detect silver and vanadium results are estimated due to negative interference from calcium.

Matrix Spike

The following matrix spike recoveries did not meet acceptable criteria indicating possible matrix interference. Sample results may be biased low.

Element	%Recovery	Sample(s) Affected
Antimony	66.5%	All

%R 30-74%: Estimate positive and non-detect results (J and UJ, respectively).

Laboratory Duplicate Results

For laboratory duplicate samples MALQ02 and MALQ02D, poor laboratory precision is noted due to the large discrepancy in the cyanide results between the sample result and that of its duplicate. Furthermore, the cyanide result for this sample MALQ02 has been rejected due to negative blank contamination (the potential for a false negative result exists). There is uncertainty with the cyanide result for this sample MALQ02. It is recommended that another sample from this location be collected and resubmitted for analysis.

Element	Sample Result (ug/l)	Duplicate Sample Result (ug/l)
Cyanide	0.9U	13.7

Inductively Coupled Plasma (ICP) Serial Dilution Results

The following percent difference result did not meet acceptable criteria, indicating a suppression due to sample matrix has occurred and the reported sample results may be biased low.

Element	%D	Sample(s) Affected
Potassium	36.7%	All

%D>15%: Estimate positive and non-detect results (J and UJ, respectively).

Results will be qualified as indicated above.

Attachment I

Chains-of Custody

US EPA ARCHIVE DOCUMENT

EPA — Inorganic Traffic Report & Chain of Custody Record

United States Environmental Protection Agency
Contract Laboratory Program

(For Inorganic CLP Analysis)

Case No. 27436

1. Project Code	Account Code	2. Region No.	Sampling Co.	4. Date Shipped	Carrier
020655	—	I	M&E	10/1/99	Fed EX

Regional Information: —

Sampler (Name): D Stamp

Sampler Signature: D Stamp

Airbill Number: 813808397602

Non-Superfund Program: Brownfields

Site Name: Brwnflds Std Timeo

City, State: NewBedford MA

Site Spill ID:

3. Purpose* — Lead: SF, PRP, ST, FED; Early Action: CLEM, PA, REM, RI, SI (X), ESI; Long-Term Action: FS, RD, RA, O&M, NPLD

5. Ship To: Sentinel, Inc
2800 Bob Wallace Ave
Suite L3
Huntsville, AL 35805

ATTN: Beverly Kilgore

6. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (specify in Column A)

7. Preservative (Enter in Column D)
1. HCl
2. HNO_3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (specify in Column D)
N. Not preserved

CLP Sample Numbers (from labels)	A Matrix (from Box 6) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 7) / Other:	E – RAS Analysis: Diss. Metals	Total Metals	Cyanide	Low only: NO_2/NO_3	Low only: Fluoride	High only: pH	High only: Conduct.	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K Field QC Qualifier (B = Blank, S = Spike, D = Duplicate, R = Rinsate, PE = Perform. Eval., — = Not a QC Sample)
MALQ07	2	Lm	G	1 2 3		X	X					133942-943	FGW020ISTF	9/30/99 1000	APG51	DS	
MALQ02	2	Lm	G	1 2 3		X	X					133946-947, 133950-951	FGW040ISTF	9/30/99 1230	APG52	DS	MS-MSD DS
MALQ04	2	Lm	G	1 2 3		X	X					133956 133957	FGW080ISTF	9/30/99 1500	APG53	DS	9/30/99
MALQ06	2	Lm	G	2,3		X	X					133960 133961	FGWK020ISTF	9/30/99 1530	APG54	DS	Dupe of APG DS MALQ 04
MALQ03	2	Lm	G	2		X						133964	GW100ISTF	9/30/99 1100	None	DS	
												Temperature Blanks					

Shipment for Case Complete? (Y/N): Y

Page: 1 of 1

Sample(s) to be Used for Laboratory QC: Use MALQ02 for MS

Additional Sampler Signatures:

Chain of Custody Seal Number(s):

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	10/1/99 1730				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks Is custody seal intact? Y/N/none	

A21-012-13 REV.

DISTRIBUTION: Green - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to CLASS

EPA Form 9110-1

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

364311

Attachment II

Sample Result Summary Sheets

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALQ02

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALQ02

Matrix (soil/water): WATER Lab Sample ID: 25287S

Level (low/med): LOW Date Received: 10/02/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	98.4	~~B~~ U		P
7440-36-0	Antimony	2.2	U J	~~B~~	P
7440-38-2	Arsenic	2.8	~~B~~ U		P
7440-39-3	Barium	756			P
7440-41-7	Beryllium	0.20	~~B~~ U		P
7440-43-9	Cadmium	2.4	~~B~~		P
7440-70-2	Calcium	508000			P
7440-47-3	Chromium	0.30	U		P
7440-48-4	Cobalt	0.60	U		P
7440-50-8	Copper	~~6.6~~	~~B~~	R	P
7439-89-6	Iron	2770		E	P
7439-92-1	Lead	1.0	U		P
7439-95-4	Magnesium	312000			P
7439-96-5	Manganese	550			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	0.70	U		P
7440-09-7	Potassium	120000	J	E	P
7782-49-2	Selenium	1.8	U		P
7440-22-4	Silver	0.40	U J		P
7440-23-5	Sodium	2310000			P
7440-28-0	Thallium	2.0	U		P
7440-62-2	Vanadium	0.80	U J		P
7440-66-6	Zinc	16.3	U		P
	Cyanide	~~0.90~~	~~U~~	R	CA

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALQ03

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALQ02

Matrix (soil/water): WATER Lab Sample ID: 25288S

Level (low/med): LOW Date Received: 10/02/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

SK 1/10/00

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2530			P
7440-36-0	Antimony	352	J	N	P
7440-38-2	Arsenic	46.1			P
7440-39-3	Barium	2830			P
7440-41-7	Beryllium	47.3			P
7440-43-9	Cadmium	53.0			P
7440-70-2	Calcium	494000			P
7440-47-3	Chromium	196			P
7440-48-4	Cobalt	505			P
7440-50-8	Copper	293			P
7439-89-6	Iron	3650		N	P
7439-92-1	Lead	18.6			P
7439-95-4	Magnesium	304000			P
7439-96-5	Manganese	1030			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	522			P
7440-09-7	Potassium	117000	J	N	P
7782-49-2	Selenium	9.8			P
7440-22-4	Silver	58.8			P
7440-23-5	Sodium	2220000			P
7440-28-0	Thallium	50.1			P
7440-62-2	Vanadium	503			P
7440-66-6	Zinc	480			P
	Cyanide				NR

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALQ04

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALQ02

Matrix (soil/water): WATER Lab Sample ID: 25289S

Level (low/med): LOW Date Received: 10/02/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

SU 11.10.00

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	51.4	B	U	P
7440-36-0	Antimony	2.2	U	J	P
7440-38-2	Arsenic	3.8	B	U	P
7440-39-3	Barium	10.4	B	U	P
7440-41-7	Beryllium	0.10	B	U	P
7440-43-9	Cadmium	0.40	U		P
7440-70-2	Calcium	88700			P
7440-47-3	Chromium	0.30	U		P
7440-48-4	Cobalt	0.80	B		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	1410		E	P
7439-92-1	Lead	1.0	U		P
7439-95-4	Magnesium	22100			P
7439-96-5	Manganese	940			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.4	B	J	P
7440-09-7	Potassium	18100	J	E	P
7782-49-2	Selenium	1.8	U		P
7440-22-4	Silver	0.40	U		P
7440-23-5	Sodium	63200			P
7440-28-0	Thallium	2.3	B		P
7440-62-2	Vanadium	0.80	U		P
7440-66-6	Zinc	16.3	U		P
	Cyanide	0.93	B	J *	CA

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALQ06

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALQ02

Matrix (soil/water): WATER Lab Sample ID: 25290S

Level (low/med): LOW Date Received: 10/02/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	46.3	U		P
7440-36-0	Antimony	2.2	U		P
7440-38-2	Arsenic	2.9	U		P
7440-39-3	Barium	9.3	U		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.40	U		P
7440-70-2	Calcium	86500			P
7440-47-3	Chromium	0.30	U		P
7440-48-4	Cobalt	0.70	U		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	1450			P
7439-92-1	Lead	1.0	U		P
7439-95-4	Magnesium	20800			P
7439-96-5	Manganese	878			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.4	U		P
7440-09-7	Potassium	16700			P
7782-49-2	Selenium	1.8	U		P
7440-22-4	Silver	0.40	U		P
7440-23-5	Sodium	58700			P
7440-28-0	Thallium	2.0	U		P
7440-62-2	Vanadium	0.80	U		P
7440-66-6	Zinc	16.3	U		P
	Cyanide	0.90	U	R*	CA

