SITE INSPECTION

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NOV 22 1999
File # DE 287
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PENINSULA PLATING
BLADES, SUSSEX COUNTY, DELAWARE

DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

DE-287

November, 1999

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EXECUTIVE SUMMARY

The Delaware Department of Natural Resources and Environmental Control (DNREC) Site Investigation and Restoration Branch (SIRB), in cooperation with the United States Environmental Protection Agency (EPA), conducted a Site Inspection (SI) for the Peninsula Plating property located at East 7th Street and River Road in Blades, Delaware.

The property is located in the Town of Blades, Sussex County, Delaware. River Road borders the property to the south, Market Street to the east, the Conrail railroad to the west and the Town Hall and residential properties along 4th Street to the north. The site consists of approximately 5.8 acres, and is located on the west side of the town. The coordinates of the site are 38^0 37' 56" North, and 75^0 36' 38" West (1987). Orthophotos for 1992 and 1997 are shown in Figures 6 and 7.

There are six older warehouse/storage type buildings present on the property of various sizes and conditions. The property is zoned as a Manufacturing/Warehouse district. Recently the buildings have been leased out to a variety of companies including a metal plating company, a vending company, a sign company, a trash hauling firm, a steel products company, a bread company distribution center, and several other operations. The property is currently vacant except for one building being used for storage.

In 1995, EPA Region III conducted a CERCLA Removal Action at the abandoned plating facility building that contained numerous vats, tanks, drums and small containers of hazardous material left unsecured and abandoned. The materials included flammable liquids, corrosive liquids, oxidizers, cadmium-contaminated liquids and chromium-contaminated solids. Only the plating facility, which occupied approximately one-half of one building (#4 on the map, Figure 5), was involved in the removal action.

The purpose of the Site Inspection (SI) was to investigate the possible existence of released hazardous substances at the Peninsula Plating site through the collection and analysis of environmental samples. The media sampled included surface soils, deep soils, and groundwater. Soil samples were field screened by the DNREC-SIRB Analytical Chemist and selected samples were submitted to STL-Envirotech, Edison, NJ, or to the DNREC Division of Water Resources Environmental Services Laboratory for analysis of specified parameters.

The analytical data generated from the collection and laboratory analysis of the environmental samples was subsequently evaluated to determine the potential for human and environmental exposures to hazardous substances.

After the completion of the SI, DNREC submitted the report to the EPA and State officials who will decide whether the site should undergo further investigation or obtain a "No Further Action" (NFA) designation under the Federal Superfund and/or State Site Investigation & Restoration Branch Programs.

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The SI is intended to provide a general characterization of the environmental conditions present at the site and does not provide a 100% complete surface and subsurface assessment of the project area or individual properties. The assessments contained within are based solely on conditions at the time of sampling and the specific locations evaluated. This report is not intended to constitute an environmental or structural assessment of the buildings on site.

As part of the SI, 10 test pits were excavated and 11 shallow and 11 deep soil samples were collected. Six additional shallow soil samples were collected from areas throughout the property. Test pit logs indicate that the site has received very little fill materials.

The site is mostly open space with six buildings across the area. There is a small amount of pavement and the remaining area is bare dirt, sand or grass covered. The site is not fenced. Part of the northern border of the site is wooded and a pile of wood, tires, and miscellaneous debris is located on the edge of the woods. A small ditch is located near the center of the site and runs south toward River Road.

Soil samples were collected from 10 test pits locations throughout the site area. Soil samples were field screened for PCBs and PAHs and related pesticides using immunoassay test kits and for metals using XRF.

Based on the results of field screening, soil samples from the Peninsula Plating property exhibited elevated concentrations of some metals, most notably carcinogenic Arsenic. Arsenic was detected in nine (9) shallow and one (1) deep test pit soil samples in excess of screening benchmarks. Other metals that exceeded the screening benchmarks include Chromium, Iron, Manganese, Vanadium, Thallium, and Zinc.

Elevated Arsenic concentrations were confirmed by laboratory analysis of selected samples. Two out of the three soil samples submitted to the laboratory exhibited Arsenic concentrations greater than screening benchmarks, with a high of 3.1 mg/Kg Arsenic in sample TP-9S.

Carcinogenic Arsenic was the only metal detected in the samples sent to the laboratory which exceeded the EPA RBCs and/or HSCA URS benchmarks.

Immunoassay screening and subsequent laboratory analysis of soil samples indicated no significant concentrations of PCBs to be present in the site samples.

Semivolatile organic compounds were detected by laboratory analysis in TP-2S, TP-9S, and TP-11S (field duplicate to TP-2S) in excess of RBC and URS benchmarks. There was no detection of semivolatiles in SS-6, however, due to the detection of motor oil in the sample, the quantitation limits had been raised. The SIRB Analytical Chemist reported the presence of motor oil in sample SS-6 that resulted in an increase in the quantitation limits. In addition, purple colored stained soils and strong odors were noted several feet deep in the test pit logs for Test Pit TP-3. The material was not identified by the laboratory analysis, but appeared to be a hydraulic or brake fluid type substance.

Carcinogenic PAHs were the primary organic contaminant of concern with five out of the six samples submitted for laboratory analysis exceeding the screening benchmark. The highest total PAH concentration was 60.3 ppm in sample TP-9S.

Based upon the information collected during the Site Inspection at the Peninsula Plating site, DNREC-SIRB identified the following issues and concerns, which need to be addressed with DNREC oversight:

- Based upon the organic contaminants detected in the on-site soils, there is potential exposure of people to contaminated soil through inadvertent ingestion and airborne dust in some areas of the property, primarily during excavation,

- At least one underground storage tank (UST) appears to be present on the site near Building #1, Figure 5. No record of this tank was located in DNREC UST Branch records. The DNREC-UST Branch should be contacted regarding proper registration of the tank. Removal of the tank and subsequent sampling and analysis of the surrounding soil may be required.

- A possible vent or fill pipe was noted on the southeast corner of Building #3, Figure 5. This area should be investigated for the possible presence of a UST. Due to the age of the buildings on the property, the presence of additional USTs is possible.

- Some of the buildings on-site may contain asbestos containing materials (ACM). This report does not constitute a pre-demolition/renovation NESHAP survey. DNREC-SIRB advises that prior to any demolition or renovation, an asbestos survey, via a State of Delaware Certified Professional Firm be conducted to identify possible asbestos containing materials.

- Several containers of paints, oils and other unknown materials were noted in some of the buildings during the site visit. These materials should be identified, and then removed and properly disposed of at an appropriate facility under applicable regulations. The DNREC Hazardous Waste Management Branch should be contacting regarding the proper disposal of these materials.

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1.0 INTRODUCTION

The Delaware Department of Natural Resources and Environmental Control (DNREC), Site Investigation and Restoration Branch (SIRB), in cooperation with the United States Environmental Protection Agency (EPA), conducted a Site Inspection (SI) at the Peninsula Plating site (Figures 1, 2, 3, 4, 5) located on River Road, in the Town of Blades, Sussex County, Delaware.

The purpose of the Site Inspection was to investigate the possible existence of released hazardous substances at the site through the collection and analysis of environmental samples. The analytical data generated from the collection and laboratory analysis of the environmental samples was subsequently evaluated to determine the potential for human and environmental exposures to hazardous substances. After the completion of the SI, DNREC will submit a report to the EPA and State officials who will decide whether the site should undergo further investigation or obtain a "No Further Action" (NFA) designation under the Federal Superfund and/or State Site Investigation & Restoration Branch Programs.

This study is intended to provide a general characterization of the environmental conditions present at the site and does not provide a 100% complete surface and subsurface assessment of the project area or individual properties. The assessments contained within are based solely on conditions at the time of sampling and the specific locations evaluated, and must be viewed in that context. This report is not intended to constitute an environmental or structural assessment of the buildings on site.

2.0 SITE DESCRIPTION AND OPERATIONAL HISTORY

2.1. Site Description

The property is located in the Town of Blades, Sussex County, Delaware. River Road borders the property to the south, Market Street to the east, the Conrail railroad to the west and the Town Hall and residential properties along 4th Street to the north. The site consists of approximately 5.8 acres, and is located on the west side of the town. The coordinates of the site are 38^0 37' 56" North, and 75^0 36' 38" West (1987). Orthophotos for 1992 and 1997 are shown in Figures 6 and 7.

There are six older warehouse/storage type buildings present on the property of various sizes and conditions. The property is zoned as a Manufacturing/Warehouse district. Recently the buildings have been leased out to a variety of companies including a metal plating company, a vending company, a sign company, a trash hauling firm, a steel products company, a bread company distribution center and several other operations. The property is currently vacant except for one building being used for storage.

In 1995, EPA Region III conducted a CERCLA Removal Action at the abandoned plating facility building that contained numerous vats, tanks, drums and small containers of hazardous material left unsecured and abandoned. The materials included flammable liquids, corrosive liquids, oxidizers, cadmium-contaminated liquids and chromium-contaminated solids. Only the plating facility, which occupied approximately one-half of one building (#4 on the map, Figure 5), was involved in the removal action.

The site is mostly open space with six buildings across the area. There is a small amount of pavement and the remaining area is bare dirt, sand or grass covered. The site is not fenced and is accessible on all sides. Part of the northern border of the site is wooded and a pile of wood, tires, and miscellaneous debris is located on the edge of the woods. A small ditch is located near the center of the site and runs west towards the railroad track.

The largest building on the property (#5 on the map, Figure 5) has three above ground storage tank containment pads located outside the structure. Only one of the pads has a fuel tank at present, which is labeled #2 fuel oil. The northernmost building (#1 on the map, Figure 5) has a fuel pump and fill pipe located on the southeast corner of the structure. A possible fill or vent pipe was also located on the southeast corner of the #3 building (Figure 5). A small water meter house is located along River Road near the center of the property. Several sewer manholes were noted near the center of the property, along with a possible septic drain field.

Several cans of paint, oil, waste oil, and other miscellaneous debris were observed inside several of the buildings on site. Evidence of trespassing, such as campfires and numerous aerosol spray cans were also observed in one building (#1 on the map, Figure 5).

Two public water wells serving the Town of Blades are located on the adjacent parcel immediately north of the subject property.

A small park is located south of the site across River Road.

The ownership of the site is currently in limbo as a result of the sale and subsequent foreclosure due to non-payment of the mortgage. The trustee of the property (Wilmington Trust Company) and a representative of the beneficiaries of the trust have been contacted with regard to the investigation

DNREC - Property Owner Site Visits – Peninsula Plating site

On June 10, 1999, the DNREC-SIRB Project Officer toured the property with a representative of the beneficiaries of the trust and the caretaker of the property. A site description is provided in Section 2.1.

3.0 PREVIOUS INVESTIGATIONS

Several previous studies have been conducted on portions of the subject property. The reports that were located are summarized below.

Phase I Audit - Blades Commercial Complex – River Road and Market Street, February 28, 1992

A Phase I Audit was conducted on the portion of the site in the area of the Continental Bakery building (#5, Figure 5) (Parcel C). The audit included a Title Search, aerial photograph review, and interviews with persons familiar with the site and an on-site investigation. The Title Search from the Phase I audit is presented below.

The recommendations of the audit included:
- properly reporting drums of regulated materials (propylene glycol and mineral spirits);
- establishment of an Employee Right-To-Know program;
- proper registration and overfill protection of two underground storage tanks, one 2000 gallon diesel fuel tanks and one 275 gallon waste oil tank;
- installation of containment dikes around two 2000 gallon above ground storage tanks, one for heating oil and one for gasoline; and
- the investigation of stained soil around the two underground storage tanks.

Removal of Waste Oil Tank - Blades Commercial Complex – River Road and Market Street, November 6, 1992

A waste oil tank was removed from the northwest corner of the former baking company building (#5, Figure 5) (Parcel C) in September 1992. Low levels of Total Petroleum Hydrocarbon (TPH) contamination were noted in soil samples around the tanks and a No Further Action letter closed the site in December 1992. Three above ground tanks were noted in the closure report outside the building; one reportedly was a 1000 gallon heating oil tank, one was a 2000 gallon diesel fuel tank, and one was a 1000 gallon gasoline tank. These tank locations correspond to the locations of containment pads observed during the June 1999 site visit.

Phase II Final Report – Blades Commercial Complex – Alternate Rt. 13 and River Road, February 11, 1993

The Phase II Final Report discussed the scope of work conducted to address recommendations listed in the Phase I Audit listed above. The scope of work included:
- retrofitting the 2000 gallon diesel underground storage tank with a four-inch fill port and ID tag and performance of a precision tank test;
- the removal of the 275 gallon waste oil underground storage tank and the collection and analysis of soil samples;
- the installation of emergency vents and the construction of containment dikes around two 1000 gallon above ground storage tanks (the Phase I report described them as 2000 gallon

tanks);
- the construction of a containment dike and the installation of a 550 gallon waste oil above ground tank to replace the tank that was removed; and
- the collection and analysis of soil samples from the stained areas around the underground storage tanks.

Phase I Audit - Blades Commercial Complex – River Road and Market Street

A Phase I Audit of Parcels A and B was apparently conducted in early 1993, however a copy of this audit report has not been located. A cost estimate proposal based on the results of the audit was located and identified several areas of concern.

The cost proposal recommended:
- the registration and removal of a 300 gallon underground storage tank (UST) for gasoline at the southeast portion of the Seaford Steel Products building (#1, Figure 5);
- the sampling, analysis, removal and disposal of an area of surficially stained soil around a 300 gallon above ground diesel fuel storage tank located east of the Protective Services, Inc. building (#6, Figure 5) and the construction of a containment dike around the tank;
- the removal and disposal of several areas of solid waste debris present on the property;
- the removal and disposal of rubber tires at the site; and
- the disposal of wood, metal, household garbage, and construction debris.

Based on the site visit of June 1999, it appears that the underground storage tank is still present near Building #1, and some of the debris piles are still present. The rubber tires and the 300 gallon diesel AST near Building #6 appear to have been removed.

Peninsula Plating Site – East 7th Street and River Road

In the spring of 1995, the DNREC Hazardous Waste Management Branch conducted a site inspection of the Peninsula Plating operation. The inspection noted the presence of various chemicals used in the plating process including nickel sulfate, sulfuric acid, chromic acid, nickel chloride, and copper cyanide.

Following a history of non-compliance with industrial waste discharge permits, Emergency Planning, and Community Right-to-Know requirements, as well as concerns from the Town of Blades Fire and Police Departments, the company closed. After a site visit by members of the DNREC Emergency Response and Enforcement Branches, the USEPA Region III Emergency Response Team was notified.

During August through December 1995, the USEPA Region III Emergency Response Team completed a CERCLA Removal Action at the abandoned Peninsula Plating site. Numerous vats, tanks, drums and small containers of hazardous materials were found unsecured and abandoned. The materials were identified and consolidated for off-site disposal. The building and vats were decontaminated and the entrances to the buildings were secured.

According to the On-Scene Coordinator's Summary report, materials removed from the building during the incident consisted of 78 (55-gallon) drums of hazardous waste and 30 cubic yards of hazardous solids and debris,.

Title Search

The title search for the Blades Commercial Complex property from the February 1992 Phase I audit is summarized as follows:

Date	Owner/Tenant	Use
10/16/80 – present	Bo-Win Enterprises, Inc (DE Corporation) (Lease)	Tract, piece, or parcel of land with improvements.
01/02046 – 10/16/80 11/01/43 12/17/48 12/06/48	Wilmington Trust Company, Executors and trustees under last will and testament of William H. Parsons (DOD 12/27/70) and Sara D. Parsons (4 Deed References)	Tract, piece, or parcel of land with improvements.
Reference #1		
• 04/13/1917 – 01/02/46	Delaware Railroad Company	Piece, parcel of land.
Reference #2		
• 11/16/42 – 11/01/43	Ex. 6 Personal Privacy (PP)	Piece, parcel of land.
• 01/10/1939 – 11/16/42		Piece, parcel of land.
Reference #3		
• 09/02/1939 – 12/17/48		Piece, parcel of land.
Reference #4		
• 05/27/41 – 12/06/48		Piece, parcel of land.
• 09/14/1939 – 05/27/41		Piece, parcel of land.

4.0 ENVIRONMENTAL SAMPLING

4.1. Introduction

Sampling of environmental media was performed at the Peninsula Plating site in order to identify and characterize the presence of contaminants that may have been released due to historic and current activities. Test pit excavation and soil sample collection took place on July 20, 1999.

DNREC collected 30 media samples during the BPA II, plus quality assurance/quality control (QA/QC) samples. Of this total, 10 media samples (plus QA/QC samples) were submitted to STL-Envirotech, Edison, NJ or to the DNREC-Division of Water Resources Environmental Services Laboratory for confirmatory analysis of chemicals of concern.

Chemicals of concern consisted of all or part of the USEPA Target Analyte List (Inorganics) and Target Compound List (Organics) (TAL/TCL) (Appendix A). Partial and/or full TAL/TCL analysis was conducted on samples based upon the results of the mobile-lab field screening.

Field screened samples identified as having elevated concentrations of contaminants for a particular chemical suite were sent to STL-Envirotech, Edison, NJ or to the DNREC Division of Water Resources Laboratory for confirmatory analysis. Analysis included volatile and semivolatile compounds, Pesticide/PCB, and metals.

Soil samples delivered to the laboratory were screened in the SIRB mobile laboratory for the following classes of compounds: Volatile Organics, Pesticides, Carcinogenic PAHs, PCBs, and Metals. Screening was performed in the mobile lab using Immunoassay Test Kits, Gas Chromatography/Mass Spectroscopy (GC/MS) and an X-Ray Fluorescence instrument (XRF). Information regarding the field screening procedures is shown in Appendix B.

In the fixed lab, the GC/MS System was used to analyze soil and water samples for Volatile and Semi-Volatile Organic Compounds (VOCs/SVOCs), Pesticides, and PCBs. Metals were tested using an Atomic Absorption Unit and an Inductively Coupled Plasma Unit (AA and ICP). These constituents are analyzed at sites with environmental and health impact concerns because they are commonly found in former industrial and landfilled areas. The above constituent groups comprise the EPA TAL/TCL list. Analysis using the GC/MS system and AA and ICP provides a good cursory tool in which to determine the presence or absence of compounds and analytes at sites under investigation.

DNREC sampled both the shallow and deep soil media in the area of investigation. Shallow and deep soil samples were generally collected from 0 to 2 feet and below 2 feet respectively. Deep soil samples were collected using a backhoe from test pits excavated to a maximum depth of 8' or until groundwater was reached. Test pits were used to evaluate subsurface conditions such as natural soil strata or composition of fill. Shallow and deep soil samples were taken from each test pit. The test pits were subsequently refilled and leveled using the excavated materials. DNREC-SIRB Scientists prepared descriptive logs of the test pits that are presented in Appendix C.

4.2. Sampling Locations

Figure 12 shows the sampling locations for the Peninsula Plating investigation.

Sampling of environmental media was accomplished through the collection of 30 media samples, plus Quality Assurance/Quality Control (QA/QC) samples. Sample descriptions and locations are listed in Table A.

Table A: Sample Locations and Descriptions for Test Pits, Soils, Surface Water, and Groundwater
Peninsula Plating

SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION
SHALLOW TEST PIT SAMPLES		
TP-1S	West side of building #4 alongside of the concrete pad.	TEST PIT, 6-12""
TP-2S	North end of building #4, parallel to the back of the building.	TEST PIT, 6-12"
TP-3S	Yard behind building #4, near oil stains.	TEST PIT, 6-12"
TP-4S	West side of building #4, 50' from River Road, 8' from the building.	TEST PIT, 12-18"
TP-5S	East side of gravel road, North of ditch, South end of building #2.	TEST PIT, 12"
TP-6S	East of building #1, North of UST area.	TEST PIT, 12"
TP-7S	West end of bakery building #5, ramp to building.	TEST PIT, 12-18"
TP-8S	East side of ditch, grassy area, 50' North of fire well.	TEST PIT, 12"
TP-9S	Between fuel containment pads, South side of bakery building #5.	TEST PIT, 12"
TP-10S	Northeast side of building #6, near site of former AST.	TEST PIT, 12"
TP-11S	North end of building #4, parallel to the back of the building. (field duplicate to TP-2S)	TEST PIT, 6-12"
DEEP TEST PIT SAMPLES		
TP-1D	West side of building #4 alongside of the concrete pad.	TEST PIT, 5-6'
TP-2D	North end of building #4, parallel to the back of the building.	TEST PIT, 4-5'
TP-3D	Yard behind building #4, near oil stains.	TEST PIT, 2-3'
TP-4D	West side of building #4, 50' from River Road, 8' from the building.	TEST PIT, 4-5'
TP-5D	East side of gravel road, North of ditch, South end of building #2.	TEST PIT, 3-4'
TP-6D	East of building #1, North of UST area.	TEST PIT, 6-7'
TP-7D	West end of bakery building #5, ramp to building.	TEST PIT, 7-8'
TP-8D	East side of ditch, grassy area, 50' North of fire well.	TEST PIT, 6-7'
TP-9D	Between fuel containment pads, South side of bakery building #5.	TEST PIT, 6-7'
TP-10D	Northeast side of building #6, near site of former AST.	TEST PIT, 6-7'
TP-11D	Yard behind building #4, near oil stains. (field duplicate to TP-3D)	TEST PIT, 2-3'

SAMPLE ID	SAMPLE LOCATION	SAMPLE DESCRIPTION
SURFACE SOIL SAMPLES		
SS-1	Ditch outfall near railroad tracks.	SURFACE SOIL, 2-4"
SS-2	Ditch, halfway through arc, near TP-3 oil stained area.	SURFACE SOIL, 2-4"
SS-3	Northeast corner of building #3, near rubbish pile.	SURFACE SOIL, 2-4"
SS-4	West side of rubbish pile, North of building #3.	SURFACE SOIL, 2-4"
SS-5	35' off NW corner of building #4, across from the kennel, in drainage swale near ditch.	SURFACE SOIL, 2"
SS-6	30' off NW corner of building #4, in front of wooden pallet – stained soil.	SURFACE SOIL, 2-3"
SURFACE WATER SAMPLES		
SW-1	Trip Blank	WATER
SW-2	Equipment Rinsate Blank	WATER
GROUNDWATER SAMPLES		
MW-1	Groundwater sample, Monitor Well MW-1	GROUNDWATER
MW-2	Groundwater sample, Monitor Well MW-2	GROUNDWATER
MW-3	Groundwater sample, Monitor Well MW-3	GROUNDWATER
MW-4	Groundwater sample, Town of Blades, Public Well	GROUNDWATER
MW-5	Groundwater sample, Field duplicate to MW-3	GROUNDWATER
MW-6	Trip Blank	WATER
MW-7	Rinsate Blank	WATER

Based on field screening results, specific samples were selected for analysis by STL-Envirotech, Edison, NJ or the DNREC Environmental Services Laboratory. Samples submitted to a fixed laboratory (exclusive of QA/QC samples) for all or part of the EPA TAL/TCL analytical package included:

- 4 shallow test pit soil samples;
- 1 deep test pit soil samples;
- 2 surface soil samples
- 4 groundwater samples

The specific parameters that were requested for laboratory analysis are indicated below (Table B).

Table B: Samples Submitted for Laboratory Analysis
Peninsula Plating – Blades, DE

Sample ID	VOCs	SVOCs	Pest/PCB	Metals/Cyan*	COMMENTS
SOIL SAMPLES					
TP-2s		X**			
TP-3s	X **	X**	X ***	X***	MS/MSD
TP-3d		X**			
TP-9s		X**		X***	
TP-11s		X**			Field Duplicate (TP-2s)
SS-1				X***	
SS-6		X***			
SURFACE WATER SAMPLES					
SW-1	X**				Trip Blank
SW-2	X**	X***	X***	X***	Rinsate Blank
GROUNDWATER SAMPLES **					
MW-1	X	X	X	X*	MS/MSD
MW-2	X	X	X	X*	
MW-3	X	X	X	X*	
MW-4	X	X	X	X	Public Well
MW-5	X	X	X	X*	Field Duplicate of MW-3
MW-6	X				Trip Blank
MW-7	X	X	X	X	Rinsate Blank

VOCs – Target Compound List Volatile Organic Compounds
SVOC – Target Compound List Semivolatile Organic Compounds
Pest/PCBs – Target Compound List Pesticides/Polychlorinated Biphenyls
Metals/Cyan - Target Analyte List Inorganics and Cyanide
* - Monitor well samples analyzed for total and dissolved metals.
** - Samples Submitted to STL-Envirotech, Edison, NJ, for Analysis
*** - Samples Submitted to DNREC Environmental Services Laboratory, Dover, Delaware for Analysis.

4.3. Analytical Analysis

The results received from the laboratory analysis were compared to the following criteria: EPA Region III Risked-Based Concentration Tables (RBCs) and DNREC Uniform Risk-Based Standards (URS).

Deep and surface soil sampling analytical results were compared to the following criteria: the RBCs for industrial and residential soils and to the URS.

5.0 GROUNDWATER PATHWAY

5.1. Hydrogeologic Setting

The Peninsula Plating property is located within the Atlantic Coastal Plain Physiographic Province. The Atlantic Coastal Plain gently slopes southeast towards the Atlantic Ocean forming a thickening wedge of unconsolidated sand, gravel, and clay. According to Sundstrom and Pickett (1970) the sedimentary deposits are underlain by the Basement Complex, which is the continuation downdip of very old metamorphic and igneous Piedmont rocks of northernmost Delaware.

The site is approximately 15 to 20 feet above sea level in a relatively flat area, based on the topographic map. The major hydrogeologic system of the study area is comprised of four (4) geologic divisions, which include (from youngest to oldest): the Nanticoke Deposits, the Beaverdam Formation, the Manokin Formation, and the St. Marys Formation. Approximate thickness of geologic deposits were inferred from the cross section A-A' contained within the Delaware Geologic Survey's map, Geohydrology of the Seaford Area, Delaware, Hydrologic Map No. 9 (Figure 10).

The youngest sediments (Nanticoke) occur in deposits that range from 3 to 20 feet thick. These deposits are composed of fine to medium grained, light gray to brown sands, as well as, laminated to massive deposits of gray to brown, clayey sandy silt and silty clayey sand. These deposits may also be capped by the fine to medium, well-sorted sand associated with dunes.

The Beaverdam Formation (approximately 40 to 50 feet thick) is comprised of two distinct rock units that result in a fining-upwards sandy sequence. The lower units consists of gravel in the lowermost beds, and fine upwards to light gray, yellow-orange, sandy gravel, and medium to coarse sand. The upper unit consists of light brown, light gray, and yellow-orange beds of fine to medium sand, sandy silt, and clayey silt, which have a white to yellow silt or clay matrix.

The Manokin Formation (approximately 30 to 40 feet thick) consists of gray to olive-gray sands that generally coarsen upwards from the base, as well as, variable amounts of silt, clay, gravel, and shell. This formation includes the Manokin aquifer system. Beneath this deposit is the St. Marys Formation (approximately 25 to 40 feet thick) which contains gray, bluish-gray, and olive-gray silt and clay with some shell beds and thin sand beds.

The Columbia aquifer is the unconfined water table aquifer for this area. Included in this aquifer are the Nanticoke Deposits, and the Beaverdam Formation. In addition, in regions where the Manokin aquifer is in direct contact with the Columbia aquifer, they function as a single hydrologic unit. The St. Marys Formation forms the low permeability base of the fresh water aquifer system.

The Columbia Group aquifer is recharged through precipitation, and in tern serves as the source of recharge to underlying aquifers. This aquifer also yields most of the fresh water used in this

area. Water levels in this aquifer range from 1 to 18 feet below the land surface, and the saturated thickness ranges from approximately 30 to 100 feet. Local variations in lithology and saturated thickness result in varying transmissivities in this region.

The potential for groundwater recharge at the study area is ranked from fair to good (Figure 10). The local groundwater flow at the site is expected to be northwest toward the Nanticoke River.

5.2. Groundwater Targets

The Peninsula Plating site is contained entirely within the Town of Blades corporate boundaries. The Town of Blades provides the potable water supply, utilizing two wells for its supply. The water supply serves approximately 960 residents. Water treatment consists of filtration, corrosion control chlorination and the addition of potassium permanganate, according to Division of Public Health records.

The town wells are located on the adjacent property immediately north of the subject site about 300 feet from the building. The wells are screened in the unconfined aquifer, approximately 66 to 96 feet below ground surface.

The City of Seaford, located just north of Blades across the Nanticoke River, utilizes four wells and serves approximately 6000 people. In addition, there are several trailer and mobile home parks within one mile of the site. The Water Supply Branch of DNREC conducted a DWUDS (Delaware Water Use Data System) search for drinking water wells located within about one mile of the site.

The nearest drinking water well is about 300 feet to the north of the site and is a Public Water Supply well. In addition, there are approximately 266 domestic drinking water wells found within one mile of the site. Assuming an average of 3 persons per household, a total of 800 people are served by domestic wells within a one-mile radius of the site. This number may be expected to be higher due to wells constructed prior to 1970 when the well permitting program was initiated.

5.3. Groundwater Sample Locations

DNREC collected groundwater samples from the study area. Groundwater sample collection required that three monitoring wells be constructed and that a nearby public well be sampled. The monitoring wells were drilled by Walton Corporation, Inc., licensed in the State of Delaware, and were constructed to the requirements of the Delaware Regulations Governing the Construction and Use of Wells, adopted February 6, 1997. The monitor well was constructed similar to Figure 13. A DNREC Hydrologist approved the well locations in the field and supervised the drilling.

Groundwater sampling of the monitor wells occurred approximately 2 weeks after the construction and development of the well in order to allow the conditions at the site to stabilize. Descriptive logs of the monitor wells are shown in Appendix D.

5.4. Groundwater Analytical Results

Groundwater samples from the monitoring wells were analyzed for both unfiltered (total) and filtered (dissolved) US EPA TAL inorganics, and for TCL organics. Analytical results will be compared to the US EPA Region III RBCs for Tap Water and EPA Safe Drinking Water Act MCLs.

Groundwater Inorganic Results – Laboratory Data

The table below lists inorganic constituents that were detected in the filtered (dissolved) and unfiltered (total) monitor well groundwater samples in excess of one or all of the benchmark values (EPA RBC Tap Water, EPA MCL Drinking Water, or URS Groundwater). Complete inorganic data tables are shown in Appendix G. The data validation package is included in Appendix E.

Table C: Groundwater Samples Exceeding Benchmarks- Inorganic Laboratory Data

Groundwater Sample	Analyte	Concentration (µg/L)	RBC (µg/L)	MCL (µg/L)	URS (µg/L)
MW-2 (total)	Aluminum	4,600			200
	Iron	1,640		NL	300
MW-3 (total)	Iron	6,410		NL	300
	Manganese	79.2		50	50
MW-3 (dissolved)	Iron	6,150		NL	300
	Manganese	79.8		50	50
MW-5 (total)	Iron	6,330		NL	300
	Manganese	78.7		50	50
MW-5 (dissolved)	Iron	6,140		NL	300
	Manganese	78.9		50	50

RBC – EPA Region III Risk-Based Concentrations, 4/12/99
URS – Remediation Standards Guidance under the Delaware Hazardous Substance Cleanup Act, 2/98
MCL – National Primary Drinking Water Standards, EPA, 2/1/94
NL – Not Listed

Groundwater Organic Results – Laboratory Data

There were no organic constituents detected in the monitor well groundwater samples in excess of any of the benchmark values (RBC Tap Water, URS Groundwater, and Drinking Water MCL). The complete organic data results are shown in Appendix G. The complete data

validation package is included in Appendix F.

5.5. Groundwater Conclusions

Inorganic results from monitor well samples indicate elevated levels of Iron and Manganese in the groundwater at the Peninsula Plating site when compared to the URS benchmark. One unfiltered sample (MW-2) also contained Aluminum above the URS benchmark, however, none of the groundwater samples exceeded the RBC for the detected analytes. These levels may or may not be a result of natural conditions.

There were no organic constituents detected in any of the monitor well groundwater samples in excess of any of the benchmark values (RBC Tap Water, URS Groundwater, and Drinking Water MCL).

The groundwater at the Peninsula Plating site is not used for domestic or public water supply. However, the town wells for Blades are located on the adjacent property immediately north of the subject site about 300 feet from the Peninsula Plating building. The wells are screened in the unconfined aquifer, approximately 66 to 96 feet below ground surface. No contamination was detected in these wells.

The local groundwater flow at the site is expected to be northwest toward the Nanticoke River.

6.0 SURFACE WATER PATHWAY

6.1. Hydrologic Setting

There is no surface water on or directly bordering the site.

The Nanticoke River is located approximately 2000 feet northwest of the subject property. There is no direct surface water pathway between the site and the river. Surface water coming from the site is expected to flow into the Nanticoke River though a combination of overland flow and through storm drains. Some surface water may flow along the railroad right-of way located to the west of the site.

The Nanticoke River watershed drains approximately 718,000 acres of land in northwestern Sussex County Delaware and the Eastern Shore of Maryland. Approximately 44% of the watershed area is located in Delaware. The Nanticoke's mean annual discharge is 90.3 cubic feet per second (cfs) measured near Bridgeville, and the general flow is in a southwesterly direction through Delaware. The baseflow of the river is derived from shallow groundwater flow. Due to the watershed's unique resident flora and fauna, as well as the recreational opportunities it supports, the Nanticoke has been designated as a "Water of Exceptional Recreational or Ecological Significance" (ERES) within Delaware's Surface Water Quality Standards.

Because Peninsula Plating is located within the town of Blades, which is in close proximity to Seaford, land use close to the site is classified as predominantly developed land. However, there are wetlands boarding the Nanticoke River located west, southwest, and northwest of the site (Figure 8).

In December of 1994, DNREC conducted a study of sediment contamination in the Delaware portion of the Nanticoke River. This study showed that the contamination levels of sediment below Seaford were significantly higher then the contamination levels above Seaford, with metals proving to be the principal contaminants of concern.

According to the National Flood Insurance Rate Maps (1996), the site is located within an area of minimal flooding (Zone X) outside of the 500-year flood plain (Figure 9).

6.2. Surface Water Targets

The Nanticoke River is located approximately 2000 feet northwest of the subject property. There are wetlands boarding the Nanticoke River located west, southwest, and northwest of the site (Figure 8). However, there is no surface water pathway directly from the site to the Nanticoke River.

6.3. Surface Water and Sediment Sample Locations

Due to the lack of direct surface water pathway, no surface water or sediment samples were collected from the Nanticoke River.

6.4. Surface Water & Sediment Conclusions

There is no surface water on or directly bordering the site.

The Nanticoke River is located approximately 2000 feet northwest of the subject property. Surface water coming from the site is expected to flow into the Nanticoke River though combination of overland flow and through storm drains. Some surface water may flow along the railroad right-of way located to the west of the site.

No surface water or sediment samples were collected during this investigation due to a lack of a identified surface water pathway.

7.0 SOIL EXPOSURE AND AIR PATHWAYS

7.1. Physical Conditions

According to the U. S. Department of Agriculture (USDA), Soil Conservation Service (SCS) soil mapping report, site soils consist of the Evesboro-Rumford Association complex. These soils

consist of somewhat excessively drained Evesboro loamy sand, loamy substratum with a 2 to 5 percent slope. Much of this complex is either farmed, or developed for residential communities (Figure 11).

Test pit logs from the Peninsula Plating investigation show no evidence that the subject site has received significant amounts of fill materials.

The site is located approximately 1000 feet from a school. There are approximately 2599 individuals residing within one-quarter mile of the site and 10468 residents with one-mile of the site, according to census information (1990).

7.2. Soil Sampling Locations

A total of ten (10) test pits were excavated on the Peninsula Plating site. DNREC sampled both shallow and deep soil media in the area of the investigation. Eleven (11) shallow and eleven (11) deep soil samples were collected using a backhoe from test pits excavated to a maximum of 8' or until groundwater is reached. Test pits were used to evaluate subsurface conditions of fill. Shallow and deep soil samples were taken from each test pit. The test pits were then subsequently backfilled and leveled using the excavated materials. In addition, six (6) shallow soil samples were collected from this site. All soil samples were screened in the SIRB mobile laboratory.

Of the twenty-eight (28) soil samples collected and field screened, seven (7) were selected for laboratory analysis. Specific parameters for analysis were requested for the samples as indicated in Table B.

Analytical results were compared to the RBC values for Industrial and Residential soil or to DNREC Uniform Risk-Based Remediation Standards where appropriate.

A map showing the soil sample locations is included in Figure 12. Test pit description logs are shown in Appendix C.

7.3. Soil Analytical Results – Inorganics

Field screening of all test pit and shallow soil samples for metals was completed using the XRF instrument. Of the samples screened, seven (7) soil samples (six shallow and one deep) were submitted for laboratory analysis of inorganic parameters. The complete XRF data sheets are shown in Appendix H.

<u>Soil Inorganic Results – Field Screening Data</u>

Field screening using XRF indicated elevated metal concentrations in several samples. XRF results were compared to EPA Region III Risk-Based Concentration Tables (RBC) and HSCA Uniform Risk Based Remediation Standards (URS) for critical unrestricted land use. Of the

twenty-two (22) test pits samples (eleven (11) shallow and eleven (11) deep) and six (6) surface soil samples collected, exceedences of EPA RBCs were detected in ten (10) of the samples. The metals that exceeded EPA RBCs included carcinogenic Arsenic, Iron, and Thallium. Exceedences of the HSCA Uniform Risk-Based Standards occurred for carcinogenic Arsenic, Chromium, Iron, Manganese, Vanadium, and Zinc. The complete XRF data sheets are shown in Appendix H.

Soil Inorganic Results – Laboratory Data

As a result of the field screening, three (3) shallow soil samples were submitted to the laboratory for inorganic analysis. The table below lists inorganic compounds exceeding Risk-Based Concentration benchmarks or DNREC Uniform Risk-Based Standards. Complete inorganic data tables are shown in Appendix G. The data validation package is included in Appendix E.

Table D: Soil Samples Exceeding Benchmarks- Inorganic Laboratory Data

Soil Sample	Analyte	Concentration (mg/kg)	RBC Residential Soil (mg/kg)	URS (mg/kg)
PPSS-1	Arsenic	2.4	0.43c	2n/0.4c
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
PPTP-9S	Arsenic	3.1	0.43c	2n/0.4c

RBC – EPA Region III Risk-Based Concentrations, 4/12/99
URS – Remediation Standards Guidance under the Delaware Hazardous Substance Cleanup Act, 2/98
n-non-carcinogen c-carcinogen VI – as Chromium VI

7.4. Soil Analytical Results – Organics

Soil Organic Results – Field Screening Data

Field screening for organic compounds utilized Gas Chromatography/Mass Spectroscopy (GC/MS) for volatile and semivolatile compounds, and Immunoassay test kits for polycyclic aromatic hydrocarbons (PAH) and polychlorinated biphenyls (PCB). GC/MS results indicated no volatile compounds in the soil samples collected at the site, however a number of samples did contained concentrations of semivolatile compounds. These results were supported by the PAH immunoassay test kits which detected carcinogenic PAHs at estimated concentrations greater than 10 mg/Kg in three (3) shallow test pit samples. In addition, five (5) shallow test pit samples and five (5) surface soil samples contained carcinogenic PAHs, which were detected at estimated concentrations of > 0.5 - < 10 mg/Kg. No PAH was detected in deep test pit samples. Immunoassay test kits for PCBs indicated no PCBs above the detection limit for the kits (Appendix I).

Soil Organic Results – Laboratory Data

As a result of the field screening, six (6) soil samples (five shallow and one deep) were submitted to the laboratory for all or part of the TCL organic analysis. Six samples were analyzed for semivolatile organics, one was analyzed for pesticide/PCBs and one received volatile organic analysis. The table below lists organic compounds exceeding Risk-Based Concentration benchmarks or DNREC Uniform Risk-Based Standards. Complete inorganic data tables are shown in Appendix G. The data validation package is included in Appendix F.

Table E: Soil Samples Exceeding Benchmarks - Organic Laboratory Data

Soil Sample	Compound	Concentration (µg/kg)	RBC Soil		URS (µg/kg)
			Residential (µg/kg)	Industrial (µg/kg)	
TP-2S	Benzo(a)anthracene	1,200	875		900
	Benzo(b)fluoranthene	1,400	875		900
	Benzo(a)pyrene	1,100	87	784	90
	Dibenz(a,h)anthracene	180	87		90
TP-3S	Benzo(a)pyrene	180	87		90
TP-9S	Carbazole	1,300			300
	Benzo(a)anthracene	2,200	875		900
	Benzo(b)fluoranthene	6,800	875		900
	Benzo(a)pyrene	3,300	87	784	90
	Indeno(1,2,3-cd)pyrene	2,200	875		900
	Dibenz(a,h)anthracene	480	87		90
TP-11S	Benzo(a)anthracene	1,400	875		900
	Benzo(b)fluoranthene	1,800	875		900
	Benzo(a)pyrene	1,200	87	784	90
	Dibenz(a,h)anthracene	140	87		90

RBC – EPA Region III Risk-Based Concentrations, 4/12/99
URS – Remediation Standards Guidance under the Delaware Hazardous Substance Cleanup Act, 2/98

7.5. Air Monitoring Results

A formal air-sampling program was not conducted at the Peninsula Plating site. Air monitoring was performed during sampling and drilling activities as part of the Health and Safety Plan utilizing a Foxboro TVA 1000 Dual Photo Ionization Detector/Flame Ionization Detector (PID/FID). No readings significantly above background were noted in the breathing zone during the investigation.

7.6. Soil Exposure and Air Pathway Conclusions

According to the U. S. Department of Agriculture (USDA), Soil Conservation Service (SCS) soil mapping report, site soils consist of the Evesboro-Rumford Association complex. These soils consist of somewhat excessively drained Evesboro loamy sand, loamy substratum with a 2 to 5 percent slope. Much of this complex is either farmed, or developed for residential communities (Figure 11).

Observations made during test pitting activities indicated that the very little fill material was deposited at this site. The native material appears to have been orange and tan select medium grained sands.

Approximately 10,464 people live within one-mile of the site with the nearest residences located across both River Road and Market Street, approximately 200 feet away. The property is unfenced and access is unrestricted on the entire property.

Soil samples were collected from 10 test pits locations and 6 shallow soil locations throughout the site area. Sample locations were chosen on the basis of known historic land use activities and to provide a representative coverage across the property. Soil samples were field screened for PCBs and PAHs and related pesticides using immunoassay test kits and for metals using XRF.

Based on the results of field screening, soil samples from the Peninsula Plating property exhibited elevated concentrations of some metals, most notably carcinogenic Arsenic. Arsenic was detected in nine (9) shallow and one (1) deep soil samples in excess of screening benchmarks of 0.43 mg/Kg and 3.8 mg/Kg, respectively (Residential Risk-Based Concentrations and/or Industrial Risk-Based Concentrations). Other metals that exceeded the screening benchmarks include Chromium, Iron, Manganese, Vanadium, Thallium, and Zinc.

Elevated Arsenic concentrations were confirmed by laboratory analysis of selected samples. Two out of the three soil samples submitted to the laboratory exhibited Arsenic concentrations slightly greater than screening benchmarks, with a high of 3.1 mg/Kg Arsenic in sample TP-9S.

Carcinogenic Arsenic was the only metal detected in the three samples sent to the laboratory which exceeded either the EPA RBCs and/or HSCA URS benchmarks.

Immunoassay screening and subsequent laboratory analysis of soil samples indicated no significant concentrations of PCBs to be present in the site samples.

Carcinogenic PAHs were the primary organic contaminant of concern with five out of the six samples submitted for laboratory analysis exceeding the screening benchmark. The highest total PAH concentration was 60.3 ppm in sample TP-9S.

Semivolatile organic compounds were detected by laboratory analysis in TP-2S, TP-9S, and TP-11S (field duplicate to TP-2S) in excess of RBC and URS benchmarks. There was no detection of semivolatiles in SS-6, however, due to the detection of motor oil in the sample. This resulted

in higher laboratory quantitation limits. In addition, test pit log descriptions reported the presence of purple stained soils and strong odors in TP-3 to a depth of several feet.

Some general information is presented below regarding several contaminants of concern detected during this investigation.

Arsenic

Arsenic was detected above screening benchmarks in soil samples across the site.

Arsenic is found naturally in the earth's crust. It is also a by-product of smelting of metals and burning of fossil fuels. The primary use of Arsenic is in weed and insect pesticides and as a wood preservative. It is also used in lead-base alloys for hardening lead used in batteries, bearings and cable and as a rust inhibitor in antifreeze. Arsenic was also historically used in the leather tanning process.

Systemic effects of Arsenic ingestion include irritation of the digestive tract, decreased production of red and white blood cells, abnormal heart function, blood vessel damage, liver and kidney injury and impaired nerve function.

One of the most common characteristics of ingestion of inorganic Arsenic is the appearance of dark and light spots on the skin, or small corns or warts on the palms, soles and trunk. Arsenic ingestion has also been connected to increased incidence of some forms of cancer. In contrast, there is also some evidence that small amounts (normal dietary intake) of Arsenic may be beneficial to good health.

Polycyclic Aromatic Hydrocarbons

(Benzo (a) pyrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Indeno(1,2,3-cd)pyrene, DiBenzo(a,h)anthracene, Benzo(k)fluoranthene)

PAHs were detected above screening benchmarks in several of the soil samples collected throughout the site as part of this investigation.

Benzo (a) pyrene (BaP) and the others are polycyclic aromatic hydrocarbon (PAH) compounds. They are formed during the burning of petroleum products and plant or animal materials. It is also found in coal tar, road and roofing tars and in creosote. Cigarette smoke also contains PAHs. PAHs can enter the body by breathing smoke containing the material or by ingesting it. It is not normally absorbed through the skin, but small amounts may be if the skin has contact with heavy oils containing PAHs.

PAHs have been shown to cause tumors in laboratory animals and are suspected human carcinogens.

8.0 SUMMARY AND CONCLUSION

The Delaware Department of Natural Resources and Environmental Control (DNREC) Site Investigation and Restoration Branch (SIRB), in cooperation with the United States Environmental Protection Agency (EPA), conducted a Site Inspection (SI) for the Peninsula Plating property located at East 7th Street and River Road in Blades, Delaware.

The former Peninsula Plating property currently occupies an approximately 5.8 acre area on the west side of the Town of Blades. The information discussed in this report is confined to the property only.

The purpose of the Site Inspection (SI) was to investigate the possible existence of released hazardous substances at the Peninsula Plating property through the collection and analysis of environmental samples. The media sampled included surface soils, deep soils, and groundwater. Soil samples were field screened by the DNREC-SIRB Analytical Chemist and selected samples were submitted to STL-Envirotech, Edison, NJ, or the DNREC Division of Water Resources Environmental Services Laboratory for analysis of specified parameters.

The analytical data generated from the collection and laboratory analysis of the environmental samples was subsequently evaluated to determine the potential for human and environmental exposures to hazardous substances.

After the completion of the SI, DNREC submitted the report to the EPA and State officials who will decide whether the site should undergo further investigation or obtain a "No Further Action" (NFA) designation under the Federal Superfund and/or State Site Investigation & Restoration Branch Programs.

The SI is intended to provide a general characterization of the environmental conditions present at the site and does not provide a 100% complete surface and subsurface assessment of the project area or individual properties. The assessments contained within are based solely on conditions at the time of sampling and the specific locations evaluated. This report is not intended to constitute an environmental or structural assessment of the buildings on site.

As part of the SI, ten (10) test pits were excavated and six (6) surface soil samples were collected. Test pit logs from the Peninsula Plating investigation indicate that the subject site has received little to no fill materials.

The groundwater at the Peninsula Plating site is not used for domestic or public water supply. However, the town wells for Blades are located on the adjacent property immediately north of the subject site about 300 feet from the Peninsula Plating building. The wells are screened in the unconfined aquifer, approximately 66 to 96 feet below ground surface. No contamination was detected in these wells.

Generally, the groundwater flow direction is inferred to be northwest, towards the Nanticoke

River. Groundwater was encountered between 4 to 6 feet in test pits excavated on site.

Inorganic results from monitor well groundwater samples indicate elevated levels of Iron and Manganese in the groundwater at the Peninsula Plating site. One unfiltered sample (MW-2) also contained Aluminum above the URS benchmark. These levels may or may not be a result of natural conditions.

There were no organic constituents detected in any of the monitor well groundwater samples in excess of any of the benchmark values (RBC Tap Water, URS Groundwater, and Drinking Water MCL).

There is no surface water on or directly bordering the site.

The Nanticoke River is located approximately 2000 feet northwest of the subject property. There is no direct surface water pathway between the site and the river. Surface water coming from the site is expected to flow into the Nanticoke River though a combination of overland flow and through storm drains. Some surface water may flow along the railroad right-of way located to the west of the site.

No surface water or sediment samples were collected during this investigation due to a lack of a direct surface water pathway.

The site is mostly open space with six buildings across the area. There is a small amount of pavement and the remaining area is bare dirt, sand or grass covered. The site is not fenced. Part of the northern border of the site is wooded and a pile of wood, tires, and miscellaneous debris is located on the edge of the woods. A small ditch is located near the center of the site and runs south toward River Road.

Soil samples were collected from 10 test pits locations, and 6 shallow surface locations throughout the site area. Soil samples were field screened for PCBs and PAHs and related pesticides using immunoassay test kits and for metals using XRF.

Based on the results of field screening, soil samples from the Peninsula Plating property exhibited elevated concentrations of some metals, most notably carcinogenic Arsenic. Arsenic was detected in nine (9) shallow and one (1) deep test pit soil samples in excess of screening benchmarks. Other metals that exceeded the screening benchmarks include Chromium, Iron, Manganese, Vanadium, Thallium, and Zinc.

Arsenic concentrations above screening benchmarks were confirmed by laboratory analysis of selected samples. Two out of the three soil samples submitted to the laboratory exhibited Arsenic concentrations slightly greater than screening benchmarks, with a high of 3.1 mg/Kg Arsenic in sample TP-9S.

Carcinogenic Arsenic was the only metal detected in the samples sent to the laboratory which exceeded either the EPA RBCs and/or HSCA URS benchmarks.

Immunoassay screening and subsequent laboratory analysis of soil samples indicated no significant concentrations of PCBs to be present in the site samples.

Carcinogenic PAHs were the primary organic contaminant of concern with five out of the six samples submitted for laboratory analysis exceeding the screening benchmark. The highest total PAH concentration was 60.3 ppm in sample TP-9S.

Semivolatile organic compounds were detected by laboratory analysis in TP-2S, TP-9S, and TP-11S (field duplicate to TP-2S) in excess of RBC and URS benchmarks. There was no detection of semivolatiles in SS-6. The SIRB Analytical Chemist reported the presence of motor oil in sample SS-6 that resulted in an increase in the quantitation limits. In addition, purple colored stained soils and strong odors were noted several feet deep in the test pit logs for TP-3. The material was not identified by the laboratory analysis, but appeared to be a hydraulic or brake fluid type substance.

Based upon the information collected during the Site Inspection at the Peninsula Plating site, the DNREC-SIRB identified the following issues and concerns, which need to be addressed with DNREC oversight:

- Based upon the organic contaminants detected in the on-site soils, there is potential exposure of people to contaminated soil through inadvertent ingestion and airborne dust in some areas of the property, primarily during excavation,

- At least one underground storage tank (UST) appears to be present on the site near Building #1, Figure 5. No record of this tank was located in DNREC UST Branch records. The DNREC-UST Branch should be contacted regarding proper registration of the tank. Removal of the tank and sampling and analysis of the surrounding soil may be required.

- A possible vent or fill pipe was noted on the southeast corner of Building #3, Figure 5. This area should be investigated for the possible presence of a UST. Due to the age of the buildings on the property, the presence of additional USTs is possible.

- Some of the buildings on-site may contain asbestos containing materials (ACM). This report <u>does not</u> constitute a pre-demolition/renovation NESHAP survey. DNREC-SIRB advises that prior to any demolition or renovation, an asbestos survey, via a State of Delaware Certified Professional Firm be conducted to identify possible asbestos containing materials.

- Several containers of paints, oils and other unknown materials were noted in some of the buildings during the site visit. These materials should be identified, and then removed and properly disposed of at an appropriate facility under applicable regulations. The DNREC Hazardous Waste Management Branch should be contacting regarding the proper disposal of these materials.

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FIGURES

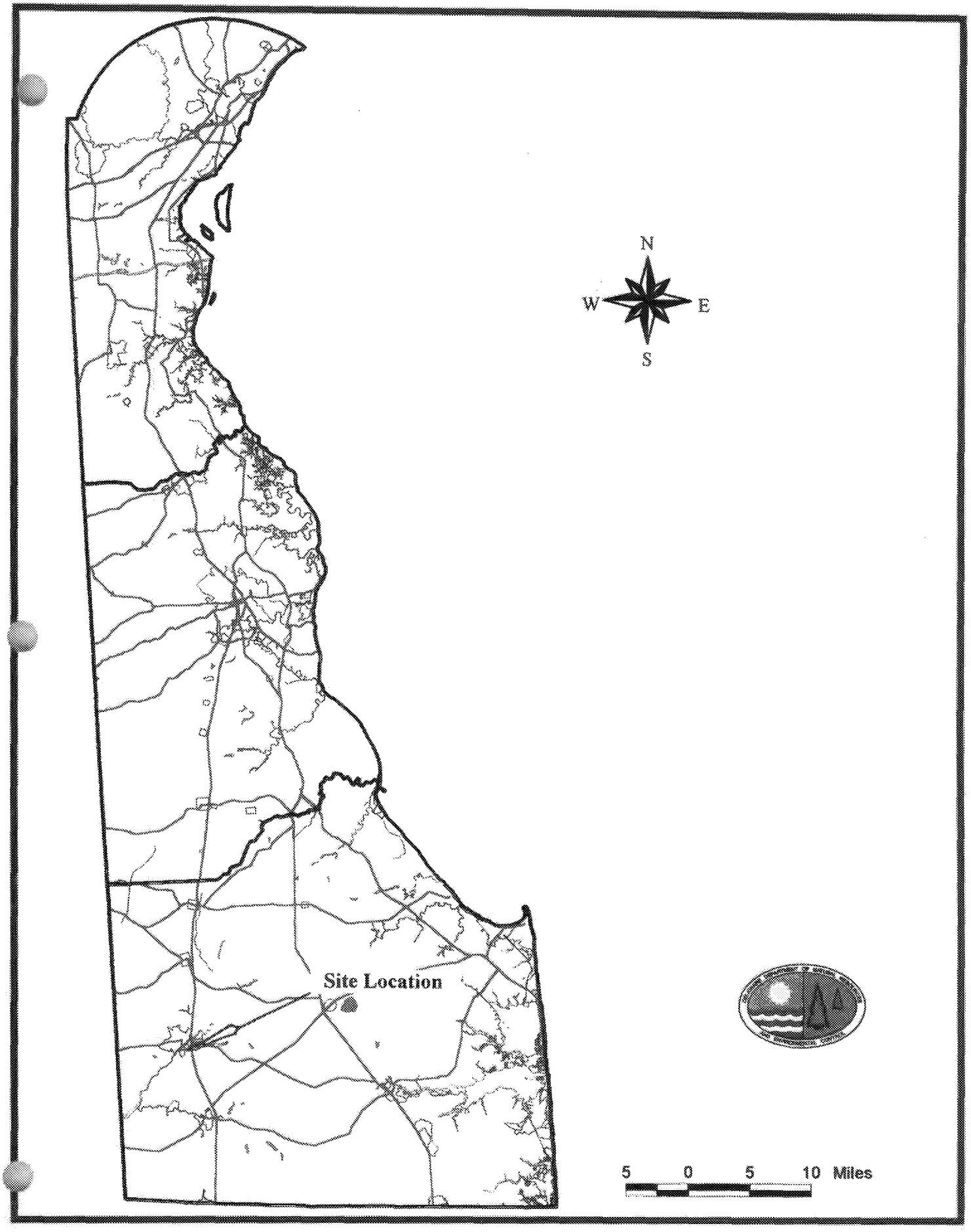

Figure 1: Location of Peninsula Plating in Delaware

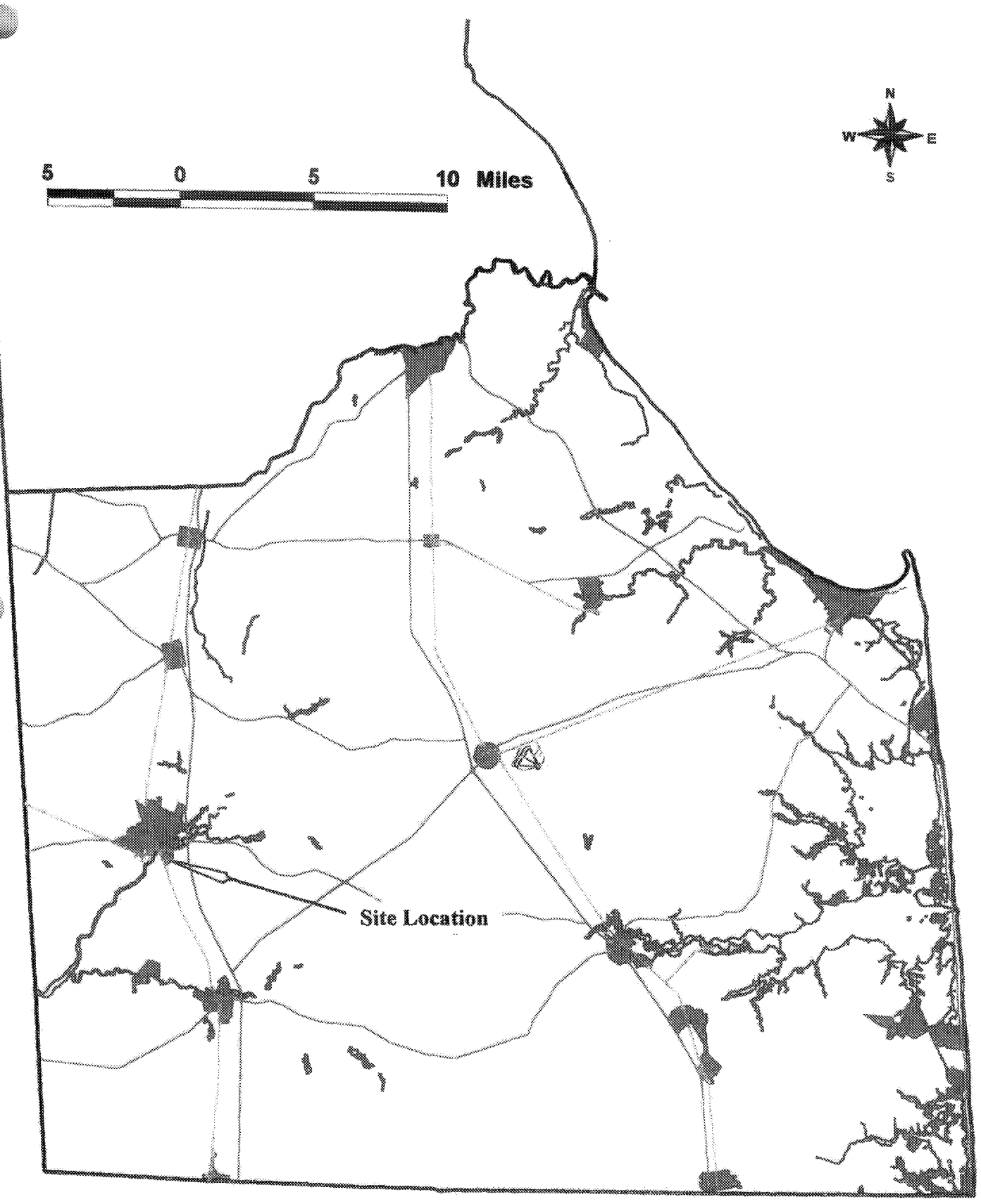

Figure 2: Location of Peninsula Plating in Sussex County, Delaware

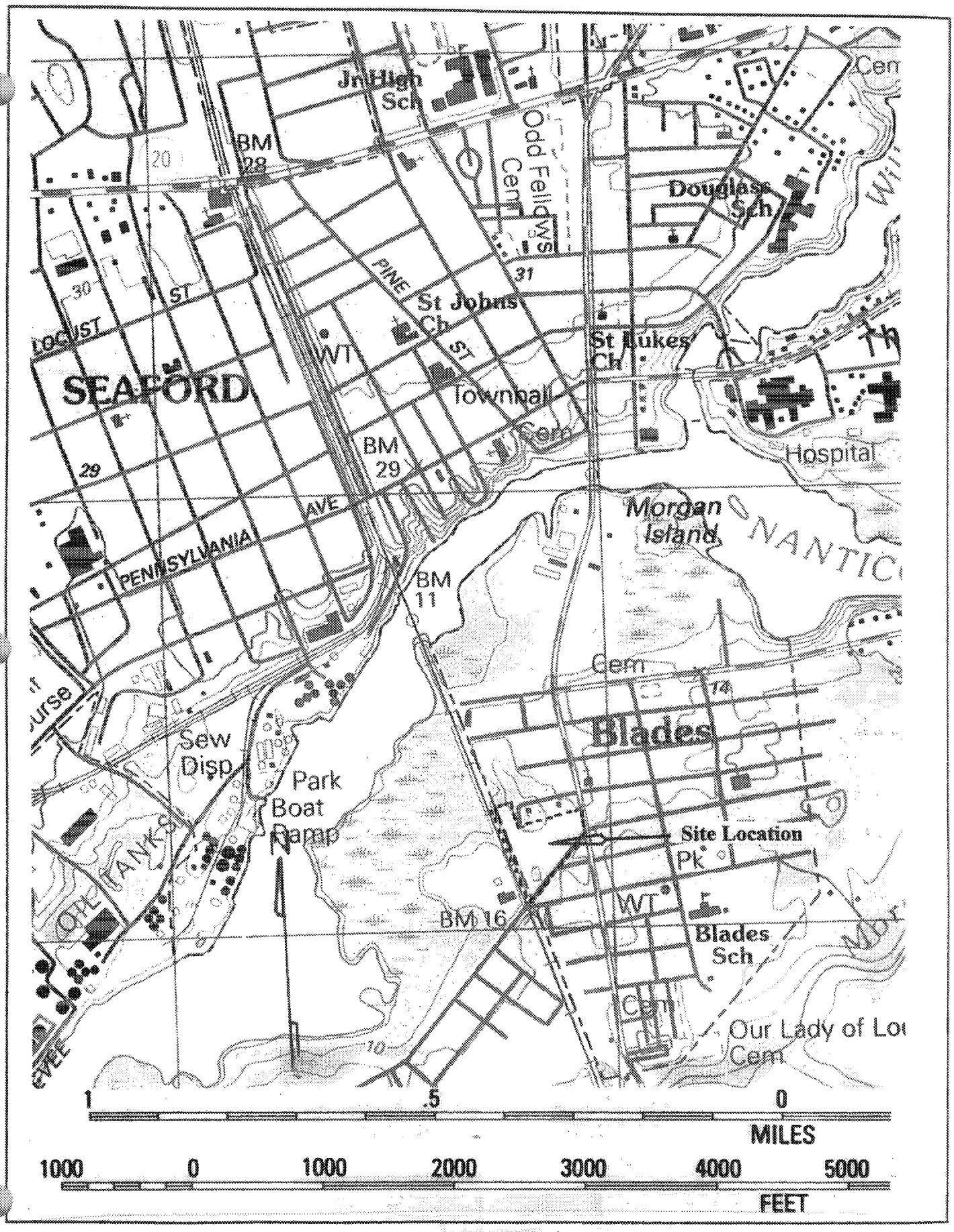

FIGURE 3.

Location of the Peninsula Plating Site.
Market St. and River Road, Blades, Delaware

FIGURE 4.

Tax Parcel Map of the Peninsula Plating Site

No Scale

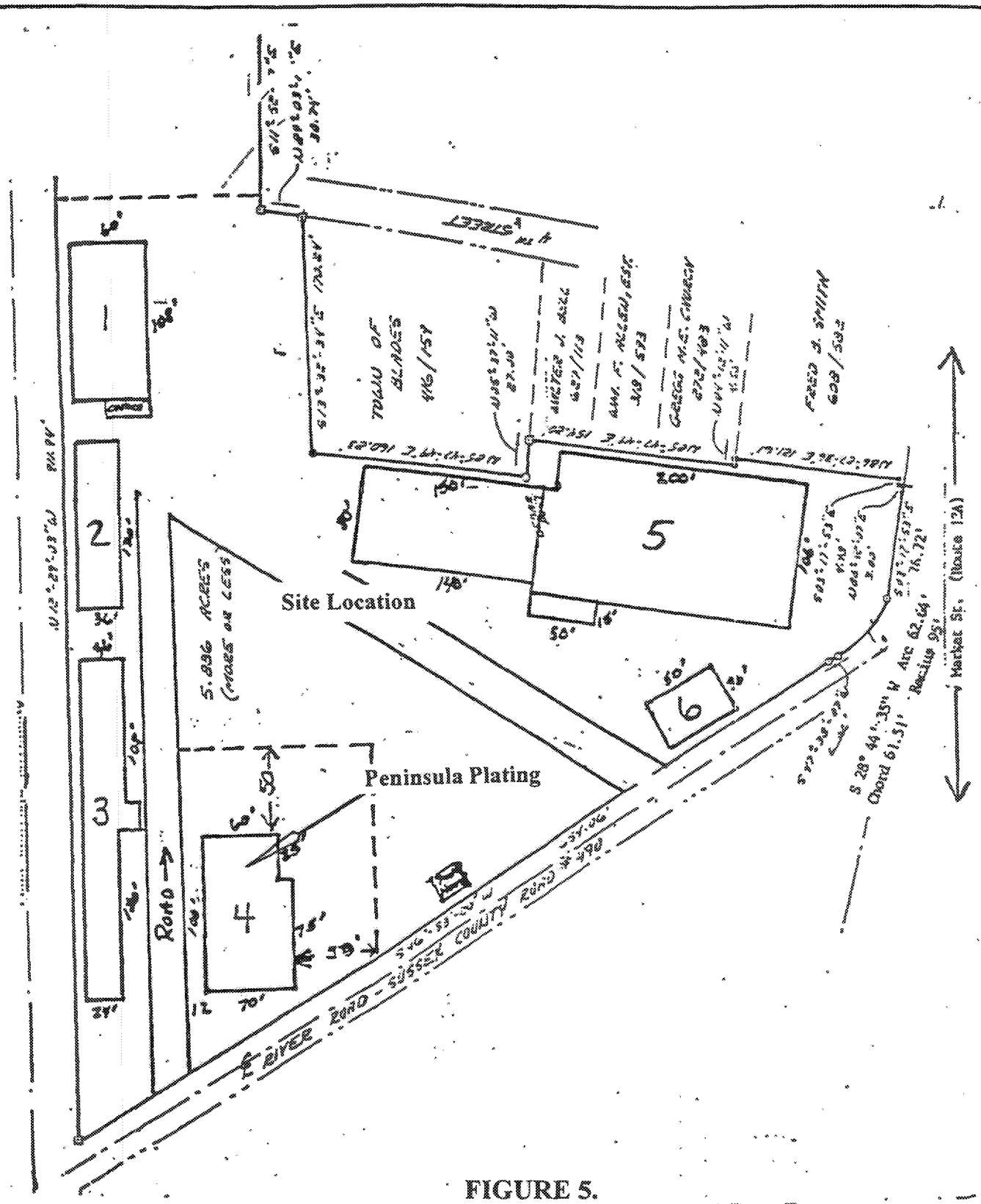

FIGURE 5.

Site Map of Peninsula Plating.
Market St. and River Road, Blades, Delaware

No Scale

FIGURE 6. 1992 Aerial Photo of Peninsula Plating

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FIGURE 7. 1997 Aerial of the Peninsula Plating Site

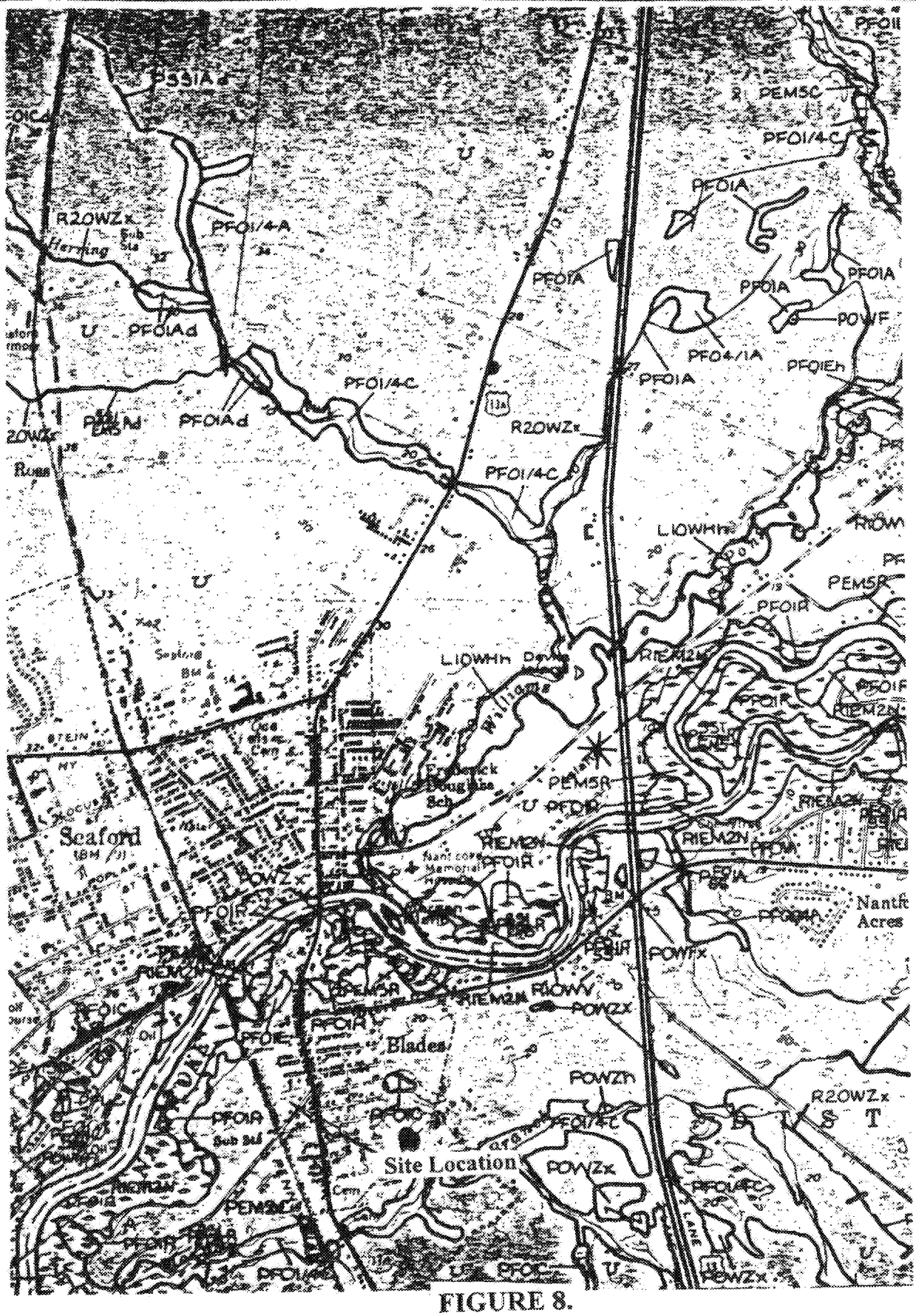


FIGURE 8.

National Wetlands Inventory Map of the Peninsula Plating Area
(from U.S. Dept. of Interior)

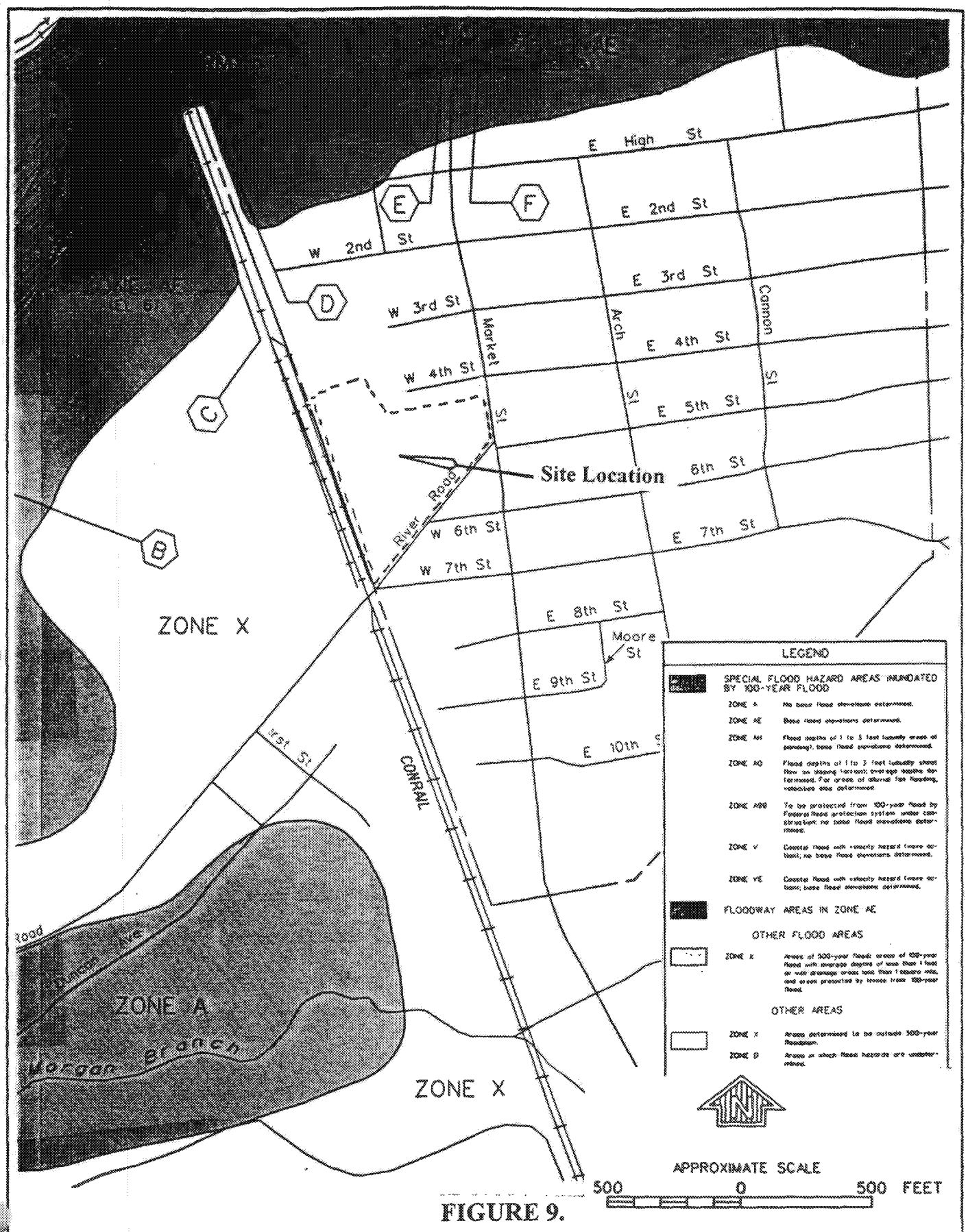


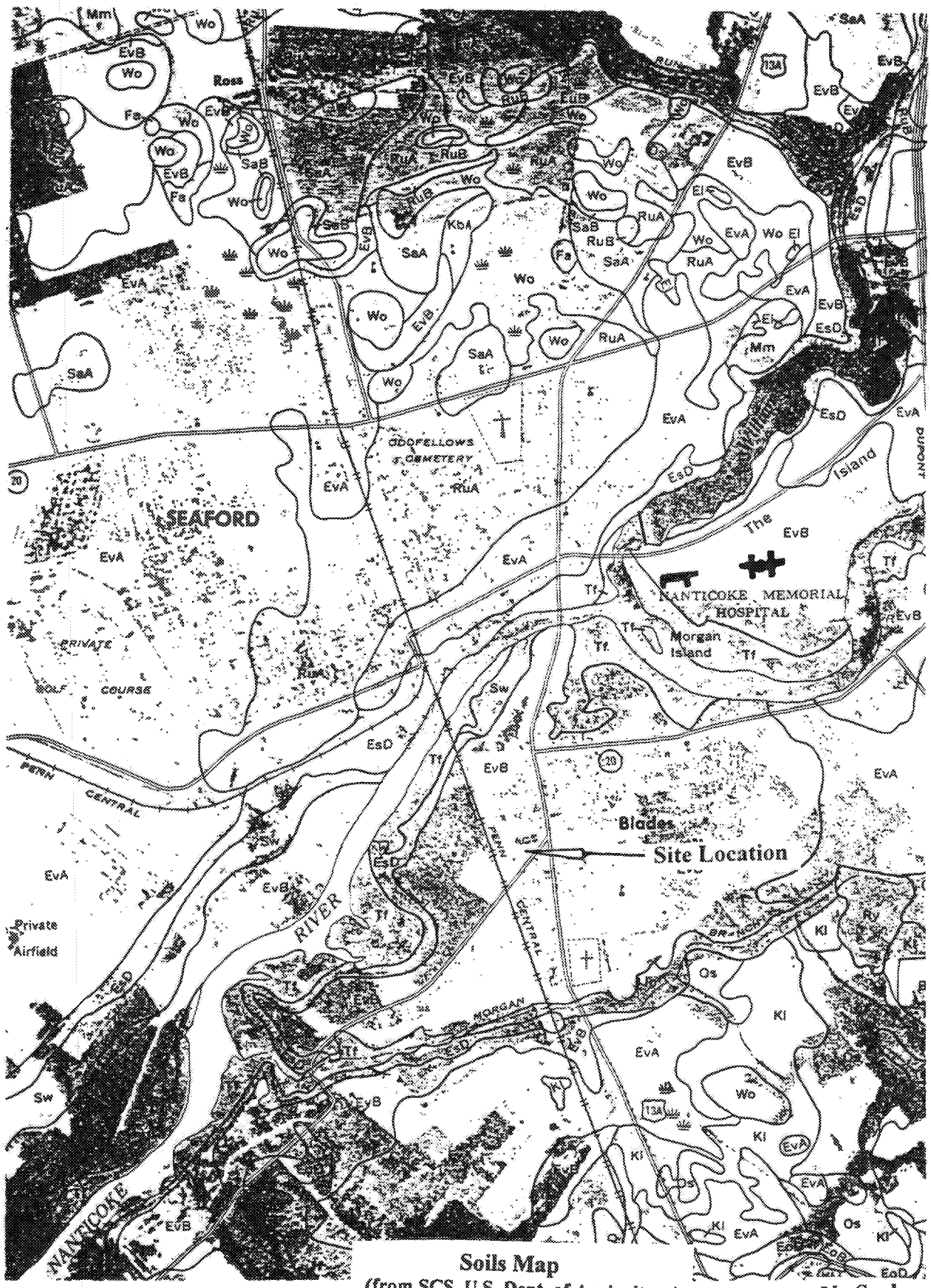
FIGURE 9.

Flood Insurance Rate Map, Peninsula Plating Area
(from the National Flood Insurance Program, 1996)

Ex. 9 Wells

Geology of the Peninsula Plating Area

(from Geohydrology of the Seaford Area, Delaware, Delaware Geological Survey, Andres, A.S., 1994)



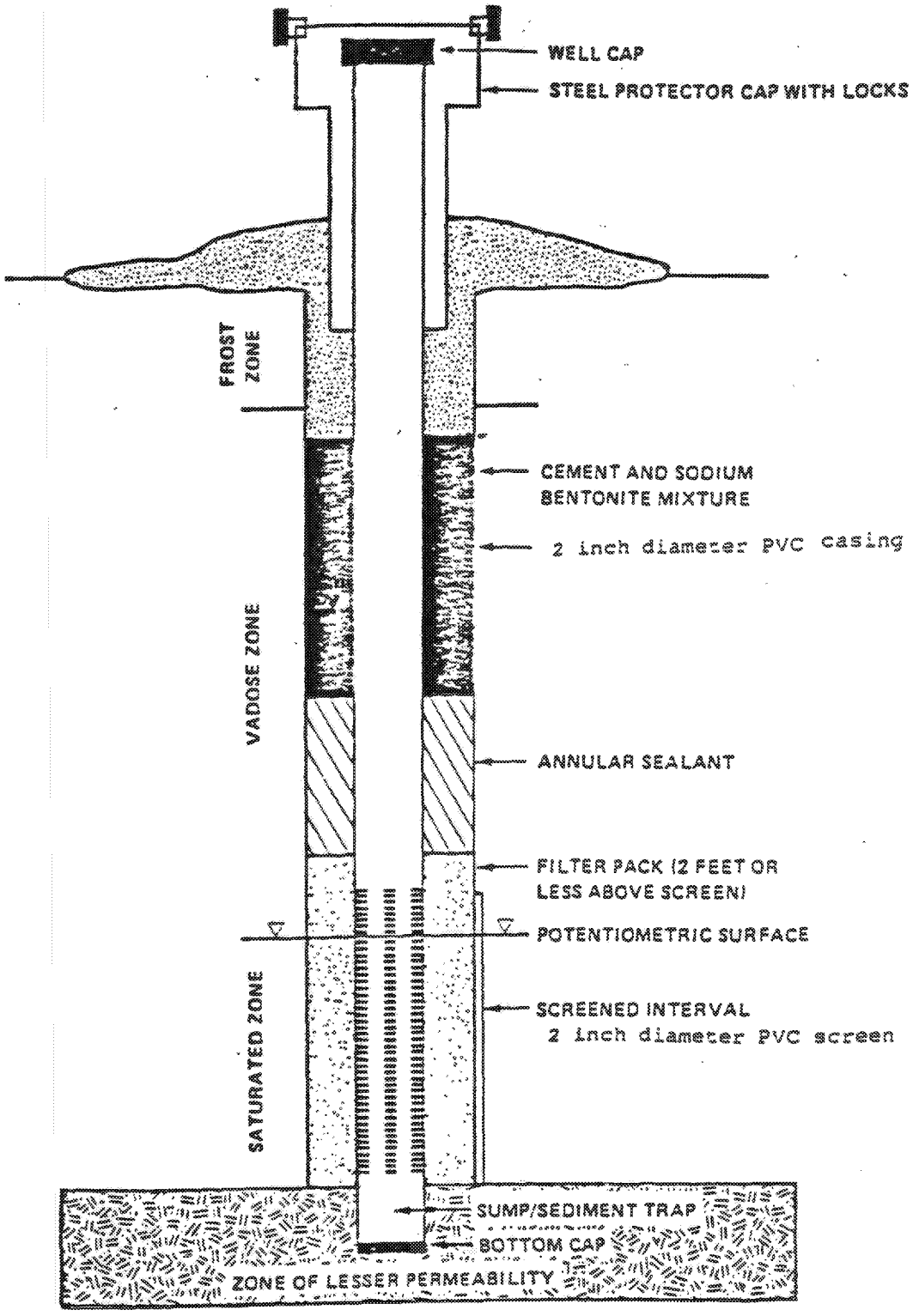
Soils Map
(from SCS, U.S. Dept. of Agriculture)

No Scale

FIGURE 11.

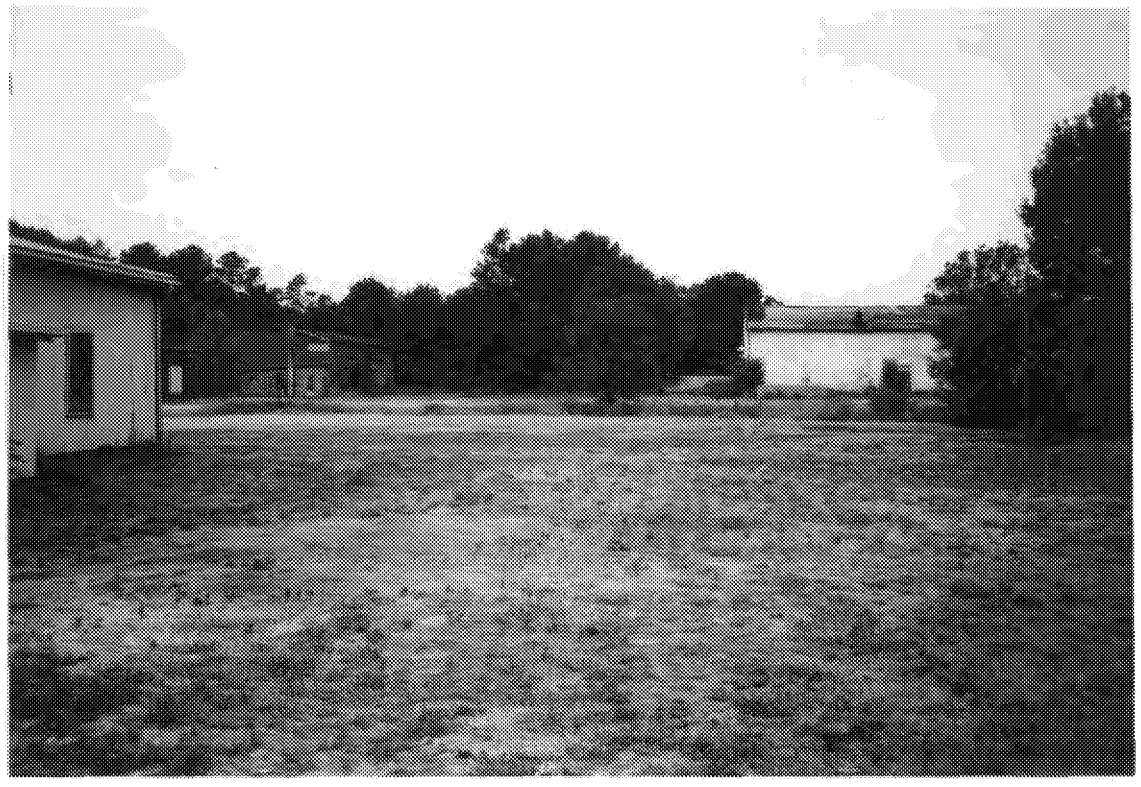
Ex. 9 Wells

FIGURE 13.
MONITORING WELL CONSTRUCTION (TYPICAL)



PHOTOGRAPHS

Photograph 1: Former Peninsula Plating Building, River Road Side
(Building #4, Figure 5)



Photograph 2: Open Lot Alongside Former Peninsula Plating Building
(Building #4, Figure 5)

Photograph 3: Back of Former Peninsula Plating Building
(Building #4, Figure 5)

Photograph 4: Former Steel Shop (Building #1, Figure 5)
Note Fuel Pump on Corner

Photograph 5: Test Pit #2, Behind former Peninsula Plating Building

Photograph 6: Test Pit #9, Alongside Building #5, Figure 5

Photograph 7: Test Pit #3, Soil Staining on Surface

Photograph 8: Test Pit #3, Soil Staining on Sideway

APPENDICES

APPENDIX A.

US EPA TARGET COMPOUND LIST AND TARGET ANALYTE LIST

Superfund EPA

Scroll down for more...

The CLP -
Superfund's Data Quality Solution:

Target Compounds and Analytes

The CLP Target Compound and Target Analyte Lists were originally derived from the EPA Priority Pollutant List. In the years since the inception of the CLP, compounds and analytes have been added to and deleted from this list, based on advances in analytical methods, evaluation of method performance data, and the needs of the Superfund program.

The compounds and analytes and their corresponding baseline quantitation/detection limits are listed below. These compounds/analytes are separated into four different list:

- Target Compound List (TCL) Volatile Compounds
- Target Compound List (TCL) Semivolatile Compounds
- Target Compound List (TCL) Pesticides/Aroclors (PCBs)
- Target Analyte List (TAL) Metals and Cyanide

Please note that water and soil/sediment quantitation limits apply to the Multi-Media Organic and Multi-Media Inorganic CLP services, while drinking water/groundwater quantitation limits can be obtained through the Low Concentration Organic Service only.

In addition to the quantitation limits, links have been provided for certain compounds/analytes to the Agency for Toxic Substance and Disease Registry's (ATSDR) ToxFAQs Internet site. Data from this site are derived from ATSDR's public health statements and represent the most up to date information at the time of listing. The information is intended to inform the reader about these substances with special emphasis placed on their known effects on human health, while at the same time, acknowledging that there are limitations that exist about long term health outcomes for many of these substances.

If you have further questions about any information regarding these compounds you may contact (EMAIL). More detailed information regarding the human health effects associated with Target Compound List and Target Analyte List substances can be obtained by directly accessing the ATSDR Homepage on the Internet at http://atsdr1.atsdr.cdc.gov:8080.

DISCLAIMER: The following links are pointers to other hosts and locations on the

Internet. This information is provided as a service; however the U.S. Environmental Protection Agency does not endorse, approve or otherwise support the non-EPA sites.

TARGET COMPOUND LIST (TCL) VOLATILE COMPOUNDS AND THEIR QUANTITATION LIMITS

COMPOUND	Drinking/ Ground Water (ug/l)	Water (ug/l)	Soil (ug/kg)	DESCRIPTION
Chloromethane	1	10	10	
Bromomethane	1	10	10	
Vinyl Chloride	1	10	10	
Chloroethane	1	10	10	
Methylene Chloride	2	10	10	
Acetone	5	10	10	
Carbon Disulfide	1	10	10	
1,1-Dichloroethene	1	10	10	
1,1-Dichloroethane	1	10	10	
1,2-Dichloroethene (total)	NA	10	10	
cis-1,2-Dichloroethene	1	NA	NA	
trans-1,2-Dichloroethene	1	NA	NA	
Chloroform	1	10	10	
1,2-Dichloroethane	1	10	10	
2-Butanone	5	10	10	
Bromochloromethane	1	NA	NA	
1,1,1-Trichloroethane	1	10	10	
Carbon Tetrachloride	1	10	10	
Bromodichloromethane	1	10	10	
1,2-Dichloropropane	1	10	10	
cis-1,3-Dichloropropene	1	10	10	
Trichloroethene	1	10	10	
Dibromochloromethane	1	10	10	

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1,1,2-Trichloroethane	1	10	10	
Benzene	1	10	10	
trans-1,3-Dichloropropene	1	10	10	
Bromoform	1	10	10	
4-Methyl-2-pentanone	5	10	10	
2-Hexanone	5	10	10	
Tetrachloroethene	1	10	10	
1,2-Dibromomethane	1	NA	NA	
Toluene	1	10	10	
1,1,2,2-Tetrachloroethane	1	10	10	
Chlorobenzene	1	10	10	
Ethylbenzene	1	10	10	
Styrene	1	10	10	
Xylenes (Total)	1	10	10	
1,2-Dibromo-3-chloropropane	1	NA	NA	

[Return to top of page]

TARGET COMPOUND LIST (TCL)
SEMIVOLATILES COMPOUNDS AND THEIR QUANTITATION LIMITS

COMPOUND	Drinking/ Ground Water (ug/l)	Water (ug/l)	Soil (ug/kg)	DESCRIPTION
Phenol	5	10	330	
bis(2-Chloroethyl) ether	5	10	330	
2-Chlorophenol	5	10	330	
1,3-Dichlorobenzene	1*	10	330	
1,4-Dichlorobenzene	1*	10	330	
1,2-Dichlorobenzene	1*	10	330	
2-Methylphenol	5	10	330	
2,2'-oxybis(1-Chloropropane)	5	10	330	
4-Methylphenol	5	10	330	
N-Nitroso-di-n-propylamine	5	10	330	
Hexachloroethane	5	10	330	
Nitrobenzene	5	10	330	

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Isophorone	5	10	330	
2-Nitrophenol	5	10	330	
2,4-Dimethylphenol	5	10	330	
bis(2-Chloroethoxy) methane	5	10	330	
2,4-Dichlorophenol	5	10	330	
1,2,4-Trichlorobenzene	1*	10	330	
Naphthalene	5	10	330	
4-Chloroaniline	5	10	330	
Hexachlorobutadiene	5	10	330	
4-Chloro-3-methylphenol	5	10	330	
2-Methylnaphthalene	5	10	330	
Hexachlorocyclopentadiene	5	10	330	
2,4,6-Trichlorophenol	5	10	330	
2,4,5-Trichlorophenol	20	25	800	
2-Chloronapthalene	5	10	330	
2-Nitroaniline	20	25	800	
Dimethylphthlate	5	10	330	
Acenaphthylene	5	10	330	
2,6-Dinitrotoluene	5	10	330	
3-Nitroaniline	20	25	800	
Acenaphthene	5	10	330	
2,4-Dinitrophenol	5	25	800	
4-Nitrophenol	5	25	800	
Dibenzofuran	5	10	330	
2,4-Dinitrotoluene	5	10	330	
Diethylphthalate	5	10	330	
4-Chlorophenyl phenyl ether	5	10	330	
Fluorene	5	10	330	
4-Nitroaniline	20	25	800	
4,6-Dinitro-2-methylphenol	20	25	800	
N-nitrosodiphenylamine	5	10	330	
4-Bromophenyl phenyl ether	5	10	330	
Hexachlorobenzene	5	10	330	
Pentachlorophenol	20	25	800	
Phenanthrene	5	10	330	
Anthracene	5	10	330	
Carbazole	NA	10	330	
Di-n-butylphthalate	5	10	330	

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Fluoranthene	5	10	330	
Pyrene	5	10	330	
Butylbenzylphthalate	5	10	330	
3,3'-Dichlorobenzidine	5	10	330	
Benzo(a)anthracene	5	10	330	
Chrysene	5	10	330	
bis(2-Ethylhexyl)phthalate	5	10	330	
Di-n-octylphthalate	5	10	330	
Benzo(b)fluoranthene	5	10	330	
Benzo(k)fluoranthene	5	10	330	
Benzo(a)pyrene	5	10	330	
Indeno(1,2,3-cd)pyrene	5	10	330	
Dibenz(a,h)anthracene	5	10	330	
Benzo(g,h,i)perylene	5	10	330	

* Compound analyzed as a volatile in the low concentration method.