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALQ07

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALQ02

Matrix (soil/water): WATER Lab Sample ID: 25291S

Level (low/med): LOW Date Received: 10/02/99

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	66.7	B	U	P
7440-36-0	Antimony	2.2	U	J	P
7440-38-2	Arsenic	2.1	U		P
7440-39-3	Barium	40.4	B		P
7440-41-7	Beryllium	0.10	B	U	P
7440-43-9	Cadmium	0.40	U		P
7440-70-2	Calcium	56000			P
7440-47-3	Chromium	0.70	B		P
7440-48-4	Cobalt	0.60	U		P
7440-50-8	Copper	2.0	U		P
7439-89-6	Iron	6650		E	P
7439-92-1	Lead	1.0	U		P
7439-95-4	Magnesium	8650			P
7439-96-5	Manganese	373			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	0.80	B	J	P
7440-09-7	Potassium	6360	J	E	P
7782-49-2	Selenium	1.8	U		P
7440-22-4	Silver	0.40	U		P
7440-23-5	Sodium	8940			P
7440-28-0	Thallium	2.0	U		P
7440-62-2	Vanadium	0.90	B		P
7440-66-6	Zinc	16.3	U		P
	Cyanide	11.1	J	*	CA

SM 1/10/00

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

Attachment III

CSF Sheet

Standard Times Reg. I
9910005-IA
DC/ESAT
10-13-99
M+E

FULL INORGANICS COMPLETE SDG FILE (CSF) INVENTORY SHEET

LABORATORY NAME: Sentinel Inc
CITY/STATE: Huntsville AL

CASE NO. 27436 SDG NO. ~~MAL002~~ (10/18/99) MALQ02
SDG NOS. TO FOLLOW
SAS NO. —

CONTRACT NO. 68-D5-0169
SOW NO. ILM04

All documents delivered in the Complete SDG File must be original documents where possible. (Reference Exhibit B, Section II F and Section III G.)

		Page Nos. From	Page Nos. To	(Please Check:) Yes	(Please Check:) Reason
1.	Inventory Sheet (DC-1) (Do not number)			✓	SH 12/3/99
2.	Cover Page	1	1	✓	SH 12/3/99
3.	Inorganic Analysis Data Sheet (Form I-IN)	2	6	✓	SH 12/3/99
4.	Initial & Continuing Calibration Verification (Form IIA-IN)	7	10	✓	SH 12/3/99
5.	CRDL Standards For AA and ICP (Form IIB-IN)	11	11	✓	SH 12/3/99
6.	Blanks (Form III-IN)	12	13	✓	SH 12/3/99
7.	ICP Interference Check Sample (Form IV-IN)	14	15	✓	SH 12/3/99
8.	Spike Sample Recovery (Form VA-IN)	16	16	✓	SH 12/3/99
9.	Post Digest Spike Sample Recovery (Form VB-IN)	17	17	✓	SH 12/3/99
10.	Duplicates (Form VI-IN)	18	18	✓	SH 12/3/99
11.	Laboratory Control Sample (Form VII-IN)	19	19	✓	SH 12/3/99
12.	Standard Addition Results (Form VIII-IN)	—	—	—	—
13.	ICP Serial Dilutions (Form IX-IN)	20	20	✓	SH 12/3/99
14.	Instrument Detection Limits (Form X-IN)	21	23	✓	SH 12/3/99
15.	ICP Interelement Correction Factors (Form XIA-IN)	24	24	✓	SH 12/3/99
16.	ICP Interelement Correction Factors (Form XIB-IN)	25	26	✓	SH 12/3/99
17.	ICP Linear Ranges (Form XII-IN)	27	27	✓	SH 12/3/99
18.	Preparation Log (Form XIII-IN)	28	30	✓	SH 12/3/99
19.	Analysis Run Log (Form XIV-IN)	31	34	✓	SH 12/3/99
20.	ICP Raw Data	35	120	✓	SH 12/3/99
21.	Furnace AA Raw Data	—	—	—	—
22.	Mercury Raw Data	121	123	✓	SH 12/3/99
23.	Cyanide Raw Data	124	128	✓	SH 12/3/99
24.	Preparation Logs Raw Data	129	132	✓	SH 12/3/99
25.	Percent Solids Determination Log	—	—	—	—

		Page Nos.		(Please Check:)	
		From	To	Lab	Region
26.	Traffic Report/COC	133	133	✓	SAH 12/3/99
	EPA Shipping/Receiving Documents	—	—		
	Airbill (No. of Shipments 1)	134	134	✓	SAH 12/3/99
	Chain-of-Custody Records/Seals	135	135	✓	SAH 12/3/99
	Sample Tags	136	139	✓	SAH 12/3/99
	Sample Log-in Sheet (Lab & DCI)	140	142	✓	SAH 12/3/99
	SDG Cover Sheet	143	143	✓	SAH 12/3/99
28.	Misc. Shipping/Receiving Records (List all individual records)				
	Telephone Logs	—	—	—	—
	_____	—	—	—	—
	_____	—	—	—	—
29.	Internal Lab Sample Transfer Records & Tracking Sheets (describe or list)	—	—	—	—
	SDG Tracking	144	144	✓	SAH 12/3/99
	_____	—	—	—	—
30.	Internal Original Sample Prep & Analysis Records (describe or list)				
	Prep Records _____	145	150	✓	SAH 12/3/99
	Analysis Records _____	151	156	✓	SAH 12/3/99
	Description _____	—	—	—	—
31.	Other Records (describe or list)				
	Telephone Communications Log	—	—	—	—
	_____	157	159	✓	SAH 12/3/99
	_____	—	—	—	—

32. Comments:

_____

_____

Completed by (CLP Lab):

Laurie Harden — (Signature)

Laurie Harden, Asst. Doc. Control — (Print Name & Title)

10/8/99 — (Date)

Audited by (EPA):

Sheila Harvey — (Signature)

Sheila Harvey Chemist — (Print Name & Title)

12/3/99 — (Date)

Region I
Data Review Worksheet

Site Name: Standard Times
Reference Number:

REGION I REVIEW OF INORGANIC CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) Sentinel, Inc data package received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No.	27436	SAS No.		Sampling Date (s)	9/30/99
SDG No.	MALQ02	Matrix	Aqueous	Shipping Date (s)	10/1/99
No. of Samples	5			Date(s) rec'd by lab	10/2/99

Traffic Report Numbers: MALQ02, MALQ03, MALQ04, MALQ06, MALQ07

Trip Blank No.:
Equipment Blank Number:
Field Duplicate Numbers: MALQ04 / MALQ06

SOW No. ILM04.0 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- ✓ -Data Completeness
- ✓ -Holding Times
- ✓ -Calibrations
- -Blanks
- -ICP Interference Check Results
- -Matrix Spike Recoveries
- -Laboratory Duplicates
- ✓ -Field Duplicates
- ✓ -Lab Control Sample Results
- ✓ -Furnace AA results
- -ICP Serial Dilution Results
- ✓ -Detection Limit Results
- ✓ -Sample Quantitation

Overall Comments:

Definitions and Qualifiers:

- A - Acceptable data
- J - Approximate data due to quality control criteria
- R - Reject data due to quality control criteria
- U - Analyte not detected

Reviewer: Sheila Harvey

Date: 12/3/99

Region I
Inorganic Data Review Worksheets

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in sections 1 and 2 below. A separate worksheet should be used for soil and water blanks.

1. **Laboratory Blanks**

Matrix: Aqueous

DATE	ICB/CCB#	PREP BL	ANALYTE	CONC UNITS
			Sb	2.5 ug/l
			As	2.1
			Ba	1.6
			Be	0.3
			Pb	2.9
			Hg	-0.1
			K	16.2
			Se	1.9
			Ag	0.6

2. Equipment/Trip Blanks

DATE	EQUIP BL #	ANALYTE	CONC UNITS

3. **Frequency Requirements**

A. Was a preparation blank analyzed for each matrix, for every 20 samples, and for each digestion batch? **Yes or No**

B. Was a calibration blank run at the beginning of the run, and every 10 samples or every 2 hours whichever is more frequent? **Yes or No**

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected:

Region :
Inorganic Data Review Worksheets

IV A. BLANK ANALYSIS RESULTS Sections 1-3)

List the blank contamination in sections 1 and 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks

Matrix: Aqueous

DATE	CB/CCB=	PREP BL	ANALYTE	CONC. UNITS
			Al	43.6 ug/L
			Ba	~~1.0~~ 2.2, 2.4, 3.1
			Be	0.1, 0.1, 0.2
			Mg	42.6
			Pb	-0.1, -0.1
			Cd	-2.4, -2.4