[Return to top of page]

TARGET COMPOUND LIST (TCL)
PESTICIDES/AROCLORS (PCBS) AND THEIR QUANTITATION LIMITS

COMPOUND	Drinking/ Ground Water (ug/l)	Water (ug/l)	Soil (ug/kg)	DESCRIPTION
alpha-BHC	0.01	0.05	1.7	
beta-BHC	0.01	0.05	1.7	
delta-BHC	0.01	0.05	1.7	
gamma-BHC (Lindane)	0.01	0.05	1.7	
Heptachlor	0.01	0.05	1.7	
Aldrin	0.01	0.05	1.7	
Heptachlor epoxide	0.01	0.05	1.7	
Endosulfan I	0.01	0.05	1.7	

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Dieldrin	0.02	0.10	3.3	
4,4'-DDE	0.02	0.10	3.3	
Endrin	0.02	0.10	3.3	
Endosulfan II	0.02	0.10	3.3	
4,4'-DDD	0.02	0.10	3.3	
Endosulfan sulfate	0.02	0.10	3.3	
4,4'-DDT	0.02	0.10	3.3	
Methoxychlor	0.10	0.50	17.0	
Endrin ketone	0.02	0.10	3.3	
Endrin aldehyde	0.02	0.10	3.3	
alpha-Chlordane	0.01	0.05	1.7	
gamma-Chlordane	0.01	0.05	1.7	
Toxaphene	1.0	5.0	170.0	
Aroclor-1016	0.20	1.0	33.0	
Aroclor-1221	0.40	2.0	67.0	
Aroclor-1232	0.20	1.0	33.0	
Aroclor-1242	0.20	1.0	33.0	
Aroclor-1248	0.20	1.0	33.0	
Aroclor-1254	0.20	1.0	33.0	
Aroclor-1260	0.20	1.0	33.0	

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TARGET ANALYTE LIST (TAL)
METALS/CYANIDE AND THEIR DETECTION LIMITS*

ANALYTES	WATER (ug/l)	DESCRIPTION
Aluminum	200	
Antimony	60	

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Arsenic	10	
Barium	200	
Berylium	5	
Cadmium	5	
Calcium	5000	
Chromium	10	
Cobalt	50	
Copper	25	
Iron	100	
Lead	3	
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	

TAL Metal detection limits are expressed as instrument detection limits obtained in pure water. Detection limits for soils are adjusted for the amount of sample analyzed and percent moisture.

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Office of Emergency and Remedial Response
Analytical Operations Center /MS:5204G
401 M Street, S.W

Washington, DC 20460
Last revised: May 13, 1997

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APPENDIX B.

FIELD SCREENING PROCEDURES

RaPID Assays

APPENDIX B

PAHs

• Intended Use

For detection of PAHs (Polynuclear Aromatic Hydrocarbons). Please refer to the attached specific procedures for water and soil. Application procedures for other sample matrices can be obtained from Ohmicron.

• Principle

The PAHs RaPID Assay® applies the principles of enzyme linked immunosorbent assay (ELISA) to the determination of PAHs. The sample to be tested is added, along with an enzyme conjugate, to a disposable test tube, followed by paramagnetic particles with antibodies specific to PAHs attached. Both the PAHs (which may be in the sample) and the enzyme labeled PAHs (the enzyme conjugate) compete for antibody binding sites on the magnetic particles. At the end of an incubation period, a magnetic field is applied to hold the paramagnetic particles (with PAHs and labeled PAHs analog bound to the antibodies on the particles, in proportion to their original concentration) in the tube and allow the unbound reagents to be decanted. After decanting, the particles are washed with Washing Solution.

The presence of PAHs is detected by adding the enzyme substrate (hydrogen peroxide) and the chromogen (3,3',5,5'-tetramethylbenzidine). The enzyme-labeled PAHs analog bound to the PAHs antibody catalyzes the conversion of the substrate/chromogen mixture to a colored product. After an incubation period, the reaction is stopped and stabilized by the addition of acid. Since the labeled PAHs (conjugate) were in competition with the unlabeled PAHs (sample) for the antibody sites, the color developed is inversely proportional to the concentration of PAHs in the sample.

• Reagents

1. PAHs Antibody Coupled Paramagnetic Particles
The PAHs antibody (rabbit anti-PAHs) is covalently bound to paramagnetic particles, which are suspended in buffered saline with preservative and stabilizers.

30 test kit: one 20 mL vial
100 test kit: one 85 mL vial

2. Lyophilized PAHs Enzyme Conjugate
Concentrated horseradish peroxidase (HRP) labeled PAH analog is supplied as a lyophilized powder. One vial is provided.

3. PAHs Enzyme Conjugate Diluent
Buffered saline containing preservatives and stabilizers.

30 test kit: one 10 mL vial (minimum)
100 test kit: one 35 mL vial (minimum)

4. PAHs Standards
Three concentrations (2.0, 10.0, 50.0 ppb) of Phenanthrene (as phenanthrene analog) standards in buffered saline with preservative and stabilizers are supplied. Each vial contains 2.0 mL.

5. Control
A concentration (approximately 25 ppb) of Phenanthrene (as phenanthrene analog) in buffered saline with preservative and stabilizers. A 2.0 mL volume is supplied in one vial.

6. Diluent/Zero Standard
Buffered saline containing preservative and stabilizers without any detectable PAHs.

30 test kit: one 10 mL vial
100 test kit: one 35 mL vial

7. Color Solution
A solution of hydrogen peroxide and 3,3',5,5'-tetramethylbenzidine in an organic base.

30 test kit: one 20 mL vial
100 test kit: one 65 mL vial

8. Stopping Solution
A solution of sulfuric acid (0.5%).

30 test kit: one 20 mL vial
100 test kit: one 80 mL vial

9. Washing Solution
Preserved deionized water with detergent.

30 test kit: one 70 mL vial
100 test kit: one 250 mL vial

10. Test Tubes
Polystyrene tubes (36) are packaged in a box.

30 test kit: one 36 tube box
100 test kit: three 36 tube boxes

• Reagent Storage and Stability

Store all reagents at 2-8°C. Reconstituted conjugate should be used within 21 days of preparation. If reconstituted conjugate cannot be used within this period of time, aliquots should be prepared and frozen. All reagents, including frozen aliquots of reconstituted conjugate, may be used until the expiration date on the kit label. *The test tubes require no special storage condition and may be stored separately from the reagents to conserve refrigerator space.*

Consult state, local and federal regulations for proper disposal of all reagents.

• Materials Required but Not Provided

In addition to the reagents provided, the following items are essential for the performance of the test:

Pipets* — Precision pipets capable of delivering 250 and 500 uL and a 1.0 mL repeating pipet.

Vortex Mixer* — Thermolyne Maxi Mix, Scientific Industries Vortex Genie, or equivalent

Magnetic Separation Rack*

RPA-I™ RaPID Analyzer* or equivalent photometer capable of readings at 450 nm

* These items are available from Ohmicron.

• Sample Information

Refer to sample preparation information contained under individual procedure (i.e. water, soil) or application notes.

If the PAHs concentration of a sample exceeds 50 ppb, the sample is subject to repeat testing using a diluted sample. A ten-fold or greater dilution of the sample is recommended with an appropriate amount of Diluent/Zero Standard or Sample Diluent. For example, in a separate test tube make a ten-fold dilution by adding 100 uL of the sample to 900 uL of Diluent/Zero Standard. Mix thoroughly before assaying. Perform the assay according to the Assay Procedure and obtain final results by multiplying the value obtain by the dilution factor e.g. 10.

The presence of the following substances up to 250 ppm were found to have no significant effect on PAHs RaPID Assay results: calcium, copper, iron, manganese, magnesium, mercury, nickel, nitrate, phosphate and zinc. In addition, sodium chloride up to 1.0M, sulfate to 10,000 ppm, sulfite and thiosulfate to 100 ppm, showed no significant effect on results.

• Reagent Preparation

The PAHs Enzyme Conjugate is provided as a lyophilized preparation that must be reconstituted prior to use. To prepare the conjugate, add approximately 3 mL of the conjugate diluent to the lyophilized conjugate vial using the disposable transfer pipet. Swirl gently to dissolve the conjugate. Accurately transfer the vial contents to the diluent bottle. Repeat this procedure twice more with 3 mL aliquots of conjugate diluent. Invert diluent bottle several times to mix completely and let stand approximately 5 minutes before use. Enter the date of reconstitution on the side label of the PAHs Conjugate Diluent bottle. Also enter the expiration date of the PAHs Enzyme Conjugate solution which is 21 days from date of reconstitution. If the conjugate cannot be used up within 21 days of reconstitution, aliquots should be prepared and frozen. *Frozen aliquots of reconstituted conjugate may be used until the expiration date found on the kit box label.*

All reagents must be allowed to come to room temperature and the antibody coupled paramagnetic particles should be mixed thoroughly before use.

OHMICRON — The Quality Difference

RaPID Prep™

Carcinogenic PAHs Sample Extraction Kit

• Intended Use

For use in conjunction with RaPID Prep™ Soil Collection Kit and the Carcinogenic PAHs RaPID Assay® Kit for determination of Carcinogenic PAHs in soil.

• Principle

Polynuclear or polycyclic aromatic hydrocarbons (PAHs) are a group of compounds composed of two or more fused aromatic rings. The U.S. EPA has identified 16 unsubstituted PAHs as priority pollutants. The seven (7) PAHs that are typically considered to be probable or possible human carcinogens are benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, dibenzo(a,h)anthracene. Benzo(a)pyrene is the most potent carcinogens among the PAHs. Carcinogenic PAHs are introduced into the environment as a product of natural and fossil fuel combustion. As a source of environmental contamination, PAHs are a serious problem at manufactured gas plants (MGP), coking operations, wood preserving sites that use creosote as a preservative and petrochemical waste disposal sites. The large number of these sites which are contaminated by carcinogenic PAHs in soil and groundwater has led federal and state agencies to mandate their clean-up. These agencies have set various regulatory levels for carcinogenic PAHs in soil, however the usual concentrations of interest are less than 1 ppm. Accurate determination of the carcinogenic PAH content of contaminated soils is necessary to make appropriate decisions regarding site cleanup and remediation.

The reagents contained in the RaPID Prep Carcinogenic PAHs Sample Extraction Kit have been optimized for fast, efficient removal of Carcinogenic PAHs from soil and convenient preparation of the sample for immunoassay at levels of interest to the investigator. The system allows for reliable, convenient and cost effective determinations at the field testing or remediation site.

• Description of Contents

1. Carcinogenic PAHs Extraction Solution
   Methanol with soil dispersion agent.
   per kit: 20 bottles containing 20 mL each
2. Carcinogenic PAHs Extract Diluent
   Buffered saline solution containing preservatives and stabilizers without any detectable Carcinogenic PAHs.
   per kit: 20 vials containing 9.8 mL each
3. Chain of custody container labels.
   per kit: 30 labels for diluent vials

• Reagent Storage and Stability

Store all reagents and components in a dry well ventilated area at 2-30°C. Reagents may be used until the expiration date shown on the vials.

Consult local, state and federal regulations for proper disposal of all reagents.

• Materials Not Provided

In addition to the materials provided, the following items will be necessary for the performance of the procedure:

- RaPID Prep Soil Collection Kit
- stopwatch or clock with second hand
- permanent marking pen
- protective gloves
- digital balance (optional, available from Ohmicron)
- precision pipet and tips capable of delivering 200 µL.

• Sample Information

This kit was validated for use with soil samples. Other types of sample matrices and solid wastes may require different procedures to extract Carcinogenic PAHs.

• Procedural Notes and Precautions

Do not use any reagent beyond its stated shelf life.

Sixty seconds of continuous agitation of the soil sample in the presence of the extraction solution is important for good extraction efficiency. Use of a one minute timer or stopwatch to assure adequate shaking time is recommended.

Avoid contact of extraction solution (methanol) with skin and mucous membranes. If this reagent comes in contact with skin wash with water.

Due to the large dilution factor used, the accuracy of the final result will depend in part on the care taken in pipetting the soil extract into the diluent.

• Limitations

The Carcinogenic PAHs Sample Extraction Kit, when used in conjunction with RaPID Prep Soil Collection Kit and the Carcinogenic PAHs RaPID Assay, will provide screening results. Positive results may need to be confirmed by a non-immunological method.

• Extraction/Filtration Procedure

Read the Procedural Notes and Precautions and the RaPID Prep Soil Collection kit package insert before proceeding. Various soil sampling options are presented in the Soil Collection Kit package insert.

1. Write sample information on the labels provided for soil collection device, extract collection vials and Carcinogenic PAHs Extract Diluent vials. Apply labels to appropriate vessels.

2. ***Sampling:*** Remove the screw cap from the soil collector and collect soil by volume or by weight as follows:

2.1 ***By volume:*** With the plunger fully depressed (pushed to the top of the tube), pack soil into the open end of the collection tube. Unscrew the plunger rod from its plunger by turning the handle counterclockwise. Level the soil flush with the top of the collector tube using the plunger rod. Using the base portion of the handle, push the soil sample and the plunger to the bottom.

2.2 ***By weight using digital balance:***
Option 1. Remove screw cap. Tare the soil collector with its plunger rod. Collect the soil "By volume," level it off and push the soil and plunger to the bottom of the tube. Reattach plunger rod and weigh the tube containing the soil. Subtract original weight from final weight to determine soil weight. Record the weight of the soil.

Option 2. Remove the screw cap and plunger rod from an empty collection tube. Position the plunger at the bottom of the collection tube. Attach the red base piece provided and place the tube in an upright position on the balance and tare weight. Weigh 10 ± 0.1 gram of soil into the tube. Record the soil weight.

3. ***Extraction***
3.1 Position the soil collection tube containing a soil sample upright in the Styrofoam rack.
3.2 Pour the contents of one vial of Carcinogenic PAH Extraction Solution into the collector. Screw the cap (without filter) on tightly and make sure that the luer cap is secured.

OHMICRON

RaPID Prep™

PCB Sample Extraction Kit

• Intended Use

For use in conjunction with RaPID Prep™ Soil Collection Kit and the PCB RaPID Assay® Kit for determination of PCB in soil.

• Principle

Before the 1978 regulations of the Toxic Substances Control Act were put in place, polychlorinated biphenyls (PCBs) were produced in the United States for use in a wide variety of industrial applications including electrical transformers and capacitors, paints, inks and pesticides. The chemical and physical stability of these compounds can lead to long term environmental problems. The non-polar structure of this class of compounds imparts a hydrophobicity that allows PCBs to adsorb readily to soil and other solid surfaces. Accurate determination of the PCB content of soils suspected of contamination is necessary to make appropriate decisions regarding site cleanup and remediation.

The reagents contained in the RaPID Prep PCB Sample Extraction Kit have been optimized for fast, efficient removal of PCB from soil and convenient preparation of the sample for immunoassay at levels of interest to the investigator. The system allows for reliable, convenient and cost effective determinations at the field testing or remediation site.

• Description of Contents

1. PCB Extraction Solution
   Methanol with soil dispersion agent.
   per kit: 20 bottles containing 20 mL each
2. PCB Extract Diluent
   Buffered saline solution containing preservatives and stabilizers without any detectable PCB.
   per kit: 20 vials containing 25 mL each
3. Twenty five microliter precision pipet.
4. Pipet tips
   per kit: 21 disposable plastic tips
5. Chain of custody container labels.
   per kit: 30 labels for diluent vials

• Reagent Storage and Stability

Store all reagents and components in a dry well ventilated area at 2-30°C. Reagents may be used until the expiration date shown on the vials.

Consult local, state and federal regulations for proper disposal of all reagents.

• Materials Not Provided

In addition to the materials provided, the following items will be necessary for the performance of the procedure:

- RaPID Prep Soil Collection Kit
- stopwatch or clock with second hand
- permanent marking pen
- protective gloves
- digital balance (optional, available from Ohmicron)

• Sample Information

This kit was validated for use with soil samples. Other types of sample matrices and solid wastes may require different procedures to extract PCB.

• Procedural Notes and Precautions

Do not use any reagent beyond its stated shelf life.

Sixty seconds of continuous agitation of the soil sample in the presence of the extraction solution is important for good extraction efficiency. Use of a one minute timer or stopwatch to assure adequate shaking time is recommended.

Avoid contact of extraction solution (methanol) with skin and mucous membranes. If this reagent comes in contact with skin wash with water.

The twenty five microliter pipet is considered disposable and should be discarded after the kit reagents are depleted.

Due to the large dilution factor used, the accuracy of the final result will depend in part on the care taken in pipetting the soil extract into the diluent.

• Limitations

The PCB Sample Extraction Kit, when used in conjunction with RaPID Prep Soil Collection Kit and the PCB RaPID Assay, will provide screening results. Positive results may need to be confirmed by a non-immunological method.

• Extraction/Filtration Procedure

Read the Procedural Notes and Precautions and the RaPID Prep Soil Collection kit package insert before proceeding. Various soil sampling options are presented in the Soil Collection Kit package insert.

1. Write sample information on the labels provided for soil collection device, extract collection vials and PCB Extract Diluent vials. Apply labels to appropriate vessels.

2. ***Sampling***: Remove the screw cap from the soil collector and collect soil by volume or by weight as follows:

2.1 ***By volume***: With the plunger fully depressed (pushed to the top of the tube), pack soil into the open end of the collection tube. Unscrew the plunger rod from its plunger by turning the handle counterclockwise. Level the soil flush with the top of the collector tube using the plunger rod. Using the base portion of the handle, push the soil sample and the plunger to the bottom.

2.2 ***By weight using digital balance:***
Option 1. Remove screw cap. Tare the soil collector with its plunger rod. Collect the soil "By volume," level it off and push the soil and plunger to the bottom of the tube. Reattach plunger rod and weigh the tube containing the soil. Subtract original weight from final weight to determine soil weight. Record the weight of the soil.

Option 2. Remove the screw cap and plunger rod from an empty collection tube. Position the plunger at the bottom of the collection tube. Attach the red base piece provided and place the tube in an upright position on the balance and tare weight. Weigh 10 ± 0.1 gram of soil into the tube. Record the soil weight.

3. ***Extraction***

3.1 Position the soil collection tube containing a soil sample upright in the Styrofoam rack.
3.2 Pour the contents of one vial of PCB Extraction Solution into the collector. Screw the cap (without filter) on tightly and make sure that the luer cap is secured.
3.4 SHAKE VIGOROUSLY AND CONTINUOUSLY FOR AT LEAST 60 SECONDS. Additional shaking may be required to break up large or dry soil aggregates.
3.5 Position the collection tube upright in the rack and allow the mixture to settle at least five minutes.

If batch processing is desired, up to 21 soil samples with added

OHMICRON
...The Quality Difference

PCB FLOWCHART: SOIL PROTOCOL

1

Remove upper rack from magnetic base.

Label test tubes for Standards, Control, and Samples.

Tube #	Content
1, 2	Diluent/Zero Standard, 0 ppb
3, 4	Standard 1 0.25 ppb
5, 6	Standard 2 1.0 ppb
7, 8	Standard 3 5.0 ppb
9	Control
10	Sample 1
11	Sample 2

Add 200 µL of either Standards, Control or Diluted Soil Extract to the **bottom** of each test tube by inserting the pipet tip all the way into the tube without touching the sides or the bottom of the tube.

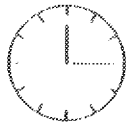
2

Add 250 µL of PCB Enzyme Conjugate down the inside wall of each tube by aiming the pipet tip 1/4" to 1/2" below the tube rim without touching the rim or tube wall with the pipet tip; deliver liquid gently.

3

Add 500 µL of **thoroughly** mixed PCB Antibody Coupled Magnetic Particles down the inside wall of each tube by using the technique described in Box 2. *Vortex* for 1 to 2 seconds (at low speed to minimize foaming).

4

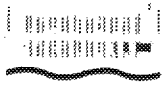


Incubate 15 minutes at room temperature (15°-30°C).

5

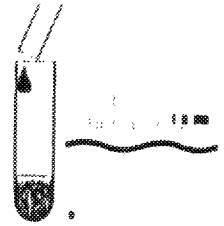
Combine the upper rack with the magnetic base; **press all tubes into base;** allow 2 minutes for the particles to separate.

6



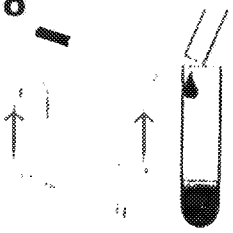
Do **not** separate upper rack from lower base. Using a smooth motion, *invert* the combined rack assembly over a sink and pour out the tube contents: keep inverted and **gently** blot the test tube rims on several layers of paper toweling.

7



Add 1 mL of Washing Solution down the inside wall of each tube. Vortex each tube. *Wait 2 minutes.* Using a smooth motion, invert the combined rack assembly over a sink and pour out the tube contents: keep inverted and **gently** blot the test tube rims on several layers of paper toweling.
Repeat this step.

8

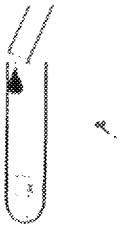


Lift the upper rack (with its tubes) off the magnetic base; *add* 500 µL of Color Reagent down the inside wall of each tube by using the technique described in Box 2. *Vortex* for 1 to 2 seconds (at low speed to minimize foaming).

9

Incubate for 20 minutes at room temperature (15°-30° C). During this period, add 1 mL of Washing Solution into a clean tube for use as an instrument blank in Step 10.

10



Add 500 µL of Stopping Solution to each tube. *Read* results at 450 nm within 15 minutes after adding the Stopping Solution.
Multiply results of extracted soil* samples by appropriate factor.
{**Safety Caution:** Stopping Solution is 2M sulfuric acid.}

For Ordering or Technical Assistance Contact:
Ohmicron Environmental Diagnostics, Inc.
800 844-8881 215 860-5115
FAX 215 860-5213

PCB Rapid Assay Kits
Part # A00133 30 Tests
 # A00134 100 Tests
RaPID Prep Soil Collection Kit A00127
RaPID Prep PCB Sample Extraction Kit A00137

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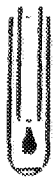
PAH's FLOWCHART: SOIL PROTOCOL

1



Prepare PAH's Enzyme conjugate for use.
- reconstitute as directed
  or
- thaw previously prepared frozen aliquots

Remove upper rack from magnetic base.

Label test tubes for Standards, Control, and Samples.

Tube #	Content
1, 2	Diluent/Zero Standard, 0 ppb
3, 4	Standard 1 2.0 ppb
5, 6	Standard 2 10.0 ppb
7, 8	Standard 3 50.0 ppb
9	Control
10	Sample 1
11	Sample 2

Add 250 µL of either Standards, Control or Diluted Soil Extract to the bottom of each test tube by inserting the pipet tip all the way into the tube without touching the sides or the bottom of the tube.

2

Add 250 µL of PAH's Enzyme Conjugate down the inside wall of each tube by aiming the pipet tip 1/4" to 1/2" below the tube rim without touching the rim or tube wall with the pipet tip; deliver liquid gently.

3

Add 500 µL of thoroughly mixed PAH's Antibody Coupled Magnetic Particles down the inside wall of each tube by using the technique described in Box 2. Vortex for 1 to 2 seconds (at low speed to minimize foaming).

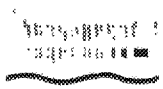
4

Incubate for 30 Minutes at Room Temperature (15° - 30°C).

5

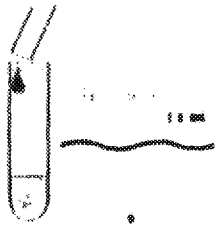
Combine the upper rack with the magnetic base; press all tubes into base; allow 2 minutes for the particles to separate.

6



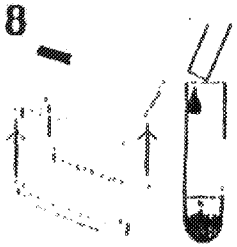
Do not separate upper rack from lower base. Using a smooth motion, *invert* the combined rack assembly over a sink and pour out the tube contents; keep inverted and gently blot the test tube rims on several layers of paper toweling.

7



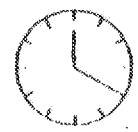
Add 1 mL of PAH's Washing Solution down the inside wall of each tube. *Vortex* each tube. Wait 2 minutes. Using a smooth motion, invert the combined rack assembly over a sink and pour out the tube contents; keep inverted and gently blot the test tube rims on several layers of paper toweling.
Repeat this step.

8



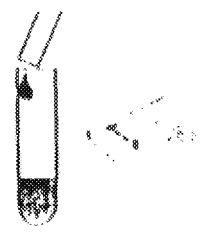
Lift the upper rack (with its tubes) off the magnetic base; add 500 µL of Color Reagent down the inside wall of each tube by using the technique previously described. Vortex for 1 to 2 seconds (at low speed to minimize foaming).

9



Incubate for 20 minutes at room temperature (15°-30° C). During this period, add 1 mL of Washing Solution into a clean tube for use as an instrument blank in Step 10.

10



Add 500 µL of Stopping Solution down the inside wall of each tube by using technique previously described. Read results at 450 nm within 15 minutes after adding the Stopping Solution. Multiply results of extracted soil samples by appropriate factor.

For Ordering or Technical Assistance Contact:
Ohmicron Environmental Diagnostics, Inc.
800 544-8881 218 880-5118
FAX 218 880-5218

Part # A00156 30 Tests
A00157 100 Tests
RaPID Prep Soil Collection Kit A00127
RaPID Prep PAH's Sample Extraction Kit A00160

MILLIPORE

EnviroGard™ DDT in Soil Test Kit

ENVR 000 31

Intended Use

The EnviroGard DDT in Soil Test Kit is a qualitative or semi-quantitative field test for the detection of DDT and its metabolites DDD and DDE in soil. The EnviroGard DDT in Soil Test Kit allows rapid semi-quantitative screening for DDT at 0.2, 1.0, and 10.0 parts per million (ppm) in soils.

Test Principles

The EnviroGard DDT in Soil Test Kit is based on the use of polyclonal antibodies that bind either DDT or DDT-Enzyme Conjugate. These antibodies are immobilized to the walls of the test tubes. When DDT is present in the sample, it competes with the DDT-Enzyme Conjugate for a limited number of antibody binding sites.

- A sample containing DDT is added to a test tube containing Assay Diluent. DDT-Enzyme Conjugate is then added to the test tube. The DDT-Enzyme Conjugate competes with the DDT for the antibody binding sites.
- After the incubation, the unbound molecules are washed away.
- A clear solution of chromogenic Substrate is then added to the test tube. In the presence of bound DDT-Enzyme Conjugate, the clear Substrate is converted to a blue color. One enzyme molecule can convert many Substrate molecules.

Since there are the same number of antibody binding sites on every test tube and each test tube receives the same number of DDT-Enzyme Conjugate molecules, a sample that contains a low concentration of DDT allows the antibody to bind many DDT-Enzyme Conjugate molecules.

Therefore, a low concentration of DDT produces a dark blue solution. Conversely, a high concentration of DDT allows fewer DDT-Enzyme Conjugate molecules to be bound by the antibodies, resulting in a lighter blue solution.

NOTE: Color is inversely proportional to DDT concentration.

Darker color = Lower concentration
Lighter color = Higher concentration

Performance Characteristics

The EnviroGard DDT in Soil Test Kit will not differentiate between DDT, its metabolites, and other structurally similar compounds, but will detect their presence to differing degrees. The following table shows a number of compounds and the approximate concentration of each required to yield a positive result (Lower Limit of Detection or LLD), and the concentration required to inhibit one-half of the color developed by the Negative Control (IC50). Concentration is in parts per million (ppm) in soil.

Compound	LLD	IC50
p,p'-DDT (kit calibrator)	0.04	1.25
p,p'-DDD	0.01	0.3
p,p'-DDE	0.18	3.6
o,p'-DDT	4	93
o,p'-DDD	0.4	11
o,p'-DDE	3	93
DDA	0.002	0.04
Chloropropylate	0.007	0.08
Chlorobenzilate	0.03	0.35
Dicofol	0.14	2
Tetradifon	1.2	14
Thiobencarb	5	52
Tebuconazole	7	95
Neburon	17	284
Chloroxuron	24	216
Monolinuron	25	714
Diclofop	70	>1000

The following compounds have lower limits of detection > 100 ppm:

2,4-D	4-chlorophenoxyacetic acid
Chlorbromuron	Chlordane
Chlortoluron	Dicamba
Diflubenzuron	Diuron
Lindane	Linuron
MCPA acid	MCPB
Mecoprop	

TABLE A

COMPOUND	LLD	IC50
Toxaphene	2 ppm	2.8 ppm
Endrin	6 pbb	22 ppb
Endosulfan I	6 pbb	36 ppb
Endosulfan II	6 pbb	28 ppb
Dieldrin	6 pbb	42 ppb
Heptachlor	6 pbb	34 ppb
Aldrin	20 ppb	116 ppb
Chlordane	14 ppb	76 ppb
Gamma-BHC*	0.6 ppm	4.6 ppm
Alpha-BHC	2 ppm	19 ppm
Delta-BHC	2 ppm	40 ppm

* - Lindane

TABLE B

COMPOUND	LLD**	IC50**
p,p'-DDT (kit calibrator	0.04	1.25
p,p'-DDD	0.01	0.3
p,p'-DDE	0.18	3.6
o,p'-DDT	4	93
o,p'-DDD	0.4	11
o,p'-DDE	3	93
DDA	0.002	0.04
Chloropropylate	0.007	0.08
Chlorobenzilate	0.03	0.35
Dicofol	0.14	2
Tetradifon	1.2	14
Thiobencarb	5	52
Tebuconazole	7	95
Neburon	17	284
Chloroxuron	24	216
Monolinuron	25	714
Diclofop	70	<1000

** - Concentration is in parts per million (ppm)

LLD - Lower Limit of detection (approximate concentration required to yield a positive result).
IC50 - Concentration required to inhibit one-half of the color developed by negative control.

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APPENDIX C.

TEST PIT DESCRIPTIVE LOGS

Peninsula Plating – Blades, DE
SITE INSPECTION

Test Pit Descriptions

TEST PIT	LOCATION	DESCRIPTION
PPTP-1	West side of building #4 alongside of the concrete pad.	0-12" Grass with 6" of light gray sand and gravel over dark gray to black sand 1-2' Dark gray to black sand with a layer of rust – then light brown to tan fine sand 2-3' Same, light brown to tan sand with some orange sand 3-4' Same, light brown to tan sand with some orange sand 4-5' Same, light brown to tan sand with some orange sand 5-6' White sand, fine to medium grained, very wet, hole caving
PPTP-2	North, behind building #4, parallel to the back of the building.	0-12" 6" of light gray silty sand with some gravel and concrete slag, 6" of dark gray (moist) sand with some silts 1-2' Light gray to brown fine sand 2-3' Light gray to brown fine sand 3-4' Light brown to tan sand 4-5' Tan to white sand, wet – water @ 5', hole caving
PPTP-3	Yard behind building #4, near oil stains.	0-12" Black oily soil and sand, strong odor 1-2' Black oil-stained sand 2-3' Light gray sand with a 6" layer of black to purple oil stained sand, strong petroleum odor 3-4' Light gray sand 4-5' Light gray sand, water @ 5', hole caving
PPTP-4	West side of building #4, 50' from River Road, 8' from the building.	0-12" Slight hard pan surface over light to dark gray fine sand, some orange sand and streaks of black sand 1-2' Same as above, then becomes light brown with depth 2-3' Light brown sand, some shells – found 4" PVC sewer pipe @ 3', moved pit NE 12' 3-4' Light brown/tan to orange sand, fine 4-5' Tan, almost white fine sand – water @ 5', hole caving
PPTP-5	East side of gravel road, North of ditch, South end of building #2.	0-12" 6" of orange sand, with some light gray sand 1-2' Light gray sand with some dark gray sand 2-3' Light gray to tan sand, 1" black plastic water pipe 3-4' White to light gray sand – water @ 4', hole caving
PPTP-6	East of building #1, North of UST area.	0-12" Shell fragments, gravel, orange and brown sand, some black stains 1-2' Orange select sand with some staining (pockets) 2-3' Same as above, then light gray fine sand 3-4' Light gray fine sand 4-5' Light gray fine sand

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Test Pit Descriptions

		5-6' Light gray fine sand, very wet, perched water 6-7' Light gray fine sand, very wet, perched water 7-8' Same as above, then very tight gray clay
PPTP-7	West end of bakery building #5, ramp to building.	0-12" Crusher run stone over orange sand with black staining 1-2' Orange select sand 2-3' Orange select sand 3-4' Orange select sand 4-5' Orange select sand – hole caving 5-6' Light orange and light gray sand, select 6-7' Light orange and light gray sand, select 7-8' Light orange and light gray sand, select – hole caving
PPTP-8	East side of ditch, grassy area, 50' North of fire well.	0-12" Light to dark gray sand, very fine with fine roots & organic matter 1-2' Light brown fine sand 2-3' Light brown fine sand 3-4' Light brown fine sand 5-6' Light brown fine sand 6-7' Fine to medium light brown to white sand, wet – hole caving
PPTP-9	Between fuel containment pads, South side of bakery building #5.	0-12" 2" of orange sand over light to dark gray sand, some brick pieces 1-2' Light to dark gray sand 2-3' Light brown and tan sand 3-4' Light brown and tan sand 4-5' Light brown and tan sand 5-6' Light brown and tan sand 6-7' White fine sand, very wet – hole caving
PPTP-10	Northeast side of building #6, near site of former AST.	0-12" Dark brown silty sand over orange select 1-2' Orange select 2-3' Orange select 3-4' Orange select 4-5' Light gray and orange sand, wetter 5-6' Light gray to orange/brown sand 6-7' Light gray to orange/brown sand – hole caving

APPENDIX D.

WELL DESCRIPTIVE LOGS

Department of Natural Resources and Environmental Control
Site Investigation and Restoration Branch
Well Log

Location: Peninsula Plating
Elevation:
Date:7/20/99

Geologist:M. Margie Zhang
Driller:Walton
Hole #:MW-1

Comments	Depth	Core Sketch	Description
	0		0' - 10' Sand Brown, yellow fine to medium sand well sorted
	1		
	2		
	3		
	4		
	5		Water table @ 5'
	6		6' - 8' Pure sugar sand, coarser than above
	7		
	8		
	9		running sands below water table
	10		

= Fill = Marsh deposit = Silt = Sand = Clay = Gravel

lj99045.xls

Department of Natural Resources and Environmental Control
Site Investigation and Restoration Branch
Well Log

Location:Peninsula Plating
Elevation:
Date:7/20/99

Geologist: M. Margie Zhang
Driller: Walton
Hole #: MW-1

Comments	Depth	Core Sketch	Description
	10		10' - 11' Sand Same as above
	11		11' - 16' Silty clay / clayey silt Dark gray silty clay or clayey silt with trace vegitation
	12		
	13		
	14		
	15		
	16		screened from 4' - 14'
	17		
	18		
	19		
	20		

= Fill = Marsh deposit = Silt = Sand = Clay = Gravel

lj99045.xls

Department of Natural Resources and Environmental Control
Site Investigation and Restoration Branch
Well Log

Location: Peninsula Plating
Elevation:
Date: 7/20/99

Geologist: M. Margie Zhang
Driller: Walton
Hole #: MW-2

Comments	Depth	Core Sketch	Description
	0		0' - 10' Sand Brown, yellow fine to medium sand well sorted
	1		
	2		
	3		
	4		
	5		
		Water table @ 5.5'	
	6		
	7		
	8		
	9		running sands
	10		

= Fill = Marsh deposit = Silt = Sand = Clay = Gravel

lij99045.xls

Department of Natural Resources and Environmental Control
Site Investigation and Restoration Branch
Well Log

Location: Peninsula Plating
Elevation:
Date: 7/20/99

Geologist: M. Margie Zhang
Driller: Walton
Hole # MW-2

Comments	Depth	Core Sketch	Description
	10		10' - 13' Sand Gray, dark gray medium sands coarser than above well sorted
	11		
	12		running sands
	13		13' sandy silt at the tip of the spoon dark gray fine sands
	14		screened from 3' - 13'
	15		
	16		
	17		
	18		
	19		
	20		

= Fill = Marsh deposit = Silt = Sand = Clay = Gravel

Department of Natural Resources and Environmental Control
Site Investigation and Restoration Branch
Well Log

Location: Peninsula Plating
Elevation:
Date: 7/20/99

Geologist: M. Margie Zhang
Driller: Walton
Hole #: MW-3

Comments	Depth	Core Sketch	Description
	0		0' - 8' Sand Brown, yellow fine to medium sand well sorted
	1		
	2		
	3		
	4		
	5		
			Water table @ 5.5'
	6		
	7		
	8		8' - 9' silty clay / clayey silt - Marsh deposit dark gray
	9		9' - 10' medium sand Dark gray, medium with some coarse sands
	10		

= Fill = Marsh deposit = Silt = Sand = Clay = Gravel

Department of Natural Resources and Environmental Control
Site Investigation and Restoration Branch
Well Log

Location: Peninsula Plating
Elevation:
Date: 7/20/99

Geologist: M. Margie Zhang
Driller: Walton
Hole #: MW-3

Comments	Depth	Core Sketch	Description
	10		10' - 11' medium sand Dark gray, same as above
	11		11' - 12' Silty clay (clayey silt - Marsh deposit) dark gray with some decayed vegitation
	12		
			screened from 5' - 10'
	13		
	14		
	15		
	16		
	17		
	18		
	19		
	20		

= Fill = Marsh deposit = Silt = Sand = Clay = Gravel

lij99045.xls

APPENDIX E.

INORGANIC DATA VALIDATION PACKAGE, TCLP DATA PACKAGE

DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
DIVISION OF AIR & WASTE MANAGEMENT
Site Investigation & Restoration Branch

MEMORANDUM

WORKING COPY

Date: September 2, 1999

Subject: Peninsula Plating Inorganic Data Validation

From: Robert M. Schulte RMS 9/2/99
Analytical Chemist

To: Lawrence Jones
Project Officer

Overview

The Sample Delivery Group (SDG) consisted of seven (7) soil samples. One rinse blank (SW-2), one trip blank (SW-1) and One field duplicate pair (TP-2S and TP11S). The field blank and the trip blank did not require inorganic analysis. The Site Investigation and Restoration Branch (SIRB) of the Delaware Department of Natural Resources and Environmental Control (DNREC) collected the samples. The Environmental Services Section of DNREC analyzed the samples according to the Standard Operating Procedures for Chemical Analytical Programs (SOPCAP) under the Hazardous Substance Cleanup Act (HSCA). Three samples and the rinse blank were analyzed for full TAL inorganics per the chain of custody.

Data Summary

All analytes were successfully analyzed for all samples.

Areas of concern are listed below according to the importance of the issue.

Major Issues

No major issues to report.

Minor Issues

The preparation blank (PB), continuing calibration blank (CCB), initial calibration blank (ICB) and rinse blank had reported results greater than the instrument detection limit (IDL) for the analytes given below. The reported results for these analytes in the affected samples that are less than five times (<5X) the blank concentration may be biased high and do not appear on the data summary forms as detectable valid results. Negative blank values in the blanks may result in bias low result and all practical quantitation limits must be

qualified with a "UJ" as estimated. The following analytes were detected in the total metal blanks: Barium .166 mg/Kg, Thallium .420 mg/Kg, Iron .737 mg/Kg, Selenium-.147 mg/Kg, Calcium 32.3 mg/Kg, Copper .408 mg/Kg, Sodium 95.4 mg/Kg, Zinc .503 mg/Kg, Vanadium .164 mg/Kg, Chromium .140 mg/Kg and Potassium 256 mg/Kg.

WORKING COPY

Notes

The laboratory control sample was within validation quality control limits. No qualification is necessary.

All analysis and preparation holding times were within validation quality control limits. No qualification is necessary.

All Antimony and Zinc matrix spike recoveries were outside of validation quality control limits. All positive results and practical quanitation limits will be qualified "J" and "UJ" as estimated, respectively, on the data summary tables.

All interference check sample results were within validation quality control limits. No qualification is necessary.

The Barium serial dilution results were outside of validation quality control limits. All positive results and practical limits will be qualified "J" and "UJ", as estimated, respectively on the data summary tables.

All instruments were calibrated daily. No qualification is necessary.

All quantitation and quantitation limits were checked against the raw data. No qualification is necessary.

All data were validated in accordance with the National Functional Guidelines for Evaluating Inorganic Analyses, With Modifications for Use within EPA Region III.

No method of standards addition was performed.

The CRDL standard results are within validation quality control limits. No qualification is necessary.

The instrument detection level study was conducted within validation quality control limits. No qualification is necessary.

All Copper and Magnesium laboratory duplicate results were outside of validation quality control limits. All positive results and practical quanitation limits will be qualified "J" and "UJ" as estimated, respectively, on the data summary tables.

All analysis run times were consistent and within validation quality control limits. No qualification is necessary.

No field duplicate comparison could be achieved.

Attachments:

Data Summary Forms
Results Reported by Laboratory Form IS
Chain of Custody
Support Documentation

RMS:slb
RMS99066 .doc
DE-287 II A 3

Site Name: Peninsula Plating

Sampling Date(s): 7/20

DATA SUMMARY FORM: INORGANICS

Soil (Media) SAMPLES

(Units) mg/Kg

Sample Number / Sample Location / Analyte	SS-1		SW2 (mg/L)		TP3S		TP9S							
Aluminum	7380				1610		2610							
Antimony		UJ		UJ		UJ		UJ						
Arsenic	2.4						3.1							
Barium	48.3	J		UJ	120	J	139	J						
Beryllium														
Cadmium							2.2							
Calcium	6780				1140		2900							
Chromium	9.4				2.4		5.5							
Cobalt														
Copper	19.4	J		UJ	7.9	J	17.0	J						
Iron	7080				2920		6820							
Lead	72.5		8.1		39.0		187							
Magnesium	1290	J		UJ		UJ		UJ						
Manganese	68.1				86.2		178							
Mercury							0.81							
Nickel														
Potassium														
Selenium	1.2													
Silver														
Sodium														
Thallium														
Vanadium	14.3													
Zinc	56.2	J		UJ	243	J	800	J						
Cyanide							0.70							

Environmental Services Section – Division of Water Resources
Department of Natural Resources and Environmental Control
89 Kings Hwy., P.O. Box 1401, Dover DE 19903 (302) 739-4771

FIELD CHAIN OF CUSTODY

Page ___ of ___

Client: DNREC - SIRB
Address: 391 LUKENS DRIVE
NEW CASTLE DE 19720
Phone: (302) 395-2600

Report To: ROBERT SCHUETE
Invoice To: ROBERT SCHUETE
Account:
ESS No.: 07439

PROJECT NAME: PENINSULA PLATING

SAMPLER(S) (signature): [signature]

ESS only Lab Log No.	Client Sample Description	Sample Date	Sample Time	Matrix*	Comp	Grab	No. of Containers	VOA	BN + LIB	PCBs / PCB	METALS (TAL)	CYANIDE				REMARKS
99027500	PP-TP-2s	7/20	1128	SO		X	22	-	X	-	-	-				
99027510	PP TP-3s		1145	SO		X	3	X	X	X	X	X				MS/MSD
99027520	PPTP-3d		1150	SO		X	22	-	X	-	-	-				
99027530	PPTP-9s		1230	SO		X	22	-	X	-	X	X				
99027540	PPTP-11s		1170	SO		X	22	-	X	-	-	-				
99027550	PP SS-1		1455	SO		X	22	-	-	-	X	X				
99027560	PP SS-2		1555	SO		X	22	-	X	-	-	-				
99027570	PP SW-1	7/22	1413	SW		X	3	X	-	-	-	-				ONE VOA HAS BUBBLE
99027580	PP SW-2	7/20	1600	SW		X	7	X	X	X	X	X				

Potential Hazard Identification: Non-Hazard [ ] Flammable [X] Toxic [X] Skin-irritant [X] Other [ ] ___

Sample Disposal: Return to Client [ ] Disposal by ESS [X] Authorized by: [signature]

RELINQUISHED BY: (signature)	DATE:	TIME:	RECEIVED BY: (signature)
[signature]	7/22/99	1600	
	7/23/99	1130	ESS only Ronald L. Heimer

COMMENTS:

* Matrix Codes

AI - air	WW - waste water
BI - biological	PW - potable water
SO - soil	SW - surface water
SE - sediment	GW - ground water
SL - sludge	DL - drum liquids
SD - solid	DS - drum solids
OI - oil	SW - solid waste
TI - tissue	ST - stormwater
WI - wipe	X - other (Please specify) ___

ESS USE ONLY

Sample Condition:
1. Shipped or Hand delivered (circled) 2. Chilled or Ambient T°C: 5 3. Received broken/leaking: Yes No (circled) 4. Properly preserved: Yes (circled) No 5. Holding times expired: Yes No (circled) 6. Bottles supplied by ESS: Yes (circled) No 7. Field Filtered: Yes No (circled)
Notes:

Custody Seal Was:
1. Present on outer package: Yes (circled) No 2. Unbroken on outer package: Yes (circled) No 3. Present on sample: Yes No (circled) 4. Unbroken on sample: Yes No 5. Discrepancies between sample labels and COC record? Yes No

9 B6.KAK

White - Original Yellow - ESS Copy Pink - Client Copy

000003C

ENVIROFORMS/INORGANIC CLP

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

PPSS-1

Lab Name: DE DNREC:DIV OF WATER RES Contract: DNREC:DAWM

Lab Code: DE023 Case No.: SAS No.: SDG No.: #07439

Matrix (soil/water): SOIL Lab Sample ID: 99027550

Level (low/med): LOW Date Received: 07/23/99

% Solids: 88.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7380			P
7440-36-0	Antimony	0.61	U	N	P
7440-38-2	Arsenic	2.4			P
7440-39-3	Barium	48.3		*	P
7440-41-7	Beryllium	0.22	B		P
7440-43-9	Cadmium	0.39	B		P
7440-70-2	Calcium	6780			P
7440-47-3	Chromium	9.4			P
7440-48-4	Cobalt	2.3	B		P
7440-50-8	Copper	19.4		E	P
7439-89-6	Iron	7080			P
7439-92-1	Lead	72.5			P
7439-95-4	Magnesium	1290		E	P
7439-96-5	Manganese	68.1			P
7439-97-6	Mercury	0.04 ~~0.06~~	B		CV
7440-02-0	Nickel	8.6	B		P
7440-09-7	Potassium	315	B		P
7782-49-2	Selenium	1.2			P
7440-22-4	Silver	0.16	U		P
7440-23-5	Sodium	45.0	U		P
7440-28-0	Thallium	0.32	U		P
7440-62-2	Vanadium	14.3			P
7440-66-6	Zinc	362		N	P
	Cyanide	0.25 ~~[illegible]~~	U		C

Color Before: BROWN Clarity Before: OPAQUE Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

ENVIROFORMS/INORGANIC CLP

1

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

PPSW-2

Lab Name: DE DNREC:DIV OF WATER RES Contract: DNREC:DAWM

Lab Code: DE023 Case No.: SAS No.: SDG No.: #07439

Matrix (soil/water): WATER Lab Sample ID: 99027580

Level (low/med): LOW Date Received: 07/23/99

% 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	14.3	B		P
7440-36-0	Antimony	2.7	U		P
7440-38-2	Arsenic	1.7	U		P
7440-39-3	Barium	0.68	B		P
7440-41-7	Beryllium	0.10	U		P
7440-43-9	Cadmium	0.56	B		P
7440-70-2	Calcium	279	B		P
7440-47-3	Chromium	0.40	U		P
7440-48-4	Cobalt	0.85	B		P
7440-50-8	Copper	2.9	B		P
7439-89-6	Iron	13.9	B		P
7439-92-1	Lead	8.1			P
7439-95-4	Magnesium	92.3	B		P
7439-96-5	Manganese	4.2	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.7	U		P
7440-09-7	Potassium	2010	B		P
7782-49-2	Selenium	2.0	U		P
7440-22-4	Silver	0.70	U		P
7440-23-5	Sodium	526	B		P
7440-28-0	Thallium	4.0	B		P
7440-62-2	Vanadium	0.70	U		P
7440-66-6	Zinc	3.8	B		P
	Cyanide	10.0	U		C

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

ENVIROFORMS/INORGANIC CLP

SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

PPTP3s

Lab Name: DE DNREC:DIV OF WATER RES Contract: DNREC:DAWM

Lab Code: DE023 Case No.: SAS No.: SDG No.: #07439

Matrix (soil/water): SOIL Lab Sample ID: 99027510

Level (low/med): LOW Date Received: 07/23/99

% Solids: 90.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1610			P
7440-36-0	Antimony	0.60	U	N	P
7440-38-2	Arsenic	1.3	B		P
7440-39-3	Barium	120		*	P
7440-41-7	Beryllium	0.08	B		P
7440-43-9	Cadmium	0.63	B		P
7440-70-2	Calcium	1140			P
7440-47-3	Chromium	2.4			P
7440-48-4	Cobalt	0.96	B		P
7440-50-8	Copper	7.9		E	P
7439-89-6	Iron	2920			P
7439-92-1	Lead	39.0			P
7439-95-4	Magnesium	95.9	B	E	P
7439-96-5	Manganese	86.2			P
7439-97-6	Mercury	0.07	B		CV
7440-02-0	Nickel	3.0	B		P
7440-09-7	Potassium	236	B		P
7782-49-2	Selenium	0.44	U		P
7440-22-4	Silver	0.15	U		P
7440-23-5	Sodium	80.8	B		P
7440-28-0	Thallium	0.39	B		P
7440-62-2	Vanadium	2.9	B		P
7440-66-6	Zinc	243		N	P
	Cyanide	0.55 ~~2.2~~	U		C

mw 8/3/99

Color Before: BROWN Clarity Before: OPAQUE Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

ENVIROFORMS/INORGANIC CLP

SAMPLE NO.

1

INORGANIC ANALYSIS DATA SHEET

PPTP9s

Lab Name: DE DNREC:DIV OF WATER RES Contract: DNREC:DAWM

Lab Code: DE023 Case No.: SAS No.: SDG No.: #07439

Matrix (soil/water): SOIL Lab Sample ID: 99027530

Level (low/med): LOW Date Received: 07/23/99

% Solids: 90.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2610			P
7440-36-0	Antimony	0.60	U	N	P
7440-38-2	Arsenic	3.1			P
7440-39-3	Barium	139		*	P
7440-41-7	Beryllium	0.17	B		P
7440-43-9	Cadmium	2.2			P
7440-70-2	Calcium	2900			P
7440-47-3	Chromium	5.5			P
7440-48-4	Cobalt	1.9	B		P
7440-50-8	Copper	17.0		E	P
7439-89-6	Iron	6820			P
7439-92-1	Lead	187			P
7439-95-4	Magnesium	351	B	E	P
7439-96-5	Manganese	178			P
7439-97-6	Mercury	0.81			CV
7440-02-0	Nickel	5.0	B		P
7440-09-7	Potassium	428	B		P
7782-49-2	Selenium	0.66	B		P
7440-22-4	Silver	0.16	U		P
7440-23-5	Sodium	44.1	U		P
7440-28-0	Thallium	0.31	U		P
7440-62-2	Vanadium	5.7	B		P
7440-66-6	Zinc	800		N	P
	Cyanide	0.70 ~~2.2~~	~~U~~		C

mnr 8/5/99

Color Before: BROWN Clarity Before: OPAQUE Texture: MEDIUM

Color After: YELLOW Clarity After: CLEAR Artifacts:

Comments:

FORM I - IN

DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
DIVISION OF AIR & WASTE MANAGEMENT
Site Investigation & Restoration Branch

MEMORANDUM

Date: **September 14, 1999**

Subject: **Peninsula Plating Inorganic Data Validation**

From: **Robert M. Schulte** RM/ 9/20/99
Analytical Chemist

To: **Lawrence Jones**
Project Officer

Overview

The Sample Delivery Group (SDG) consisted of four (4) groundwater samples. One rinse blank (MW-7), one trip blank, and one field duplicate pair (MW-3 and MW-5). The trip blank did not require inorganic analysis. The Site Investigation and Restoration Branch (SIRB) of the Delaware Department of Natural Resources and Environmental Control (DNREC) collected the samples. STL Envirotech analyzed the samples according to the Standard Operating Procedures for Chemical Analytical Programs (SOPCAP) under the Hazardous Substance Cleanup Act (HSCA). Three samples and the rinse blank were analyzed for full TAL inorganics per the chain of custody.

Data Summary

All analytes were successfully analyzed for all samples.

Areas of concern are listed below according to the importance of the issue.

Major Issues

No major issues to report.

Minor Issues

The preparation blank (PB), continuing calibration blank (CCB), initial calibration blank (ICB) and rinse blank had reported results greater than the instrument detection limit (IDL) for the analytes given below. The reported results for these analytes in the affected samples that are less than five times (<5X) the blank concentration may be biased high and do not appear on the data summary forms as detectable valid results. Negative blank values in the blanks may result in bias low result and all practical quantitation limits must be qualified with a "UJ" as estimated. The following analytes were detected in the

total metal blanks: Cobalt –1.3 ug/L, Iron –36.3 ug/L, Chromium –1.60 ug/L and Potassium –228 ug/L.

Notes

The laboratory control sample was within validation quality control limits. No qualification is necessary.

All analysis and preparation holding times were within validation quality control limits. No qualification is necessary.

All matrix spike recoveries were within validation quality control limits. No qualifcation is necessary.

All interference check sample results were within validation quality control limits. No qualification is necessary.

All serial dilution results were within of validation quality control limits. No qualifcation is necessary.

All instruments were calibrated daily. No qualification is necessary.

All quantitation and quantitation limits were checked against the raw data. No qualification is necessary.

All data were validated in accordance with the National Functional Guidelines for Evaluating Inorganic Analyses, With Modifications for Use within EPA Region III.

No method of standards addition was performed.

The CRDL standard results are within validation quality control limits. No qualification is necessary.

The instrument detection level study was conducted within validation quality control limits. No qualification is necessary.

All laboratory duplicate results were within validation quality control limits. All positive results and practical quanitation limits will be qualified "J" and "UJ" as estimated, respectively, on the data summary tables.

All analysis run times were consistent and within validation quality control limits. No qualification is necessary.

No field duplicate comparison could be achieved.

Attachments:

Data Summary Forms
Results Reported by Laboratory Form IS
Chain of Custody
Support Documentation

RMS:slb
RMS99070.doc
DE-287 II A 3

ENVIROTECH RESEARCH INC.
777 New Durham Road
Edison, New Jersey 08817
Phone: (908) 549-3900 Fax: (908) 549-3679

CHAIN OF CUSTODY / ANALYSIS REQUEST

PAGE ___ OF ___

Name (for report and invoice) ROBERT SCHULTE	Samplers Name (Printed) L JONES J SCHUBER	Site/Project Identification PENINSULA PLATING
Company DNREC-SIRB	P.O. #	State (Location of site) NJ: ☐ NY: ☐ Other: DE
		Regulatory Program: SUPERFUND
Address 391 LUKENS DR.	Analysis Turnaround Time: Standard ☒	
City NEW CASTLE State DE Zip 19720	Rush Charges Authorized For: 2 Week ☐ 1 Week ☐ Other ☐	
Phone (302) 395-2600 Fax (302) 395-2601		

ANALYSIS REQUESTED (ENTER "X" BELOW TO INDICATE REQUEST)

LAB USE ONLY
Project No:
Job No: 5179

Sample Identification	Date	Time	Matrix	No. of Cont.	VOA	BN+LIB	PEST/PCB	TOT. METAL	DIS METAL	CYANIDE						Sample Numbers	DIS
~~PP MW-6~~ TRIP BLANK (3 VOLS) per Bob Schulte BDS 1/9/99	PROFILED		GW	3	X	-	-	-	-	-						148355	—
PP MW-1 MS/MSD	8/4/99	1100	GW	16	X	X	X	X	X	X						148356	148
PP MW-2		1230	GW	8	X	X	X	X	X	X						148357	1483
PP MW-4		120	GW	7	X	X	X	X	-	X						148358	—
PP MW-3		1420	GW	8	X	X	X	X	X	X						148359	148
PP MW-5		1430	GW	8	X	X	X	X	X	X						148360	148
PP MW-7 [illegible]		1500	GW	7	X	X	X	X	-	X						148361	—
~~TRIP BLANK~~ 8/4/99	8/4/99		AQ	3													
Preservation Used: 1 = ICE, 2 = HCl, 3 = H_2SO_4, 4 = HNO_3, 5 = NaOH				Soil	-	-	-	-	-	-							
6 = Other _____, 7 = Other _____				Water	2	1	1	4	4	5	①	ALL					

Special Instructions: _____ Water Metals Filtered (Yes/No)? DIS. ONLY

Relinquished by	Company	Date / Time	Received by	Company
1) Ex. 4 CBI	DNREC-SIRB	~~8/4/99 1810~~	Ex. 4 CBI 5/99	STL
2) Ex. 4 CBI	STL	8/5/99 1810	Ex. 4 CBI	STL-ENVIROTECH ROBERT PRITCHARD
3)			3)	
4)			4)	

Site Name: Peninsula Plating

Sampling Date(s): 8/4/99

DATA SUMMARY FORM: INORGANICS

Water
(Media) SAMPLES
(Units) ug/L

Sample Number														
Sample Location	MW-1		MW-2		MW3		MW5							
Analyte	DIS		DIS		DIS									
Aluminum														
Antimony														
Arsenic														
Barium														
Beryllium														
Cadmium														
Calcium	39800		9800		7940		7780							
Chromium														
Cobalt														
Copper														
Iron			138		6150		6140							
Lead														
Magnesium	5440													
Manganese					79.8		78.9							
Mercury														
Nickel														
Potassium														
Selenium														
Silver														
Sodium	11900				8670		8590							
Thallium														
Vanadium														
Zinc														
Cyanide														

ED_005024_00000655-00091

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

PPMW-1DIS

Lab Name: STL_ENVIROTECH_____ Contract: _____

Lab Code: 12543_ Case No.: _____ SAS No.: _____ SDG No.: S1792_

Matrix (soil/water): WATER Lab Sample ID: 148362

Level (low/med): LOW__ Date Received: 08/05/99

% 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_	122	B		P_
7440-36-0	Antimony_	4.4	U		P_
7440-38-2	Arsenic__	3.2	U		P_
7440-39-3	Barium___	24.5	B		P_
7440-41-7	Beryllium	0.20	U		P_
7440-43-9	Cadmium__	0.50	U		P_
7440-70-2	Calcium__	39800			P_
7440-47-3	Chromium_	1.5	U		P_
7440-48-4	Cobalt___	1.3	U		P_
7440-50-8	Copper___	2.9	U		P_
7439-89-6	Iron____	35.3	U		P_
7439-92-1	Lead____	2.3	U		P_
7439-95-4	Magnesium	5440			P_
7439-96-5	Manganese	4.7	B		P_
7439-97-6	Mercury__	0.10	U		CV
7440-02-0	Nickel___	1.5	B		P_
7440-09-7	Potassium	2440	B		P_
7782-49-2	Selenium_	3.7	U		P_
7440-22-4	Silver___	1.3	U		P_
7440-23-5	Sodium___	11900			P_
7440-28-0	Thallium_	4.7	U		P_
7440-62-2	Vanadium_	1.9	U		P_
7440-66-6	Zinc____	7.6	U		P_
5955-70-0	Cyanide__				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

FORM I - IN ILM04.0

U.S. EPA - CLP

1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

PPMW-2DIS

Lab Name: STL_ENVIROTECH_____ Contract: _____

Lab Code: 12543_ Case No.: _____ SAS No.: _____ SDG No.: S1792_

Matrix (soil/water): WATER Lab Sample ID: 148363

Level (low/med): LOW__ Date Received: 08/05/99

% 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_	64.0	U		P
7440-36-0	Antimony_	4.4	U		P
7440-38-2	Arsenic__	3.2	U		P
7440-39-3	Barium___	11.0	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium__	0.50	U		P
7440-70-2	Calcium__	9800			P
7440-47-3	Chromium_	1.5	U		P
7440-48-4	Cobalt___	1.3	U		P
7440-50-8	Copper___	2.9	U		P
7439-89-6	Iron____	138			P
7439-92-1	Lead____	2.3	U		P
7439-95-4	Magnesium	1150	B		P
7439-96-5	Manganese	3.4	B		P
7439-97-6	Mercury__	0.10	U		CV
7440-02-0	Nickel___	1.4	U		P
7440-09-7	Potassium	805	B		P
7782-49-2	Selenium_	3.7	U		P
7440-22-4	Silver___	1.3	U		P
7440-23-5	Sodium___	2850	B		P
7440-28-0	Thallium_	4.7	U		P
7440-62-2	Vanadium_	1.9	U		P
7440-66-6	Zinc____	13.8	B		P
5955-70-0	Cyanide__				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

PPMW-3DIS

Lab Name: STL_ENVIROTECH_____ Contract: _____

Lab Code: 12543_ Case No.: _____ SAS No.: _____ SDG No.: S1792_

Matrix (soil/water): WATER Lab Sample ID: 148364

Level (low/med): LOW__ Date Received: 08/05/99

% Sclids: __0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L_

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum_	64.0	U		P_
7440-36-0	Antimony_	4.4	U		P_
7440-38-2	Arsenic__	3.2	U		P_
7440-39-3	Barium___	63.2	B		P_
7440-41-7	Beryllium	0.20	U		P_
7440-43-9	Cadmium__	0.50	U		P_
7440-70-2	Calcium__	7940			P_
7440-47-3	Chromium_	1.5	U		P_
7440-48-4	Cobalt___	1.3	U		P_
7440-50-8	Copper___	2.9	U		P_
7439-89-6	Iron____	6150			P_
7439-92-1	Lead____	2.3	U		P_
7439-95-4	Magnesium	1980	B		P_
7439-96-5	Manganese	79.8			P_
7439-97-6	Mercury__	0.10	U		CV
7440-02-0	Nickel___	1.9	B		P_
7440-09-7	Potassium	2840	B		P_
7782-49-2	Selenium_	3.7	U		P_
7440-22-4	Silver___	1.3	U		P_
7440-23-5	Sodium___	8670			P_
7440-28-0	Thallium_	4.7	U		P_
7440-62-2	Vanadium_	1.9	U		P_
7440-66-6	Zinc____	10.6	B		P_
5955-70-0	Cyanide__				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

PPMW-5DIS

Lab Name: STL_ENVIROTECH_____ Contract: _____

Lab Code: 12543_ Case No.: _____ SAS No.: _____ SDG No.: S1792_

Matrix (soil/water): WATER Lab Sample ID: 148365

Level (low/med): LOW__ Date Received: 08/05/99

% 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_	64.0	U		P_
7440-36-0	Antimony_	4.4	U		P_
7440-38-2	Arsenic__	3.2	U		P_
7440-39-3	Barium___	63.0	B		P_
7440-41-7	Beryllium	0.20	U		P_
7440-43-9	Cadmium__	0.50	U		P_
7440-70-2	Calcium__	7780			P_
7440-47-3	Chromium_	1.5	U		P_
7440-48-4	Cobalt___	1.3	U		P_
7440-50-8	Copper___	2.9	U		P_
7439-89-6	Iron____	6140			P_
7439-92-1	Lead____	2.3	U		P_
7439-95-4	Magnesium	1940	B		P_
7439-96-5	Manganese	78.9			P_
7439-97-6	Mercury__	0.10	U		CV
7440-02-0	Nickel___	2.1	B		P_
7440-09-7	Potassium	2790	B		P_
7782-49-2	Selenium_	3.7	U		P_
7440-22-4	Silver___	1.3	U		P_
7440-23-5	Sodium___	8590			P_
7440-28-0	Thallium_	4.7	U		P_
7440-62-2	Vanadium_	1.9	U		P_
7440-66-6	Zinc____	19.3	B		P_
5955-70-0	Cyanide__				NR

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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Site Name: Peninsula Plating

Sampling Date(s): 8/4/99

DATA SUMMARY FORM: INORGANICS

Water (Media) SAMPLES

(Units) ug/L

Sample Number / Sample Location / Analyte	MW-2	MW-4	MW-3	MW-5	MW-7	MW-1	
Aluminum	4600						
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium	9600	7320	7820	7780		38700	
Chromium							
Cobalt							
Copper							
Iron	1640	113	6410	6330			
Lead							
Magnesium						5160	
Manganese		35.6	79.2	78.7			
Mercury							
Nickel							
Potassium							
Selenium							
Silver							
Sodium		5600	9320	8860		12300	
Thallium							
Vanadium							
Zinc	30.5	61.9					
Cyanide							

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

PPMW-2

Lab Name: STL_ENVIROTECH_____ Contract: _____

Lab Code: 12543_ Case No.: _____ SAS No.: _____ SDG No.: S1792_

Matrix (soil/water): WATER Lab Sample ID: 148357

Level (low/med): LOW__ Date Received: 08/05/99

% 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_	4600			P
7440-36-0	Antimony_	4.4	U		P
7440-38-2	Arsenic__	3.2	U		P
7440-39-3	Barium___	23.4	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium__	0.50	U		P
7440-70-2	Calcium__	9600			P
7440-47-3	Chromium_	3.4	B		P
7440-48-4	Cobalt___	1.3	U		P
7440-50-8	Copper___	3.6	B		P
7439-89-6	Iron____	1640			P
7439-92-1	Lead____	2.3	U		P
7439-95-4	Magnesium	1280	B		P
7439-96-5	Manganese	7.1	B		P
7439-97-6	Mercury__	0.10	U		CV
7440-02-0	Nickel___	3.2	B		P
7440-09-7	Potassium	904	B		P
7782-49-2	Selenium_	3.7	U		P
7440-22-4	Silver___	1.3	U		P
7440-23-5	Sodium___	2890	B		P
7440-28-0	Thallium_	4.7	U		P
7440-62-2	Vanadium_	8.2	B		P
7440-66-6	Zinc____	30.5			P
5955-70-0	Cyanide__	10.0	U		C

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

PPMW-4

Lab Name: STL_ENVIROTECH_____ Contract: _____

Lab Code: 12543_ Case No.: _____ SAS No.: _____ SDG No.: S1792_

Matrix (soil/water): WATER Lab Sample ID: 148358

Level (low/med): LOW__ Date Received: 08/05/99

% 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_	64.0	U		P
7440-36-0	Antimony_	4.4	U		P
7440-38-2	Arsenic__	3.2	U		P
7440-39-3	Barium___	93.2	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium__	0.50	U		P
7440-70-2	Calcium__	7320			P
7440-47-3	Chromium_	1.5	U		P
7440-48-4	Cobalt___	1.3	U		P
7440-50-8	Copper___	2.9	U		P
7439-89-6	Iron____	113			P
7439-92-1	Lead____	2.3	U		P
7439-95-4	Magnesium	1810	B		P
7439-96-5	Manganese	35.6			P
7439-97-6	Mercury__	0.10	U		CV
7440-02-0	Nickel___	1.7	B		P
7440-09-7	Potassium	2670	B		P
7782-49-2	Selenium_	3.7	U		P
7440-22-4	Silver___	1.3	U		P
7440-23-5	Sodium___	5600			P
7440-28-0	Thallium_	4.7	U		P
7440-62-2	Vanadium_	1.9	U		P
7440-66-6	Zinc____	61.9			P
5955-70-0	Cyanide__	10.0	U		C

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

PPMW-3

Lab Name: STL_ENVIROTECH_____ Contract: _____

Lab Code: 12543_ Case No.: _____ SAS No.: _____ SDG No.: S1792_

Matrix (soil/water): WATER Lab Sample ID: 148359

Level (low/med): LOW__ Date Received: 08/05/99

% 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_	170	B		P
7440-36-0	Antimony_	4.4	U		P
7440-38-2	Arsenic__	3.2	U		P
7440-39-3	Barium___	63.7	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium__	0.50	U		P
7440-70-2	Calcium__	7820			P
7440-47-3	Chromium_	1.5	U		P
7440-48-4	Cobalt___	1.3	U		P
7440-50-8	Copper___	2.9	U		P
7439-89-6	Iron____	6410			P
7439-92-1	Lead____	2.3	U		P
7439-95-4	Magnesium	1940	B		P
7439-96-5	Manganese	79.2			P
7439-97-6	Mercury__	0.10	U		CV
7440-02-0	Nickel___	1.4	U		P
7440-09-7	Potassium	2940	B		P
7782-49-2	Selenium_	3.7	U		P
7440-22-4	Silver___	1.3	U		P
7440-23-5	Sodium___	9320			P
7440-28-0	Thallium_	4.7	U		P
7440-62-2	Vanadium_	1.9	U		P
7440-66-6	Zinc____	13.0	B		P
5955-70-0	Cyanide__	10.0	U		C

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

PPMW-5

Lab Name: STL_ENVIROTECH_____ Contract: _____

Lab Code: 12543_ Case No.: _____ SAS No.: _____ SDG No.: S1792_

Matrix (soil/water): WATER Lab Sample ID: 148360

Level (low/med): LOW__ Date Received: 08/05/99

% 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_	90.2	B		P_
7440-36-0	Antimony_	4.4	U		P_
7440-38-2	Arsenic__	3.2	U		P_
7440-39-3	Barium___	63.0	B		P_
7440-41-7	Beryllium	0.20	U		P_
7440-43-9	Cadmium__	0.50	U		P_
7440-70-2	Calcium__	7780			P_
7440-47-3	Chromium_	1.5	U		P_
7440-48-4	Cobalt___	1.3	U		P_
7440-50-8	Copper___	2.9	U		P_
7439-89-6	Iron____	6330			P_
7439-92-1	Lead____	2.3	U		P_
7439-95-4	Magnesium	1940	B		P_
7439-96-5	Manganese	78.7			P_
7439-97-6	Mercury__	0.10	U		CV
7440-02-0	Nickel___	2.3	B		P_
7440-09-7	Potassium	2870	B		P_
7782-49-2	Selenium_	3.7	U		P_
7440-22-4	Silver___	1.3	U		P_
7440-23-5	Sodium___	8860			P_
7440-28-0	Thallium_	4.7	U		P_
7440-62-2	Vanadium_	1.9	U		P_
7440-66-6	Zinc____	12.6	B		P_
5955-70-0	Cyanide__	10.0	U		C_

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

PPMW-7

Lab Name: STL_ENVIROTECH_____ Contract: _____

Lab Code: 12543_ Case No.: _____ SAS No.: _____ SDG No.: S1792_

Matrix (soil/water): WATER Lab Sample ID: 148361

Level (low/med): LOW__ Date Received: 08/05/99

% 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_	64.0	U		P_
7440-36-0	Antimony_	4.4	U		P_
7440-38-2	Arsenic__	3.2	U		P_
7440-39-3	Barium___	1.6	U		P_
7440-41-7	Beryllium	0.20	U		P_
7440-43-9	Cadmium__	0.50	U		P_
7440-70-2	Calcium__	58.1	U		P_
7440-47-3	Chromium_	1.5	U		P_
7440-48-4	Cobalt___	1.3	U		P_
7440-50-8	Copper___	2.9	U		P_
7439-89-6	Iron____	35.3	U		P_
7439-92-1	Lead____	2.3	U		P_
7439-95-4	Magnesium	50.6	U		P_
7439-96-5	Manganese	1.1	U		P_
7439-97-6	Mercury__	0.10	U		CV
7440-02-0	Nickel___	1.4	U		P_
7440-09-7	Potassium	162	U		P_
7782-49-2	Selenium_	3.7	U		P_
7440-22-4	Silver___	1.3	U		P_
7440-23-5	Sodium___	441	U		P_
7440-28-0	Thallium_	4.7	U		P_
7440-62-2	Vanadium_	1.9	U		P_
7440-66-6	Zinc____	7.6	U		P_
5955-70-0	Cyanide__	10.0	U		C_

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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1
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

PPMW-1

Lab Name: STL_ENVIROTECH_____ Contract: _____

Lab Code: 12543_ Case No.: _____ SAS No.: _____ SDG No.: S1792_

Matrix (soil/water): WATER Lab Sample ID: 148356

Level (low/med): LOW__ Date Received: 08/05/99

% 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_	64.0	U		P_
7440-36-0	Antimony_	4.4	U		P_
7440-38-2	Arsenic__	3.2	U		P_
7440-39-3	Barium___	25.0	B		P_
7440-41-7	Beryllium	0.20	U		P_
7440-43-9	Cadmium__	0.50	U		P_
7440-70-2	Calcium__	38700			P_
7440-47-3	Chromium_	1.5	U		P_
7440-48-4	Cobalt___	1.3	U		P_
7440-50-8	Copper___	2.9	U		P_
7439-89-6	Iron____	35.3	U		P_
7439-92-1	Lead____	2.3	U		P_
7439-95-4	Magnesium	5160			P_
7439-96-5	Manganese	4.5	B		P_
7439-97-6	Mercury__	0.10	U		CV
7440-02-0	Nickel___	1.4	U		P_
7440-09-7	Potassium	2200	B		P_
7782-49-2	Selenium_	3.7	U		P_
7440-22-4	Silver___	1.3	U		P_
7440-23-5	Sodium___	12300			P_
7440-28-0	Thallium_	4.7	U		P_
7440-62-2	Vanadium_	1.9	U		P_
7440-66-6	Zinc____	7.6	U		P_
5955-70-0	Cyanide__	10.0	U		C_

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments:

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APPENDIX F.

ORGANIC DATA VALIDATION PACKAGE

WORKING COPY

DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
DIVISION OF AIR & WASTE MANAGEMENT
Site Investigation & Restoration Branch

MEMORANDUM

Date: **October 1, 1999**

Subject: **Peninsula Plating Organic Data Validation**

From: **Robert M. Schulte** RM/ 10/1/99

To: **Lawrence J. Jones**
Project Officer

Overview

The Sample Delivery Group consisted of one (1) soil sample and one rinse blank. The Site Investigation & Restoration Branch (SIRB) of the Department of Natural Resources and Environmental Control (DNREC) collected the samples. The rinse is associated with previous reported samples. Environmental Services Section analyzed samples for semivolatiles and pesticide/PCB per the chain of custody's. The samples were analyzed in accordance with the Standard Operating Procedures for Chemical Analytical Programs (SOPCAP) under the Hazardous Substance Cleanup Act (HSCA).

Summary

All samples were successfully analyzed for all targeted compounds. All instrument and method sensitivities were in accordance with the SOPCAP of HSCA.

Areas of concern with respect to usability are listed below according to the seriousness of the issue.

Major Issues

No major issues to report.

Minor Issues

No minor issues to report.

Notes

The maximum concentration of all compounds found in the analyses of the rinsate and preparation blanks are listed below. Samples with concentrations of common laboratory contaminants less than ten times (<10x) the blank concentration or with concentrations of other contaminants less than five times (<5x) the blank concentration will be excluded from the data summary tables and not considered chemicals of concern. The following compounds were found: No chemicals of concern were detected.

All semivolatile and pesticide/PCB ending, initial and continuing calibrations were within validation quality control limits. No qualification is necessary.

All semivolatile and pesticide/PCB system monitoring compounds were within validation quality control limits. No qualification is necessary.

All semivolatile response factors were within validation quality control limits. No qualification is necessary.

All semivolatile internal standards were within validation quality control limits. No qualification is necessary.

All semivolatile system performance checks were within validation quality control limits. No qualification is necessary.

All data was reviewed in accordance with National Functional Guidelines for Evaluating Organic Analyses with modification for use in EPA Region III.

All TICs were identified with a functionality group (e.g. unknown PAH). Unidentifiable TICs were accompanied with a "?" and the spectra and/or spectrum are included with the sample results behind the data summary tables. Some peaks are unidentifiable due to non-spectra matches or coelutions.

The preparation and analysis holding times for all samples were within validation quality control limits. No qualification is necessary.

All pesticide/PCB matrix spike and matrix spike duplicate results were within validation quality control limits. The comparison of non spiked results are as follow:

Concentration ug/Kg

Compound	TP3S	TP3SMS	TP3SMSD	% RSD
Aroclor 1260	33	33	29	8

Precision results are within validation quality control limits. No qualification is necessary.

All cleanup procedures were performed on the sample.

No field duplicate comparison could be achieved.

All semivolatile and pesticide/PCB laboratory control samples were within validation quality control limits. No qualification is necessary.

Attachments

Laboratory Form IS
Reviewed and Corrected Tentatively Identified Compounds
Support Documentation
Chain of Custody

RMS:slb
RMS99083.doc
DE-287 II A 3

07/18/95 16:30 DIV WATER RESOURSES + DIV AIR + WASTE 302 739 3491 NO.281 P002/002

Environmental Services Section – Division of Water Resources
Department of Natural Resources and Environmental Control
89 Kings Hwy., P.O. Box 1401, Dover DE 19903 (302) 739-4771

FIELD CHAIN OF CUSTODY

Page ___ of ___

Client: DNREC - SIRB
Address: 391 LUKENS DRIVE
NEW CASTLE DE 19720
Phone: (302) 395-2600

Report To: ROBERT SCHULTE
Invoice To: ROBERT SCHULTE
Account:
ESS No.: 27439

PROJECT NAME: PENINSULA PLATING

SAMPLE(S) (signature): Ex. 4 CBI

ESS only Lab Log No.	Client Sample Description	Sample Date	Sample Time	Matrix*	Comp	Grab	No. of Containers	VOA	BN+LIB	PEST/PCB	METALS (TAL)	CYANIDE				REMARKS
99027500	PP-TP-2s	7/20	1128	SO		X	2	-	X	-	-	-				
99027510	PP TP-3s		1145	SO		X	3	X	X	X	X	X				MS/MSD
99027520	PP TP-3d		1150	SO		X	2	-	X	-	-	-				
99027530	PP TP-9s		1230	SO		X	2	-	X	-	X	X				
99027540	PP TP-11s		1130	SO		X	2	-	X	-	-	-				
99027550	PP SS-1		1455	SO		X	2	-	-	-	X	X				
99027560	PP SS-6		1555	SO		X	2	-	X	-	-	-				
99027570	PP SW-1	7/12	1600	SW		X	3	X	-	-	-	-				ONE VIAL HAS BUBBLE
99027580	PP SW-2	7/20	1600	SW		X	7	X	X	X	X	X				

Potential Hazard Identification: Non-Hazard [ ] Flammable [X] Toxic [X] Skin-irritant [X] Other [ ] _____

Sample Disposal: Return to Client [ ] Disposal by ESS [X] Authorized by: [signature]

RELINQUISHED BY: (signature)	DATE:	TIME:	RECEIVED BY: (signature)
Ex. 4 CBI	7/22/99	1600	
	7/23/99	1130	ESS only: Ex. 4 CBI

COMMENTS:

* Matrix Codes

AI - air	WW - waste water
BI - biological	PW - potable water
SO - soil	SW - surface water
SE - sediment	GW - ground water
SL - sludge	DL - drum liquids
SD - solid	DS - drum solids
OI - oil	SW - solid waste
TI - tissue	ST - stormwater
WI - wipe	X - other (Please specify) _____

ESS USE ONLY

Sample Condition:
1. Shipped or Hand-delivered 2. Chilled or Ambient T°C: 5 3. Received broken/leaking Yes No 4. Properly preserved Yes No 5. Holding times expired Yes No 6. Bottles supplied by ESS Yes No 7. Field Filtered Yes No

Notes:

Custody Seal Was:
1. Present on outer package Yes No 2. Unbroken on outer package Yes No 3. Present on sample Yes No 4. Unbroken on sample Yes No 5. Discrepancies between sample labels and COC record? Yes No

000483

9502 AK White - Original Yellow - ESS Copy Pink - Client Copy

Site Name: Pe[illegible]ysula Platng
Sampling Date(s): 7/20/99

DATA SUMMARY FORM: SEMIVOLATILE (1)

(Media) SAMPLES
(UNITS) ug/L

Sample Number Dilution Factor Sample Location	~~RE0GE1~~ SW2															
Phenol																
bis(2-Chloroethyl)ether																
2-Chlorophenol																
1,3-Dichlorobenzene																
1,4-Dichlorobenzene																
1,2-Dichlorobenzene																
2-Methylphenol																
2,2'-oxybis(1-Chloropropane)																
4-Methylphenol																
N-Nitroso-di-n-propylamine																
Hexachloroethane																
Nitrobenzene																
Isophorone																
2-Nitrophenol																
2,4-Dimethylphenol																
bis(2-Chloroethoxy)methane																
2,4-Dichlorophenol																
1,2,4-Trichlorobenzene																
Naphthalene																
4-Chloroaniline																

Site Name: Peninsula Plating
Sample Date(s): 7/20/99

DATA SUMMARY FORM: SEMIVOLATILE (2)

(Media) SAMPLES
(UNITS) ug/L

Sample Number Dilution Factor Sample Location	SW2 Rinse Bit																	
Hexachlorobutadiene																		
4-Chloro-3-methylphenol																		
2-Methylnaphthalene																		
Hexachlorocyclopentadiene																		
2,4,6-Trichlorophenol																		
2,4,5-Trichlorophenol																		
2-Chloronaphthalene																		
2-Nitroaniline																		
Dimethylphthalate																		
Acenaphthylene																		
2,6-Dinitrotoluene																		
3-Nitroaniline																		
Acenaphthene																		
2,4-Dinitrophenol																		
4-Nitrophenol																		
Dibenzofuran																		
2,4-Dinitrotoluene																		
Diethylphthalate																		
4-Chlorophenyl-phenyl ether																		
Fluorene																		
4-Nitroaniline																		
4,6-Dinitro-2-methylphenol																		

Site Name: _____
Sample Date(s): _____

DATA SUMMARY FORM: SEMIVOLATILE (3)

(Media) SAMPLES
(UNITS)

Sample Number Dilution Factor Sample Location	SW2 RINSE BLANK																	
N-Nitrosodiphenylamine (1)																		
4-Bromophenyl-phenylether																		
Hexachlorobenzene																		
Pentachlorophenol																		
Phenanthrene																		
Anthracene																		
Carbazole																		
Di-n-butylphthalate																		
Fluoranthene																		
Pyrene																		
Butylbenzylphthalate																		
3,3'-Dichlorobenzidine																		
Benzo(a)anthracene																		
Chrysene																		
bis(2-Ethylhexyl)phthalate																		
Di-n-octylphthalate																		
Benzo(b)fluoranthene																		
Benzo(k)fluoranthene																		
Benzo(a)pyrene																		
Indeno(1,2,3-cd)Pyrene																		
Dibenz(a,h)anthracene																		
Benzo(g,h,i)perylene																		

Site Name: Peninsula Plating
Sampling Date(s): 7/20/99

DATA SUMMARY FORM: PESTICIDES AND PCB's

Soil
(Media) SAMPLES
(UNITS) ug/Kg

Sample Number Dilution Factor Sample Location	SW2 RINSE BLK		TP35																	
alpha-BHC																				
beta-BHC																				
delta-BHC																				
gamma-BHC(Lindane)																				
Heptachlor																				
Aldrin																				
Heptachlor epoxide																				
Endosulfan I																				
Dieldrin																				
4,4'-DDE																				
Endrin																				
Endosulfan II																				
4,4'-DDD																				
Endosulfan sulfate																				
4,4'-DDT																				
Methoxychlor																				
Endrin ketone																				
Endrin aldehyde																				
alpha-Chlordane																				
gamma-Chlordane																				
Toxaphene																				
Aroclor-1016																				
Aroclor-1221																				
Aroclor-1232																				
Aroclor-1242																				
Aroclor-1248																				
Aroclor-1254																				
Aroclor-1260			33																	

ED_005024_00000655-00111

1B

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPSW2

Lab Name: DE DNREC:DIV OF WATER RES Contract: DNREC:DAWM

Lab Code: DE023 Case No.: SAS No.: SDG No.: #7439

Matrix: (soil/water) WATER Lab Sample ID: 9902758 0 0016

Sample wt/vol: 1000.0 (g/mL ML Lab File ID: P2520.D

Level: (low/med) Date Received: 7/23/99

% Moisture: decanted: (Y/N): N Date Extracted: 7/27/99

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 8/25/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
111-44-4	bis(2-Chloroethyl)ether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
67-72-1	Hexachloroethane	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	10	U
208-96-8	Acenaphthylene	10	U
131-11-3	Dimethylphthalate	10	U
606-20-2	2,6-Dinitrotoluene	10	U
99-09-2	3-Nitroaniline	10	U
83-32-9	Acenaphthene	10	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
86-73-7	Fluorene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
100-01-6	4-Nitroaniline	10	U
86-30-6	N-Nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
85-01-8	Phenanthrene	10	U

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPSW2

Lab Name: DE DNREC:DIV OF WATER RES Contract: DNREC:DAWM

Lab Code: DE023 Case No.: SAS No.: SDG No.: #7439

Matrix: (soil/water) WATER Lab Sample ID: 9902758

000017

Sample wt/vol: 1000.0 (g/mL ML Lab File ID: P2520.D

Level: (low/med) Date Received: 7/23/99

% Moisture: decanted: (Y/N): N Date Extracted: 7/27/99

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 8/25/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

CAS No.	Compound	Concentration Units: (ug/L or ug/Kg) ug/L	Q
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
56-55-3	Benzo(a)Anthracene	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

(1) - Cannot be separated from Diphenylamine

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1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

PPSW2

000018

Lab Name: DE DNREC:DIV OF WATER RES Contract: DNREC:DAWM

Lab Code: DE023 Case No.: SAS No.: SDG No.: #7439

Matrix: (soil/water) WATER Lab Sample ID: 9902758

Sample wt/vol: 1000.0 (g/mL) ML Lab File ID: P2520.D

Level: (low/med) Date Received: 7/23/99

% Moisture: decanted: (Y/N) N Date Extracted: 7/27/99

Concentrated Extract Volume: 1000 (uL) Date Analyzed: 8/25/99

Injection Volume: 2.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH:

Number TICs found: 5 Concentration Units: (ug/L or ug/Kg) ug/L

CAS Number	Compound Name	RT	Est. Conc	Q
1.	Unknown	2.69	4	J B
2.	Unknown	3.33	9	J
3.	Unknown	3.50	3	J
4.	Unknown	3.73	11	J
~~5.~~	~~Unknown~~	~~10.18~~	~~30~~	~~J~~ R SS
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPSW2

Lab Name:DE DNREC:Div of Water Res Contract:DNREC:DAWM

Lab Code:DE023 Case No. SAS No.: SDG No.:#7439

Matrix: (soil/water)WATER Lab Sample ID: GC3A8584

Sample wt/vol: 1000 (g/ml)ML Lab File ID:

% Moisture: decanted: (Y/N) Date Received: 7/23/99

Extraction: (SepF/Cont/Sonc)CONT Date Extracted: 7/27/99

Concentrated Extract Volume: 10000 (uL) Date Analyzed: 8/18/99

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N)N pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS (ug/L or ug/Kg)UG/L	Q
319-84-6	alpha-BHC	0.05	U
319-85-7	beta-BHC	0.05	U
319-86-8	delta-BHC	0.05	U
58-89-9	gamma-BHC(Lindane)	0.05	U
76-44-8	Heptachlor	0.05	U
309-00-2	Aldrin	0.05	U
111024-57	Heptachlor epoxide	0.05	U
959-98-8	Endosulfan I	0.05	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	0.05	U
5103-74-2	gamma-Chlordane	0.05	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

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO. **000118**

PPTP3S

Lab Name:DE DNREC:Div of Water Res Contract:DNREC:DAWM

Lab Code:DE023 Case No. SAS No.: SDG No.:#7439

Matrix: (soil/water)SOIL Lab Sample ID: GC3A8624

Sample wt/vol: 30.2 (g/ml)G Lab File ID:

% Moisture: 10 decanted: (Y/N) N Date Received: 7/23/99

Extraction: (SepF/Cont/Sonc)SONC Date Extracted: 7/28/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 8/20/99

Injection Volume: 1.0 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N)Y pH: 6.7 Sulfur Cleanup: (Y/N) N

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
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
111024-57	Heptachlor epoxide	1.8	U
959-98-8	Endosulfan I	1.8	U
60-57-1	Dieldrin	3.7	U
72-55-9	4,4'-DDE	3.7	U
72-20-8	Endrin	3.7	U
33213-65-9	Endosulfan II	3.7	U
72-54-8	4,4'-DDD	3.7	U
1031-07-8	Endosulfan sulfate	3.7	U
50-29-3	4,4'-DDT	3.7	U
72-43-5	Methoxychlor	18.	U
53494-70-5	Endrin ketone	3.7	U
7421-93-4	Endrin aldehyde	3.7	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	37.	U
11104-28-2	Aroclor-1221	73.	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	33.	P

DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
DIVISION OF AIR & WASTE MANAGEMENT
Site Investigation & Restoration Branch

MEMORANDUM

WORKING COPY

Date: October 6, 1999

Subject: Peninsula Plating Organic Data Validation

From: Margaret J. Zimmerman MJZ for MJZ 10/6/99

To: Lawrence J. Jones
Project Officer

Overview

The Sample Delivery Group consisted of six (6) water samples collected by the Site Investigation and Restoration Branch. STL-Envirotech, Edison, New Jersey analyzed samples for Volatiles, Semivolatiles (Base-Neutral only) and Pesticide/PCBs per the chain of custody. The samples were analyzed in accordance with the Standard Operating Procedures for Chemical Analytical Programs (SOPCAP) under the Hazardous Substance Cleanup Act (HSCA).

Summary

All samples were successfully analyzed for all targeted compounds. All instrument and method sensitivities were in accordance with the SOPCAP of HSCA.

Areas of concern with respect to usability are listed below according to the seriousness of the issue.

Major Issues

None

Minor Issues

The Semivolatile matrix spike compound 4-nitrophenol was recovered outside the established quality control limits. The established limits are 10-80%; the laboratory recovered 87 % for the blank spike and 97% on both the matrix spike and matrix spike duplicate sample. No qualification is necessary.

Lawrence J. Jones
Peninsula plating
October 6, 1999

Notes

The laboratory control spike recoveries for the Volatile and Pesticide/ PCB fractions were within QC limits. No qualification is necessary.

WORKING COPY

All blanks were with in QC limits. No qualification is necessary.

All initial and continuing calibrations were within validation quality control limits. No qualification is necessary.

All data was reviewed in accordance with National Functional Guidelines for Evaluating Organic Analyses with modification for use in EPA Region III.

All TICs were identified with a functionality group (e.g. unknown PAH). Unidentifiable TICs were accompanied with a "?" and the spectra and/or spectrum are included with the sample results behind the data summary tables. Some peaks are unidentifiable due to non-spectra matches or coelutions.

The preparation and analysis holding times for all samples were within validation quality control limits. No qualification is necessary.

All cleanup procedures were performed on the samples.

No field duplicate comparison could be achieved.