2. Equipment Trip Blanks

DATE	EQUIP BL=	ANALYTE	CONC. UNITS

3. **Frequency Requirements**

A. Was a preparation blank analyzed for each matrix, for every 20 samples, and for each digestion batch? Yes or No

B. Was a calibration blank run at the beginning of the run, and every 10 samples or every 2 hours whichever is more frequent? Yes or No

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected:

Region .
Inorganic Data Review Worksheets

IV A. BLANK ANALYSIS RESULTS Sections 1-3

List the blank contamination in sections one 1 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks

Matrix: aqueous

DATE	CCB/CCB=	PREP BL	ANALYTE	CONC. UNITS
			CN	-2.436 ug/l

2. Equipment Trip Blanks

DATE	EQUIP BL =	ANALYTE	CONC. UNITS

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples, and for each digestion batch? Yes or No

B. Was a calibration blank run at the beginning of the run, and every 10 samples or every 2 hours whichever is more frequent? Yes or No

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected:

Region I
Inorganic Data Review Worksheets

IV B. BLANK ANALYSIS RESULTS (Section 4)

4. Blank Actions

The Action Level for any analyte is equal to 5X the highest concentration of that analyte found in any blank. (Use 5X the absolute value for any negative blank results). The Action Level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive result should be reported unless the concentration of the analyte in the sample exceeds the Action Level (AL) for that analyte. Specific actions are as follows:

1. When the concentration is greater than the IDL, but less than the Action Level, report the sample concentration detected with a U.

2. When the sample concentration is greater than the Action Level, report the sample concentration unqualified.

Matrix: aqueous

ELEMENT	MAX. CONC. UNITS	AL UNITS ug/l
Al	43.6	218
Sb	2.5	12.5
As	2.1	10.5
Ba	3.1	15.5
Be	0.3	1.5
Pb	2.9	14.5
Hg	-0.1	-0.5
Mg	42.6	213
K	16.2	81.0
Se	1.9	9.5
Ag	0.6	3.0
Ca	-2.436	-12.18

Matrix: _____

ELEMENT	MAX. CONC. UNITS	AL. UNIT.

NOTE: Blanks analyzed during a soil case must be converted to mg/kg in order to compare them with the sample results.

conc. in ug/l X $\frac{\text{Volume diluted to (200ml)}}{\text{Weight digested (1gram)}}$ X $\frac{1\text{L}}{1000\text{ml}}$ X $\frac{1000\text{g}}{1\text{kg}}$ X $\frac{1\text{mg}}{1000\text{ug}}$ = mg/kg

Multiplying this result by 5 to arrive at the Action Level gives a final result in mg/kg which can then be compared to sample results

Region I
Inorganic Data Review Worksheets

V B. ICP INTERFERENCE CHECK SAMPLE (Section 3)

3 Report the concentration of any elements detected in the ICS A solution > 2X IDL that should not be present.

ELEMENT	CONC. DETECTED IN THE ICS			CONC. OF INTERFERENTS IN THE ICS			
		U2 03		AL	CA	FE	MG
Ba	3	NA	NA	500,000	500,00	180,00	500,000
Cr	40	NA	NA				
Cu	23	~~NA~~ R	NA				
Co	7	NA	NA				
Mn	45	NA	NA				
Ni	16	NA	NA				
Ag	-4	U3	NA				
Va	-6	U3	NA				

Estimate the concentration produced by the interfering element in all affected samples. See the guidelines for examples. List the samples affected by the interferences below:

SAMPLE AFFECTED	ELEMENT AFFECTED	SAMPLE CONC. (µg/L)	SAMPLE INTERFERENT CONC. (µg/L)				ESTIMATED INTERF (µg/L)
			AL	CA	FE	MG	

ACTIONS:

1. In general, the sample data can be accepted without qualification if the sample concentrations of Al, Ca, Fe, and Mg are less than 50% of their respective levels in the ICS solution.
2. Estimate (J) positive results for affected elements for samples with levels of interferents 50% or more of that in the ICS solution.
3. Reject (R) positive results if the reported concentration is due entirely to the interfering element.
4. Estimate (UJ) non-detected results for which false negatives are suspect.

Give an explanation for any actions taken below:

Region I
Inorganic Data Review Worksheets

VI. MATRIX SPIKE

TR = MALQ02 Matrix: Aqueous

1. Recovery Criteria

List the percent recoveries for analytes which did not meet the required criteria.

S - amount of spike added
SSR - spiked sample result
SR - sample result

ANALYTE	SSR	SR	S	%R	ACTION
Sb	332.6	2.2U	500	66.5	J(+) UJ (ND)

Matrix Spike Actions apply to all samples of the same matrix.

ACTIONS:

1. If the sample concentration exceed the spike concentration by a factor of 4 or more, no action is taken.
2. If any analyte does not meet the %R criteria, follow the actions stated below:

	PERCENT RECOVERY		
	< 30%	30%-74%	>125%
Positive Sample Results	J	J	J
Non-detected Results	R	UJ	A

2. Frequency Criteria

A. Was a matrix spike prepared at the required frequency? Yes or No
B. Was a post digestion spike analyzed for elements that did not meet the required criteria for matrix spike recovery? Yes or No

A separate worksheet should be filled out for each matrix spike pair.

Region I
Inorganic Data Review Worksheets

VII. LABORATORY DUPLICATES

List the concentrations of any analyte not meeting the criteria for duplicate precision. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evaluate precision by circling either the RPD or CRDL for each element.

Matrix: Aqueous

ELEMENT	CRDL		SAMPLE #	DUPLICATE #	RPD	ACTION
	WATER ug/L	SOIL mg/kg	MA002	MA002D		
Aluminum	200					
Antimony	60					
Arsenic	10					
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25					
Iron	100					
Lead	5					
Magnesium	5000					
Manganese	15					
Mercury	0.2					
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000					
Thallium	10					
Vanadium	50					
Zinc	20					
Cyanide	10		0.9 U	13.6978	NC	J (+)

Laboratory duplicate actions should be applied to all other samples of the same matrix type.

ACTION:

1. Estimate (J) positive results for elements which have an RPD > 20% for waters and > 35% for soils.
2. If sample results are less than 5X the CRDL, estimate (J) positive results for elements whose absolute difference is > CRDL (2X CRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

Region I
Inorganic Data Review Worksheets

XI. INDUCTIVELY COUPLED PLASMA (ICP) SERIAL DILUTION ANALYSIS

_____ Serial dilutions were performed for each matrix and results of the diluted sample analysis agreed within ± 10% of the original undiluted analysis.

_____ Serial dilution was not performed for the following:

_____

_✓_ Serial dilutions were performed, but analytical results did not agree within ± 10% for analyte concentrations greater than 50X the IDL before dilution.

Report all results below that do not meet the required laboratory criteria for ICP serial dilution analysis.

Matrix:

ELEMENT	IDL	50X IDL	SAMPLE RESULT	SERIAL DILUTION	% D	ACTION
Aluminum						
Antimony						
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Magnesium						
Manganese						
Nickel						
Potassium		440	120300.2	76207.5	36.7	J(+)/UJ(ND)
Silver						
Sodium						
Vanadium						
Zinc						

Actions apply to all samples of the same matrix

ACTIONS:

1. Estimate (J) all positive results and (UJ) all nondetects if the % D > 15%.

MEMORANDUM

To: Standard Times Brownsfields Site Assessment File (J-020655-0002-005)

From: S. Harvey, Metcalf & Eddy (M&E)

Rev'd By: C. Lapite

Subject: Review of Analytical Results
RAS Case No. 27436; SDG No. MALP88

cc: B. Wyskowski
N. Thurber (memo only)

Date: December 15, 1999

On 28 September 1999 12 soil samples were collected at the Standard Times site, located in New Bedford, Massachusetts by Metcalf & Eddy field personnel. The sampling was performed as part of a Brownsfields Site Assessment. The samples were submitted to Sentinel, Inc. laboratory, located in Huntsville, Alabama for the analysis of low concentration metals and cyanide. All samples were received by the laboratory on 1 October 1999. The data package was received in the M&E Office on 14 November 1999. Included in Attachment I is a copy of the chain-of-custody (COC) record.

M&E reviewed the data in accordance with guidance received from EPA Work Assignment Manager, James Chow, in a September 17, 1999 letter to M&E Work Assignment Manager, Barb Wyskowski. The data review included:

*	•	Preservation and Technical Holding Times
	•	Initial and Continuing Calibration
	•	Blanks
*	•	Surrogate Compounds
	•	Matrix Spike (MS)/Matrix Spike Duplicates (MSD)
*	•	Laboratory Duplicates
*	•	Field Duplicates
*	•	Laboratory Fortified Blank (LFB) and/or Laboratory Control Sample (LCS)

*	=	All criteria met for this parameter.
NA	=	Not Applicable. No information was provided by the laboratory.