Attachments

Laboratory Form IS
Reviewed and Corrected Tentatively Identified Compounds
Support Documentation
Chain of Custody

MJZ:slb
MJZ99047.doc
DE-287 II B 3

Site Name Peninsula Platin-8
Sampling Date(s): 8/4/99

DATA SUMMARY FORM: VOLATILES (1)

Water
(Media) SAMPLES
(UNITS)
ug/L

Sample Number Dilution Factor Sample Location	PPMW1		PPMW2		PPMW3		PPMW4		PPMW5		PPMW7		TRIP Blank					
Chloromethane																		
Promomethane																		
Vinyl Chloride																		
Chloroethane																		
Methylene Chloride																		
Acetone																		
Carbon Disulfide																		
1,1-Dichloroethene																		
1,1-Dichloroethane																		
1,2-Dichloroethene (total)																		
Chloroform																		
1,2-Dichloroethane																		
2-Butanone																		
1,1,1-Trichloroethane																		
Carbon Tetrachloride																		
Vinyl Acetate																		
Bromodichloromethane																		

Site Name: Pennsauk Plating
Sampling Date(s): 8/4/97

DATA SUMMARY FORM: VOLATILES (2)
Water
(Media) SAMPLES
(UNITS)
ug/L

Sample Number	PPMW1	PPMW2	PPMW3	PPMW4	PPMW5	PPMW7	TRIP BLANK		
Dilution Factor									
Sample Location									
1,2-Dichloropropane									
cis-1,3-Dichloropropene									
Trichloroethene									
Dibromochloromethane									
1,1,2-Trichloroethane									
Benzene									
trans-1,3-Dichloropropene									
Bromoform									
4-Methyl-2-Pentanone									
2-Hexanone									
Tetrachloroethene									
1,1,2,2-Tetrachloroethane									
Toluene									
Chlorobenzene									
Ethylbenzene									
Styrene									
Xylene (total)									

Site Name: Peninsula Plating
Sampling Date(s): 8/4/99

DATA SUMMARY FORM: SEMIVOLATILE (1)

Water
(Media) SAMPLES
(UNITS)
ug/L

Sample Number Dilution Factor Sample Location	PPMW1		PPMW2		PPMW3		PPMW4		PPMW5		PPMW7					
Phenol																
bis(2-Chloroethyl)ether																
2-Chlorophenol																
1,3-Dichlorobenzene																
1,4-Dichlorobenzene																
1,2-Dichlorobenzene																
2-Methylphenol																
2,2'-oxybis(1-Chloropropane)																
4-Methylphenol																
N-Nitroso-di-n-propylamine																
Hexachloroethane																
Nitrobenzene																
Isophorone																
2-Nitrophenol																
2,4-Dimethylphenol																
bis(2-Chloroethoxy)methane																
2,4-Dichlorophenol																
1,2,4-Trichlorobenzene																
Naphthalene																
4-Chloroaniline																

Site Name: Peninsula Plating
Sample Date(s): 3/4/99

DATA SUMMARY FORM: SEMIVOLATILE (2)

Water
(Media) SAMPLES
(UNITS)
ug/L

Sample Number	PPMW1	PPMW2	PPMW3	PPMW4	PPMW5	PPMW7			
Dilution Factor									
Sample Location									
Hexachlorobutadiene									
4-Chloro-3-methylphenol									
2-Methylnaphthalene									
Hexachlorocyclopentadiene									
2,4,6-Trichlorophenol									
2,4,5-Trichlorophenol									
2-Chloronaphthalene									
2-Nitroaniline									
Dimethylphthalate									
Acenaphthylene									
2,6-Dinitrotoluene									
3-Nitroaniline									
Acenaphthene									
2,4-Dinitrophenol									
4-Nitrophenol									
Dibenzofuran									
2,4-Dinitrotoluene									
Diethylphthalate									
4-Chlorophenyl-phenyl ether									
Fluorene									
4-Nitroaniline									
4,6-Dinitro-2-methylphenol									

Site Name: Peninsula Plating
Sample Date(s): 8/4/99

DATA SUMMARY FORM: SEMIVOLATILE (3)
Water
(Media) SAMPLES
(UNITS)
ug/L

Sample Number / Dilution Factor / Sample Location	PP MW1		PPMW2		PPMW3		PPMW4		PPMW5		PPMW7							
N-Nitrosodiphenylamine (1)																		
4-Bromophenyl-phenylether																		
Hexachlorobenzene																		
Pentachlorophenol																		
Phenanthrene																		
Anthracene																		
Carbazole																		
Di-n-butylphthalate																		
Fluoranthene																		
Pyrene																		
Butylbenzylphthalate																		
3,3'-Dichlorobenzidine																		
Benzo(a)anthracene																		
Chrysene																		
bis(2-Ethylhexyl)phthalate	1		1															
Di-n-octylphthalate																		
Benzo(b)fluoranthene																		
Benzo(k)fluoranthene																		
Benzo(a)pyrene																		
Indeno(1,2,3-cd)Pyrene																		
Dibenz(a,h)anthracene																		
Benzo(g,h,i)perylene																		

Site Name: Peninsula Plating
Sampling Date(s): 8/4/99

DATA SUMMARY FORM: PESTICIDES AND PCB's

water
(Media) SAMPLES
(UNITS)
ug/L

Sample Number Dilution Factor Sample Location	PPMW1		PPMW2		PPMW3		PPMW4		PPMW5		PPMW7							
alpha-BHC																		
beta-BHC																		
delta-BHC																		
gamma-BHC(Lindane)																		
Heptachlor																		
Aldrin																		
Heptachlor epoxide																		
Endosulfan I																		
Dieldrin																		
4,4'-DDE																		
Endrin																		
Endosulfan II																		
4,4'-DDD																		
Endosulfan sulfate																		
4,4'-DDT																		
Methoxychlor																		
Endrin ketone																		
Endrin aldehyde																		
alpha-Chlordane																		
gamma-Chlordane																		
Toxaphene																		
Aroclor-1016																		
Aroclor-1221																		
Aroclor-1232																		
Aroclor-1242																		
Aroclor-1248																		
Aroclor-1254																		
Aroclor-1260																		

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Trip Blank

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148355

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: D4696

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: not dec. _____ Date Analyzed: 08/13/99

GC Column: DB624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylenes (Total)	10	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-1

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148356

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: D4697

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: not dec. _____ Date Analyzed: 08/13/99

GC Column: DB624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylenes (Total)	10	U

FORM I VOA

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

PPMW-1

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148356

Sample wt/vol: 5.000 (g/mL) mL Lab File ID: D4697

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: not dec. _____ Date Analyzed: 08/13/99

GC Column: DB624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 2

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN SILOXANE Column bleed	16.60	8	J
2.	UNKNOWN SILOXANE Column bleed	18.52	5	J
3.	10/5/99			
4.	KMB			
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FORM I VOA-TIC

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-2

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148357

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: D4698

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: not dec. _____ Date Analyzed: 08/13/99

GC Column: DB624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylenes (Total)	10	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-4

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148358

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: D4699

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: not dec. _____ Date Analyzed: 08/13/99

GC Column: DB624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylenes (Total)	10	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-3

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148359

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: D4700

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: not dec. _____ Date Analyzed: 08/13/99

GC Column: DB624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylenes (Total)	10	U

FORM I VOA

1E
VOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

PPMW-3

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148359

Sample wt/vol: 5.000 (g/mL) mL Lab File ID: D4700

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: not dec. _____ Date Analyzed: 08/13/99

GC Column: DB624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN SILOXANE Column	16.60	6	J
2.	Bleed 10/5/99			
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FORM I VOA-TIC

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-5

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148360

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: D4701

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: not dec. _____ Date Analyzed: 08/13/99

GC Column: DB624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylenes (Total)	10	U

FORM I VOA

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-7

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148361

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: D4702

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: not dec. _____ Date Analyzed: 08/13/99

GC Column: DB624 ID: 0.53 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
74-87-3	Chloromethane	10	U
74-83-9	Bromomethane	10	U
75-01-4	Vinyl Chloride	10	U
75-00-3	Chloroethane	10	U
75-09-2	Methylene Chloride	10	U
67-64-1	Acetone	10	U
75-15-0	Carbon Disulfide	10	U
75-35-4	1,1-Dichloroethene	10	U
75-34-3	1,1-Dichloroethane	10	U
540-59-0	1,2-Dichloroethene (total)	10	U
67-66-3	Chloroform	10	U
107-06-2	1,2-Dichloroethane	10	U
78-93-3	2-Butanone	10	U
71-55-6	1,1,1-Trichloroethane	10	U
56-23-5	Carbon Tetrachloride	10	U
75-27-4	Bromodichloromethane	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	cis-1,3-Dichloropropene	10	U
79-01-6	Trichloroethene	10	U
124-48-1	Dibromochloromethane	10	U
79-00-5	1,1,2-Trichloroethane	10	U
71-43-2	Benzene	10	U
10061-02-6	trans-1,3-Dichloropropene	10	U
75-25-2	Bromoform	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
591-78-6	2-Hexanone	10	U
127-18-4	Tetrachloroethene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
108-88-3	Toluene	10	U
108-90-7	Chlorobenzene	10	U
100-41-4	Ethylbenzene	10	U
100-42-5	Styrene	10	U
1330-20-7	Xylenes (Total)	10	U

FORM I VOA

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-1

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148356

Sample wt/vol: 1000 (g/mL) ML Lab File ID: M7944

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)____ Date Extracted:08/10/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/17/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
111-44-4	bis(2-Chloroethyl)Ether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	25	U
86-30-6	N-nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
85-01-8	Phenanthrene	10	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-1

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-1

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148356

Sample wt/vol: 1000 (g/mL) ML Lab File ID: M7944

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted:08/10/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/17/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	1	J
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

FORM I SV-2

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

PPMW-1

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148356

Sample wt/vol: 1000 (g/mL) mL Lab File ID: M7944

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 08/10/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/17/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

	CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.		UNKNOWN Column bleed 10/5/99	9.64	4	JB
2.					
3.					
4.					
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FORM I SV-TIC

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-2

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148357

Sample wt/vol: 1000 (g/mL) ML Lab File ID: M7934

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
111-44-4	bis(2-Chloroethyl)Ether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	25	U
86-30-6	N-nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
85-01-8	Phenanthrene	10	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-1

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-2

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148357

Sample wt/vol: 1000 (g/mL) ML Lab File ID: M7934

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted:08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	1	J
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

FORM I SV-2

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

PPMW-2

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148357

Sample wt/vol: 1000 (g/mL) mL Lab File ID: M7934

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted:08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN Column bleed 10/5/99 YKR	9.64	6	JB
2.				
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FORM I SV-TIC

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-4

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148358

Sample wt/vol: 1000 (g/mL) ML Lab File ID: M7935

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)____ Date Extracted:08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
111-44-4	bis(2-Chloroethyl)Ether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	25	U
86-30-6	N-nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
85-01-8	Phenanthrene	10	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-1

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-4

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148358

Sample wt/vol: 1000 (g/mL) ML Lab File ID: M7935

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted:08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

FORM I SV-2

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

PPMW-4

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148358

Sample wt/vol: 1000 (g/mL) mL Lab File ID: M7935

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN Column bleed 10/5/99	9.63	5	JB
2.				
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FORM I SV-TIC

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-3

Lab Name: STL Envirotech . Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148359

Sample wt/vol: 1000 (g/mL) ML Lab File ID: M7936

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted:08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
111-44-4	bis(2-Chloroethyl)Ether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	25	U
86-30-6	N-nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
85-01-8	Phenanthrene	10	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-1

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-3

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148359

Sample wt/vol: 1000 (g/mL) ML Lab File ID: M7936

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

FORM I SV-2

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

PPMW-3

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148359

Sample wt/vol: 1000 (g/mL) mL Lab File ID: M7936

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted:08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN Column bleed 10/15/99	9.63	5	JB
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FORM I SV-TIC

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-5

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148360

Sample wt/vol: 1000 (g/mL) ML Lab File ID: M7937

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted:08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
111-44-4	bis(2-Chloroethyl)Ether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	25	U
86-30-6	N-nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
85-01-8	Phenanthrene	10	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-1

1C
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-5

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148360

Sample wt/vol: 1000 (g/mL) ML Lab File ID: M7937

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted:08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

FORM I SV-2

1F

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

PPMW-5

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148360

Sample wt/vol: 1000 (g/mL) mL Lab File ID: M7937

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN Column bleed 10/5/99	9.63	5	JB
2.				
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FORM I SV-TIC

1B
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-7

Lab Name: STL Envirotech . Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148361

Sample wt/vol: 1000 (g/mL) ML Lab File ID: M7938

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
111-44-4	bis(2-Chloroethyl)Ether	10	U
541-73-1	1,3-Dichlorobenzene	10	U
106-46-7	1,4-Dichlorobenzene	10	U
95-50-1	1,2-Dichlorobenzene	10	U
108-60-1	2,2'-oxybis(1-Chloropropane)	10	U
621-64-7	N-Nitroso-di-n-propylamine	10	U
67-72-1	Hexachloroethane	10	U
98-95-3	Nitrobenzene	10	U
78-59-1	Isophorone	10	U
111-91-1	bis(2-Chloroethoxy)methane	10	U
120-82-1	1,2,4-Trichlorobenzene	10	U
91-20-3	Naphthalene	10	U
106-47-8	4-Chloroaniline	10	U
87-68-3	Hexachlorobutadiene	10	U
91-57-6	2-Methylnaphthalene	10	U
77-47-4	Hexachlorocyclopentadiene	10	U
91-58-7	2-Chloronaphthalene	10	U
88-74-4	2-Nitroaniline	25	U
131-11-3	Dimethylphthalate	10	U
208-96-8	Acenaphthylene	10	U
606-20-2	2,6-Dinitrotoluene	10	U
99-09-2	3-Nitroaniline	25	U
83-32-9	Acenaphthene	10	U
132-64-9	Dibenzofuran	10	U
121-14-2	2,4-Dinitrotoluene	10	U
84-66-2	Diethylphthalate	10	U
7005-72-3	4-Chlorophenyl-phenylether	10	U
86-73-7	Fluorene	10	U
100-01-6	4-Nitroaniline	25	U
86-30-6	N-nitrosodiphenylamine (1)	10	U
101-55-3	4-Bromophenyl-phenylether	10	U
118-74-1	Hexachlorobenzene	10	U
85-01-8	Phenanthrene	10	U

(1) - Cannot be separated from Diphenylamine

FORM I SV-1

1C

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-7

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148361

Sample wt/vol: 1000 (g/mL) ML Lab File ID: M7938

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted: 08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/L	Q
120-12-7	Anthracene	10	U
86-74-8	Carbazole	10	U
84-74-2	Di-n-butylphthalate	10	U
206-44-0	Fluoranthene	10	U
129-00-0	Pyrene	10	U
85-68-7	Butylbenzylphthalate	10	U
91-94-1	3,3'-Dichlorobenzidine	10	U
56-55-3	Benzo(a)anthracene	10	U
218-01-9	Chrysene	10	U
117-81-7	bis(2-Ethylhexyl)phthalate	10	U
117-84-0	Di-n-octylphthalate	10	U
205-99-2	Benzo(b)fluoranthene	10	U
207-08-9	Benzo(k)fluoranthene	10	U
50-32-8	Benzo(a)pyrene	10	U
193-39-5	Indeno(1,2,3-cd)pyrene	10	U
53-70-3	Dibenz(a,h)anthracene	10	U
191-24-2	Benzo(g,h,i)perylene	10	U

FORM I SV-2

1F
SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

EPA SAMPLE NO.

PPMW-7

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148361

Sample wt/vol: 1000 (g/mL) mL Lab File ID: M7938

Level: (low/med) LOW Date Received: 08/05/99

% Moisture: _____ decanted: (Y/N)___ Date Extracted:08/08/99

Concentrated Extract Volume: 1000(uL) Date Analyzed: 08/16/99

Injection Volume: 2.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: 7.0

Number TICs found: 1

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/L

CAS NUMBER	COMPOUND NAME	RT	EST. CONC.	Q
1.	UNKNOWN Column bleed 10/5/99 YKB	9.63	5	JB
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

FORM I SV-TIC

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-1

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148356

Sample wt/vol: 1000 (g/mL) ML Lab File ID: XF027649

% Moisture: _____ decanted: (Y/N)___ Date Received: 08/05/99

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/10/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 08/11/99

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) Y

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	0.050	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

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-2

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148357

Sample wt/vol: 1000 (g/mL) ML Lab File ID: XF027652

% Moisture: _____ decanted: (Y/N)___ Date Received: 08/05/99

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/10/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 08/12/99

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) Y

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	0.050	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

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-4

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148358

Sample wt/vol: 1000 (g/mL) ML Lab File ID: XF027653

% Moisture: _____ decanted: (Y/N)___ Date Received: 08/05/99

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 08/10/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 08/12/99

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) Y

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	0.050	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

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-3

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148359

Sample wt/vol: 1000 (g/mL) ML Lab File ID: XF027654

% Moisture: _____ decanted: (Y/N)___ Date Received: 08/05/99

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted:08/10/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 08/12/99

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) Y

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	0.050	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

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-5

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148360

Sample wt/vol: 1000 (g/mL) ML Lab File ID: XF027655

% Moisture: _____ decanted: (Y/N)___ Date Received: 08/05/99

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 08/10/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 08/12/99

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) Y

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	0.050	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

FORM I PEST

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

PPMW-7

Lab Name: STL Envirotech Contract: N/A

Lab Code: N/A Case No.: N/A SAS No.: N/A SDG No.: S1791

Matrix: (soil/water) WATER Lab Sample ID: 148361

Sample wt/vol: 1000 (g/mL) ML Lab File ID: XF027656

% Moisture: _____ decanted: (Y/N)___ Date Received: 08/05/99

Extraction: (SepF/Cont/Sonc) SEPF Date Extracted: 08/10/99

Concentrated Extract Volume: 10000(uL) Date Analyzed: 08/12/99

Injection Volume: 1.0(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) N pH: ___ Sulfur Cleanup: (Y/N) Y

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	0.050	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

FORM I PEST

Data File: /chem/XVOAMS4.i/CLPWATER/08-13-99/13aug99.b/d4697.d

Date : 13-AUG-1999 21:16

Client ID: PPMW-1 Instrument: XVOAMS4.i

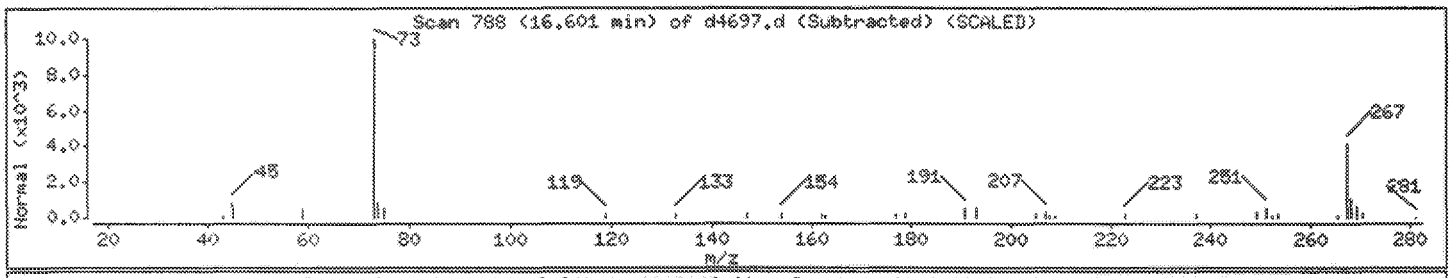
Sample Info: 148356

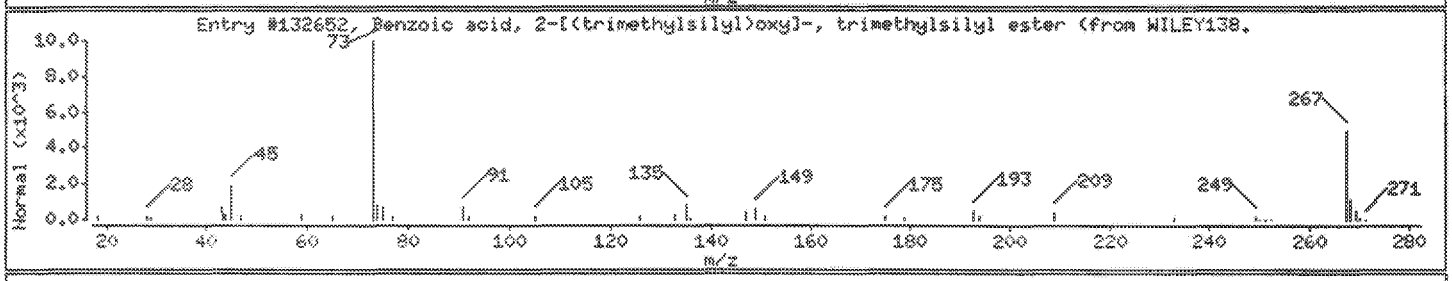
Purge Volume: 5.0 Operator: VOAMS 4

Column phase: DB624 Column diameter: 0.53

Column bleed 10/5/99

Library Search Compound Match	CAS Number	Library	Entry	Quality	Formula	Weight
Unknown Siloxane						
Benzoic acid, 2-[(trimethylsilyl)oxy]-,	3789-85-3	WILEY138.1	132652	40	C13H22O3Si2	282





Data File: /chem/XVOAMS4.i/CLPWATER/08-13-99/13aug99.b/d4697.d

Date : 13-AUG-1999 21:16

ient ID: PPMW-1

Sample Info: 148356

Purge Volume: 5.0

Column phase: DB624

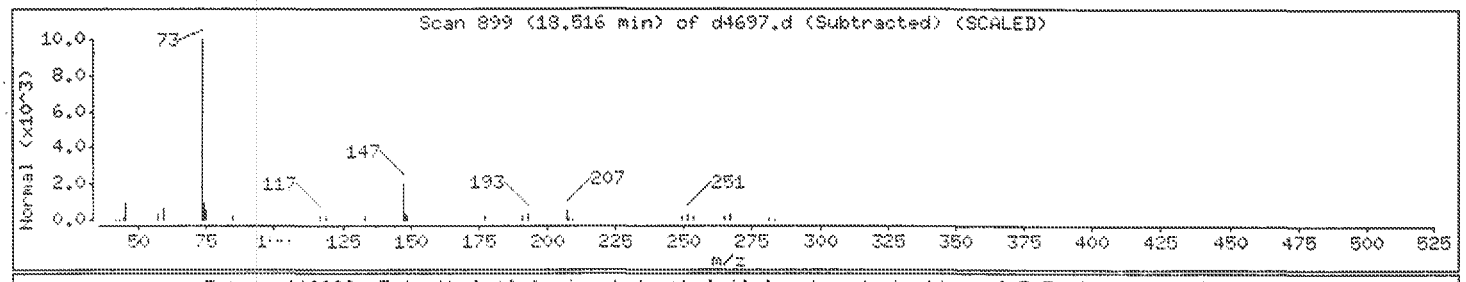
Column Bleed
JKB 10/5/99

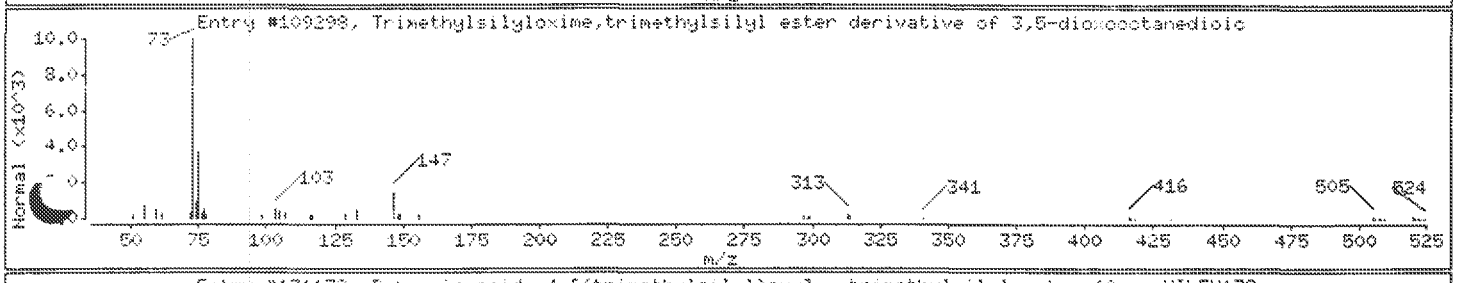
Instrument: XVOAMS4.i

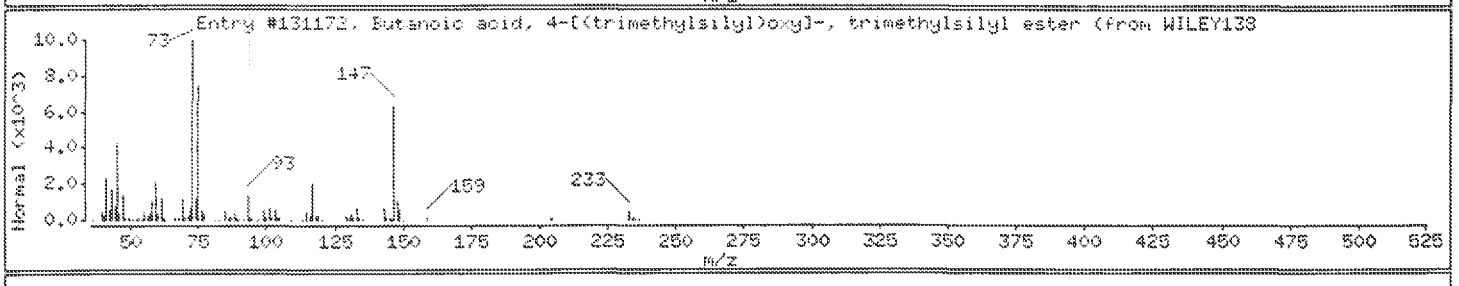
Operator: VOAMS 4

Column diameter: 0.53

Library Search Compound Match	CAS Number	Library	Entry	Quality	Formula	Weight
Unknown Siloxane						
Trimethylsilyloxime,trimethylsilyl ester	0-00-0	WILEY138.1	109298	36	C20H44N2O6Si4	520
Butanoic acid, 4-[(trimethylsilyl)oxy]-,	55133-95-4	WILEY138.1	131172	28	C10H24O3Si2	248







Data File: /chem/XVOAHS4.i/CLPWATER/08-13-99/13aug99.b/d4700.d

Date : 13-AUG-1999 22:49

Client ID: PPHW-3

Sample Info: 148359

Purge Volume: 5.0

Column phase: DB624

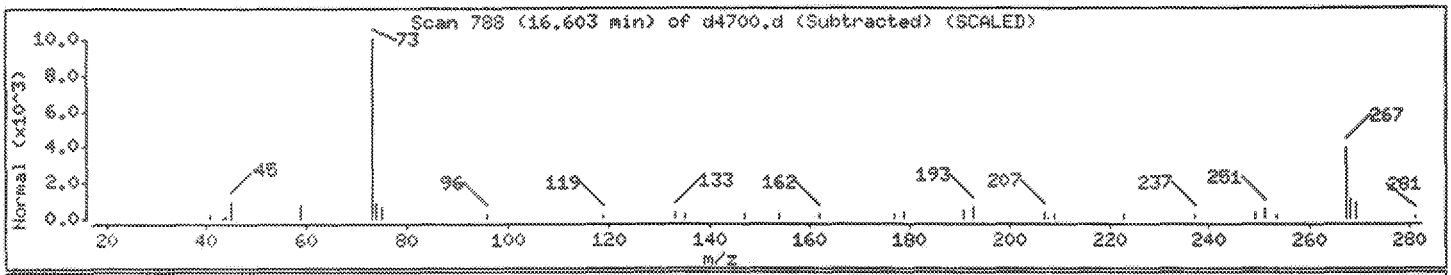
Column bleed 10/5/99 JMB

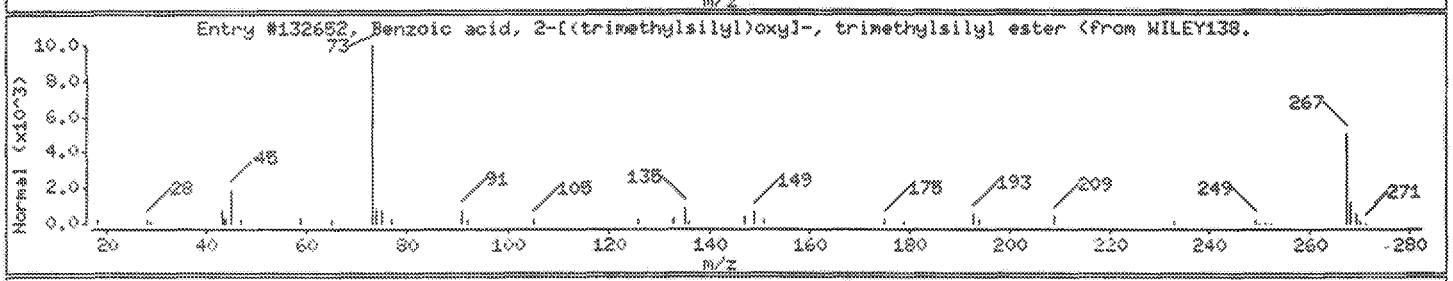
Instrument: XVOAHS4.i

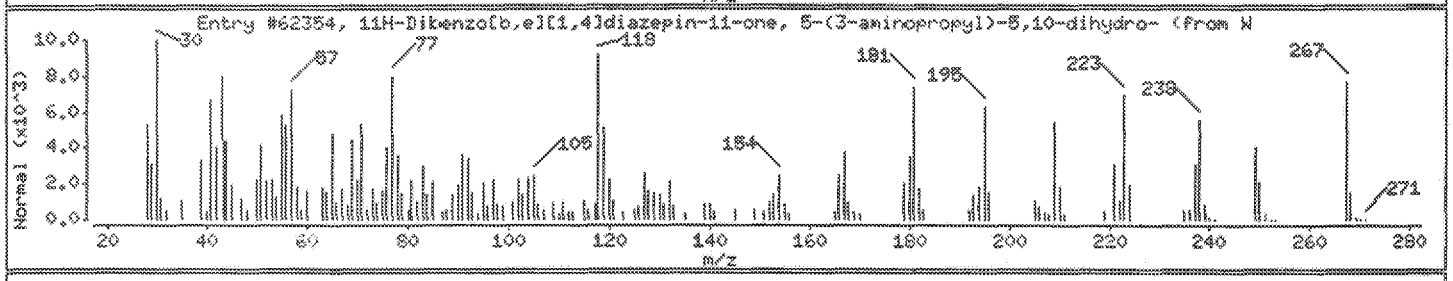
Operator: VOAHS 4

Column diameter: 0.53

Library Search Compound Match	CAS Number	Library	Entry	Quality	Formula	Weight
Unknown Siloxane						
Benzoic acid, 2-[(trimethylsilyl)oxy]-,	3789-85-3	WILEY138.l	132652	39	C13H22O3Si2	282
11H-Dibenzo[b,e][1,4]diazepin-11-one, 5-	13450-73-2	WILEY138.l	62354	25	C16H17N3O	267







Data File: /chem/XBNAHS6.i/CLP/08-12-99del/17aug99.b/m7944.d

Date : 17-AUG-1999 11:44

Client ID: PPHW-1 Instrument: XBNAHS6.i

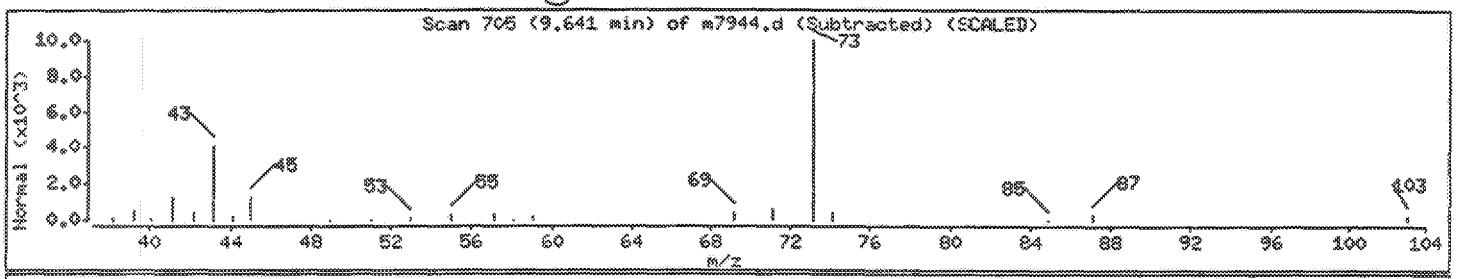
Sample Info: 148356;S179;1

Volume Injected (uL): 2.0 Operator: BNAHS 6

Column phase: Column diameter: 0.25

Library Search Compound Match	CAS Number	Library	Entry	Quality	Formula	Weight
UNKNOWN						

Column bleed
YKB 10/5/99



Data File: /chem/XBNAMS6.i/CLP/08-12-99del/16aug99.b/m7934.d

Date : 16-AUG-1999 18:23

Client ID: PPMW-2 Instrument: XBNAMS6.i

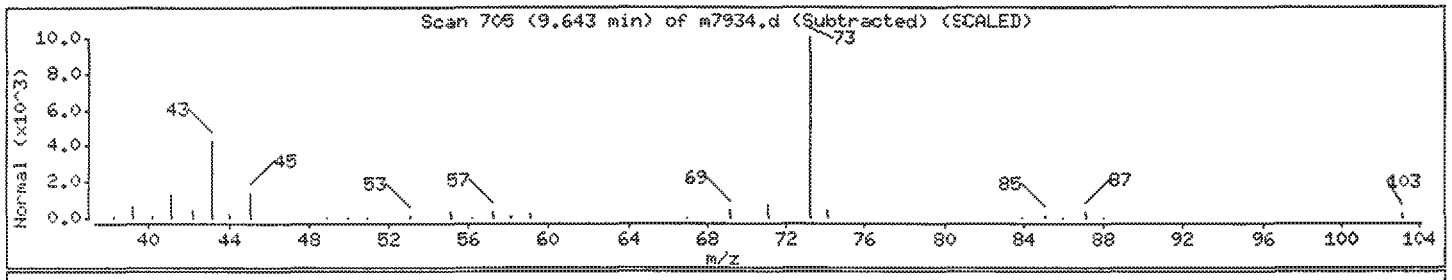
Sample Info: 148357;S179;1

Volume Injected (uL): 2.0 Operator: BNAMS 6

Column phase: Column diameter: 0.25

Library Search Compound Match	CAS Number	Library	Entry	Quality	Formula	Weight
Unknown						
Unknown			0	0		0

Column bleed
10/5/99 YK



Data File: /chem/XBNAMS6.i/CLP/08-12-99del/16aug99.b/m7935.d

Date : 16-AUG-1999 19:11

Client ID: PPMW-4 | Instrument: XBNAMS6.i

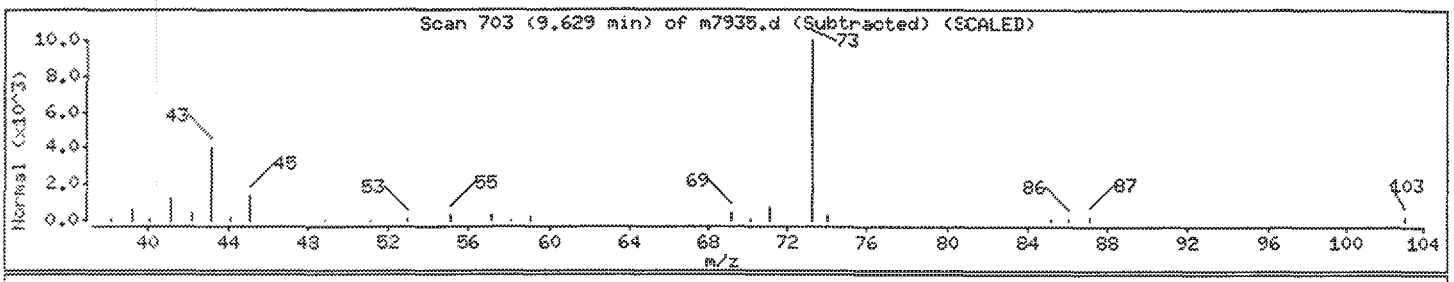
Sample Info: 148358:S179:1

Volume Injected (uL): 2.0 | Operator: BNAMS 6

Column phase: | Column diameter: 0.25

Library Search Compound Match	CAS Number	Library	Entry	Quality	Formula	Weight
Unknown						
Unknown			0	0		0

Column bleed
10/5/99 YKB



Data File: /chem/XBNAHS6.i/CLP/08-12-99del/16aug99.b/m7936.d

Date : 16-AUG-1999 19:58

Client ID: PPMW-3

Instrument: XBNAHS6.i

Sample Info: 148389;S179;1

Volume Injected (uL): 2.0

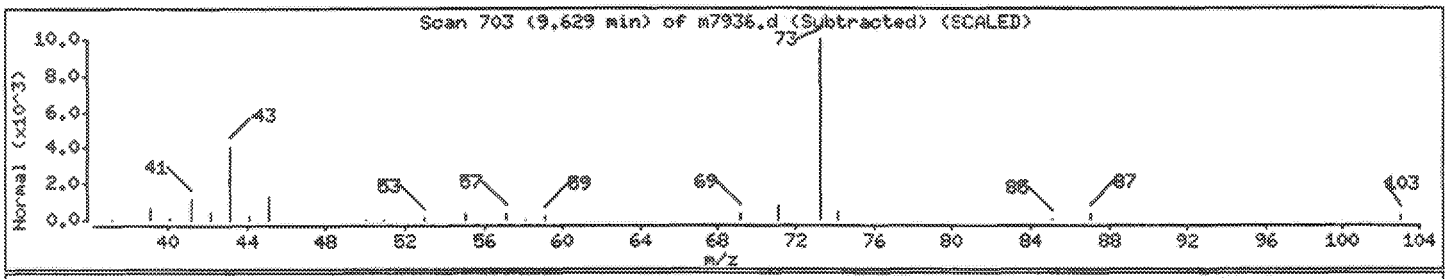
Operator: BNAHS 6

Column phase:

Column diameter: 0.25

Library Search Compound Match	CAS Number	Library	Entry	Quality	Formula	Weight
Unknown						
Unknown			0	0		0

Column bleed 10/5/99 YKB



Data File: /chem/XBNAMS6.i/CLP/08-12-99del/16aug99.b/m7937.d

Date : 16-AUG-1999 20:48

Client ID: PPMW-5 Instrument: XBNAMS6.i

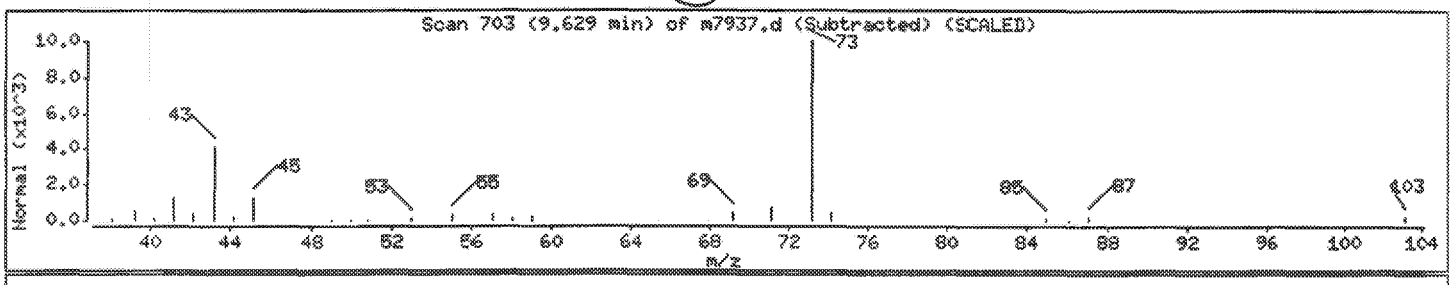
Sample Info: 148360;S179;1

Volume Injected (uL): 2.0 Operator: BNAMS 6

Column phase: Column diameter: 0.25

Library Search Compound Match	CAS Number	Library	Entry	Quality	Formula	Weight
Unknown						
Unknown			0	0		0

Column bleed
10/5/99 MK



Data File: /chem/XBNAMS6.i/CLP/08-12-99del/16aug99.b/m7938.d

Date : 16-AUG-1999 21:33

Client ID: PPMW-7 | Instrument: XBNAMS6.i

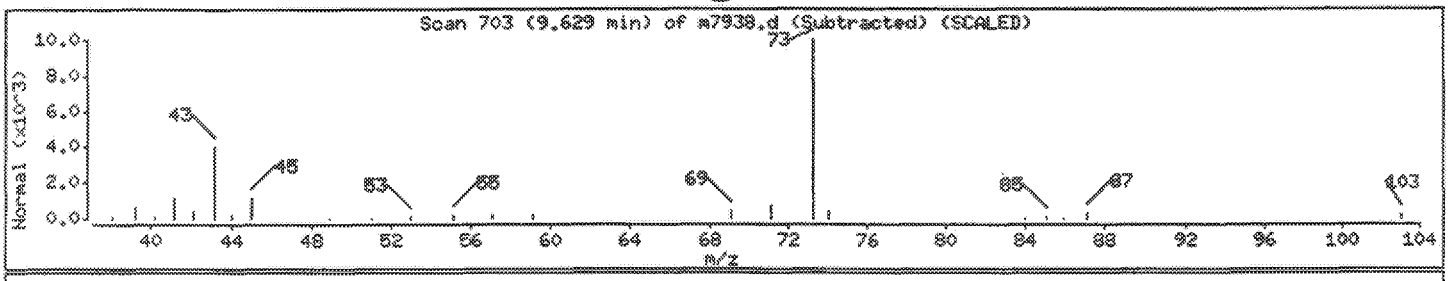
Sample Info: 148361;S179;1

Volume Injected (uL): 2.0 | Operator: BNAMS 6

Column phase: | Column diameter: 0.25

Library Search Compound Match	CAS Number	Library	Entry	Quality	Formula	Weight
Unknown						
Unknown			0	0		0

Column bleed 10/5/99 MG



SDG NARRATIVE

STL ENVIROTECH

SDG No. S1791

STL Envirotech Sample	Client ID
148355	Trip Blank
148356	PPMW-1
148357	PPMW-2
148358	PPMW-4
148359	PPMW-3
148360	PPMW-5
148361	PPMW-7

Fraction	Problems Encountered	Corrective Action Taken
Volatiles	None	N/A
Semivolatiles	BS/MS/MSD% recovery 4-Nitrophenol = 87/97/97% (10-80% Q.C. limits)	None Required
Pesticides/PCBs	None	N/A

I certify that this data package is in compliance with the terms of the SOP both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this data package has been authorized by the laboratory manager or his designee.

Ex. 4 CBI 9/28/99

Ex. 4 CBI
Laboratory Manager

ENVIROTECH RESEARCH INC.
777 New Durham Road
Edison, New Jersey 08817
Phone: (908) 549-3900 Fax: (908) 549-3679

CHAIN OF CUSTODY / ANALYSIS REQUEST

PAGE ___ OF ___

40

Name (for report and invoice) ROBERT SCHULTE	Samplers Name (Printed) Ex. 4 CBI	Site/Project Identification PENINSULA PLATING
Company DNREC - SIRB	P.O. #	State (Location of site) NJ: ☐ NY: ☐ Other: DE
		Regulatory Program: SUPERFUND
Address 391 LUKENS DR.	Analysis Turnaround Time: Standard ☒	LAB USE ONLY Project No:
City NEW CASTLE State DE Zip 19720	Rush Charges Authorized For: 2 Week ☐ 1 Week ☐ Other ☐	Job No: S179
Phone (302) 395-2600 Fax (302) 395-2601		

ANALYSIS REQUESTED (ENTER 'X' BELOW TO INDICATE REQUEST)

Sample Identification	Date	Time	Matrix	No. of Cont.	VOA	BN+LB	PEST/PCB	TOT. METAL	DIS. METAL	CYANIDE						Sample Numbers	DIS
~~PP MW-6~~ TRIP BLANK (BUBBLES) per Bob Schultz BDB 8/9/99	PREFILLED		GW	3	X	-	-	-	-	-						148355	—
PP MW-1 MS/MSD	8/4/99	1100	GW	16	X	X	X	X	X	X						148356	148
PP MW-2		1230	GW	8	X	X	X	X	X	X						148357	148
PP MW-4		1200	GW	7	X	X	X	X	-	X						148358	—
PP MW-3		1420	GW	8	X	X	X	X	X	X						148359	148
PP MW-5		1430	GW	8	X	X	X	X	X	X						148360	148
PP MW-7		1500	GW	7	X	X	X	X	-	X						148361	—
~~TRIP BLANK~~ 8/6/99	~~8/22/99~~		~~AQ~~	~~3~~													
Preservation Used: 1 = ICE, 2 = HCl, 3 = H_2SO_4, 4 = HNO_3, 5 = NaOH				Soil:	-	-	-	-	-	-							
6 = Other _____, 7 = Other _____				Water:	2	1	1	4	4	5	①	ALL					

Special Instructions: _____ Water Metals Filtered (Yes/No)? DIS. ONLY

Relinquished by	Company	Date / Time	Received by	Company
1) Ex. 4 CBI	DNREC - SIRB	~~8/4/99 1840~~	Ex. 4 CBI 8/5/99 1300	STL
2) Ex. 4 CBI	STL	8/5/99 1810	Ex. 4 CBI	STL-ENVIROTECH ROBERT PRITCHARD
3)			3)	
4)			4)	

WORKING COPY

DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
DIVISION OF AIR & WASTE MANAGEMENT
Site Investigation & Restoration Branch

MEMORANDUM

Date: **September 27, 1999**

Subject: **Peninsula Plating Organic Data Validation**

From: **Robert M. Schulte** RMS 9/27/99

To: **Lawrence Jones**
Project Officer

Overview

The Sample Delivery Group consisted of five (5) soil samples.. The Site Investigation & Restoration Branch (SIRB) of the Department of Natural Resources and Environmental Control (DNREC) collected the samples. One rinse blank (SW-2-not included in this report) and one field duplicate pair (TP-2S and TP11S) were collected. Environmental Services Section subcontracted the semivolatile extracts to STL-Envirotech for analysis. The samples were analyzed in accordance with the Standard Operating Procedures for Chemical Analytical Programs (SOPCAP) under the Hazardous Substance Cleanup Act (HSCA).

Summary

All samples were successfully analyzed for all targeted compounds. All instrument and method sensitivities were in accordance with the SOPCAP of HSCA.

Areas of concern with respect to usability are listed below according to the seriousness of the issue.

Major Issues

No major issues to report.

Minor Issues

No minor issues to report.

Notes

The maximum concentration of all compounds found in the analyses of the rinsate and preparation blanks are listed below. Samples with concentrations of common laboratory contaminants less than ten times (<10x) the blank concentration or with concentrations of other contaminants less than five times (<5x) the blank concentration will be excluded from the data summary tables and not considered chemicals of concern. The following compounds were found: Di-n-butyl-phthalate 48 ug/Kg.

All semivolatile ending, initial and continuing calibrations were within validation quality control limits. No qualification is necessary.

All semivolatile system monitoring compounds were within validation quality control limits. No qualification is necessary.

All semivolatile response factors were within validation quality control limits. No qualification is necessary.

All semivolatile internal standards were within validation quality control limits. No qualification is necessary.

All semivolatile system performance checks were within validation quality control limits. No qualification is necessary.

All data was reviewed in accordance with National Functional Guidelines for Evaluating Organic Analyses with modification for use in EPA Region III.

All TICs were identified with a functionality group (e.g. unknown PAH). Unidentifiable TICs were accompanied with a "?" and the spectra and/or spectrum are included with the sample results behind the data summary tables. Some peaks are unidentifiable due to non-spectra matches or coelutions.

The preparation and analysis holding times for all samples were within validation quality control limits. No qualification is necessary.

All semivolatile matrix spike and matrix spike duplicate results were within validation quality control limits. A comparison of nonspiked compounds is as follows:

Concentration ug/Kg

Compound	TP3S	TP3SMS	TP3SMSD	%RSD
Flouranthene	390	360	270	15
Benzo(a)anthracene	190	180	150	9
Chrysene	250	240	190	8
Benzo(b)flouranthene	280	270	210	8
Benzo(k)flouranthene	130	120	95	16
Benzo(a)pyrene	180	180	140	5
Indeno(1,2,3-cd)pyrene	130	140	110	6
Dibenz(a,h)anthracene	45	57	49	9

The results are within validation quality control limits. No qualification is necessary.

All cleanup procedures were within validation quality control limits. No qualification is necessary.

The field duplicate results are as follows:

Concentration ug/Kg

Compound	TP11s	TP2S	%RSD
Flouranthene	2100	1800	15
Pyrene	2100	1800	15
Benzo(a)antracene	1400	1200	8
Chrysene	1500	1400	7
Benzo(b)flouranthene	1800	1400	25
Benzo(k)flouranthene	790	600	27
Benzo(a)pyrene	1200	1100	9

All field duplicate results are within validation quality control limits. No qualification is necessary.

All semivolatile laboratory control samples were within validation quality control limits. No qualification is necessary.

Attachments

Laboratory Form IS
Reviewed and Corrected Tentatively Identified Compounds
Support Documentation

Chain of Custody

RMS:slb
RMS99079.doc
DE-287 II A 3

Environmental Laboratory Section - Division of Water Resources
Department of Natural Resources and Environmental Control
89 Kings Highway, Dover, DE 19901 (302) 739-4771

FIELD CHAIN OF CUSTODY

Client : DNREC-SIRB
Address : 391 Lukens Drive
New Castle DE 19720
Phone No.: (302) 395-2646

Report To : Robert M. Schwartz
Invoice To : Robert M. Schwartz
Account :
ELS Batch # :

PROJECT NAME: Peninsula Plating

SAMPLERS (Please Print)

(ELS Use Only) Lab Log No.	Client Sample Description	Sample Date	Sample Time	Matrix*	Comp	Grab	No. Of Containers	ANALYSES: BN + Lib.								REMARKS
	PP-TP-2S	7/20/99	1125	SO		X		X								99027500
	PP-TP-3S	↓	1145	↓		↓		↓								99027510
	PP-TP-3d		1150													99027520
	PP-TP-9S		1230													99027530
	PP TP-11S		1130													99027540
	PP SS-6	↓	1555	↓		↓		↓								99027560

Potential Hazard Identification: Non-Hazard [ ] Flammable [ ] Toxic [ ] Skin-irritant [ ] Other [ ]

Sample Disposal: Return to Client [ ] Disposal by ELS [ ] Authorized by:

RELINQUISHED BY: (signature)	DATE	TIME	RECEIVED BY: (signature)
Ex. 4 CBI STL-ENVIROTECH	8/17/99	0900	Ex. 4 CBI STL-ENVIROTECH 1100 Ex. 4 CBI
Ex. 4 CBI Ex. 4 CBI	8/17/99	1600	Ex. 4 CBI STL

COMMENTS: Outsourced to Envirotech 8/17/99

*Matrix Codes

AI - air	WW - waste water
BI - biological	SW - surface water
SO - soil	PW - potable water
SE - sediment	GW - ground water
SL - sludge	DL - drum liquids
SD - solid	DS - drum solids
OI - oil	WS - waste solid
TI - Tissue	X - other (Please specify ____
WI - wipe	

ELS USE ONLY

Sample Condition:
1. Shipped or Hand-delivered or ELS Pickup
2. Chilled or Ambient T° C:
3. Received broken/leaking Yes No
4. Properly preserved Yes No
5. Holding times expired Yes No
6. Bottles supplied by ELS Yes No
7. Field Filtered Yes No

Custody Seal Was:
1. Present on outer package Yes No
2. Unbroken on outer package Yes No
3. Present on sample Yes No
4. Unbroken on samples Yes No
5. Discrepancies between sample labels and COC record? Yes No

Coc:06/11/99

91

Site Name: Peninsula Plating
Sampling Date(s): 7/20/99

DATA SUMMARY FORM: SEMIVOLATILE (1)

~~Peninsu~~ Soil
(Media) SAMPLES
(UNITS) ug/Kg

Sample Number Dilution Factor Sample Location	~~RXOGE1~~ TP2S		TP3S		TP3D		TP9S		TP11S		SS-6					
Phenol																
bis(2-Chloroethyl)ether																
2-Chlorophenol																
1,3-Dichlorobenzene																
1,4-Dichlorobenzene																
1,2-Dichlorobenzene																
2-Methylphenol																
2,2'-oxybis(1-Chloropropane)																
4-Methylphenol																
N-Nitroso-di-n-propylamine																
Hexachloroethane																
Nitrobenzene																
Isophorone																
2-Nitrophenol																
2,4-Dimethylphenol																
bis(2-Chloroethoxy)methane																
2,4-Dichlorophenol																
1,2,4-Trichlorobenzene																
Naphthalene	74	J	87	J			560	J	69	J						
4-Chloroaniline																

Site Name: Tonawanda Plating
Sample Date(s): 3/20/99

DATA SUMMARY FORM: SEMIVOLATILE (2)

Soil
(Media) SAMPLES
(UNITS) ug/Kg

Sample Number / Dilution Factor / Sample Location	TP25		TP35		TP30		TP95		TP115									
Hexachlorobutadiene																		
4-Chloro-3-methylphenol																		
2-Methylnaphthalene	140	J	15	J			250	J	110	J								
Hexachlorocyclopentadiene																		
2,4,6-Trichlorophenol																		
2,4,5-Trichlorophenol																		
2-Chloronaphthalene																		
2-Nitroaniline																		
Dimethylphthalate																		
Acenaphthylene	260		50	J			1300		290									
2,6-Dinitrotoluene																		
3-Nitroaniline																		
Acenaphthene	30	J	8.9	J			54	J	41	J								
2,4-Dinitrophenol																		
4-Nitrophenol			8.9	J														
Dibenzofuran	58	J	6.2	J			1000		62	J								
2,4-Dinitrotoluene																		
Diethylphthalate																		
4-Chlorophenyl-phenyl ether																		
Fluorene	49	J	6.2	J			300	J	61	J								
4-Nitroaniline																		
4,6-Dinitro-2-methylphenol																		

Site Name: Peninsula Plating
Sample Date(s): 7/20/99

DATA SUMMARY FORM: SEMIVOLATILE (3)

Soil
(Media) SAMPLES
(UNITS) ug/Kg

Sample Number / Dilution Factor / Sample Location	TP2S		TP3S		TP3D		TP4S		TP11S									
N-Nitrosodiphenylamine (1)																		
4-Bromophenyl-phenylether																		
Hexachlorobenzene																		
Pentachlorophenol																		
Phenanthrene	830		160	J	~~13000~~	~~MJ~~	12000		1100									
Anthracene	220		32	J	~~570~~	~~J~~	570	J	260									
Carbazole	160	J	34	J			1300		200									
Di-n-butylphthalate																		
Fluoranthene	1800		390				12000		2100									
Pyrene	1800		340				9800		2100									
Butylbenzylphthalate																		
3,3'-Dichlorobenzidine																		
Benzo(a)anthracene	1200		190				2200		1400									
Chrysene	1400		250				5800		1500									
bis(2-Ethylhexyl)phthalate																		
Di-n-octylphthalate																		
Benzo(b)fluoranthene	1400		280				6800		1800									
Benzo(k)fluoranthene	600		130				2900		790									
Benzo(a)pyrene	1100		180				3300		1200									
Indeno(1,2,3-cd)Pyrene	610		130				2200		420									
Dibenz(a,h)anthracene	180		45				480		140									
Benzo(g,h,i)perylene	500		120	J			1600		340									

TP25

Client ID: **99027500**
Site: Extracts Outsourced

Lab Sample No: **151053**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/25/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0540.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 1.0
% Moisture: 17

SEMI-VOLATILE ORGANICS - GC/MS
METHOD 8270C

Parameter	Analytical Results Units: ug/kg (Dry Weight)	Quantitation Limit Units: ug/kg
bis(2-Chloroethyl)ether	ND	20
1,3-Dichlorobenzene	ND	200
1,4-Dichlorobenzene	ND	200
1,2-Dichlorobenzene	ND	200
bis(2-chloroisopropyl)ether	ND	200
N-Nitroso-di-n-propylamine	ND	20
Hexachloroethane	ND	20
Nitrobenzene	ND	20
Isophorone	ND	200
bis(2-Chloroethoxy)methane	ND	200
1,2,4-Trichlorobenzene	ND	20
Naphthalene	74 J	200
4-Chloroaniline	ND	200
Hexachlorobutadiene	ND	40
2-Methylnaphthalene	140 J	200
Hexachlorocyclopentadiene	ND	200
2-Chloronaphthalene	ND	200
2-Nitroaniline	ND	400
Dimethylphthalate	ND	200
Acenaphthylene	260	200
2,6-Dinitrotoluene	ND	40
3-Nitroaniline	ND	400
Acenaphthene	30 J	200
Dibenzofuran	58 J	200
2,4-Dinitrotoluene	ND	40
Diethylphthalate	ND	200
4-Chlorophenyl-phenylether	ND	200
Fluorene	49 J	200
4-Nitroaniline	ND	400
N-Nitrosodiphenylamine	ND	200
4-Bromophenyl-phenylether	ND	200
Hexachlorobenzene	ND	20
Phenanthrene	830	200
Anthracene	220	200

Client ID: **99027500**
Site: Extracts Outsourced

Lab Sample No: **151053**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/25/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0540.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 1.0
% Moisture: 17

SEMI-VOLATILE ORGANICS - GC/MS
METHOD 8270C

Parameter	Analytical Results Units: ug/kg (Dry Weight)	Quantitation Limit Units: ug/kg
Carbazole	160 J	200
Di-n-butylphthalate	76 J B	200
Fluoranthene	1800	200
Pyrene	1800	200
Butylbenzylphthalate	ND	200
3,3'-Dichlorobenzidine	ND	400
Benzo(a)anthracene	1200	20
Chrysene	1400	200
bis(2-Ethylhexyl)phthalate	ND	200
Di-n-octylphthalate	ND	200
Benzo(b)fluoranthene	1400	20
Benzo(k)fluoranthene	600	20
Benzo(a)pyrene	1100	20
Indeno(1,2,3-cd)pyrene	610	20
Dibenz(a,h)anthracene	180	20
Benzo(g,h,i)perylene	500	200

Client ID: **99027500**
Site: Extracts Outsourced

Lab Sample No: **151053**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/25/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0540.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 1.0
% Moisture: 17.4

SEMI-VOLATILE ORGANICS - GC/MS
TENTATIVELY IDENTIFIED COMPOUNDS
METHOD 8270C

COMPOUND NAME	RT	EST. CONC. ug/kg	Q
1. Unknown B A	11.38	1200	B A
2. Unknown	11.65	4900	
3. Unknown	12.33	5700	
4. Unknown	13.24	2800	
5. Unknown	13.83	410	
6. Unknown Alkane	19.37	450	
7. C15H12 PAH	21.20	370	
8. C17H10O Ketone	24.11	280	
9. C17H10O Ketone	24.46	280	
10. C20H12 PAH	27.75	790	
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
23.			
24.			
25.			
26.			
27.			
28.			
29.			
30.			

TOTAL ESTIMATED CONCENTRATION 17180

Client ID: 99027510
Site: Extracts Outsourced

Lab Sample No: 151054
Lab Job No: S527

TP35

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/24/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0524.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 1.0
% Moisture: 10

SEMI-VOLATILE ORGANICS - GC/MS
METHOD 8270C

Parameter	Analytical Results Units: ug/kg (Dry Weight)	Quantitation Limit Units: ug/kg
bis(2-Chloroethyl)ether	ND	18
1,3-Dichlorobenzene	ND	180
1,4-Dichlorobenzene	ND	180
1,2-Dichlorobenzene	ND	180
bis(2-chloroisopropyl)ether	ND	180
N-Nitroso-di-n-propylamine	ND	18
Hexachloroethane	ND	18
Nitrobenzene	ND	18
Isophorone	ND	180
bis(2-Chloroethoxy)methane	ND	180
1,2,4-Trichlorobenzene	ND	18
Naphthalene	8.7J	180
4-Chloroaniline	ND	180
Hexachlorobutadiene	ND	37
2-Methylnaphthalene	15 J	180
Hexachlorocyclopentadiene	ND	180
2-Chloronaphthalene	ND	180
2-Nitroaniline	ND	370
Dimethylphthalate	ND	180
Acenaphthylene	52 J	180
2,6-Dinitrotoluene	ND	37
3-Nitroaniline	ND	370
Acenaphthene	ND	180
Dibenzofuran	8.9J	180
2,4-Dinitrotoluene	ND	37
Diethylphthalate	ND	180
4-Chlorophenyl-phenylether	ND	180
Fluorene	6.2J	180
4-Nitroaniline	ND	370
N-Nitrosodiphenylamine	ND	180
4-Bromophenyl-phenylether	ND	180
Hexachlorobenzene	ND	18
Phenanthrene	160 J	180
Anthracene	32 J	180

Client ID: **99027510**
Site: Extracts Outsourced

Lab Sample No: **151054**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/24/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0524.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 1.0
% Moisture: 10

SEMI-VOLATILE ORGANICS - GC/MS
METHOD 8270C

Parameter	Analytical Results Units: ug/kg (Dry Weight)		Quantitation Limit Units: ug/kg
Carbazole	34	J	180
Di-n-butylphthalate	44	J	180
Fluoranthene	390		180
Pyrene	340		180
Butylbenzylphthalate	ND		180
3,3'-Dichlorobenzidine	ND		370
Benzo(a)anthracene	190		18
Chrysene	250		180
bis(2-Ethylhexyl)phthalate	ND		180
Di-n-octylphthalate	ND		180
Benzo(b)fluoranthene	280		18
Benzo(k)fluoranthene	130		18
Benzo(a)pyrene	180		18
Indeno(1,2,3-cd)pyrene	130		18
Dibenz(a,h)anthracene	45		18
Benzo(g,h,i)perylene	120	J	180

Client ID: **99027510**
Site: Extracts Outsourced

Lab Sample No: **151054**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/24/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0524.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 1.0
% Moisture: 9.6

SEMI-VOLATILE ORGANICS - GC/MS
TENTATIVELY IDENTIFIED COMPOUNDS
METHOD 8270C

COMPOUND NAME	RT	EST. CONC. ug/kg	Q
1. Ethane, 1,1,2,2-tetrachloro-	11.22	310	B
2. Unknown	11.41	3500	BA
3. Unknown	11.64	2200	
4. Unknown	12.33	2500	
5. Unknown	12.65	280	
6. Unknown	13.28	4900	B
7. C17H10O Ketone	24.10	180	
8. C17H10O Ketone	24.46	220	
9. Unknown Alkane	27.29	240	
10. Unknown Alkane	29.61	550	
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
23.			
24.			
25.			
26.			
27.			
28.			
29.			
30.			

TOTAL ESTIMATED CONCENTRATION 14880

Client ID: 99027520
Site: Extracts Outsourced

TP3D

Lab Sample No: 151055
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/24/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0527.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 1.0
% Moisture: 14

SEMI-VOLATILE ORGANICS - GC/MS
METHOD 8270C

Parameter	Analytical Results Units: ug/kg (Dry Weight)	Quantitation Limit Units: ug/kg
bis(2-Chloroethyl)ether	ND	19
1,3-Dichlorobenzene	ND	190
1,4-Dichlorobenzene	ND	190
1,2-Dichlorobenzene	ND	190
bis(2-chloroisopropyl)ether	ND	190
N-Nitroso-di-n-propylamine	ND	19
Hexachloroethane	ND	19
Nitrobenzene	ND	19
Isophorone	ND	190
bis(2-Chloroethoxy)methane	ND	190
1,2,4-Trichlorobenzene	ND	19
Naphthalene	ND	190
4-Chloroaniline	ND	190
Hexachlorobutadiene	ND	38
2-Methylnaphthalene	ND	190
Hexachlorocyclopentadiene	ND	190
2-Chloronaphthalene	ND	190
2-Nitroaniline	ND	380
Dimethylphthalate	ND	190
Acenaphthylene	ND	190
2,6-Dinitrotoluene	ND	38
3-Nitroaniline	ND	380
Acenaphthene	ND	190
Dibenzofuran	ND	190
2,4-Dinitrotoluene	ND	38
Diethylphthalate	ND	190
4-Chlorophenyl-phenylether	ND	190
Fluorene	ND	190
4-Nitroaniline	ND	380
N-Nitrosodiphenylamine	ND	190
4-Bromophenyl-phenylether	ND	190
Hexachlorobenzene	ND	19
Phenanthrene	ND	190
Anthracene	ND	190

Client ID: **99027520**
Site: Extracts Outsourced

Lab Sample No: **151055**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/24/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0527.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 1.0
% Moisture: 14

SEMI-VOLATILE ORGANICS - GC/MS
METHOD 8270C

Parameter	Analytical Results Units: ug/kg (Dry Weight)	Quantitation Limit Units: ug/kg
Carbazole	ND	190
Di-n-butylphthalate	ND	190
Fluoranthene	ND	190
Pyrene	ND	190
Butylbenzylphthalate	ND	190
3,3'-Dichlorobenzidine	ND	380
Benzo(a)anthracene	ND	19
Chrysene	ND	190
bis(2-Ethylhexyl)phthalate	ND	190
Di-n-octylphthalate	ND	190
Benzo(b)fluoranthene	ND	19
Benzo(k)fluoranthene	ND	19
Benzo(a)pyrene	ND	19
Indeno(1,2,3-cd)pyrene	ND	19
Dibenz(a,h)anthracene	ND	19
Benzo(g,h,i)perylene	ND	190

Data File: /chem/BNAHS1.i/8270/08-18-99DEL/24aug99.b/r0527.d

Date : 24-AUG-1999 14:55

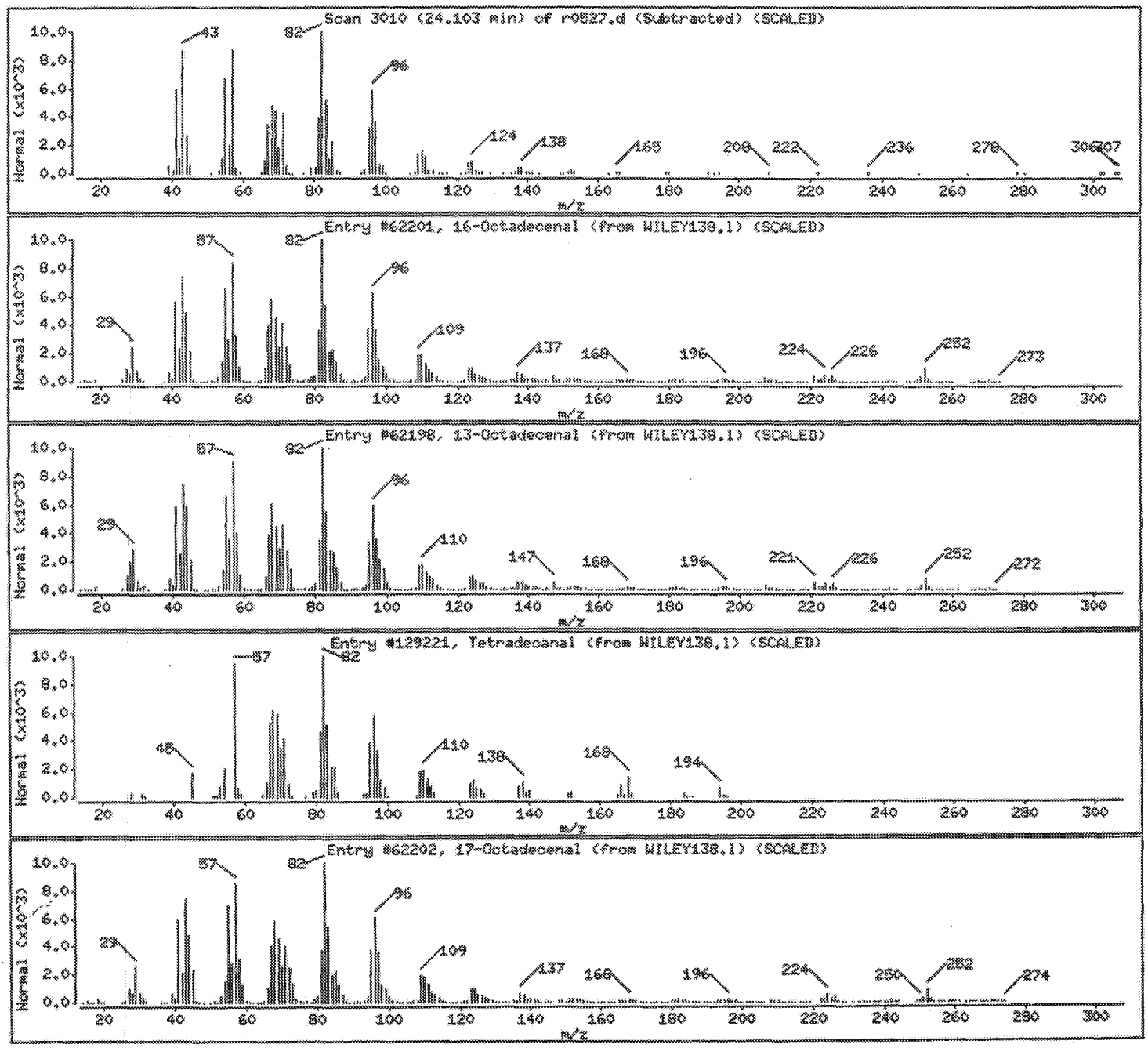
Client ID: 99027520 Instrument: BNAHS1.i

Sample Info: 151055;30;1;1;13.6

Operator: BNAHS1

Column phase: DB-5 Column diameter: 0.25

Library Search Compound Match	CAS Number	Library	Entry	Quality	Formula	Weight
Unknown						
16-Octadecenal	56554-87-1	WILEY138.1	62201	90	C18H340	266
13-Octadecenal	56554-90-6	WILEY138.1	62198	90	C18H340	266
Tetradecanal	124-25-4	WILEY138.1	129221	90	C14H280	212
17-Octadecenal	56554-86-0	WILEY138.1	62202	86	C18H340	266



Data File: /chem/BNAMS1.i/8270/08-18-99DEL/24aug99.b/r0527.d

Date : 24-AUG-1999 14:55

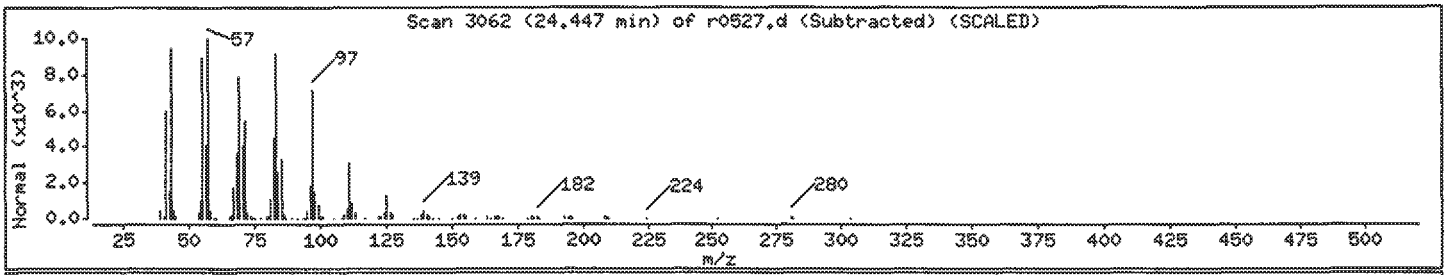
Client ID: 99027520 Instrument: BNAMS1.i

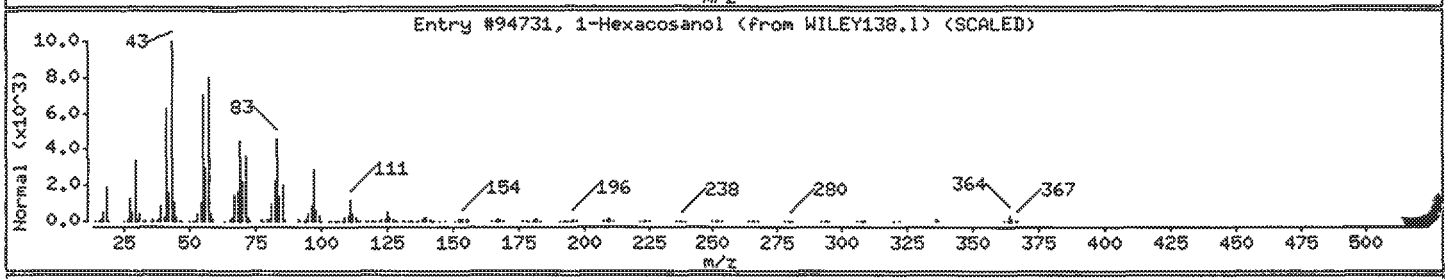
Sample Info: 151055;30;1;1;13.6

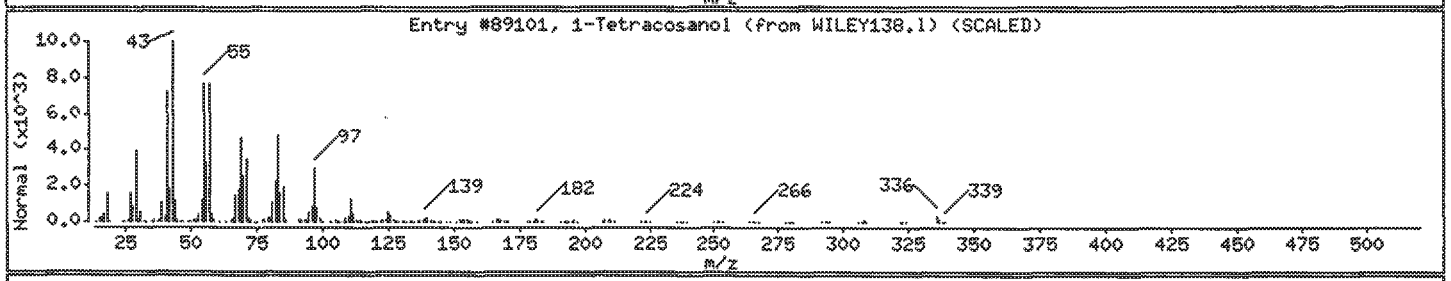
Operator: BNAMS1

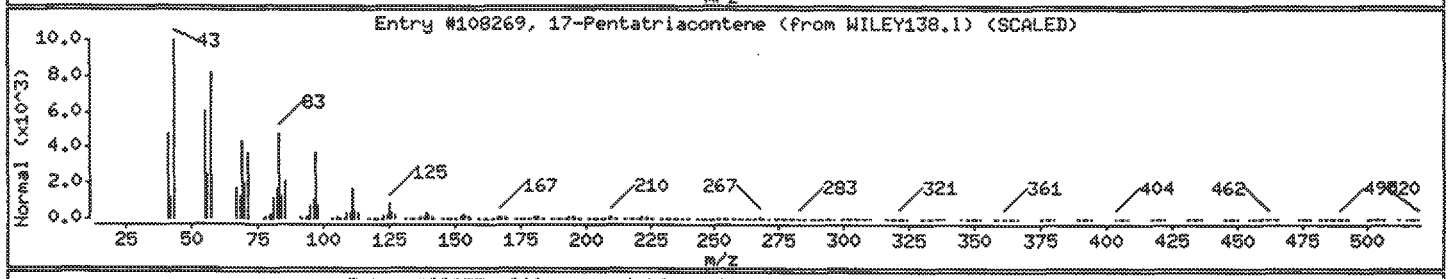
Column phase: DB-5 Column diameter: 0.25

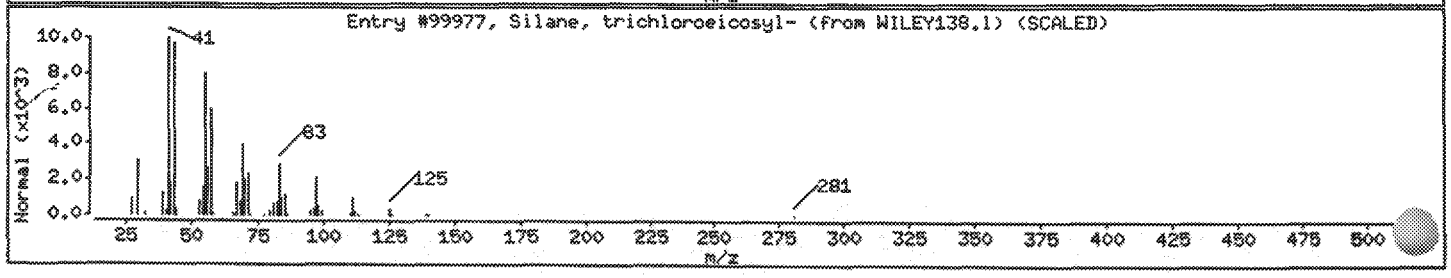
Library Search Compound Match	CAS Number	Library	Entry	Quality	Formula	Weight
Unknown						
1-Hexacosanol	506-52-5	WILEY138.1	94731	91	C26H54O	382
1-Tetracosanol	506-51-4	WILEY138.1	89101	91	C24H50O	354
17-Pentatriacontene	6971-40-0	WILEY138.1	108269	91	C35H70	491
Silane, trichloroeicosyl-	18733-57-8	WILEY138.1	99977	90	C20H41Cl3Si	414











Data File: /chem/BNAMS1.i/8270/08-18-99DEL/24aug99.b/r0527.d

Date : 24-AUG-1999 14:55

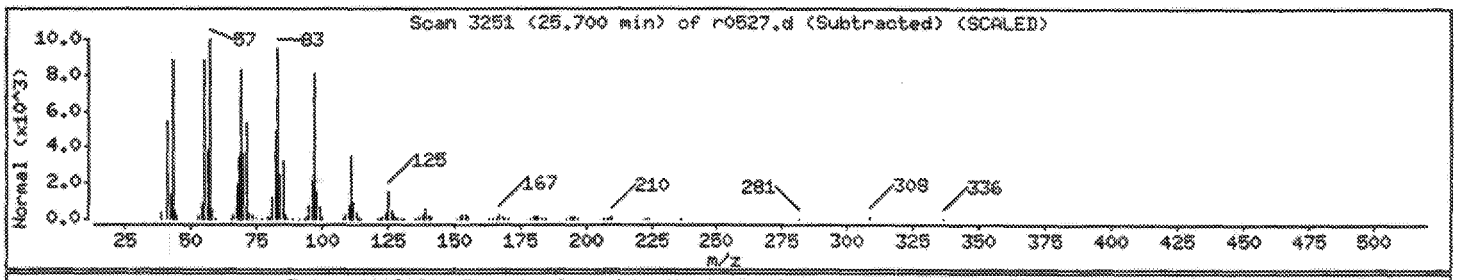
Client ID: 99027520 Instrument: BNAMS1.i

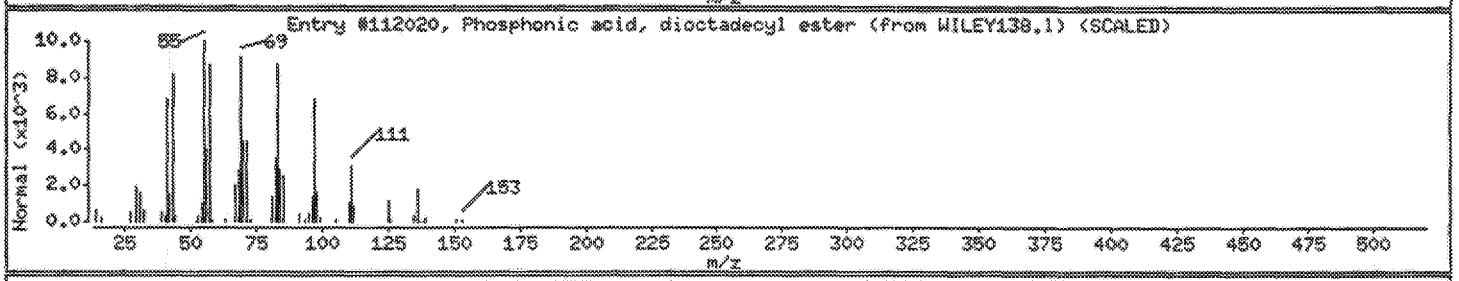
Sample Info: 151055;30;1;1;13.6

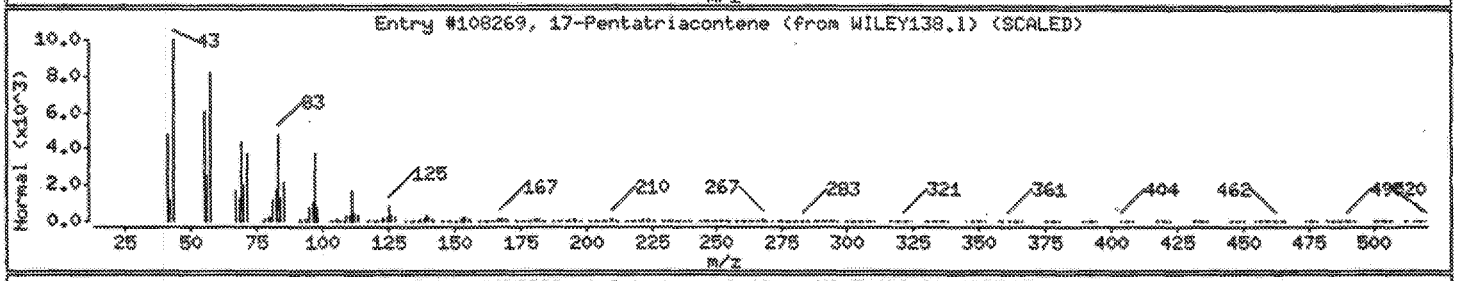
Operator: BNAMS1

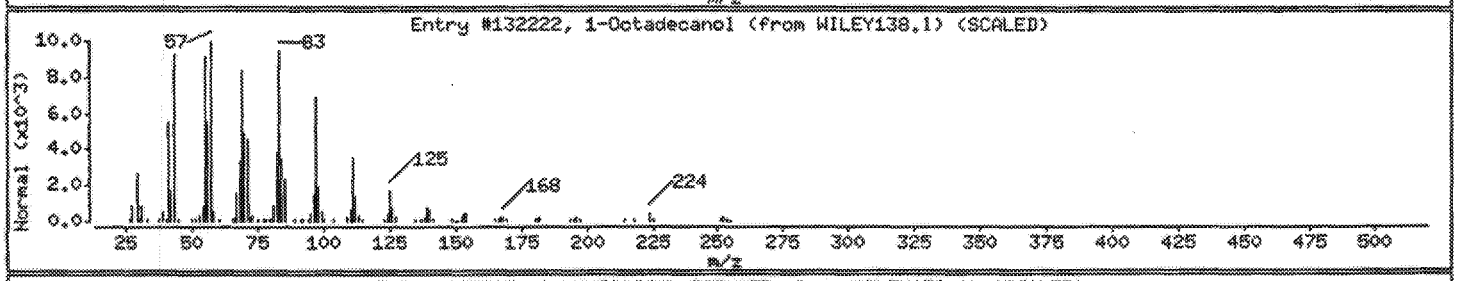
Column phase: DB-5 Column diameter: 0.25

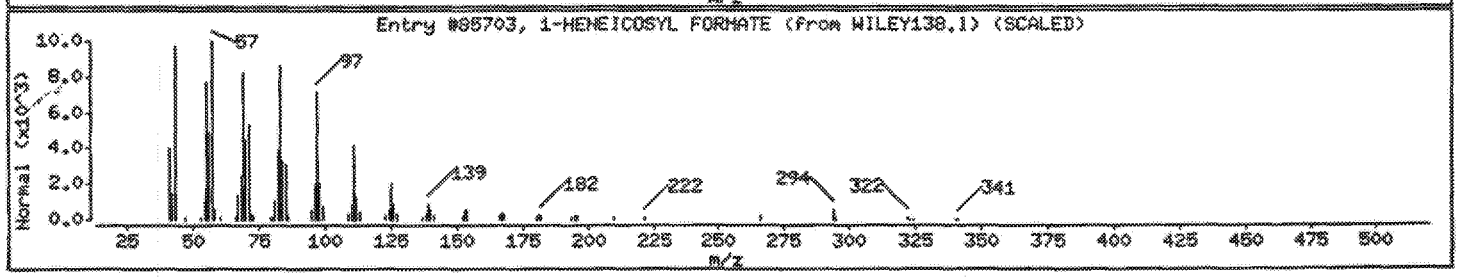
Library Search Compound Match	CAS Number	Library	Entry	Quality	Formula	Weight
Unknown						
Phosphonic acid, dioctadecyl ester	19047-85-9	WILEY138.1	112020	93	C36H75O3P	587
17-Pentatriacontene	6971-40-0	WILEY138.1	108269	83	C35H70	491
1-Octadecanol	112-92-5	WILEY138.1	132222	64	C18H38O	270
1-HENEICOSYL FORMATE	77899-03-7	WILEY138.1	85703	64	C22H44O2	340











Data File: /chem/BNAHS1.i/8270/08-18-99DEL/24aug99.b/r0527.d

Date : 24-AUG-1999 14:55

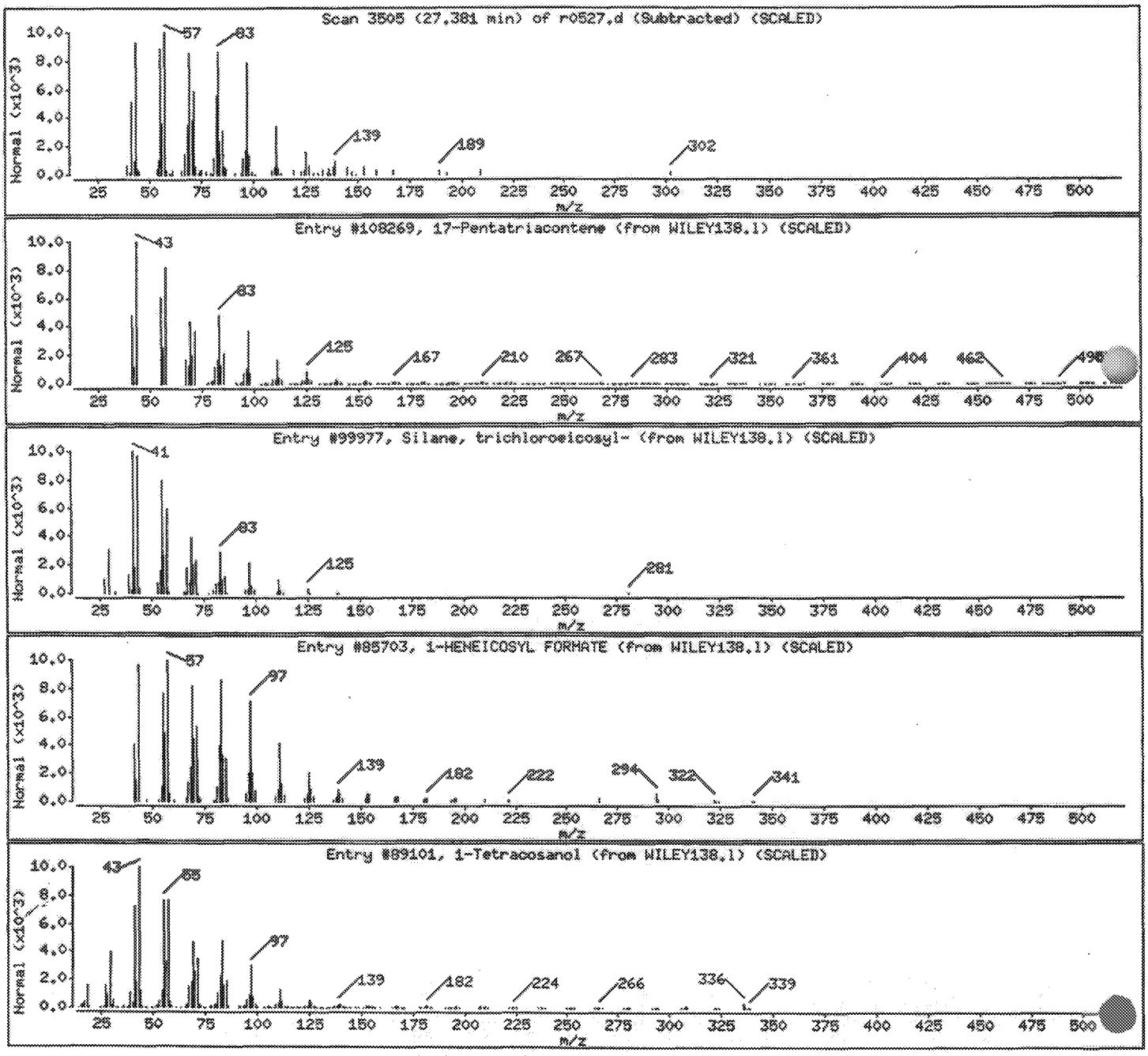
Client ID: 99027520 Instrument: BNAHS1.i

Sample Info: 151055;30;1;1;13.6

Operator: BNAHS1

Column phase: DB-5 Column diameter: 0.25

Library Search Compound Match	CAS Number	Library	Entry	Quality	Formula	Weight
Unknown						
17-Pentatriacontene	6971-40-0	WILEY138.1	108269	83	C35H70	491
Silane, trichloroeicosyl-	18733-67-8	WILEY138.1	99977	80	C20H41Cl3Si	414
1-HENEICOSYL FORMATE	77899-03-7	WILEY138.1	85703	74	C22H44O2	340
1-Tetracosanol	506-51-4	WILEY138.1	89101	72	C24H50O	354



Data File: /chem/BNAMS1.i/8270/08-18-99DEL/24aug99.b/r0527.d

Date : 24-AUG-1999 14:55

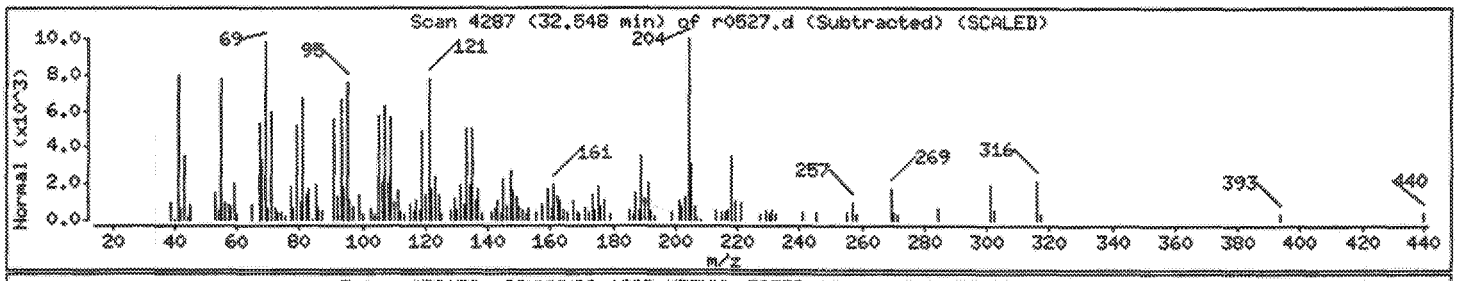
Client ID: 99027520 Instrument: BNAMS1.i

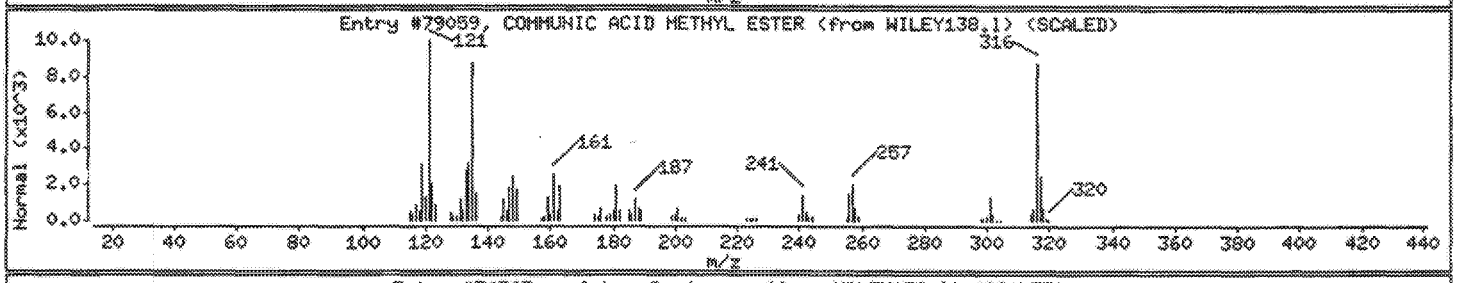
Sample Info: 151055;30;1;1;13.6

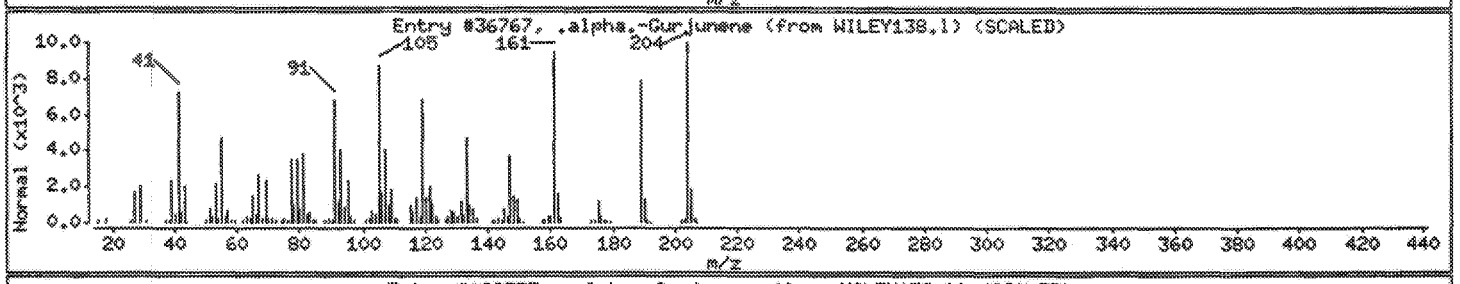
Operator: BNAMS1

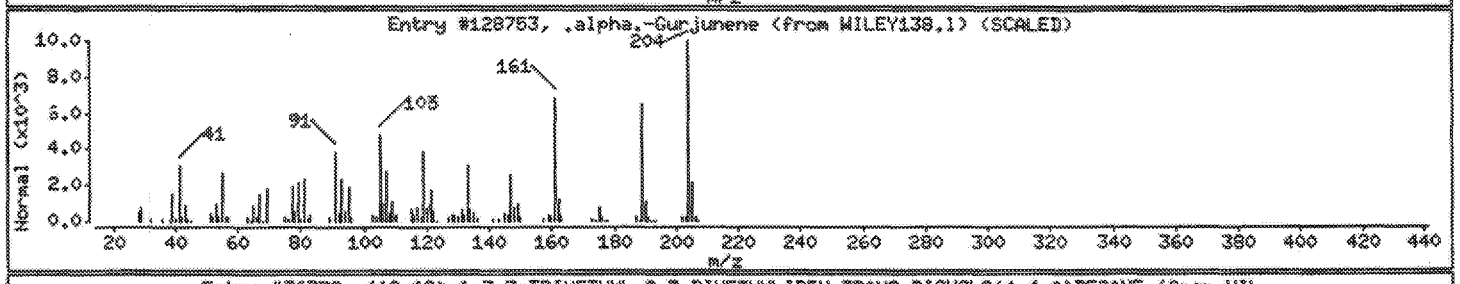
Column phase: DB-5 Column diameter: 0.25

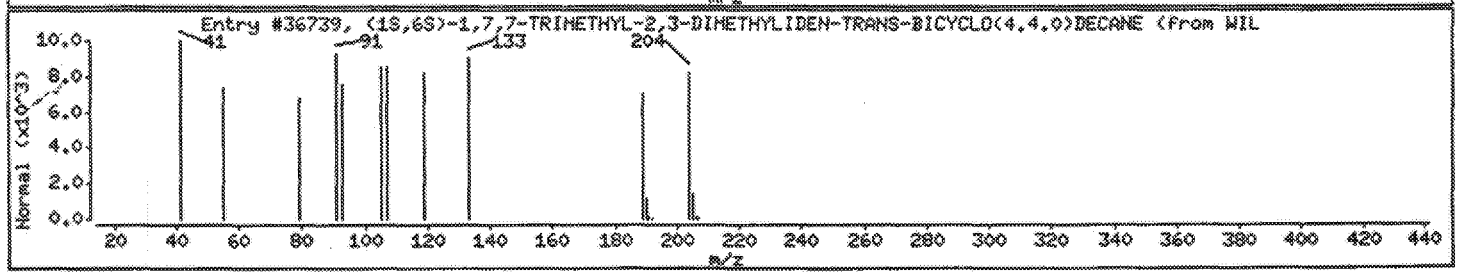
Library Search Compound Match	CAS Number	Library	Entry	Quality	Formula	Weight
Unknown						
COMMUNIC ACID METHYL ESTER	1235-39-8	WILEY138.1	79059	64	C21H32O2	316
.alpha.-Gurjunene	489-40-7	WILEY138.1	36767	42	C15H24	204
.alpha.-Gurjunene	489-40-7	WILEY138.1	128753	42	C15H24	204
(1S,6S)-1,7,7-TRIMETHYL-2,3-DIMETHYLIDEN	58795-27-0	WILEY138.1	36739	42	C15H24	204











Client ID: **99027530**
Site: Extracts Outsourced

Lab Sample No: **151056**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/26/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0563.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 5.0
% Moisture: 10