Included in Attachment II are the result summary sheets, annotated with the qualifiers detailed in this memorandum.

CRDL Recovery

The 2XCRDL calibration standard for ICP did not meet the acceptable criteria indicating that results close to the CRDL are questionable. A bias in the quantitation could not be determined.

Analyte	Percent Recovery	Samples Affected
Mercury	60%	All
Lead	125.7%; 127%	All

%R<80%: J (+) results and UJ (ND)
%R>120%: J (+)

Blank Analysis Results

A review of laboratory blank analysis results indicate the presence of laboratory contamination for the compounds listed below.

Element	Sample(s) Affected
Beryllium	MALP88-90, MALP92-99
Cadmium	MALP91
Selenium	MALP89, MALP90, MALP92-97, MALP99
Silver	MALP88, MALP89, MALP91-98
Mercury	MALP90, MALP93-95
Cyanide	MALP90-93, MALP97

Samples which have been listed as being affected had concentrations of the elements less than 5x the highest blank concentration for that element. The positive result in these samples for the elements indicated have been reported as the samples' quantitation limit, and have been qualified as non-detect (U).

Matrix Spike

The following matrix spike recoveries did not meet acceptable criteria indicating possible matrix interferance. Sample results may be biased low.

Analyte	%Recovery	Sample(s) Affected
Antimony	41.2%	All
Lead	70.1%	All

%R 30-74%: J (+), UJ (ND)

Results will be qualified as indicated above.

US EPA ARCHIVE DOCUMENT

EPA — Inorganic Traffic Report & Chain of Custody Record

United States Environmental Protection Agency
Contract Laboratory Program

(For Inorganic CLP Analyis)

Case No. 27436

1. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (specify in Column A)

2. Preservative (Enter in Column D)
1. HCl
2. HNO_3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (specify in Column D)
N. Not preserved

2. Region No. I — Sampling Co. Metcalf & Eddy

Sampler (Name) Derek St Onge

Sampler Signature D St Onge

3. Purpose* — Lead: SF, PRP, ST, FED; Early Action: CLEM, PA, REM, RI, SI, ESI (X); Long-Term Action: FS, RD, RA, O&M, NFLD

4. Date Shipped 9/30/99 — Carrier FedEx

Airbill Number 813808397305

5. Ship To: Sentrachem Inc. (256) 534-1800
2502 (Bldg) Wallace Ave
Suite C3
Huntsville, AL 35805
ATTN: Beverly Kilgore

6. Date Received -- Received by: 10/1/99 AB Hossett

Laboratory Contract Number 68-D5-0169 — Unit Price 85.00

7. Transfer to: — Date Received

Received by

Contract Number — Price

CLP Sample Numbers (from labels)	A Matrix (from Box 1) / Other	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 2) / Other	E – RAS Analysis: Diss. Metals	Total Metals	Cyanide	Low only: NO_2/NO_3	Low only: Fluoride	High only: pH	High only: Conduct.	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K High Phases: Solids	Water-Miscible Liq.	Water-Immis. Liq.
MALP88	5	L/m	G			X	X					133901	SS02015TF	9/29/99 1015	APF79	DS			
MALP89	5	L/m	G			X	X					133906	SS03015TF	9/28/99 1520	APF80	DS			
MALP90	5	L/m	G			X	X					133909	SS04015TF	9/28/99 1453	APF81	DS			
MALP91	5	L/m	G			X	X					133912	SS04025TF	9/28/99 1400	APF82	DS			
MALP92	5	L/m	G			X	X					133915	SS05015TF	9/28/99 1255	APF83	DS			
MALP93	5	L/m	G			X	X					133918	SS05025TF	9/28/99 1340	APF84	DS			
MALP94	5	L/m	G			X	X					133921	SS06015TF	9/28/99 1245	APF85	DS			
MALP95	5	L/m	G			X	X					133924	SS07015TF	9/28/99 0220	APF86	DS			
MALP96	5	L/m	G			X	X					133927	SS08015TF	9/28/99 1200	APF87	DS			
MALP97	5	L/m	G			X	X					133930	SS09015TF	9/28/99 1130	APF88	DS			

Shipment for Case Complete? (Y/N) N

Page 1 of 2

Sample(s) to be Used for Laboratory QC: MALP99 for MS

Additional Sampler Signatures: Constance Karle

Chain of Custody Seal Number(s)

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	9/30/99 1900				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	Is custody seal intact? (Y/N/none)
[signature]		Amanda B Hossett	10/1/99 0914		

DISTRIBUTION: Green - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to SMO

EPA Form 9110-1

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

A21-012-14 REV

364301

US EPA ARCHIVE DOCUMENT

EPA United States Environmental Protection Agency
Contract Laboratory Program

Inorganic Traffic Report & Chain of Custody Record
(For Inorganic CLP Analyis)

Case No. 27436

1. Matrix (Enter in Column A)
1. Surface Water
2. Ground Water
3. Leachate
4. Field QC
5. Soil/Sediment
6. Oil (High only)
7. Waste (High only)
8. Other (specify in Column A)

2. Preservative (Enter in Column D)
1. HCl
2. HNO_3
3. NaOH
4. H_2SO_4
5. $K_2CR_2O_7$
6. Ice only
7. Other (specify in Column D)
N. Not preserved

2. Region No.: 4
Sampling Co.: Metcalf + Eddy
Sampler (Name): Derek Slonac
Sampler Signature: DS Mac

4. Date Shipped: 9/29/99
Carrier: Fed Ex
Airbill Number: 813808397565

5. Ship To: Sentinel Inc (256)534-9800
2800 Bob Wallace Ave
Suite L3
Huntsville AL 35805
ATTN: Beverly Kilgore

3. Purpose*
Lead: SF, PRP, ST, FED
Early Action: CLEM, PA, REM, RI, SI (X), ESI
Long-Term Action: FS, RD, RA, O&M, NPLD

6. Date Received -- Received by: 10/1/99 ABGossett
Laboratory Contract Number: 68-D5-0169
Unit Price: 85.00
7. Transfer to:
Date Received
Received by
Contract Number
Price

CLP Sample Numbers (from labels)	A Matrix (from Box 1) / Other:	B Conc.: Low Med High	C Sample Type: Comp./ Grab	D Preservative (from Box 2) / Other:	E – RAS Analysis: Diss. Metals	Total Metals	Cyanide	Low only: NO_2/NO_3	Low only: Fluoride	High only: pH	High only: Conduct.	F Regional Specific Tracking Number or Tag Numbers	G Station Location Identifier	H Mo/Day/ Year/Time Sample Collection	I Corresponding CLP Organic Sample No.	J Sampler Initials	K High Phases: Solids	Water-Miscible Liq.	Water-Immis. Liq.
MALP98	5	Hm	G	6		X	X					133931	SS1090151FF	9/28/99	APF89	DS			
MALP99	5	Hm	G	6		X	X					133940 133941	SS1001STF	9/28/99	APF90	DS			
												Cooler Temperature Blanks							

17

Shipment for Case Complete? (Y/N): N
Page: 2 of 2
Sample(s) to be Used for Laboratory QC: use MALP99 for MS
Additional Sampler Signatures: Constance Lapete
Chain of Custody Seal Number(s)

CHAIN OF CUSTODY RECORD

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Constance Lapete	9/30/99 1900				
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	Is custody seal intact? Y/N/none
		Amanda B Gossett	10/1/99 0914		

DISTRIBUTION: Green - Region Copy; White - Lab Copy for Return to Region; Pink - CLASS Copy; Yellow - Lab Copy for Return to SMO

EPA Form 9110-1

SEE REVERSE FOR ADDITIONAL STANDARD INSTRUCTIONS
*SEE REVERSE FOR PURPOSE CODE DEFINITIONS

A21-012-14 REV.

364302

Region I
Data Review Worksheet

Site Name: Standard Times
Reference Number: _____

REGION I REVIEW OF INORGANIC CONTRACT LABORATORY DATA PACKAGE

The hardcopied (laboratory name) Sentinel, Inc data pacicage received at Region I has been reviewed and the quality assurance and performance data summarized. The data review included:

Case No. 27436
SDG No. MALP88
No. of Samples 12

SAS No. —
Matrix Soil

Sampling Date (s) 9/28/99
Shipping Date (s) 9/30/99
Date(s) rec'd by lab 10/1/99

Traffic Report Numbers: MALP88, MALP89, MALP90, MALP91, MALP92, MALP93, MALP94, MALP95, MALP96, MALP97, MALP98, MALP99

Trip Blank No.
Equipment Blank Number:
Field Duplicate Numbers: MALP97/MALP98

SOW No. ILM04 requires that specific analytical work be done and that associated reports be provided by the laboratory to the Regions, EMSL-LV, and SMO. The general criteria used to determine the performance were based on an examination of:

- -Data Completeness
- -Holding Times
- -Calibrations
- -Blanks
- -ICP Interference Check Results
- -Matrix Spike Recoveries
- -Laboratory Duplicates
- -Field Duplicates
- -Lab Control Sample Results
- -Furnace AA results
- -ICP Serial Dilution Results
- -Detection Limit Results
- -Sample Quantitation

Overall Comments:

Definitions and Qualifiers:

- A - Acceptable data
- J - Approximate data due to quality control criteria
- R - Reject data due to quality control criteria
- U - Analyte not detected

Reviewer: Sheila Harvey

Date: 11/30/99

Region I
Inorganic Data Review Worksheets

II. HOLDING TIMES

Complete table for all samples and circle the analysis date for samples not within criteria.