SEMI-VOLATILE ORGANICS - GC/MS
METHOD 8270C

Parameter	Analytical Results Units: ug/kg (Dry Weight)	Quantitation Limit Units: ug/kg
bis(2-Chloroethyl)ether	ND	92
1,3-Dichlorobenzene	ND	920
1,4-Dichlorobenzene	ND	920
1,2-Dichlorobenzene	ND	920
bis(2-chloroisopropyl)ether	ND	920
N-Nitroso-di-n-propylamine	ND	92
Hexachloroethane	ND	92
Nitrobenzene	ND	92
Isophorone	ND	920
bis(2-Chloroethoxy)methane	ND	920
1,2,4-Trichlorobenzene	ND	92
Naphthalene	560 J	920
4-Chloroaniline	ND	920
Hexachlorobutadiene	ND	180
2-Methylnaphthalene	250 J	920
Hexachlorocyclopentadiene	ND	920
2-Chloronaphthalene	ND	920
2-Nitroaniline	ND	1800
Dimethylphthalate	ND	920
Acenaphthylene	1700	920
2,6-Dinitrotoluene	ND	180
3-Nitroaniline	ND	1800
Acenaphthene	54 J	920
Dibenzofuran	1000	920
2,4-Dinitrotoluene	ND	180
Diethylphthalate	ND	920
4-Chlorophenyl-phenylether	ND	920
Fluorene	300 J	920
4-Nitroaniline	ND	1800
N-Nitrosodiphenylamine	ND	920
4-Bromophenyl-phenylether	ND	920
Hexachlorobenzene	ND	92
Phenanthrene	12000	920
Anthracene	570 J	920

Client ID: **99027530**
Site: Extracts Outsourced

Lab Sample No: **151056**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/26/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0563.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 5.0
% Moisture: 10

SEMI-VOLATILE ORGANICS - GC/MS
METHOD 8270C

Parameter	Analytical Results Units: ug/kg (Dry Weight)	Quantitation Limit Units: ug/kg
Carbazole	1300	920
Di-n-butylphthalate	ND	920
Fluoranthene	12000	920
Pyrene	9800	920
Butylbenzylphthalate	ND	920
3,3'-Dichlorobenzidine	ND	1800
Benzo(a)anthracene	2200	92
Chrysene	5800	920
bis(2-Ethylhexyl)phthalate	ND	920
Di-n-octylphthalate	ND	920
Benzo(b)fluoranthene	6800	92
Benzo(k)fluoranthene	2900	92
Benzo(a)pyrene	3300	92
Indeno(1,2,3-cd)pyrene	2200	92
Dibenz(a,h)anthracene	480	92
Benzo(g,h,i)perylene	1600	920

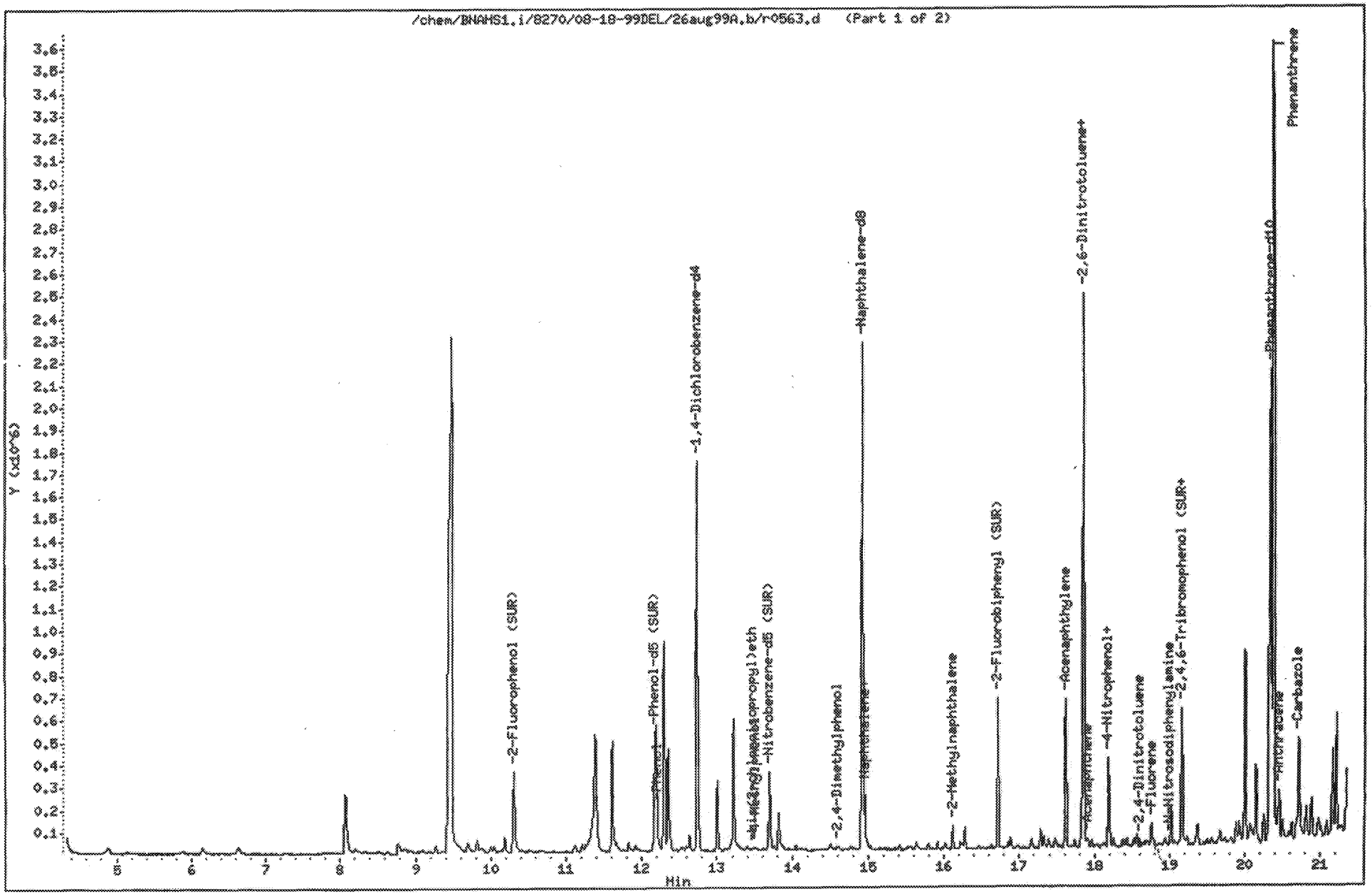
Data File: /chem/BNAHS1.i/8270/08-18-99DEL/26aug99A.b/r0563.d
Date : 26-AUG-1999 20:05
Client ID: 99027830
Sample Info: 1E1056;30;1;5;9.77;

Instrument: BNAHS1.i

Operator: BNAHS1

Column phase: DB-5

Column diameter: 0.25



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Data File: /chem/BNAMS1.i/8270/08-18-99DEL/26aug99A.b/r0563.d
Date -AUG-1999 20:05
Client ID: 99027530
Sample Info: 151056;30;1;5;9.77;

Column phase: DB-5

Instrument: BNAMS1.i

Operator: BNAMS1
Column diameter: 0.25

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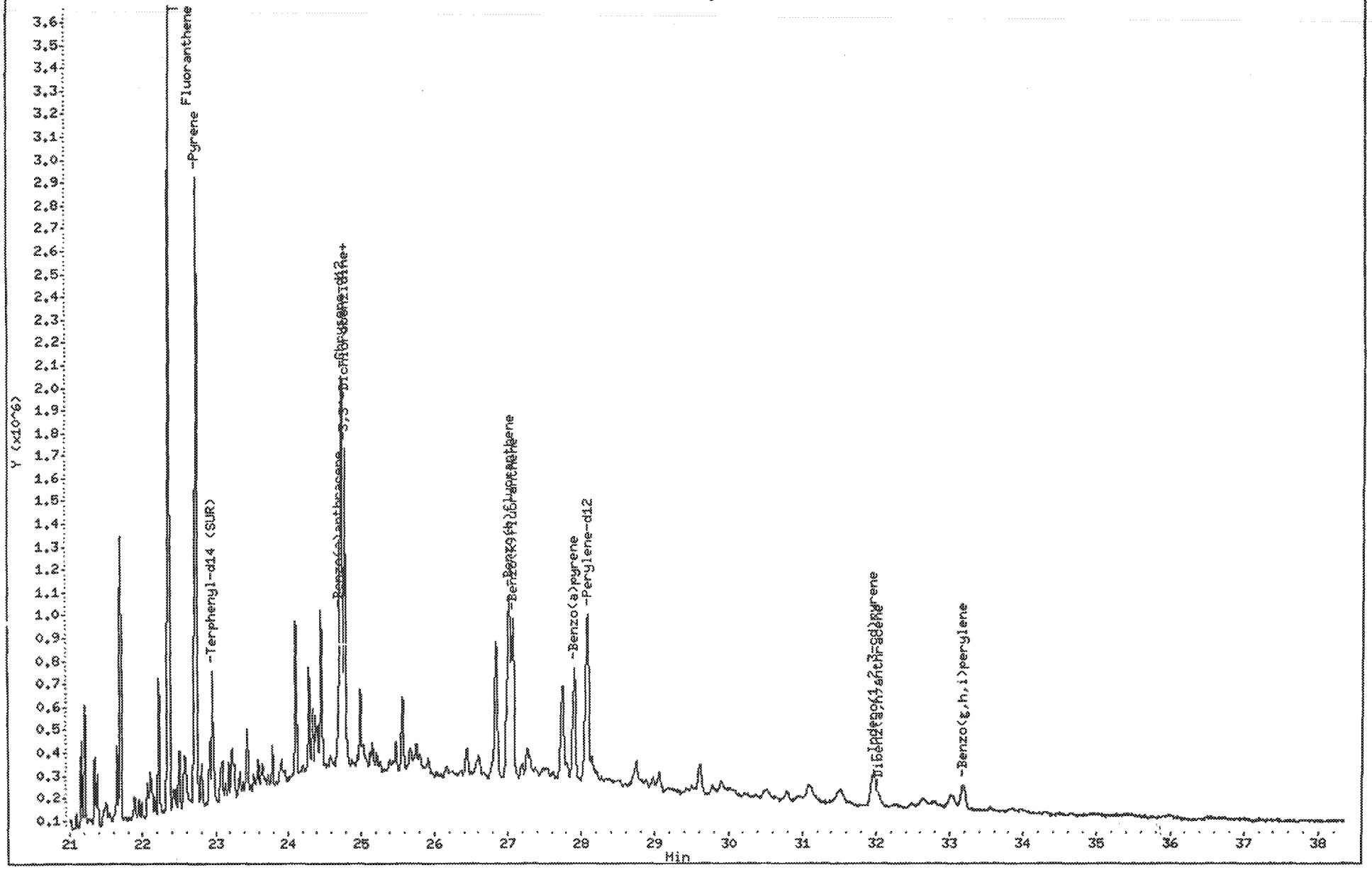
/chem/BNAMS1.i/8270/08-18-99DEL/26aug99A.b/r0563.d (Part 2 of 2)



Client ID: **99027530**
Site: Extracts Outsourced

Lab Sample No: **151056**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/26/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0563.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 5.0
% Moisture: 9.8

SEMI-VOLATILE ORGANICS - GC/MS
TENTATIVELY IDENTIFIED COMPOUNDS
METHOD 8270C

COMPOUND NAME	RT	EST. CONC. ug/kg	Q
1. Unknown	11.39	5200	ØΔ
2. Unknown	12.19	4600	
3. Unknown	12.30	3700	
4. Unknown	13.22	2900	
5. 9H-Fluoren-9-one	20.00	2400	
6. 9,10-Anthracenedione	21.70	3700	
7. C17H10O Ketone	24.11	1700	
8. C17H10O Ketone	24.46	1700	
9. Unknown	26.83	5200	
10. C20H12 PAH	27.75	3800	
11.			
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TOTAL ESTIMATED CONCENTRATION 34900

Client ID: **99027540**
Site: Extracts Outsourced

Lab Sample No: **151057**
Lab Job No: S527

TPMS

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/25/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0542.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 1.0
% Moisture: 18

SEMI-VOLATILE ORGANICS - GC/MS
METHOD 8270C

Parameter	Analytical Results Units: ug/kg (Dry Weight)	Quantitation Limit Units: ug/kg
bis(2-Chloroethyl)ether	ND	20
1,3-Dichlorobenzene	ND	200
1,4-Dichlorobenzene	ND	200
1,2-Dichlorobenzene	ND	200
bis(2-chloroisopropyl)ether	ND	200
N-Nitroso-di-n-propylamine	ND	20
Hexachloroethane	ND	20
Nitrobenzene	ND	20
Isophorone	ND	200
bis(2-Chloroethoxy)methane	ND	200
1,2,4-Trichlorobenzene	ND	20
Naphthalene	69 J	200
4-Chloroaniline	ND	200
Hexachlorobutadiene	ND	41
2-Methylnaphthalene	110 J	200
Hexachlorocyclopentadiene	ND	200
2-Chloronaphthalene	ND	200
2-Nitroaniline	ND	410
Dimethylphthalate	ND	200
Acenaphthylene	290	200
2,6-Dinitrotoluene	ND	41
3-Nitroaniline	ND	410
Acenaphthene	41 J	200
Dibenzofuran	62 J	200
2,4-Dinitrotoluene	ND	41
Diethylphthalate	ND	200
4-Chlorophenyl-phenylether	ND	200
Fluorene	61 J	200
4-Nitroaniline	ND	410
N-Nitrosodiphenylamine	ND	200
4-Bromophenyl-phenylether	ND	200
Hexachlorobenzene	ND	20
Phenanthrene	1100	200
Anthracene	260	200

Client ID: **99027540**
Site: Extracts Outsourced

Lab Sample No: **151057**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/25/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0542.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 1.0
% Moisture: 18

SEMI-VOLATILE ORGANICS - GC/MS
METHOD 8270C

Parameter	Analytical Results Units: ug/kg (Dry Weight)		Quantitation Limit Units: ug/kg
Carbazole	200	J	200
Di-n-butylphthalate	64	J	200
Fluoranthene	2100		200
Pyrene	2100		200
Butylbenzylphthalate	ND		200
3,3'-Dichlorobenzidine	ND		410
Benzo(a)anthracene	1400		20
Chrysene	1500		200
bis(2-Ethylhexyl)phthalate	ND		200
Di-n-octylphthalate	ND		200
Benzo(b)fluoranthene	1800		20
Benzo(k)fluoranthene	790		20
Benzo(a)pyrene	1200		20
Indeno(1,2,3-cd)pyrene	420		20
Dibenz(a,h)anthracene	140		20
Benzo(g,h,i)perylene	340		200

Client ID: **99027540**
Site: Extracts Outsourced

Lab Sample No: **151057**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/25/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0542.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 1.0
% Moisture: 17.9

SEMI-VOLATILE ORGANICS - GC/MS
TENTATIVELY IDENTIFIED COMPOUNDS
METHOD 8270C

COMPOUND NAME	RT	EST. CONC. ug/kg	Q
1. Unknown	11.39	3100	BA
2. Unknown	11.63	2200	
3. Unknown	12.20	2500	
4. Unknown	12.32	2400	
5. Unknown	13.25	3600	
6. Unknown	13.84	540	
7. C17H12 PAH	23.44	220	
8. C17H10O Ketone	24.12	270	
9. 7H-Benz[de]anthracen-7-one	24.47	290	
10. C20H12 PAH	27.78	1000	
11.			
12.			
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TOTAL ESTIMATED CONCENTRATION 16120

Motor Oil

Client ID: **99027560**
Site: Extracts Outsourced

Lab Sample No: **151058**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/25/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0543.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 5.0 ml
Dilution Factor: 10.0
% Moisture: 2

SEMI-VOLATILE ORGANICS - GC/MS
METHOD 8270C

Parameter	Analytical Results Units: ug/kg (Dry Weight)	Quantitation Limit Units: ug/kg
bis(2-Chloroethyl)ether	ND	850
1,3-Dichlorobenzene	ND	8500
1,4-Dichlorobenzene	ND	8500
1,2-Dichlorobenzene	ND	8500
bis(2-chloroisopropyl)ether	ND	8500
N-Nitroso-di-n-propylamine	ND	850
Hexachloroethane	ND	850
Nitrobenzene	ND	850
Isophorone	ND	8500
bis(2-Chloroethoxy)methane	ND	8500
1,2,4-Trichlorobenzene	ND	850
Naphthalene	ND	8500
4-Chloroaniline	ND	8500
Hexachlorobutadiene	ND	1700
2-Methylnaphthalene	ND	8500
Hexachlorocyclopentadiene	ND	8500
2-Chloronaphthalene	ND	8500
2-Nitroaniline	ND	17000
Dimethylphthalate	ND	8500
Acenaphthylene	ND	8500
2,6-Dinitrotoluene	ND	1700
3-Nitroaniline	ND	17000
Acenaphthene	ND	8500
Dibenzofuran	ND	8500
2,4-Dinitrotoluene	ND	1700
Diethylphthalate	ND	8500
4-Chlorophenyl-phenylether	ND	8500
Fluorene	ND	8500
4-Nitroaniline	ND	17000
N-Nitrosodiphenylamine	ND	8500
4-Bromophenyl-phenylether	ND	8500
Hexachlorobenzene	ND	850
Phenanthrene	ND	8500
Anthracene	ND	8500

Client ID: **99027560**
Site: Extracts Outsourced

Lab Sample No: **151058**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/25/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0543.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 5.0 ml
Dilution Factor: 10.0
% Moisture: 2

SEMI-VOLATILE ORGANICS - GC/MS
METHOD 8270C

Parameter	Analytical Results Units: ug/kg (Dry Weight)	Quantitation Limit Units: ug/kg
Carbazole	ND	8500
Di-n-butylphthalate	ND	8500
Fluoranthene	ND	8500
Pyrene	ND	8500
Butylbenzylphthalate	ND	8500
3,3'-Dichlorobenzidine	ND	17000
Benzo(a)anthracene	ND	850
Chrysene	ND	8500
bis(2-Ethylhexyl)phthalate	ND	8500
Di-n-octylphthalate	ND	8500
Benzo(b)fluoranthene	ND	850
Benzo(k)fluoranthene	ND	850
Benzo(a)pyrene	ND	850
Indeno(1,2,3-cd)pyrene	ND	850
Dibenz(a,h)anthracene	ND	850
Benzo(g,h,i)perylene	ND	8500

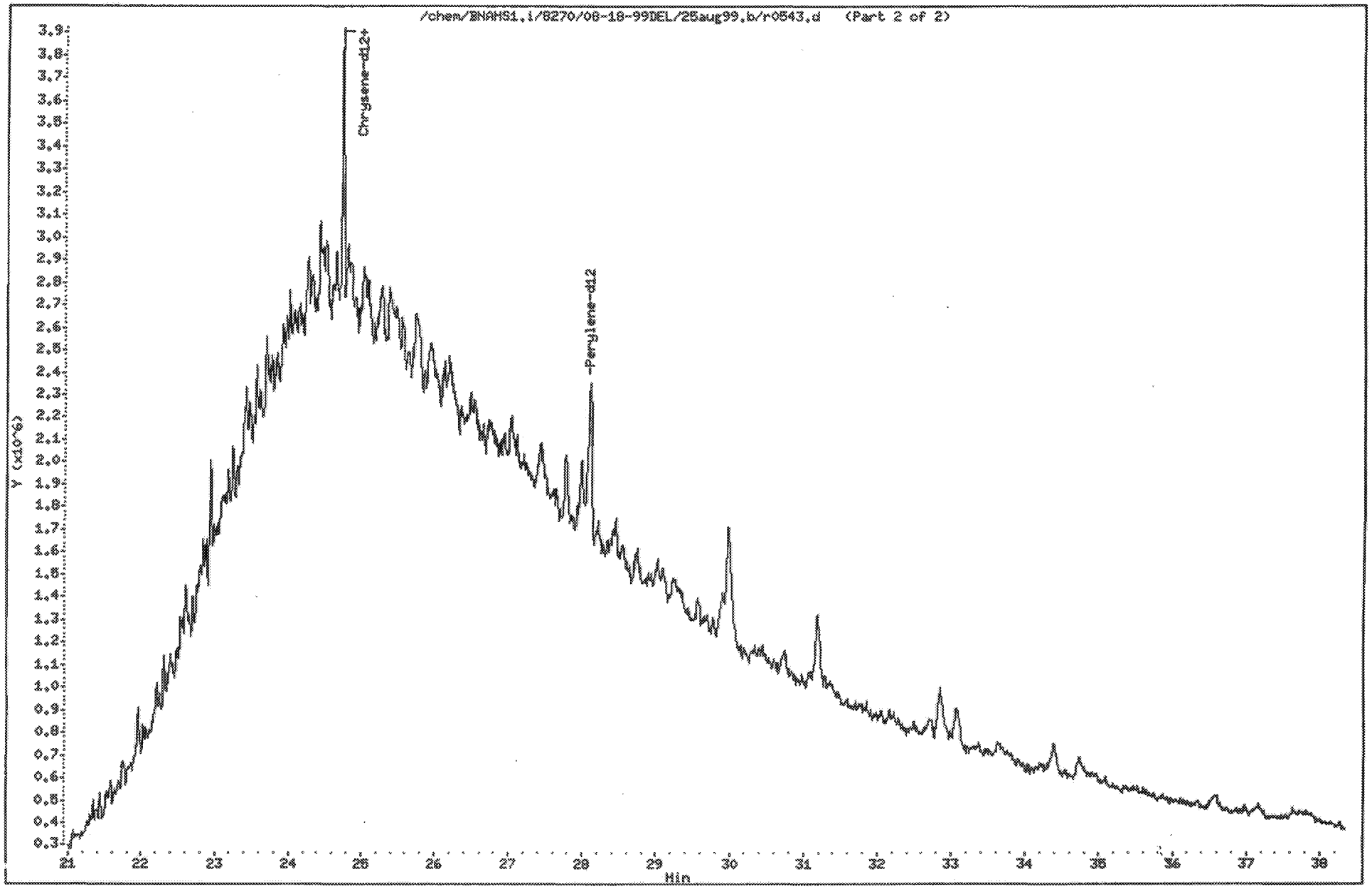
Data File: /chem/BNAHS1.i/8270/08-18-99DEL/25aug99.b/r0543.d
Date : 25-AUG-1999 13:46
Client ID: 99027860
Sample Info: 1B1058;30;5;10;2.36

Column phase: DB-5

Instrument: BNAHS1.i

Operator: BNAHS1
Column diameter: 0.25

316



Client ID: **99027560**
Site: Extracts Outsourced

Lab Sample No: **151058**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/25/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0543.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 5.0 ml
Dilution Factor: 10.0
% Moisture: 2.4

SEMI-VOLATILE ORGANICS - GC/MS
TENTATIVELY IDENTIFIED COMPOUNDS
METHOD 8270C

COMPOUND NAME	RT	EST. CONC. ug/kg	Q
1. Unknown Alkane	22.94	36000	
2. Unknown Alkane/Unknown	24.26	33000	
3. Unknown Alkane/Aliphatic	24.51	27000	
4. Unknown	25.27	28000	
5. Unknown	27.78	24000	
6. Unknown	27.99	24000	
7. Unknown	29.90	22000	
8. Unknown	29.98	70000	
9. Unknown	31.18	29000	
10. Unknown	32.85	31000	
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TOTAL ESTIMATED CONCENTRATION 324000

Client ID: **99027520**
Site: Extracts Outsourced

Lab Sample No: **151055**
Lab Job No: S527

Date Sampled: 07/20/99
Date Received: 08/17/99
Date Extracted: 07/28/99
Date Analyzed: 08/24/99
GC Column: DB-5
Instrument ID: BNAMS1.i
Lab File ID: r0527.d

Matrix: SOIL
Level: LOW
Sample Weight: 30.0 g
Extract Final Volume: 1.0 ml
Dilution Factor: 1.0
% Moisture: 13.6

SEMI-VOLATILE ORGANICS - GC/MS
TENTATIVELY IDENTIFIED COMPOUNDS
METHOD 8270C

COMPOUND NAME	RT	EST. CONC. ug/kg	Q
1. Unknown	11.40	1200	RA
2. Unknown	11.65	3600	
3. Unknown	12.32	1500	
4. Unknown	13.24	1600	
5. Unknown	24.10	550	
6. Unknown	24.45	1100	
7. Unknown	25.70	1800	
8. Unknown	27.38	250	
9. Unknown Alkane	29.60	250	
10. Unknown	32.55	710	
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TOTAL ESTIMATED CONCENTRATION 12560

DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
DIVISION OF AIR & WASTE MANAGEMENT
Site Investigation & Restoration Branch

MEMORANDUM

Date: **September 14, 1999**

Subject: **Peninsula Plating Organic Data Validation**

From: **Robert M. Schulte** RM 9/20/99

To: **Lawrence Jones**
Project Officer

Overview

The Sample Delivery Group consisted of one (1) soil. The samples were collected by the Site Investigation & Restoration Branch (SIRB) of the Department of Natural Resources and Environmental Control (DNREC). One trip blank (SW-1) and one rinse blank were collected. Environmental Services Section subcontracted the volatiles analysis to STL-Envirotech of Edison, N.J per the chain of custody's. The samples were analyzed in accordance with the Standard Operating Procedures for Chemical Analytical Programs (SOPCAP) under the Hazardous Substance Cleanup Act (HSCA).

Summary

All samples were successfully analyzed for all targeted compounds. All instrument and method sensitivities were in accordance with the SOPCAP of HSCA.

Areas of concern with respect to usability are listed below according to the seriousness of the issue.

Major Issues

No major issues to report.

Minor Issues

No minor issues to report.

Notes

The maximum concentration of all compounds found in the analyses of the rinsate and preparation blanks are listed below. Samples with concentrations of common laboratory contaminants less than ten times (<10x) the blank concentration or with concentrations of other contaminants less than five times (<5x) the blank concentration will be excluded from the data summary tables and not considered chemicals of concern. The following compounds were found: No chemicals of concern were detected in the blanks.

All volatile ending, initial and continuing calibrations were within validation quality control limits. No qualification is necessary.

All volatile system monitoring compounds were within validation quality control limits. No qualification is necessary.

All volatile response factors were within validation quality control limits. No qualification is necessary.

All volatile internal standards were within validation quality control limits. No qualification is necessary.

All volatile system performance checks were within validation quality control limits. No qualification is necessary.

All data was reviewed in accordance with National Functional Guidelines for Evaluating Organic Analyses with modification for use in EPA Region III.

All TICs were identified with a functionality group (e.g. unknown PAH). Unidentifiable TICs were accompanied with a "?" and the spectra and/or spectrum are included with the sample results behind the data summary tables. Some peaks are unidentifiable due to non-spectra matches or coelutions.

The preparation and analysis holding times for all samples were within validation quality control limits. No qualification is necessary.

All cleanup procedures were performed on the sample.

No field duplicate comparison could be achieved.

The matrix spike and matrix duplicate results were within validation quality control limits. All %D and %RPD were acceptable. No comparison of non spiked compounds could be achieved because all results were reported below the practical quantitation limits.

Attachments

Laboratory Form IS
Reviewed and Corrected Tentatively Identified Compounds
Support Documentation
Chain of Custody

RMS:slb
RMS99069.doc
DE-287 II A 3

Site Name: Peninsula Plating
Sampling Date(s): 7/20/99

DATA SUMMARY FORM: VOLATILES (2)

Soil
(Media) SAMPLES
(UNITS) ug/kg

Sample Number Dilution Factor Sample Location	TP35		SW-1		SW-2													
1,2-Dichloropropane																		
cis-1,3-Dichloropropene																		
Trichloroethene																		
Dibromochloromethane																		
1,1,2-Trichloroethane																		
Benzene																		
trans-1,3-Dichloropropene																		
Bromoform																		
4-Methyl-2-Pentanone																		
2-Hexanone																		
Tetrachloroethene																		
1,1,2,2-Tetrachloroethane																		
Toluene																		
Chlorobenzene																		
Ethylbenzene																		
Styrene																		
Xylene (total)																		

ED_005024_00000655-00207

Site Name Peninsula Plating
Sampling Date(s): 7/20/99

DATA SUMMARY FORM: VOLATILES (1)
Soil
(Media) SAMPLES
(UNITS) ug/Kg

Sample Number Dilution Factor Sample Location	TP35		SW-1		SW-2													
Chloromethane																		
Bromomethane																		
Vinyl Chloride																		
Chloroethane																		
Methylene Chloride																		
Acetone																		
Carbon Disulfide																		
1,1-Dichloroethene																		
1,1-Dichloroethane																		
1,2-Dichloroethene (total)																		
Chloroform																		
1,2-Dichloroethane																		
2-Butanone																		
1,1,1-Trichloroethane																		
Carbon Tetrachloride																		
Vinyl Acetate																		
Bromodichloromethane																		

Environmental Laboratory Section - Division of Water Resources
Department of Natural Resources and Environmental Control
89 Kings Highway, Dover, DE 19901 (302) 739-4771

FIELD CHAIN OF CUSTODY

Job R863

Client : DNREC-SIRB
Address : 391 Lukens Drive
New Castle DE 19720
Phone No.: (302) 395-2600

Report To : Robert Schulte
Invoice To : Robert Schulte
Account :
ELS Batch # :

PROJECT NAME
Peninsula Plating

SAMPLERS (Please Print)

(ELS Use Only) Lab Log No.	Client Sample Description	Sample Date	Sample Time	Matrix*	Comp	Grab	No. Of Containers	VOA								REMARKS
146487	PP TP-35	7/20	1128	SO				X								MS / MSD
	PP SW-1 TRIPBLANK	↓	LAB	SW				X								Not Rec'd AS 7/28
146488	PP SW-2	↓	1600	SW				X								
146489	~~Trip Blank after~~	7/22/99		water												
	* Chain AS 7/27															
	PPSW-1 ISTRIP BLANK per Ex. 4 CBI 7/20/99 KN															

Potential Hazard Identification: Non-Hazard [ ] Flammable [X] Toxic [X] Skin-irritant [X] Other [ ]
Sample Disposal: Return to Client [ ] Disposal by ELS [ ] Authorized by:

RELINQUISHED BY: *(signature)*	DATE	TIME	RECEIVED BY: *(signature)*
Ex. 4 CBI Ex. 4 CBI	7/27/99	1210	STL-ENVIROTECH STL RALPH H
~~STL-ENVIROTECH~~ Ex. 4 CBI	7/29/99	1640	STL
Ex. 4 CBI STL	7/27/99	1815	

Ex. 4 CBI

COMMENTS:

***Matrix Codes**

AI - air	WW - waste water
BI - biological	SW - surface water
SO - soil	PW - potable water
SE - sediment	GW - ground water
SL - sludge	DL - drum liquids
SD - solid	DS - drum solids
OI - oil	WS - waste solid
TI - Tissue	X - other (Please
WI - wipe	specify _____

ELS USE ONLY
Sample Condition:
1. Shipped or Hand-delivered or ELS Pickup
2. Chilled or Ambient T° C:
3. Received broken/leaking Yes No
4. Properly preserved Yes No
5. Holding times expired Yes No
6. Bottles supplied by ELS Yes No
7. Field Filtered Yes No

Custody Seal Was:
1. Present on outer package Yes No
2. Unbroken on outer package Yes No
3. Present on sample Yes No
4. Unbroken on samples Yes No
5. Discrepancies between sample labels and COC record? Yes No

Cor 11/99

STL Envirotech

Client ID: **PPTP-3S**
Site: Peninsula Plating

Lab Sample No: **146487**
Lab Job No: R863

Date Sampled: 07/20/99
Date Received: 07/27/99
Date Analyzed: 08/03/99
GC Column: DB624
Instrument ID: VOAMS9.i
Lab File ID: k0810.d

Matrix: SOIL
Level: HIGH
Sample Weight: 116.3 g
Methanol Ext. Volume: 100.0 ml
Ext. Dilution Factor: 50.0
% Moisture: 0

VOLATILE ORGANICS - GC/MS
METHOD 8260B

Parameter	Analytical Results Units: ug/kg (Dry Weight)	Quantitation Limit Units: ug/kg
Chloromethane	ND	86
Bromomethane	ND	86
Vinyl Chloride	ND	86
Chloroethane	ND	86
Methylene Chloride	ND	130
Acetone	ND	210
Carbon Disulfide	ND	210
1,1-Dichloroethene	ND	86
1,1-Dichloroethane	ND	210
trans-1,2-Dichloroethene	ND	210
cis-1,2-Dichloroethene	ND	210
Chloroform	ND	210
1,2-Dichloroethane	ND	86
2-Butanone	ND	210
1,1,1-Trichloroethane	ND	210
Carbon Tetrachloride	ND	86
Bromodichloromethane	ND	43
1,2-Dichloropropane	ND	43
cis-1,3-Dichloropropene	ND	210
Trichloroethene	ND	43
Dibromochloromethane	ND	210
1,1,2-Trichloroethane	ND	130
Benzene	ND	43
trans-1,3-Dichloropropene	ND	210
Bromoform	ND	170
4-Methyl-2-Pentanone	ND	210
2-Hexanone	ND	210
Tetrachloroethene	ND	43
1,1,2,2-Tetrachloroethane	ND	43
Toluene	ND	210
Chlorobenzene	ND	210
Ethylbenzene	ND	170
Styrene	ND	210
Xylene (Total)	ND	210

STL Envirotech

Client ID: **PPTP-3S**
Site: Peninsula Plating

Lab Sample No: **146487**
Lab Job No: R863

Date Sampled: 07/20/99
Date Received: 07/27/99
Date Analyzed: 08/03/99
GC Column: DB624
Instrument ID: VOAMS9.i
Lab File ID: k0810.d

Matrix: SOIL
Level: HIGH
Sample Weight: 116.3 g
Methanol Ext. Volume: 100.0 ml
Ext. Dilution Factor: 50.0
% Moisture: 0.0

VOLATILE ORGANICS - GC/MS
TENTATIVELY IDENTIFIED COMPOUNDS
METHOD 8260B

COMPOUND NAME	RT	EST. CONC. ug/kg	Q
1. NO VOLATILE ORGANIC COMPOUNDS FOUND			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
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29.			
30.			

TOTAL ESTIMATED CONCENTRATION 0.0

STL Envirotech

Client ID: **PPSW-2**
Site: Peninsula Plating

Lab Sample No: **146488**
Lab Job No: R863

Date Sampled: 07/20/99
Date Received: 07/27/99
Date Analyzed: 08/02/99
GC Column: DB624
Instrument ID: VOAMS4.i
Lab File ID: d4383.d

Matrix: WATER
Level: LOW
Purge Volume: 5.0 ml
Dilution Factor: 1.0

VOLATILE ORGANICS - GC/MS
METHOD 8260B

Parameter	Analytical Result Units: ug/l	Quantitation Limit Units: ug/l
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl Chloride	ND	2.0
Chloroethane	ND	2.0
Methylene Chloride	ND	3.0
Acetone	ND	5.0
Carbon Disulfide	ND	5.0
1,1-Dichloroethene	ND	2.0
1,1-Dichloroethane	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
1,2-Dichloroethane	ND	2.0
2-Butanone	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon Tetrachloride	ND	2.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	1.0
Dibromochloromethane	ND	5.0
1,1,2-Trichloroethane	ND	3.0
Benzene	ND	1.0
trans-1,3-Dichloropropene	ND	5.0
Bromoform	ND	4.0
4-Methyl-2-Pentanone	ND	5.0
2-Hexanone	ND	5.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Toluene	ND	5.0
Chlorobenzene	ND	5.0
Ethylbenzene	ND	4.0
Styrene	ND	5.0
Xylene (Total)	ND	5.0

Client ID: **PPSW-2**
Site: Peninsula Plating

Lab Sample No: **146488**
Lab Job No: R863

Date Sampled: 07/20/99
Date Received: 07/27/99
Date Analyzed: 08/02/99
GC Column: DB624
Instrument ID: VOAMS4.i
Lab File ID: d4383.d

Matrix: WATER
Level: LOW
Purge Volume: 5.0 ml
Dilution Factor: 1.0

VOLATILE ORGANICS - GC/MS
TENTATIVELY IDENTIFIED COMPOUNDS
METHOD 8260B

COMPOUND NAME	RT	EST. CONC. ug/l	Q
1. NO VOLATILE ORGANIC COMPOUNDS FOUND			
2.			
3.			
4.			
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30.			

TOTAL ESTIMATED CONCENTRATION 0.0

Client ID: **PPSW-1Trip_Blank**
Site: Peninsula Plating

Lab Sample No: **146489**
Lab Job No: R863

Date Sampled: 07/20/99
Date Received: 07/27/99
Date Analyzed: 08/02/99
GC Column: DB624
Instrument ID: VOAMS4.i
Lab File ID: d4384.d

Matrix: WATER
Level: LOW
Purge Volume: 5.0 ml
Dilution Factor: 1.0

VOLATILE ORGANICS - GC/MS
METHOD 8260B

Parameter	Analytical Result Units: ug/l	Quantitation Limit Units: ug/l
Chloromethane	ND	2.0
Bromomethane	ND	2.0
Vinyl Chloride	ND	2.0
Chloroethane	ND	2.0
Methylene Chloride	ND	3.0
Acetone	ND	5.0
Carbon Disulfide	ND	5.0
1,1-Dichloroethene	ND	2.0
1,1-Dichloroethane	ND	5.0
trans-1,2-Dichloroethene	ND	5.0
cis-1,2-Dichloroethene	ND	5.0
Chloroform	ND	5.0
1,2-Dichloroethane	ND	2.0
2-Butanone	ND	5.0
1,1,1-Trichloroethane	ND	5.0
Carbon Tetrachloride	ND	2.0
Bromodichloromethane	ND	1.0
1,2-Dichloropropane	ND	1.0
cis-1,3-Dichloropropene	ND	5.0
Trichloroethene	ND	1.0
Dibromochloromethane	ND	5.0
1,1,2-Trichloroethane	ND	3.0
Benzene	ND	1.0
trans-1,3-Dichloropropene	ND	5.0
Bromoform	ND	4.0
4-Methyl-2-Pentanone	ND	5.0
2-Hexanone	ND	5.0
Tetrachloroethene	ND	1.0
1,1,2,2-Tetrachloroethane	ND	1.0
Toluene	ND	5.0
Chlorobenzene	ND	5.0
Ethylbenzene	ND	4.0
Styrene	ND	5.0
Xylene (Total)	ND	5.0

STL Envirotech

Client ID: **PPSW-1Trip_Blank**
Site: Peninsula Plating

Lab Sample No: **146489**
Lab Job No: R863

Date Sampled: 07/20/99
Date Received: 07/27/99
Date Analyzed: 08/02/99
GC Column: DB624
Instrument ID: VOAMS4.i
Lab File ID: d4384.d

Matrix: WATER
Level: LOW
Purge Volume: 5.0 ml
Dilution Factor: 1.0

VOLATILE ORGANICS - GC/MS
TENTATIVELY IDENTIFIED COMPOUNDS
METHOD 8260B

COMPOUND NAME	RT	EST. CONC. ug/l	Q
1. NO VOLATILE ORGANIC COMPOUNDS FOUND			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
23.			
24.			
25.			
26.			
27.			
28.			
29.			
30.			

TOTAL ESTIMATED CONCENTRATION 0.0

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APPENDIX G.

LABORATORY DATA SUMMARY TABLES

Site Name: Peninsula Plating
Sampling Date(s): 8/4/1999

DATA SUMMARY FORM: INORGANICS
LABORATORY VALIDATED DATA
GROUNDWATER SAMPLES
ug/L

Sample Number Sample Location Analyte	PPMW-1 Total Metals	PPMW-1 Dissolved Metals	PPMW-2 Total Metals	PPMW-2 Dissolved Metals	PPMW-3 Total Metals	EPA RBC* Tap Water ug/L 4/12/1999	EPA MCL** Drinking Water ug/L 2/1/1994	URS ~ Groundwater ug/L 2/1/1998
Aluminum			4,600			36,500 n	****	200
Antimony						14.6 n	6	6
Arsenic						0.045 n/c	50	50 /1n, 1c
Barium						2,555 n	***P 2,000	2,000
Beryllium						73 c	4	4 /0.02
Cadmium						18 n	5	5
Calcium	38,700	39,800	9,600	9,800	7,820	NL	NL	NL
Chromium						54,750/109.5 III/VI	***100	100/18 III/IV
Cobalt						2,190 n	NL	220
Copper						1,460 n	***P 1,300	1,000
Iron			1,640	138	6,410	10,950 n	NL	300
Lead						NL	15	15
Magnesium	5,160	5,440				NL	NL	NL
Manganese					79.2	730 n	50	50
Mercury						^11 n	2	2
Nickel						730 n	100	100
Potassium						NL	NL	NL
Selenium						182.5 n	***50	50
Silver						182.5 n	NL	100
Sodium	12,300	11,900			9,320	NL	NL	NL
Thallium						2.55 n	2	2
Vanadium						255.5 n	NL	26
Zinc			30.5			10,950 n	NL	2,000
Cyanide						730 n	200	200

^ = EPA Region III Risk-Based Concentration Tables. R.I. Smith, 10/22/97
* = EPA Region III Risk-Based Concentration Tables. E. W. Johnson, 4/12/99
~ = HSCA Uniform Risk Based Remediation Standards for groundwater, 2/1/98

** = National Primary Drinking Water Standards, EPA, 2/1/94.
*** = Water Quality Criteria Summary For Drinking Water, U.S. EPA, 1991
**** = Criterion pH Dependent

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Site Name: Peninsula Plating
Sampling Date(s): 8/4/1999

DATA SUMMARY FORM: INORGANICS
LABORATORY VALIDATED DATA
GROUNDWATER SAMPLES
ug/L

Sample Number Sample Location Analyte	PPMW-3 Dissolved Metals	PPMW-4 Total Metals	PPMW-5 Total Metals	PPMW-5 Dissolved Metals	PPMW-7 Total Metals	EPA RBC* Tap Water ug/L 4/12/1999	EPA MCL** Drinking Water ug/L 2/1/1994	URS ~ Groundwater ug/L 2/1/1998
Aluminum						36,500 n	****	200
Antimony						14.6 n	6	6
Arsenic						0.045 n/c	50	50 /1n, 1c
Barium						2,555 n	***P 2,000	2,000
Beryllium						73 c	4	4 /0.02
Cadmium						18 n	5	5
Calcium	7,940	7,320	7,780	7,780		NL	NL	NL
Chromium						54,750/109.5 III/VI	***100	100/18 III/IV
Cobalt						2,190 n	NL	220
Copper						1,460 n	***P 1,300	1,000
Iron	6,150	113	6,330	6,140		10,950 n	NL	300
Lead						NL	15	15
Magnesium						NL	NL	NL
Manganese	79.8	35.6	78.7	78.9		730 n	50	50
Mercury						^11 n	2	2
Nickel						730 n	100	100
Potassium						NL	NL	NL
Selenium						182.5 n	***50	50
Silver						182.5 n	NL	100
Sodium	8,590	5,600	8,860	8,590		NL	NL	NL
Thallium						2.55 n	2	2
Vanadium						255.5 n	NL	26
Zinc		61.9				10,950 n	NL	2,000
Cyanide						730 n	200	200

^ = EPA Region III Risk-Based Concentration Tables. R.I. Smith, 10/22/97
* = EPA Region III Risk-Based Concentration Tables. E. W. Johnson, 4/12/99
~ = HSCA Uniform Risk Based Remediation Standards for groundwater, 2/1/98

** = National Primary Drinking Water Standards, EPA, 2/1/94.
*** = Water Quality Criteria Summary For Drinking Water, U.S. EPA, 1991
**** = Criterion pH Dependent

ljj99078.xls

Site Name: Peninsula Plating
Sampling Date(s): 7/20/99

DATA SUMMARY FORM: INORGANICS
LABORATORY VALIDATED DATA
SOIL SAMPLES
mg/Kg

Sample Number / Analyte	PPSS-1		PPTP-3S		PPTP-9S		RBC* INDUSTRIAL mg/Kg 4/12/1999		RBC* RESIDENTIAL mg/Kg 4/12/1999		HSCA** (Shallow Soils) mg/Kg 2/1/1998	
Aluminum	7,380		1,610		2,610		2,044,000	N	78,214	N	20,000	
Antimony		UJ		UJ		UJ	818	N	31	N	3	
Arsenic	2.4				3.1		^610/3.8	N/C	^23/0.43	N/C	2/0.4	N/C
Barium	48.3	J	120	J	139	J	143,080	N	5,475	N	550	
Beryllium							4,100	N	160	N	0.5	
Cadmium					2.2		2,044	N	78	N	4	
Calcium	6,780		1,140		2,900		NL		NL		NL	
Chromium	9.4		2.4		5.5		3,066,000/6,132	III/VI	117,321/235	III/VI	1,000/35	III/VI
Cobalt							122,640	N	4,693	N	22	
Copper	19.4	J	7.9	J	17.0	J	81,760	N	3,129	N	1,000	
Iron	7,080		2,920		6,820		613,200	N	23,464	N	23,000	
Lead	72.5		39.0		187		**1,000		**400		400	
Magnesium	1,290	J		UJ		UJ	NL		NL		NL	
Manganese	68.1		86.2		178		40,880	N	1,564	N	180	
Mercury					0.81		^610	N	^23	N	10	
Nickel							40,880	N	1,564	N	160	
Potassium							NL		NL		NL	
Selenium	1.2						10,220	N	391	N	26	
Silver							10,220	N	391	N	39	
Sodium							NL		NL		NL	
Thallium							143	N	5.5	N	14	
Vanadium	14.3						14,308	N	548	N	55	
Zinc	562	J	243	J	800	J	613,200	N	23,464	N	1,000	
Cyanide					0.70		40,880	N	1,564	N	160	

^ = EPA Region III Risk-Based Concentration Tables. E. W. Johnson, 10/22/97
* = EPA Region III Risk-Based Concentration Tables. J. Hubbard, 10/1/98
** = HSCA Uniform Risk Based Remediation Standards for critical water resource area/unrestricted land use, 2/1/98
J = analyte Present. Reported value may not be accurate or precise.