SAMPLE ID	DATE SAMPLED	~~HG~~ CN ANALYSIS DATE	~~CYANIDE~~ Hg ANALYSIS DATE	OTHERS ANALYSIS DATE	pH	ACTION
MALP88	9/28/99	10/8/99	10/6/99	10/6/99		
89						
90						
91						
92						
93						
94						
95						
96						
97						
98						
99				10/6 + 10/8/99		

METALS	180 DAYS FROM SAMPLE COLLECTION
MERCURY	28 DAYS FROM SAMPLE COLLECTION
CYANIDE	14 DAYS FROM SAMPLE COLLECTION

ACTION: all criteria met

1. If holding times are exceeded, and/or pH is >2 for metals and mercury or < 12 for cyanide, all positive results are estimated (J) and all non-detects are estimated (UJ).
2. If holding times are grossly exceeded, the reviewer may determine that non-detects are unusable (R).

Region I
Inorganic Data Review Worksheets

III A. Instrument Calibration (Section I continued)

CRDL Recovery Criteria (Custom Worksheet)

Matrix:

Please list below all analytes not meeting percent criteria in the CRDL standard.

Analyte	Percent Recovery (%)	Actions/Samples Affected
Mercury	40%	J(+) UJ (ND)
Lead	125.7%, 127.5%	J(+)

Actions:

1. If %R < 80%, J (+) results. UJ (ND)
2. If %R > 120%, J (+) only
3. J (+) and (UJ) ND samples < 3xCRDL
4. No actions for those samples > 3xCRDL

US EPA ARCHIVE DOCUMENT

Region I
Inorganic Data Review Worksheets

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in sections 1 and 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks

Matrix: ~~Soil~~ Soil

DATE	ICB/CCB#	PREP BL	ANALYTE	CONC UNITS
			Ba	1.1 ug/l
			Be	0.2 ug/l
			Cd	0.4 ug/l
			Cr	0.4 ug/l
			Co	0.6 ug/l
			Pb	2.2 ug/l
			K	5.6 ug/l
			Se	2.0 ug/l
			Ag	0.4 ug/l
			Pb	1.2 ug/l

2. Equipment Trip Blanks

DATE	EQUIP BL #	ANALYTE	CONC UNITS

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples, and for each digestion batch? **Yes or No**

B. Was a calibration blank run at the beginning of the run, and every 10 samples or every 2 hours whichever is more frequent? **Yes or No**

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected:

US EPA ARCHIVE DOCUMENT

Region 1
Inorganic Data Review Worksheets

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in sections 1 and 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks

Matrix: Soil

DATE	ICB/CCB#	PREP BL	ANALYTE	CONC UNITS
	2.1, 2.2, 2.0		Ba	
		0.1	Be	
	0.6	0.3	Cr	
	-0.1, -0.1, -0.1		Hg	
	0.9		Ni	
	10.0 9.0 8.8		K	
	2.0		Se	
	0.7 ~~0.9~~ 0.4		Ag	
	0.8		Va	
	-1.1 -1.7 -1.6		Ca	

2. Equipment Trip Blanks

DATE	EQUIP BL =	ANALYTE	CONC UNITS

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples, and for each digestion batch? Yes or No

B Was a calibration blank run at the beginning of the run, and every 10 samples or every 2 hours whichever is more frequent? Yes or No

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected:

Region 1
Inorganic Data Review Worksheets

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in sections 1 and 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks

Matrix: Soil

DATE	ICB/CCB#	PREP BL	ANALYTE	CONC UNITS
			Al	48.7 ug/l
			Ba	2.6
			Be	0.1
			Cr	0.3
			Co	0.7
			Mg	52.4
			K	9.6
			Si	2.0
			Ag	0.5
			Va	0.9

2. Equipment Trip Blanks

DATE	EQUIP BL #	ANALYTE	CONC UNITS

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples, and for each digestion batch? Yes or No

B. Was a calibration blank run at the beginning of the run, and every 10 samples or every 2 hours whichever is more frequent? Yes or No

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected:

Region 1
Inorganic Data Review Worksheets

IV A. BLANK ANALYSIS RESULTS (Sections 1-3)

List the blank contamination in sections 1 and 2 below. A separate worksheet should be used for soil and water blanks.

1. Laboratory Blanks

Matrix: Soil

DATE	ICB/CCB=	PREP BL mg/kg	ANALYTE	CONC UNITS
			Ag	0.08
			Cd	-0.131

2. Equipment Trip Blanks

DATE	EQUIP BL =	ANALYTE	CONC UNITS

3. Frequency Requirements

A. Was a preparation blank analyzed for each matrix, for every 20 samples, and for each digestion batch? Yes or No

B. Was a calibration blank run at the beginning of the run, and every 10 samples or every 2 hours whichever is more frequent? Yes or No

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify the data accordingly. Discuss any actions below, and list the samples affected:

Region I
Inorganic Data Review Worksheets

IV B. BLANK ANALYSIS RESULTS (Section 4)

4. Blank Actions

The Action Level for any analyte is equal to 5X the highest concentration of that analyte found in any blank. (Use 5X the absolute value for any negative blank results). The Action Level for samples which have been concentrated or diluted should be multiplied by the concentration/dilution factor. No positive result should be reported unless the concentration of the analyte in the sample exceeds the Action Level (AL) for that analyte. Specific actions are as follows:

1. When the concentration is greater than the IDL, but less than the Action Level, report the sample concentration detected with a U.

2. When the sample concentration is greater than the Action Level, report the sample concentration unquantified.

Matrix: Soil

ELEMENT	MAX. CONC. UNITS	AL UNITS
Ba	2.6 ug/l	13.0 ug/l
Be	0.2 ug/l	1.0 ug/l
Cd	0.4 ug/l	2.0 ug/l
Cr	0.6 ug/l	3.0 ug/l
Co	0.7 ug/l	3.5 ug/l
Pb	2.2 ug/l	11.0 ug/l
K	15.6 ug/l	78.0 ug/l
Se	2.0 ug/l	10.0 ug/l
Ag	0.7 ug/l	3.5 ug/l
Hg	-0.1 ug/l	-0.5 ug/l
Na	0.9 ug/l	4.5 ug/l
Vn	0.9 ug/l	4.5 ug/l

Matrix: Soil

ELEMENT	MAX. CONC. UNITS	AL UNITS
CN	-1.7 ug/l	-8.5 ug/l
Al	48.7 ug/l	243.5 ug/l
Mg	52.4 ug/l	262.0 ug/l

NOTE: Blanks analyzed during a soil case must be converted to mg/kg in order to compare them with the sample results.

conc. in ug/l X $\frac{\text{Volume diluted to (200ml)}}{\text{Weight digested (1gram)}}$ X $\frac{1L}{1000ml}$ X $\frac{1000g}{1kg}$ X $\frac{1mg}{1000ug}$ = mg/kg

Multiplying this result by 5 to arrive at the Action Level gives a final result in mg/kg which can then be compared to sample results

Region I
Inorganic Data Review Worksheets

VI. MATRIX SPIKE

TR = MALP99

Matrix: Soil

Recovery Criteria

List the percent recoveries for analytes which did not meet the required criteria.

S - amount of spike added
SSR - spiked sample result
SR - sample result

ANALYTE	SSR	SR	S	%R	ACTION
Sb	42.4274	0.4574	103.95	41.2	J(+), UJ(ND)
Pb	16.2703	13.3555	4.16	70.1	J(+), UJ(ND)

Matrix Spike Actions apply to all samples of the same matrix.

ACTIONS:

1. If the sample concentration exceed the spike concentration by a factor of 4 or more, no action is taken.
2. If any analyte does not meet the %R criteria, follow the actions stated below

	PERCENT RECOVERY		
	< 30%	30%-74%	>125%
Positive Sample Results	J	J	J
Non-detected Results	R	UJ	A

2. Frequency Criteria

A. Was a matrix spike prepared at the required frequency? Yes or No

B. Was a post digestion spike analyzed for elements that did not meet the required criteria for matrix spike recovery? Yes or No

A separate worksheet should be filled out for each matrix spike pair.

Region I
Inorganic Data Review Worksheets

VII. LABORATORY DUPLICATES

List the concentrations of any analyte not meeting the criteria for duplicate precision. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evaluate precision by circling either the RPD or CRDL for each element.

Matrix: Soil

ELEMENT	CRDL		SAMPLE # MALP99	DUPLICATE # MALP99D	RPD	ACTION
	WATER ug/L	SOIL mg/kg	mg/kg	mg/kg		
Aluminum	200					
Antimony	60					
Arsenic	10					
Barium	200					
Beryllium	5					
Cadmium	5					
Calcium	5000					
Chromium	10					
Cobalt	50					
Copper	25					
Iron	100					
Lead	5					
Magnesium	5000					
Manganese	15					
Mercury	0.2					
Nickel	40					
Potassium	5000					
Selenium	5					
Silver	10					
Sodium	5000	1,000	116.9439	75.8912		NA
Thallium	10					
Vanadium	50					
Zinc	20					
Cyanide	10					

Laboratory duplicate actions should be applied to all other samples of the same matrix type.

ACTION:

1. Estimate (J) positive results for elements which have an RPD > 20% for waters and > 35% for soils.
2. If sample results are less than 5X the CRDL, estimate (J) positive results for elements whose absolute difference is > CRDL (2X CRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

Region I
Inorganic Data Review Worksheets

VIII. FIELD DUPLICATES

List the concentrations of all analytes in the field duplicate pair. For soil duplicates, calculate the CRDL in mg/kg using the sample weight, volume and percent solids data for the sample. Indicate what criteria was used to evaluate precision by circling either the RPD or CRDL for each element.

Matrix: Soil

ELEMENT	CRDL		SAMPLE # MA2P97	DUPLICATE # MA2P98	RPD	ACTION
	WATER ug/L	SOIL mg/kg	mg/kg	mg/kg		
Aluminum	200	40	3390	3070	9.9	NA
Antimony	60					
Arsenic	10	2	1.7	1.6		NA
Barium	200	40	8.1	7.1		NA
Beryllium	5	1	0.04	0.06		NA
Cadmium	5					
Calcium	5000	1000	552	497		NA
Chromium	10	2	7.1	6.2		NA
Cobalt	50	10	1.8	1.5		NA
Copper	25	5	7.3	5.2		NA
Iron	100	20	6370	5600	12.9	NA
Lead	5	1	5.4	5.1		NA
Magnesium	5000	1000	1260	1100		NA
Manganese	15	3	65.9	61.4	7.1	NA
Mercury	0.2					
Nickel	40	8	3.8	3.2		NA
Potassium	5000	1000	556	442		NA
Selenium	5	1	0.55			NA
Silver	10	2	0.13	0.09		NA
Sodium	5000	1,000	132	98.2		NA
Thallium	10					
Vanadium	50	10	10.1	8.5		NA
Zinc	20	4	14.4	13.1		NA
Cyanide	10	2	0.29			NA

Field duplicate actions should be applied to all other samples of the same matrix type.

ACTION:

1. Estimate (J) positive results for elements which have an RPD > 30% for waters and > 50% for soils.
2. If sample results are less than 5X the CRDL, estimate (J) positive results for analytes whose absolute difference is > 2X CRDL (4X CRDL for soils). If both samples are non-detected, the RPD is not calculated (NC).

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALP88

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALP88

Matrix (soil/water): SOIL Lab Sample ID: 25275S

Level (low/med): LOW Date Received: 10/01/99

% Solids: 90.6

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5110			P
7440-36-0	Antimony	0.48	U	J N	P
7440-38-2	Arsenic	1.3			P
7440-39-3	Barium	18.3			P
7440-41-7	Beryllium	0.02		U	P
7440-43-9	Cadmium	0.09	U		P
7440-70-2	Calcium	559			P
7440-47-3	Chromium	4.4			P
7440-48-4	Cobalt	1.5			P
7440-50-8	Copper	4.7			P
7439-89-6	Iron	5770			P
7439-92-1	Lead	30.0	J	N	P
7439-95-4	Magnesium	834			P
7439-96-5	Manganese	91.8			P
7439-97-6	Mercury	0.06	U	J	CV
7440-02-0	Nickel	2.8			P
7440-09-7	Potassium	253			P
7782-49-2	Selenium	0.39	U		P
7440-22-4	Silver	0.13		U	P
7440-23-5	Sodium	94.0			P
7440-28-0	Thallium	0.43	U		P
7440-62-2	Vanadium	8.6			P
7440-66-6	Zinc	20.0			P
	Cyanide	0.05	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

2

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALP89

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALP88

Matrix (soil/water): SOIL Lab Sample ID: 25276S

Level (low/med): LOW Date Received: 10/01/99

% Solids: 85.1

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3860			P
7440-36-0	Antimony	0.51	U		P
7440-38-2	Arsenic	14.3			P
7440-39-3	Barium	55.1			P
7440-41-7	Beryllium	0.12	U		P
7440-43-9	Cadmium	0.09	U		P
7440-70-2	Calcium	737			P
7440-47-3	Chromium	4.5			P
7440-48-4	Cobalt	2.7			P
7440-50-8	Copper	16.5			P
7439-89-6	Iron	9730			P
7439-92-1	Lead	105			P
7439-95-4	Magnesium	929			P
7439-96-5	Manganese	65.9			P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	5.1			P
7440-09-7	Potassium	985			P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.23	U		P
7440-23-5	Sodium	255			P
7440-28-0	Thallium	0.47	U		P
7440-62-2	Vanadium	9.2			P
7440-66-6	Zinc	58.9			P
	Cyanide	0.05	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

3

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALP90

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALP88

Matrix (soil/water): SOIL Lab Sample ID: 25277S

Level (low/med): LOW Date Received: 10/01/99

% Solids: 90.6

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3720			P
7440-36-0	Antimony	21.4	J	N	P
7440-38-2	Arsenic	5.5			P
7440-39-3	Barium	165			P
7440-41-7	Beryllium	0.11	B	U	P
7440-43-9	Cadmium	1.9			P
7440-70-2	Calcium	4900			P
7440-47-3	Chromium	9.1		N	P
7440-48-4	Cobalt	3.5	B		P
7440-50-8	Copper	47.7			P
7439-89-6	Iron	17400			P
7439-92-1	Lead	3640	J	NE	P
7439-95-4	Magnesium	1290		E	P
7439-96-5	Manganese	141			P
7439-97-6	Mercury	0.07	B	UJ	CV
7440-02-0	Nickel	7.6	B		P
7440-09-7	Potassium	324	B	E	P
7782-49-2	Selenium	0.96	B	U	P
7440-22-4	Silver	0.82	B		P
7440-23-5	Sodium	129	B		P
7440-28-0	Thallium	0.43	U		P
7440-62-2	Vanadium	11.7			P
7440-66-6	Zinc	327			P
	Cyanide	0.21	B	U	CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

4

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALP91

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALP88

Matrix (soil/water): SOIL Lab Sample ID: 25278S

Level (low/med): LOW Date Received: 10/01/99

% Solids: 81.8

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3950			P
7440-36-0	Antimony	0.54	U	J N	P
7440-38-2	Arsenic	14.7			P
7440-39-3	Barium	125			P
7440-41-7	Beryllium	0.59	B		P
7440-43-9	Cadmium	0.34	B	U	P
7440-70-2	Calcium	6110			P
7440-47-3	Chromium	5.7		E	P
7440-48-4	Cobalt	3.5	B		P
7440-50-8	Copper	57.5			P
7439-89-6	Iron	10700			P
7439-92-1	Lead	379	J	NE E	P
7439-95-4	Magnesium	1880			P
7439-96-5	Manganese	122			P
7439-97-6	Mercury	0.27	J		CV
7440-02-0	Nickel	8.0	B		P
7440-09-7	Potassium	480	B	E	P
7782-49-2	Selenium	2.8			P
7440-22-4	Silver	0.15	B	U	P
7440-23-5	Sodium	305	B		P
7440-28-0	Thallium	0.49	U		P
7440-62-2	Vanadium	14.9			P
7440-66-6	Zinc	142			P
	Cyanide	0.27	B	U	CA

Color Before: BLACK Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALP92

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALP88

Matrix (soil/water): SOIL Lab Sample ID: 25279S

Level (low/med): LOW Date Received: 10/01/99

% Solids: 88.6

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3680			P
7440-36-0	Antimony	0.49	U		P
7440-38-2	Arsenic	7.1			P
7440-39-3	Barium	86.8			P
7440-41-7	Beryllium	0.11			P
7440-43-9	Cadmium	0.09	U		P
7440-70-2	Calcium	1400			P
7440-47-3	Chromium	9.1			P
7440-48-4	Cobalt	3.1			P
7440-50-8	Copper	32.8			P
7439-89-6	Iron	16600			P
7439-92-1	Lead	151	J		P
7439-95-4	Magnesium	1280			P
7439-96-5	Manganese	121			P
7439-97-6	Mercury	0.41			CV
7440-02-0	Nickel	8.0			P
7440-09-7	Potassium	433			P
7782-49-2	Selenium	1.1			P
7440-22-4	Silver	0.31			P
7440-23-5	Sodium	132			P
7440-28-0	Thallium	0.45	U		P
7440-62-2	Vanadium	22.8			P
7440-66-6	Zinc	85.1			P
	Cyanide	0.10			CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALP93

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALP88

Matrix (soil/water): SOIL Lab Sample ID: 25280S

Level (low/med): LOW Date Received: 10/01/99

% Solids: 84.3

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3880			P
7440-36-0	Antimony	0.52	U	J N	P
7440-38-2	Arsenic	6.6			P
7440-39-3	Barium	28.9	B		P
7440-41-7	Beryllium	0.09	B	U	P
7440-43-9	Cadmium	0.09	U		P
7440-70-2	Calcium	1500			P
7440-47-3	Chromium	8.5		E	P
7440-48-4	Cobalt	2.3	B		P
7440-50-8	Copper	28.5			P
7439-89-6	Iron	12400			P
7439-92-1	Lead	99.7	J	NE	P
7439-95-4	Magnesium	943	B	E	P
7439-96-5	Manganese	85.7			P
7439-97-6	Mercury	0.08	B	UJ	CV
7440-02-0	Nickel	5.5	B		P
7440-09-7	Potassium	308	B	E	P
7782-49-2	Selenium	1.1	B	U	P
7440-22-4	Silver	0.23	B	U	P
7440-23-5	Sodium	114	B		P
7440-28-0	Thallium	0.47	U		P
7440-62-2	Vanadium	11.5	B		P
7440-66-6	Zinc	55.8			P
	Cyanide	0.13	B	U	CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALP94

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALP88

Matrix (soil/water): SOIL Lab Sample ID: 25281S

Level (low/med): LOW Date Received: 10/01/99

% Solids: 91.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3940			P
7440-36-0	Antimony	0.47	U	J N	P
7440-38-2	Arsenic	3.9			P
7440-39-3	Barium	54.2			P
7440-41-7	Beryllium	0.09	B	U	P
7440-43-9	Cadmium	0.09	U		P
7440-70-2	Calcium	1180			P
7440-47-3	Chromium	10.6		E	P
7440-48-4	Cobalt	2.6	B		P
7440-50-8	Copper	20.8			P
7439-89-6	Iron	6130			P
7439-92-1	Lead	134	J	NE	P
7439-95-4	Magnesium	1460		E	P
7439-96-5	Manganese	76.5			P
7439-97-6	Mercury	0.09	B	UJ	CV
7440-02-0	Nickel	6.8	B		P
7440-09-7	Potassium	466	B	E	P
7782-49-2	Selenium	0.42	B	U	P
7440-22-4	Silver	0.17	B	U	P
7440-23-5	Sodium	94.9	B		P
7440-28-0	Thallium	0.43	U		P
7440-62-2	Vanadium	10.6	B		P
7440-66-6	Zinc	69.5			P
	Cyanide	0.05	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALP95

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALP88

Matrix (soil/water): SOIL Lab Sample ID: 25282S

Level (low/med): LOW Date Received: 10/01/99

% Solids: 89.8

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3650			P
7440-36-0	Antimony	0.49	U	J N	P
7440-38-2	Arsenic	3.5			P
7440-39-3	Barium	37.5	B		P
7440-41-7	Beryllium	0.11	B	U	P
7440-43-9	Cadmium	0.09	U		P
7440-70-2	Calcium	1070	B		P
7440-47-3	Chromium	6.4		E	P
7440-48-4	Cobalt	2.2	B		P
7440-50-8	Copper	15.5			P
7439-89-6	Iron	6290			P
7439-92-1	Lead	66.4	J	NE	P
7439-95-4	Magnesium	1190		E	P
7439-96-5	Manganese	84.5			P
7439-97-6	Mercury	0.05	B	UJ	CV
7440-02-0	Nickel	4.8	B		P
7440-09-7	Potassium	433	B	E	P
7782-49-2	Selenium	0.49	B	U	P
7440-22-4	Silver	0.13	B	U	P
7440-23-5	Sodium	122	B		P
7440-28-0	Thallium	0.44	U		P
7440-62-2	Vanadium	11.1			P
7440-66-6	Zinc	39.3			P
	Cyanide	0.05	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

9

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALP96

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALP88

Matrix (soil/water): SOIL Lab Sample ID: 25283S

Level (low/med): LOW Date Received: 10/01/99

% Solids: 96.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2620			P
7440-36-0	Antimony	0.45	U	J	P
7440-38-2	Arsenic	1.3			P
7440-39-3	Barium	8.1			P
7440-41-7	Beryllium	0.06		U	P
7440-43-9	Cadmium	0.08	U		P
7440-70-2	Calcium	468			P
7440-47-3	Chromium	4.3			P
7440-48-4	Cobalt	1.4			P
7440-50-8	Copper	4.4			P
7439-89-6	Iron	4500			P
7439-92-1	Lead	5.0	J		P
7439-95-4	Magnesium	891			P
7439-96-5	Manganese	58.2			P
7439-97-6	Mercury	0.05	U	J	CV
7440-02-0	Nickel	3.4			P
7440-09-7	Potassium	251			P
7782-49-2	Selenium	0.42		U	P
7440-22-4	Silver	0.16		U	P
7440-23-5	Sodium	95.9			P
7440-28-0	Thallium	0.41	U		P
7440-62-2	Vanadium	5.8			P
7440-66-6	Zinc	11.9			P
	Cyanide	0.05	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

10

EPA SAMPLE NO.

MALP97

INORGANIC ANALYSIS DATA SHEET

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALP88

Matrix (soil/water): SOIL Lab Sample ID: 25284S

Level (low/med): LOW Date Received: 10/01/99

% Solids: 90.5

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3390			P
7440-36-0	Antimony	0.49	U	J N	P
7440-38-2	Arsenic	1.7	B		P
7440-39-3	Barium	8.1	B		P
7440-41-7	Beryllium	0.04	B	U	P
7440-43-9	Cadmium	0.09	U		P
7440-70-2	Calcium	556	B		P
7440-47-3	Chromium	7.1		E	P
7440-48-4	Cobalt	1.8	B		P
7440-50-8	Copper	7.3			P
7439-89-6	Iron	6370			P
7439-92-1	Lead	5.4	J	NE	P
7439-95-4	Magnesium	1260		E	P
7439-96-5	Manganese	65.9			P
7439-97-6	Mercury	0.06	U	J	CV
7440-02-0	Nickel	3.8	B		P
7440-09-7	Potassium	556	B	E	P
7782-49-2	Selenium	0.55	B	U	P
7440-22-4	Silver	0.13	B	U	P
7440-23-5	Sodium	132	B		P
7440-28-0	Thallium	0.44	U		P
7440-62-2	Vanadium	10.1	B		P
7440-66-6	Zinc	14.4			P
	Cyanide	0.29	B	U	CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

MALP98

INORGANIC ANALYSIS DATA SHEET

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALP88

Matrix (soil/water): SOIL Lab Sample ID: 25285S

Level (low/med): LOW Date Received: 10/01/99

% Solids: 91.5

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3070			P
7440-36-0	Antimony	0.47	U	J N	P
7440-38-2	Arsenic	1.6	B		P
7440-39-3	Barium	7.1	B		P
7440-41-7	Beryllium	0.06	B	U	P
7440-43-9	Cadmium	0.09	U		P
7440-70-2	Calcium	497	B		P
7440-47-3	Chromium	6.2		E	P
7440-48-4	Cobalt	1.5	B		P
7440-50-8	Copper	5.2	B		P
7439-89-6	Iron	5600			P
7439-92-1	Lead	5.1	J	NE	P
7439-95-4	Magnesium	1100		E	P
7439-96-5	Manganese	61.4			P
7439-97-6	Mercury	0.05	U	J	CV
7440-02-0	Nickel	3.2	B		P
7440-09-7	Potassium	442	B	E	P
7782-49-2	Selenium	0.39	U		P
7440-22-4	Silver	0.09	B	U	P
7440-23-5	Sodium	98.2	B		P
7440-28-0	Thallium	0.43	U		P
7440-62-2	Vanadium	8.5	B		P
7440-66-6	Zinc	13.1			P
	Cyanide	0.05	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MALP99

Lab Name: SENTINEL INC. Contract: 68-D5-0169

Lab Code: SENTIN Case No.: 27436 SAS No.: SDG No.: MALP88

Matrix (soil/water): SOIL Lab Sample ID: 25286S

Level (low/med): LOW Date Received: 10/01/99

% Solids: 96.2

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2020			P
7440-36-0	Antimony	0.46	U	J	P
7440-38-2	Arsenic	1.0			P
7440-39-3	Barium	10.4			P
7440-41-7	Beryllium	0.04	U		P
7440-43-9	Cadmium	0.08	U		P
7440-70-2	Calcium	966			P
7440-47-3	Chromium	3.8		E	P
7440-48-4	Cobalt	1.2			P
7440-50-8	Copper	6.7			P
7439-89-6	Iron	3400			P
7439-92-1	Lead	13.4	J	NE	P
7439-95-4	Magnesium	858		E	P
7439-96-5	Manganese	51.8			P
7439-97-6	Mercury	0.05	U	J	CV
7440-02-0	Nickel	3.0			P
7440-09-7	Potassium	256		E	P
7782-49-2	Selenium	0.39	U		P
7440-22-4	Silver	0.08	U		P
7440-23-5	Sodium	117			P
7440-28-0	Thallium	0.42	U		P
7440-62-2	Vanadium	4.9			P
7440-66-6	Zinc	13.2			P
	Cyanide	0.05	U		CA

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: COLORLESS Clarity After: Artifacts:

Comments:

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APPENDIX F. MADEP SITE SCORING MAP

MA DEP - Bureau of Waste Site Cleanup

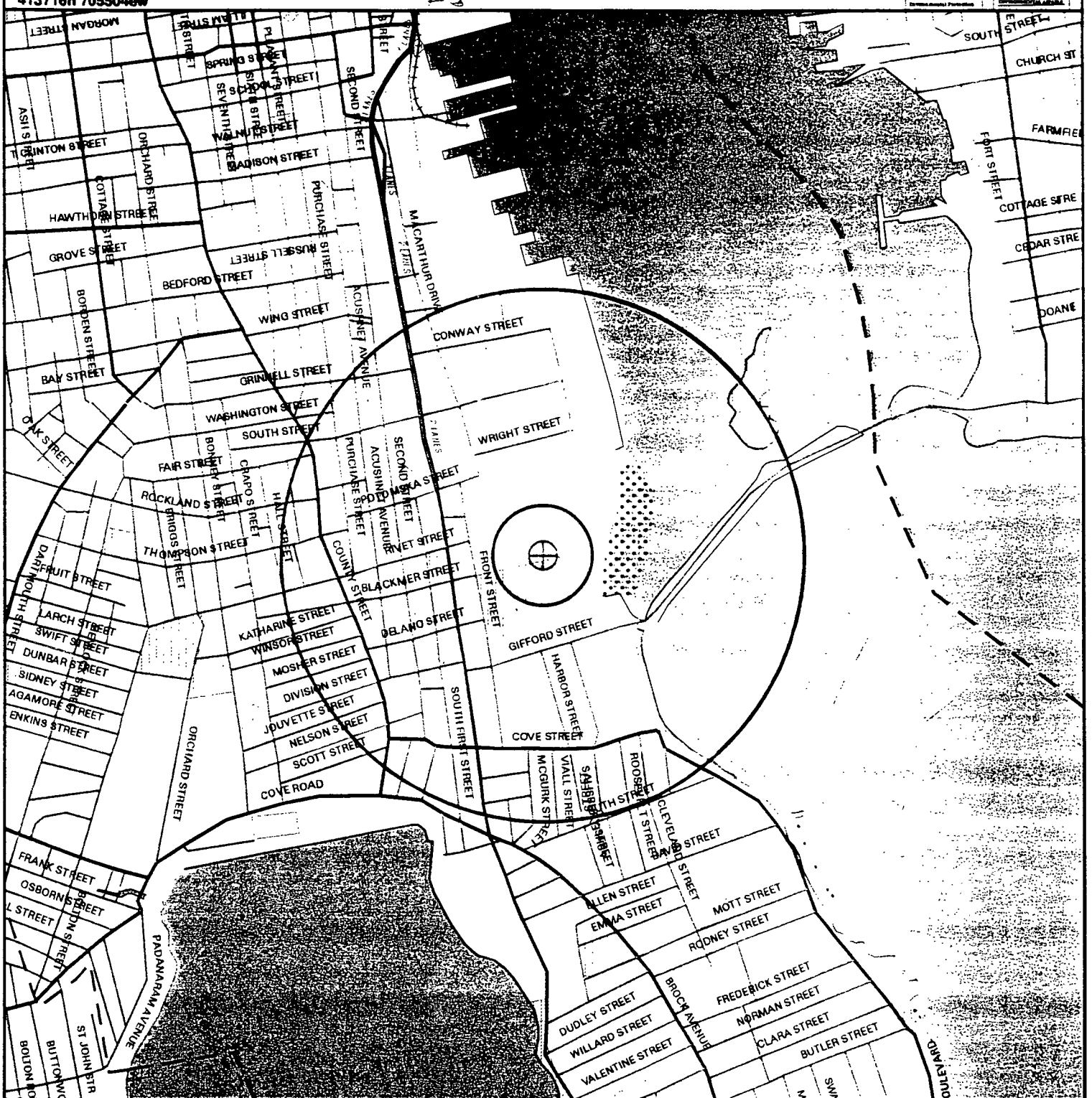
Site Scoring Map: 500 feet & 0.5 Mile Radii

SITE NAME:
Standard Times Field
South Front Street
Between Gifford and Wright St.
New Bedford
413716n 705504ew

Site Location

The information shown on this map is the best available at the date of printing. Please refer to the data source descriptions document.

MASSGIS — Massachusetts Geographic Information System — Massachusetts Executive Office of Environmental Affairs - 1999



Roads: Limited Access, Divided, Major Road, Connector, Street, Track, Trail

Boundaries: Town, County, DEP Region; Train; Powerline; Pipeline; Aqueduct

Basins: Major, Sub; Streams: Perennial, Intermittent, Man Made Shore, Dams

Potentially Productive Aquifers: Medium,High Yield .....

Non-Potential Drinking Water Source Area: Medium,High Yield

EPA Designated Sole Source Aquifer .....

Public Water Supplies: Ground,Surface,Non Community

Approved Zone2; IWPA; Surface Water Supply Zone A

Hydrography: Water Features,Public Surface Water Supply ...

Wetlands: Fresh,Salt,NHESP Wetlands Habitat .....

Protected Open Space; ACEC .....

DEP Permitted Solid Waste Facilities; Certfied Vernal Pools ...

N W E S

SCALE 1:15000

0 1/2 MILES

0 1/2 KILOMETERS

July 26, 1999

APPENDIX G. STATEMENT OF LIMITATIONS

Metcalf & Eddy

STATEMENT OF LIMITATIONS

The data presented and the opinions expressed in this report are qualified as follows:

1. The sole purpose of the investigation and of this report is to assess the physical characteristics of the Site with respect to the presence or absence in the environment of oil or hazardous materials and substances as defined in the applicable state and federal environmental laws and regulations and to gather information regarding current and past environmental conditions at the Site.

2. Metcalf & Eddy (M&E) derived the data in this report primarily from visual inspections, examination of records in the public domain, interviews with individuals with information about the Site, and a limited number of subsurface explorations made on the dates indicated. The passage of time, manifestation of latent conditions or occurrence of future events may require further exploration at the Site, analysis of the data, and reevaluation of the findings, observations, and conclusions expressed in the report.

3. In preparing this report, M&E has relied upon and presumed accurate certain information (or the absence thereof) about the Site and adjacent properties provided by governmental officials and agencies, the Client, and others identified herein. Except as otherwise stated in the report, M&E has not attempted to verify the accuracy or completeness of any such information.

4. The data reported and the findings, observations, and conclusions expressed in the report are limited by the Scope of Services, including the extent of subsurface exploration and other tests. The Scope of Services was defined by the requests of the Client, the time and budgetary constraints imposed by the Client, and the availability of access to the Site.

5. Because of the limitations stated above, the findings, observations, and conclusions expressed by M&E in this report are not, and should not be considered, an opinion concerning the compliance of any past or present owner or operator of the site with any federal, state or local law or regulation. No warranty or guarantee, whether express or implied, is made with respect to the data reported or findings, observations, and conclusions expressed in this report. Further, such data, findings observations, and conclusions are based solely upon site conditions in existence at the time of investigation.

6. This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the Agreement and the provisions thereof.