NL = Not Listed
C = Carcinogenic
N = Non Carcinogenic
ND = Not Detected

Site Name: Peninsula Plating
Sampling Date(s): 7/20/1999

DATA SUMMARY FORM: INORGANICS
LABORATORY VALIDATED DATA
SURFACE WATER SAMPLES
ug/L

Sample Number Sample Location Analyte	PPSW-2 Rinse Blank		Fresh* Acute Criterion ug/L	Fresh* Chronic Criterion ug/L	URS*** ug/L
Aluminum					
Antimony		UJ	NL	NL	104
Arsenic					
Barium		UJ	NL	NL	4
Beryllium					
Cadmium					
Calcium					
Chromium					
Cobalt					
Copper		UJ	18	12	18
Iron					
Lead	8.1		83	3.2	82
Magnesium		UJ	NL	NL	NL
Manganese					
Mercury					
Nickel					
Potassium					
Selenium					
Silver					
Sodium					
Thallium					
Vanadium					
Zinc		UJ	120	110	117
Cyanide					

* = Water Quality Criteria Summary, U.S. EPA, 1991
** = State of Delaware Surface Water Quality Standards, 1993
*** = HSCA Uniform Risk-Based Remediation Standards for Protection of the Environment, Surface Water, 2/1/98
NL = Not listed

Site Name: Peninsula Plating
Sample Date(s): 8/4/1999

DATA SUMMARY FORM: SEMIVOLATILE
LABORATORY VALIDATED DATA
GROUNDWATER SAMPLES
ug/kg

Sample Number Sample Location	PPMW-1		PPMW-2		EPA RBC* Tap Water ug/Kg 4/12/1999		EPA MCL** Drinking Water ug/Kg 2/1/1994		URS ~ Groundwater ug/Kg 2/1/1998
bis(2-Ethylhexyl)phthalate (DEHP)	1		1		4.8	C	NL		5

* = EPA Region III Risk-Based Concentration Tables. J. Hubbard, 4/12/99
** = National Primary Drinking Water Standards, EPA, 2/1/94.
~ = HSCA Uniform Risk Based Remediation Standards for critical water resource area/unrestricted land use, 2/1/98
J = Analyte Present. Reported value may not be accurate or precise

NL = Not Listed
C = Carcinogenic
N = Non Carcinogenic

Site Name: [illegible]da Plating
Sampling Date(s): 7/20/99

DATA SUMMARY FO[illegible]I: SEMIVOLATILE
LABORATORY VALIDATED DATA
SOIL SAMPLES
ug/kg

Sample Number Sample Location	SS-6		TP-2S		TP-3S		TP-3D		TP-9S		TP-11S		RBC * Industrial Soil ug/Kg 4/12/1999		RBC * Residential Soil ug/Kg 4/12/1999		HSCA URS** ug/Kg 2/1/1998
Naphthalene			74	J	8.7	J			560	J	69	J	40,880,000	N	1,564,286	N	5,000
2-Methylnaphthalene			140	J	15	J			250	J	110	J	40,880,000	N	1,564,286	N	NL
Acenaphthylene			260		57	J			1,700		290		NL		NL		NL
Acenaphthene			30	J					54	J	41	J	122,640,000	N	4,692,857	N	270,000
Dibenzofuran			58	J	8.9	J			1,000		62	J	8,176,000	N	312,857	N	2,000
Fluorene			49	J	16.2	J			300	J	61	J	81,760,000	N	3,128,571	N	300,000
Phenanthrene			830		160	J			12,000		1,100		NL		NL		1,000,000
Anthracene			220		32	J			570	J	260		613,200,000	N	23,464,286	N	1,000,000
Carbazole			160	J	34	J			1,300		200		286,160	C	31,936	C	300
Fluoranthene			1,800		390				12,000		2,100		81,760,000	N	3,128,571	N	310,000
Pyrene			1,800		340				9,800		2,100		61,320,000	N	2,346,429	N	230,000
Benzo(a)anthracene			1,200		190				2,200		1,400		7,840	C	875	C	900
Chrysene			1,400		250				5,800		1,500		784,000	C	87,497	C	88,000
Benzo(b)fluoranthene			1,400		280				6,800		1,800		7,840	C	875	C	900
Benzo(k)fluoranthene			600		130				2,900		790		78,400	C	8,750	C	9,000
Benzo(a)pyrene			1,100		180				3,300		1,200		784	C	87	C	90
Indeno(1,2,3-cd)Pyrene			610		130				2,200		420		7,840	C	875	C	900
Dibenz(a,h)anthracene			180		45				480		140		784	C	87	C	90
Benzo(g,h,i)perylene			500		120	J			1,600		340		NL		NL		NL

* = EPA Region III Risk-Based Concentration Tables. J. Hubbard, 4/12/99
^ = EPA Region III Risk-Based Concentration Tables. J. Hubbard, 10/01/98
** = HSCA Uniform Risk Based Remediation Standards for critical water resource area/unrestricted land use, 2/1/98
J = analyte Present. Reported value may not be accurate or precise.

NL = Not Listed
C = Carcinogenic
N = Non Carcinogenic

Site Name: Insula Plating
Sampling Date(s): 7/20/99

DATA SUMMARY FORM: SEMIVOLATILE
LABORATORY VALIDATED DATA
SOIL SAMPLES
ug/kg

Sample Number Sample Location	TP-2S		TP-3S		TP-9S		TP-11S		RBC * Industrial Soil ug/Kg 4/12/1999		RBC * Residential Soil ug/Kg 4/12/1999		HSCA URS** ug/Kg 2/1/1998
Naphthalene	74	J	8.7	J	560	J	69	J	40,880,000	N	1,564,286	N	5,000
2-Methylnaphthalene	140	J	15	J	250	J	110	J	40,880,000	N	1,564,286	N	NL
Acenaphthylene	260		57	J	1,700		290		NL		NL		NL
Acenaphthene	30	J			54	J	41	J	122,640,000	N	4,692,857	N	270,000
Dibenzofuran	58	J	8.9	J	1,000		62	J	8,176,000	N	312,857	N	2,000
Fluorene	49	J	16.2	J	300	J	61	J	81,760,000	N	3,128,571	N	300,000
Phenanthrene	830		160	J	12,000		1,100		NL		NL		1,000,000
Anthracene	220		32	J	570	J	260		613,200,000	N	23,464,286	N	1,000,000
Carbazole	160	J	34	J	1,300		200		286,160	C	31,936	C	300
Fluoranthene	1,800		390		12,000		2,100		81,760,000	N	3,128,571	N	310,000
Pyrene	1,800		340		9,800		2,100		61,320,000	N	2,346,429	N	230,000
Benzo(a)anthracene	1,200		190		2,200		1,400		7,840	C	875	C	900
Chrysene	1,400		250		5,800		1,500		784,000	C	87,497	C	88,000
Benzo(b)fluoranthene	1,400		280		6,800		1,800		7,840	C	875	C	900
Benzo(k)fluoranthene	600		130		2,900		790		78,400	C	8,750	C	9,000
Benzo(a)pyrene	1,100		180		3,300		1,200		784	C	87	C	90
Indeno(1,2,3-cd)Pyrene	610		130		2,200		420		7,840	C	875	C	900
Dibenz(a,h)anthracene	180		45		480		140		784	C	87	C	90
Benzo(g,h,i)perylene	500		120	J	1,600		340		NL		NL		NL

* = EPA Region III Risk-Based Concentration Tables. J. Hubbard, 4/12/99
^ = EPA Region III Risk-Based Concentration Tables. J. Hubbard, 10/01/98
** = HSCA Uniform Risk Based Remediation Standards for critical water resource area/unrestricted land use, 2/1/98
J = analyte Present. Reported value may not be accurate or precise.

NL = Not Listed
C = Carcinogenic
N = Non Carcinogenic

Site Name: Peninsula Plating
Sample Date(s): 7/20/99

DATA SUMMARY FORM: PESTICIDE/PCB
LABORATORY VALIDATED DATA
SOIL SAMPLES
ug/kg

Sample Number Sample Location	TP-3s		RBC * Industrial Soil ug/Kg 4/12/1999		RBC * Residential Soil ug/Kg 4/12/1999		HSCA** URS ug/Kg 2/1/1998
Aroclor-1260	33		2,862	C	319	C	3,000

* = EPA Region III Risk-Based Concentration Tables. J. Hubbard, 4/12/99
^ = EPA Region III Risk-Based Concentration Tables. J. Hubbard, 10/01/98
J = Analyte Present. Reported value may not be accurate or precise
** = HSCA Uniform Risk Based Remediation Standards for critical water resource area/unrestricted land use, 2/1/98

NL = Not Listed
C = Carcinogenic
N = Non Carcinogenic

APPENDIX H.

INORGANIC DATA – X-RAY FLUORESCENCE (XRF) DATA SHEETS

Site Name: Peninsula Plating
Sampling Date: 7/20/99

DATA SUMMARY FORM: INORGANICS
X-RAY FLUORESCENCE (XRF) - DATA IS NOT VALIDATED
Test Pit Shallow Soil Samples
mg/kg

Sample Number / Analyte	TP-1S	TP-2S	TP-3S	TP-4S	TP-5S	RBC* Industrial mg/Kg 4/12/1999		RBC* Residential mg/Kg 4/12/1999		HSCA** (Shallow Soils) mg/Kg 2/1/1998	
Antimony						818	N	31	N	3	
Arsenic	10.4	4.1	5			^610/3.8	N/C	^23/0.43	N/C	2/0.4	N/C
Barium	311.8	232	261	255	285	143,080	N	5,475	N	550	
Cadmium						2,044	N	78	N	4	
Calcium	5623	9,501	8,532	2,160	5,437	NL		NL		NL	
Chromium	57.2	23	15			3,066,000/6,132	III/VI	117,321/235	III/VI	1,000/35	III/VI
Cobalt						122,640	N	4,693	N	22	
Copper	53.0	21	20	12.8	14	81,760	N	3,129	N	1,000	
Iron	26,600	17,344	7,755	5,580	5,018	613,200	N	23,464	N	23,000	
Lead	40.6	46	73	18.4	13	**1,000		**400		400	
Manganese	134.7	181	343	76.9	55	40,880	N	1,564	N	180	
Mercury						^610	N	^23	N	10	
Nickel						40,880	N	1,564	N	160	
Selenium						10,220	N	391	N	26	
Silver						10,220	N	391	N	39	
Thallium			7			143	N	5.5	N	14	
Vanadium						14,308	N	548	N	55	
Zinc	57.2	52	440	16.7	14	613,200	N	23,464	N	1,000	

^ = EPA Region III Risk-Based Concentration Tables. E. W. Johnson, 10/22/97
* = EPA Region III Risk-Based Concentration Tables. J. Hubbard, 4/12/99
** = HSCA Uniform Risk Based Remediation Standards for critical unrestricted land use, 2/1/98
(III & VI) = Chromium III, Chromium VI values

NL = Not Listed
C = Carcinogenic
N = Non Carcinogenic
ND = Not Detected

Site Name: Peninsula Plating
Sampling Date: 7/20/99

DATA SUMMARY FORM: INORGANICS
X-RAY FLUORESCENCE (XRF) - DATA IS NOT VALIDATED
Test Pit Shallow Soil Samples
mg/kg

Sample Number / Analyte	TP-6S	TP-7S	TP-8S	TP-9S	TP-10S	TP-11S	RBC* Industrial mg/Kg 4/12/1999		RBC* Residential mg/Kg 4/12/1999		HSCA** (Shallow Soils) mg/Kg 2/1/1998	
Antimony							818	N	31	N	3	
Arsenic	4.65			13.0		4.2	^610/3.8	N/C	^23/0.43	N/C	2/0.4	N/C
Barium	269	236	295	332	278	211	143,080	N	5,475	N	550	
Cadmium							2,044	N	78	N	4	
Calcium	6,840	585	2,480	15,100	3,800	6,862	NL		NL		NL	
Chromium	20.2			36.3	12.2	21	3,066,000/6,132	III/VI	117,321/235	III/VI	1,000/35	III/VI
Cobalt							122,640	N	4,693	N	22	
Copper	12.7	10.3		47.7		26	81,760	N	3,129	N	1,000	
Iron	7,400	1,960	2,980	16,400	5,800	14,632	613,200	N	23,464	N	23,000	
Lead	15.2	5.76	12.8	159	20.3	50	**1,000		**400		400	
Manganese	61.8	37.0	80.5	442	170	73	40,880	N	1,564	N	180	
Mercury							^610	N	^23	N	10	
Nickel			27.2				40,880	N	1,564	N	160	
Selenium							10,220	N	391	N	26	
Silver							10,220	N	391	N	39	
Thallium							143	N	5.5	N	14	
Vanadium							14,308	N	548	N	55	
Zinc	4.99		30.7	1,200	21.1	47	613,200	N	23,464	N	1,000	

^ = EPA Region III Risk-Based Concentration Tables. E. W. Johnson, 10/22/97
* = EPA Region III Risk-Based Concentration Tables. J. Hubbard, 4/12/99
** = HSCA Uniform Risk Based Remediation Standards for critical unrestricted land use, 2/1/98
(III & VI) = Chromium III, Chromium VI values

NL = Not Listed
C = Carcinogenic
N = Non Carcinogenic
ND = Not Detected

Site Name: Peninsula Plating
Sampling Date: 7/20/99

DATA SUMMARY FORM: INORGANICS
X-RAY FLUORESCENCE (XRF) - DATA IS NOT VALIDATED
Shallow Soil Samples
mg/kg

Sample Number / Analyte	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6	RBC* Industrial mg/Kg 4/12/1999		RBC* Residential mg/Kg 4/12/1999		HSCA** (Shallow Soils) mg/Kg 2/1/1998	
Antimony							818	N	31	N	3	
Arsenic	3.62	5.64			6.25		^610/3.8	N/C	^23/0.43	N/C	2/0.4	N/C
Barium	349	459	553	369	469	323	143,080	N	5,475	N	550	
Cadmium							2,044	N	78	N	4	
Calcium	22,200	34,400	2,460	7,280	41,000	21,700	NL		NL		NL	
Chromium	36.8	24.0	35.5	29.8	53.0	19.3	3,066,000/6,132	III/VI	117,321/235	III/VI	1,000/35	III/VI
Cobalt							122,640	N	4,693	N	22	
Copper	36.8	43.3	17.4		63.9	17.3	81,760	N	3,129	N	1,000	
Iron	20,300	14,400	10,900	10,800	21,600	8,740	613,200	N	23,464	N	23,000	
Lead	113	69.6	17.5	13.2	72.9	24.0	**1,000		**400		400	
Manganese	272	192	100	178	415	143	40,880	N	1,564	N	180	
Mercury							^610	N	^23	N	10	
Nickel					31.2		40,880	N	1,564	N	160	
Selenium							10,220	N	391	N	26	
Silver							10,220	N	391	N	39	
Thallium							143	N	5.5	N	14	
Vanadium					70.3		14,308	N	548	N	55	
Zinc	1,040	212	22.3	71.1	196	71.3	613,200	N	23,464	N	1,000	

^ = EPA Region III Risk-Based Concentration Tables. E. W. Johnson, 10/22/97
* = EPA Region III Risk-Based Concentration Tables. J. Hubbard, 4/12/99
** = HSCA Uniform Risk Based Remediation Standards for critical unrestricted land use, 2/1/98
(III & VI) = Chromium III, Chromium VI values

NL = Not Listed
C = Carcinogenic
N = Non Carcinogenic
ND = Not Detected

Site Name: Peninsula Plating
Sampling Date: 7/20/99

DATA SUMMARY FORM: INORGANICS
X-RAY FLUORESCENCE (XRF) - DATA IS NOT VALIDATED
Test Pit Deep Soil Samples
mg/kg

Sample Number / Analyte	TP-1D	TP-2D	TP-3D	TP-4D	TP-5D	RBC* Industrial mg/Kg 4/12/1999		RBC* Residential mg/Kg 4/12/1999		HSCA** (Deep Soils) mg/Kg 2/1/1998	
Antimony						818	N	31	N	3	
Arsenic		3.4				^610/3.8	N/C	^23/0.43	N/C	2/0.4	N/C
Barium	243	142	162	133	199	143,080	N	5,475	N	550	
Cadmium						2,044	N	78	N	4	
Calcium	503	649	7,669	477	487	NL		NL		NL	
Chromium						3,066,000/6,132	III/VI	117,321/235	III/VI	1,000/35	III/VI
Cobalt						122,640	N	4,693	N	22	
Copper			9.8			81,760	N	3,129	N	1,000	
Iron	1,400	2,570	2,098	1,330	1,443	613,200	N	23,464	N	23,000	
Lead	7.46	2.9	5.6		6.4	**1,000		**400		400	
Manganese	35.9	104	31		61	40,880	N	1,564	N	180	
Mercury						^610	N	^23	N	10	
Nickel						40,880	N	1,564	N	160	
Selenium						10,220	N	391	N	26	
Silver						10,220	N	391	N	39	
Thallium						143	N	5.5	N	14	
Vanadium						14,308	N	548	N	55	
Zinc		9.1	119			613,200	N	23,464	N	1,000	

^ = EPA Region III Risk-Based Concentration Tables. E. W. Johnson, 10/22/97
* = EPA Region III Risk-Based Concentration Tables. J. Hubbard, 4/12/99
** = HSCA Uniform Risk Based Remediation Standards for critical unrestricted land use, 2/1/98
(III & VI) = Chromium III, Chromium VI values

NL = Not Listed
C = Carcinogenic
N = Non Carcinogenic
ND = Not Detected

Site Name: Peninsula Plating
Sampling Date: 7/20/99

DATA SUMMARY FORM: INORGANICS
X-RAY FLUORESCENCE (XRF) - DATA IS NOT VALIDATED
Test Pit Deep Soil Samples
mg/kg

Sample Number / Analyte	TP-6D	TP-7D	TP-8D	TP-9D	TP-10D	TP-11D	RBC* Industrial mg/Kg 4/12/1999		RBC* Residential mg/Kg 4/12/1999		HSCA** (Deep Soils) mg/Kg 2/1/1998	
Antimony							818	N	31	N	3	
Arsenic							^610/3.8	N/C	^23/0.43	N/C	2/0.4	N/C
Barium	190	217	165	301	260	223	143,080	N	5,475	N	550	
Cadmium							2,044	N	78	N	4	
Calcium	459	465	398	725	1,320	10,682	NL		NL		NL	
Chromium		17.7			15.0		3,066,000/6,132	III/VI	117,321/235	III/VI	1,000/35	III/VI
Cobalt							122,640	N	4,693	N	22	
Copper	13.3	9.3			3.76		81,760	N	3,129	N	1,000	
Iron	1,700	2,190	1,350	2,569	3,350	3,045	613,200	N	23,464	N	23,000	
Lead	4.53		6.80		6.63	2.8	**1,000		**400		400	
Manganese	33.7	48.5	42.7	117	159	127	40,880	N	1,564	N	180	
Mercury						13	^610	N	^23	N	10	
Nickel							40,880	N	1,564	N	160	
Selenium							10,220	N	391	N	26	
Silver							10,220	N	391	N	39	
Thallium							143	N	5.5	N	14	
Vanadium							14,308	N	548	N	55	
Zinc					10.8	157	613,200	N	23,464	N	1,000	

^ = EPA Region III Risk-Based Concentration Tables. E. W. Johnson, 10/22/97
* = EPA Region III Risk-Based Concentration Tables. J. Hubbard, 4/12/99
** = HSCA Uniform Risk Based Remediation Standards for critical unrestricted land use, 2/1/98
(III & VI) = Chromium III, Chromium VI values

NL = Not Listed
C = Carcinogenic
N = Non Carcinogenic
ND = Not Detected

APPENDIX I.

ORGANIC DATA – IMMUNOASSAY DATA SHEETS

SCREENING DATA PENINSULA PLATING
POLYCHLORINATED BIPHENYLS (PCB) IMMUNOASSAY TEST RESULTS
COMPARISON WITH LABORATORY DATA
DATA IS NOT VALIDATED

SAMPLE ID	IMMUNOASSAY RESULT mg/Kg	LABORATORY RESULT mg/Kg	CONFIRMATION YES / NO
SHALLOW TEST PIT SAMPLES			
TP-1S	<.5		
TP-2S	<.5		
TP-3S	**<.5**	**0.03**	**Yes**
TP-4S	<.5		
TP-5S	<.5		
TP-6S	<.5		
TP-7S	<.5		
TP-8S	<.5		
TP-9S	<.5		
TP-10S	<.5		
TP-11S	<.5		
SHALLOW SOIL SAMPLES			
SS-1	<.5		
SS-2	<.5		
SS-3	<.5		
SS-4	<.5		
SS-5	<.5		
SS-6	<.5		
DEEP TEST PIT SAMPLES			
TP-1D	<.5		
TP-2D	<.5		
TP-3D	<.5		
TP-4D	<.5		
TP-4C	<.5		
TP-5D	<.5		
TP-6D	<.5		
TP-7D	<.5		
TP-8D	<.5		
TP9D	<.5		
TP-10D	<.5		
TP-11D	<.5		

ND - Non-detected
NT - Not tested - No field screening data
N/A - Not applicable - No laboratory data
Bold - Sample submitted for laboratory PCB analysis

SCREENING DATA PENINSULA PLATING
POLYAROMATIC HYDROCARBON (PAH) IMMUMOASSAY TEST RESULTS
COMPARISON WITH LABORATORY DATA
DATA IS NOT VALIDATED

SAMPLE ID	IMMUNOASSAY RESULT mg/Kg	LABORATORY RESULT mg/Kg*	CONFIRMATION YES / NO
SHALLOW TEST PIT SAMPLES			
TP-1S	>.5 - <10		
TP-2S	**>10**	**10.9**	**Yes**
TP-3S	**>.5 - <10**	**2.2**	**Yes**
TP-4S	>.5 - <10		
TP-5S	>.5 - <10		
TP-6S	<.5		
TP-7S	<.5		
TP-8S	<.5		
TP-9S	**>10**	**60.3**	**Yes**
TP-10S	>.5 - <10		
TP-11S	**>10**	**13.2**	**Yes**
SHALLOW SOIL SAMPLES			
SS-1	>.5 - <10		
SS-2	>.5 - <10		
SS-3	<.5		
SS-4	>.5 - <10		
SS-5	>.5 - <10		
SS-6	**>.5 - <10**	**ND**	**No**
DEEP TEST PIT SAMPLES			
TP-1D	<.5		
TP-2D	<.5		
TP-3D	**<.5**	**ND**	**Yes**
TP-4D	<.5		
TP-5D	<.5		
TP-6D	<.5		
TP-7D	<.5		
TP-8D	<.5		
TP9D	<.5		
TP-10D	<.5		
TP-11D	<.5		

NT - Not tested - No field screening data
N/A - Not Applicable - No Laboratory Data
*TCL Polyaromatic Hydrocarbons + TICs
TICs - Tentatively Identified Compounds
TNR - TICs not reported
Bold - Samples sent to laboratory for PAH analysis

APPENDIX J.

FEDERAL ON-SCENE COORDINATOR'S POST-INCIDENT SUMMARY REPORT, US EPA

FEDERAL ON-SCENE COORDINATOR'S POST-INCIDENT SUMMARY REPORT

for

Peninsula Plating Site
Blades, Sussex County, Delaware
4 August 1995 to 21 December 1995

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION III
PHILADELPHIA, PENNSYLVANIA

Federal On-Scene Coordinator's Post Incident Summary Report
Peninsula Plating Site

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2. Site Sketch
3. Special Bulletin A
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Federal On-Scene Coordinator's Post Incident Summary Report
Peninsula Plating Site

REGION III
CERCLA REMOVAL ACTION

PROJECT # 378
FACT SHEET

SITE:	Peninsula Plating Site
SIZE:	One building on a three-acre lot
LOCATION:	East 7th Avenue and River Road, Blades, Delaware 19973
APPROVAL DATE:	4 August 1995
PROJECT DATES:	4 August through 21 December 1995
DESCRIPTION:	The Peninsula Plating Site was an abandoned plating facility with numerous vats, tanks, drums, and small containers of hazardous materials left unsecured and abandoned. Removal activities consisted of identification and consolidation of waste streams for off-site transportation and disposal. Final removal activities consisted of gross decontamination of the building and storage vats. The building was left in a non-hazardous condition and entrances to the building were secured.
NATIONAL PRIORITIES LIST (NPL) SITE STATUS:	Not proposed.
HAZARDOUS MATERIALS:	Flammable liquids, corrosive liquids, oxidizer liquids, cadmium-contaminated liquids, and chromium-contaminated solids.
QUANTITIES REMOVED:	78 drums (55-gallon) of hazardous waste 30 cubic yards of hazardous solids and debris
OSC:	William Steuteville
REMOVAL CONTRACTOR:	Earth Tech Remediation Services, Inc., of Richmond, Virginia
DISPOSAL LOCATIONS:	Clean Harbors of Connecticut, Inc.; Clean Harbors of Braintree, Inc.; and Michigan Disposal, Inc.
PROJECT CEILING:	$ 200,000
PROJECT COSTS:	$ 177,739
COMMENTS:	This removal action was successfully completed in a timely manner. No outstanding issues or operational problems were encountered.

William Steuteville
On-Scene Coordinator

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FOREWORD

The On-Scene Coordinator (OSC), as mandated by the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300 (NCP 1994), is required to provide a coordinated federal response capability at the scene of an unplanned or sudden release of oil or hazardous substance that poses a threat to the public welfare or the environment. In addition, the provisions of Section 104 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), promote a coordinated federal, state, and local response to mitigate situations at hazardous waste sites that pose an imminent and substantial threat to public health and/or the environment.

Conditions at the Peninsula Plating Site presented an imminent and substantial risk of harm to human health and the environment due to the uncontrolled release of a hazardous substance to the environment, thereby providing a legal basis for federal response activities. The provisions of the NCP, Section 300.415, were implemented by the U.S. Environmental Protection Agency, Region III, Philadelphia, Pennsylvania.

The OSC would like to extend thanks to all of the agencies and individuals who provided valuable assistance and expertise to ensure the successful completion of this cleanup effort.

William Steuteville
On-Scene Coordinator
U.S. EPA Region III
Philadelphia, Pennsylvania

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Federal On-Scene Coordinator's Post-Incident Summary Report
Peninsula Plating Site

1.0 PURPOSE

This Post-Incident Summary Report was completed in accordance with the 8 January 1997 OSC Report Policy and Guidance in lieu of the formal OSC Report format.

2.0 SUMMARY OF INCIDENT

2.1 Initial Conditions and Resources Committed

On 3 August 1995, John Mohrman of the Delaware Department of Natural Resources and Environmental Control (DNREC) requested EPA assistance at Peninsula Plating, Inc., an abandoned electroplating facility located in Blades, Sussex County, Delaware. DNREC obtained a search warrant and secured the facility. OSC Steuteville was assigned the site, and subsequently tasked the Roy F. Weston, Inc. (WESTON®) Site Assessment Technical Assistance (SATA) team, formerly Technical Assistance Team (TAT), to respond to the site and perform an emergency assessment.

The site building is three storied and located in a mixed residential/industrial neighborhood. There are residential buildings and a school within 200 yards of the site. The building itself is divided into two units; the western part was occupied by Peninsula Plating and the eastern part is occupied by Seaford Disposal, Inc., a non-hazardous waste disposal company. Immediately outside the northern boundary of the property are two drinking water wells operated by the City of Blades. The Nanticoke River flows within one-quarter mile north of the site. A food vending service company is located immediately west of the site building. The building was used for a plating business from 1992 until its abandonment in 1995.

The Blades fire and police chiefs informed the OSC that in July there was a mysterious fire in a dumpster at the site. They also observed children playing with matches around the site. The building was not secured and the windows could be opened easily from the outside. The Chiefs also reported a history of theft and vandalism at the site. During the 24-hour period on 3 August 1995 that DNREC was providing site security, many individuals tried to gain access to the building in order to retrieve items that they had left for plating. Many of these items were of significant value and payment for plating was made in advance. The fire chief informed the OSC that the local fire department was not equipped to handle an emergency situation at this site if a fire was to occur.

SATA recorded label information and performed field hazard categorization (hazcat) of the substances in the vats and drums. The results indicated the presence of hazardous substances that included corrosives (pH of 0 and pH of 14 units), oxidizers, cyanides, cadmium and chromium liquids, and other metals. Based on these results, the OSC consulted EPA management and discussed the need for an emergency Superfund Response Action. On 4 August 1995, the OSC activated $200,000 in

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Liquids, small lab-pack containers, and solids generated by HEPA vacuum decontamination were drummed. Other solid debris (contaminated concrete, wood, personal protective equipment, etc.) was staged in a 30-cubic yard roll-off box. Finally, all hazardous wastes were transported off site for disposal in accordance with current EPA policy.

In addition to these removal activities, the contractor gathered and decontaminated all former customer's metal parts and ornaments and staged them in a secure room not impacted by removal operations. The police chief was responsible for coordinating with the facility owner and the former customers to arrange for the return of the parts to the rightful owners.

2.3 Disposal of Hazardous Materials (Types and Quantities Removed)

This section summarizes the types and quantities of hazardous materials that were identified and transported off site for proper disposal. The following information is presented according to waste stream. Original manifests and related documentation are maintained at the EPA Region III office, Philadelphia, PA.

The disposal facility for the wastes listed on manifests 95001, 95002, and 95003 was Clean Harbors of Connecticut, Inc. (CTD00604488). The disposal facility for the wastes listed on manifest 95004 was Clean Harbors of Braintree, Inc. (MAD053452637). The disposal facility for the waste listed on manifest 95005 is Michigan Disposal, Inc. (MID000724831).

The oxygen cylinder was retrieved by Air Products and Chemicals, Inc. of Salisbury, Maryland.

Manifest Number	Date Shipped	Quantity	Waste Description
95001	21 December 1995	13 Fiber Drums	Waste corrosive liquids, oxidizing, N.O.S. (chromic acid, cadmium). EPA Waste No. F007
95001	21 December 1995	4 Fiber Drums	Waste corrosive liquids, N.O.S. (hydrofluoric acid, chromium). EPA Waste No. F009
95001	21 December 1995	11 Fiber Drums	Waste corrosive liquids, oxidizing, N.O.S. (sulfuric acid, selenium). EPA Waste No. D001
95001	21 December 1995	1 Fiber Drum	Hazardous waste liquid, N.O.S. (cadmium). EPA Waste No. F007
95002	21 December 1995	4 Metal Drum	Hazardous waste solid, N.O.S. (chromium). EPA Waste No. D007

incumbent upon the owner of the building to appropriately address such concentrations if the building is to be used in the future for an activity causing, or by persons susceptible to, exposure to such residual contamination.

3.2 Outstanding Issues

The OSC did not encounter any unusual or particularly difficult problems in undertaking response activities. No issues remain outstanding except the issue of residual contamination in paragraph 3.1, above.

4.0 ROSTER OF AGENCIES

FEDERAL AGENCY	CONTACT	ROLE
U.S. EPA Region III Removal Response Section 814 Chestnut Building Philadelphia, PA 19107 (215) 566-5000	William Steuteville, OSC	Coordinated all site activities through the completion of the project.
U.S. EPA Region III Removal Enforcement and Oil Section	Dan McGoldrick, EOSC Larry Richardson, CI	Assisted the OSC with enforcement issues and PRP identification.
U.S. EPA Region III Removal Branch	Rosalind Pough, FAS	Assisted OSC with site cost tracking and administrative requirements.

STATE and LOCAL	CONTACT	ROLE
State of Delaware Div. of Air and Waste Mgmt. Dept. of Natural Resources and Environmental Control P.O. 1401, 89 Kings Highway Dover, Delaware 19903 (302) 739-3964	Maj. William H. Hill, Chief of Enforcement John Mohrman, Jr., Program Manager, Environmental Response Branch	Identified and notified EPA of Site. Secured Site until EPA could provide response actions.
Blades Volunteer Fire Company 5th and Cannon Streets Blades, Delaware 19973 (302) 629-3718	Earl Chaffinch, Fire Chief	Provided EPA with logistics information concerning local resources during the removal. Provided background fire and safety information.
Blades Police Department Blades Town Hall West Fourth Street Blades, Delaware 19973 (302) 629-7329	Paul Viehman, Police Chief	Provided EPA with background information and communications support during initial actions. Coordinated return of property to former customers of the plating facility.

APPENDIX 1

Site Location Map

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WESTON FEDERAL PROGRAMS DIVISION	Peninsula Plating Site Blades, Sussex County, DE	TDD No.: 9701-15 CONTRACT No. 68-S5-3002

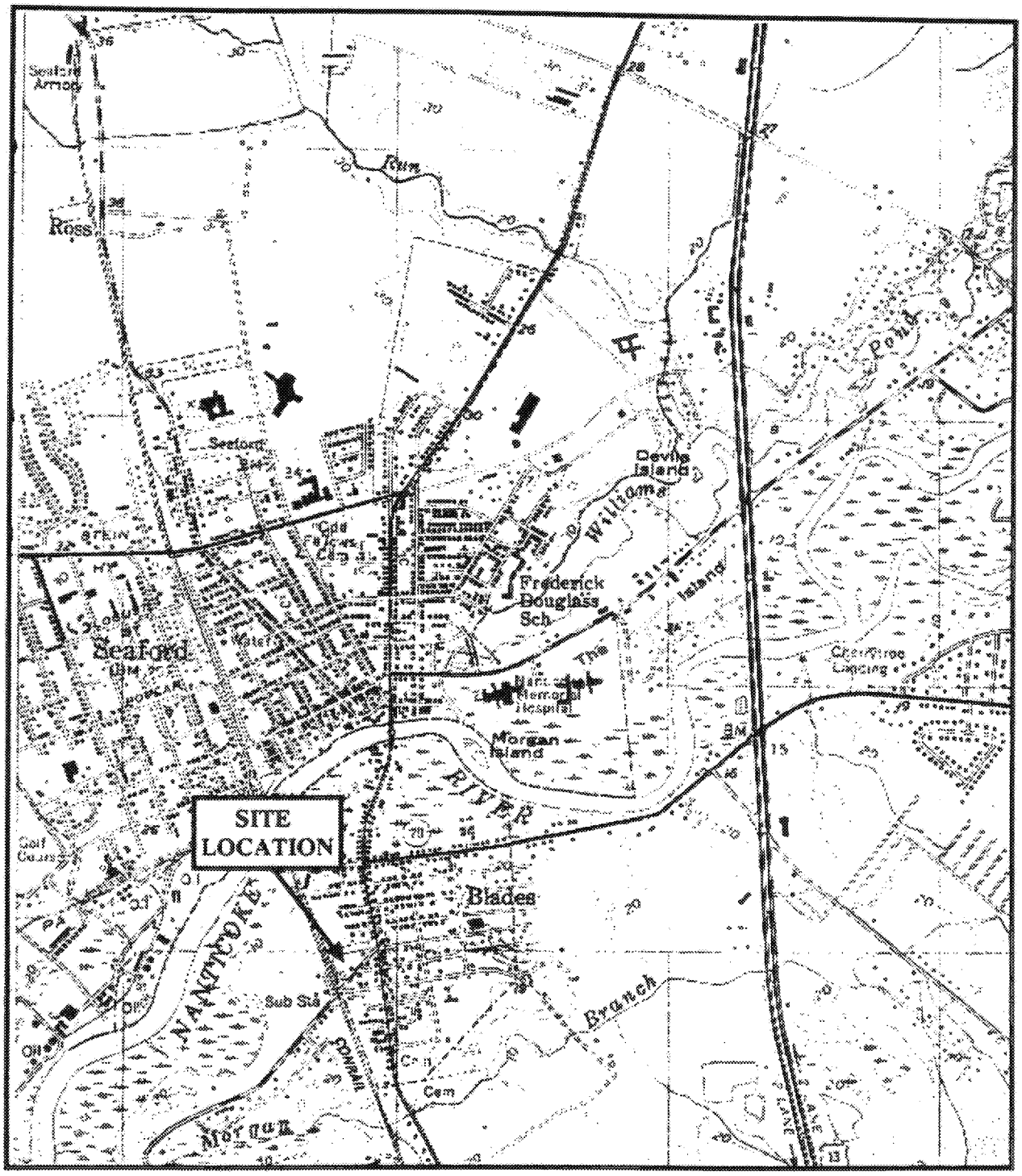

Figure 1: Site Location Map

U.S. Dept. of the Interior Geologic Survey
Seaford East Quadrangle;
1955 Photorevised, 1983.

7.5 Minute Series (Topographic) Map
Contour Interval 10 Feet - Scale 1:24 000
Delaware, Sussex County, Delaware

APPENDIX 2

Site Sketch

ED_005024_00000655-00244

WESTON FEDERAL PROGRAMS DIVISION	Peninsula Plating Site Blades, Sussex County, DE	TDD No.: 9701-15 CONTRACT No.68-S5-3002

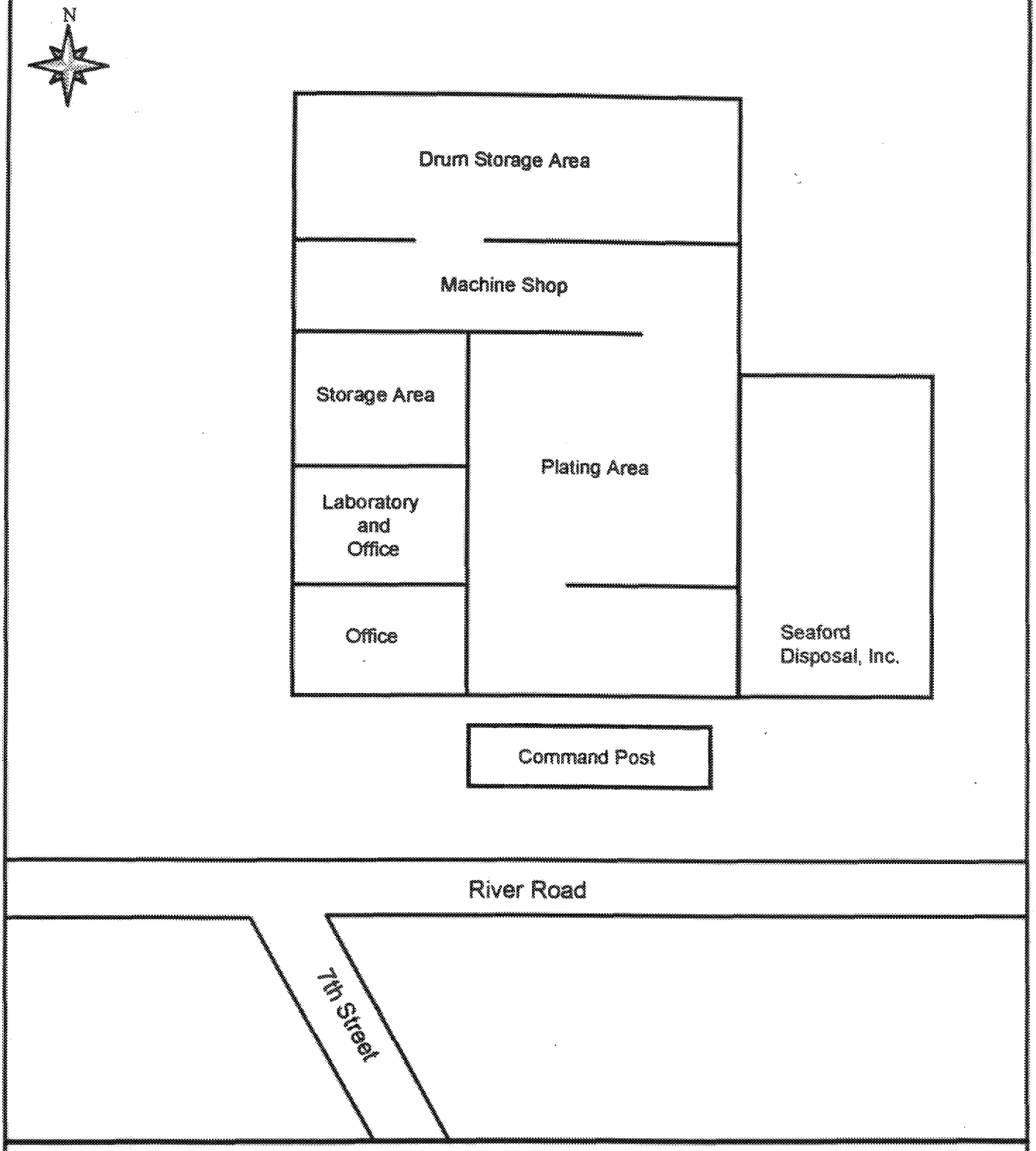

Figure 2: Site Sketch

Not to Scale

APPENDIX 3

Special Bulletin A

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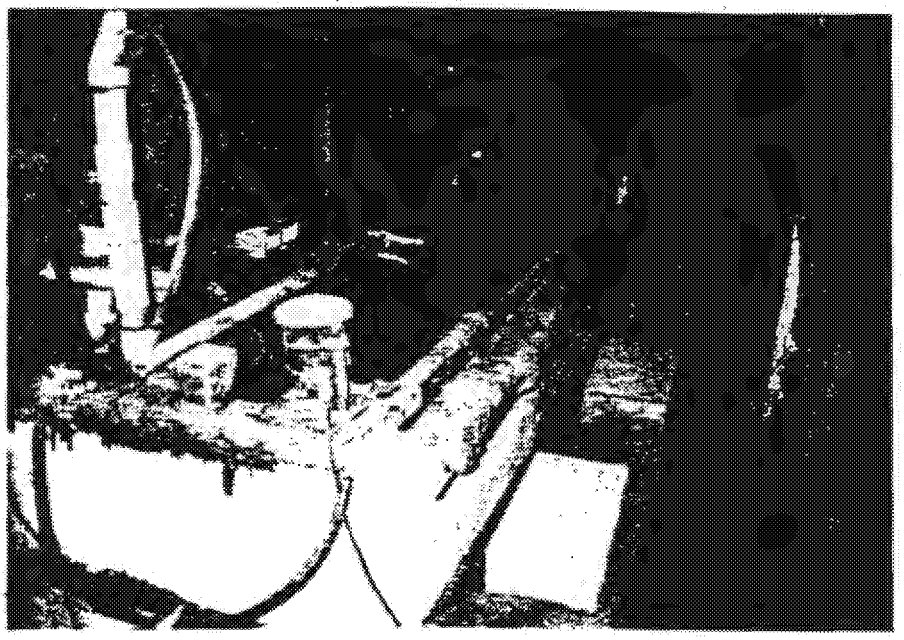
APPENDIX 4

Photograph Log

ED_005024_00000655-00247

Photograph Log

Peninsula Plating Site
Blades, Sussex County, Delaware



Date Taken: 4 August 1995
Photographer: Region III SATA
Description: Initial conditions in plating area. Copper plating solution in open vat.

Date Taken: 4 August 1995
Photographer: Region III SATA
Description: Initial conditions in storage area. Small container storage.

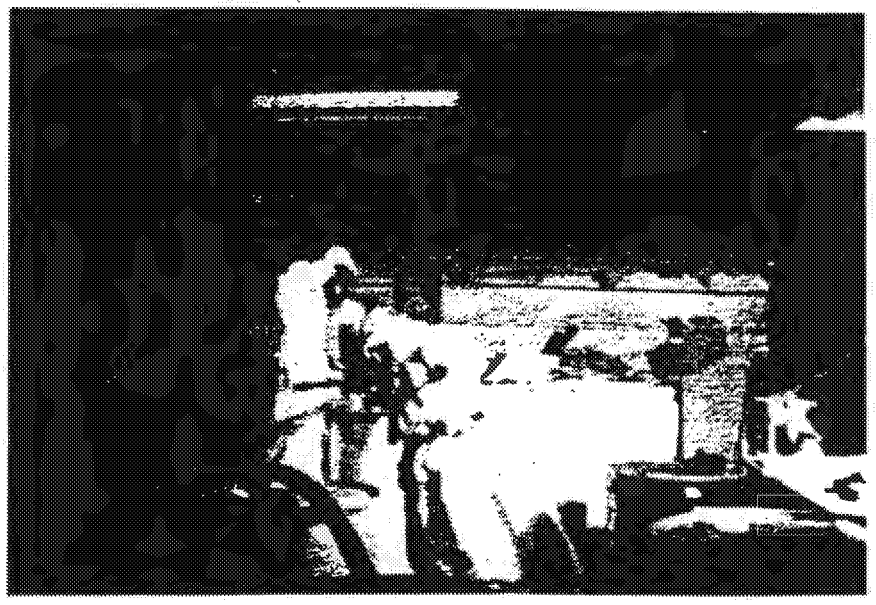
Photograph Log **Peninsula Plating Site**
Blades, Sussex County, Delaware

Date Taken: 30 August 1995
Photographer: Region III SATA
Description: Sample collection to facilitate transportation and disposal.

Date Taken: 30 August 1995
Photographer: Region III SATA
Description: Small container consolidation in drum storage area.

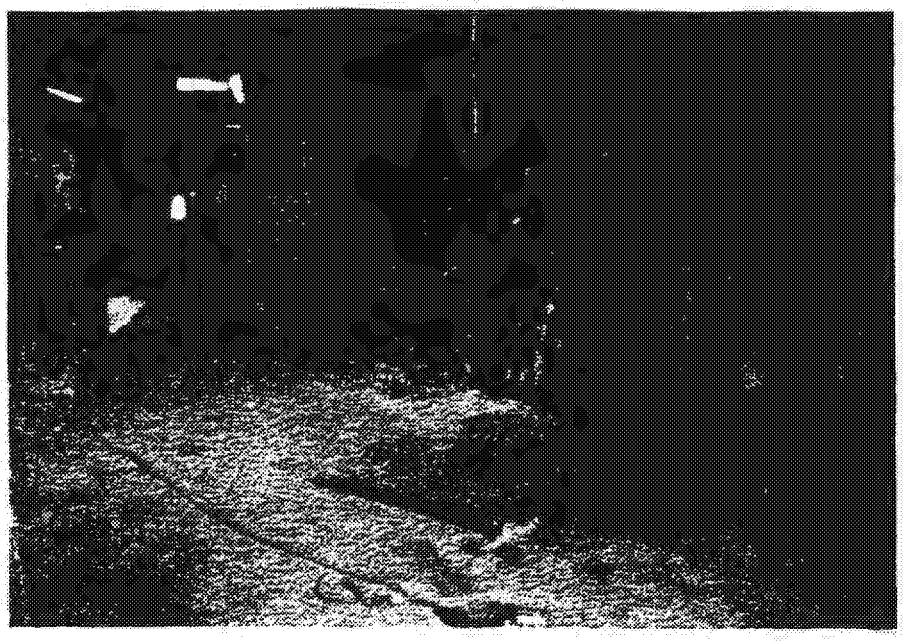
Photograph Log **Peninsula Plating Site**
Blades, Sussex County, Delaware

Date Taken: 14 October 1995
Photographer: Region III SATA
Description: Liquid transfer operations.

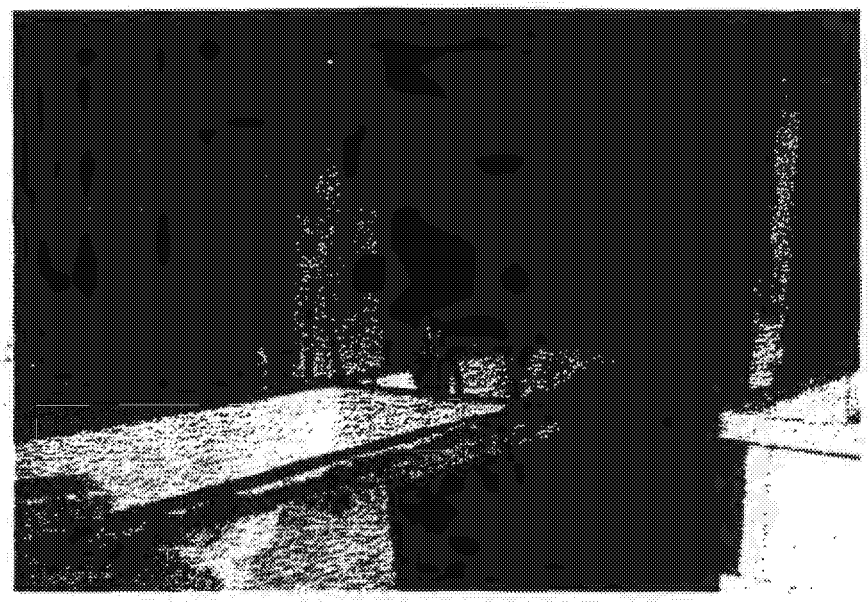


Date Taken: 14 October 1995
Photographer: Region III SATA
Description: Liquid transfer operations.

Photograph Log **Peninsula Plating Site**
Blades, Sussex County, Delaware

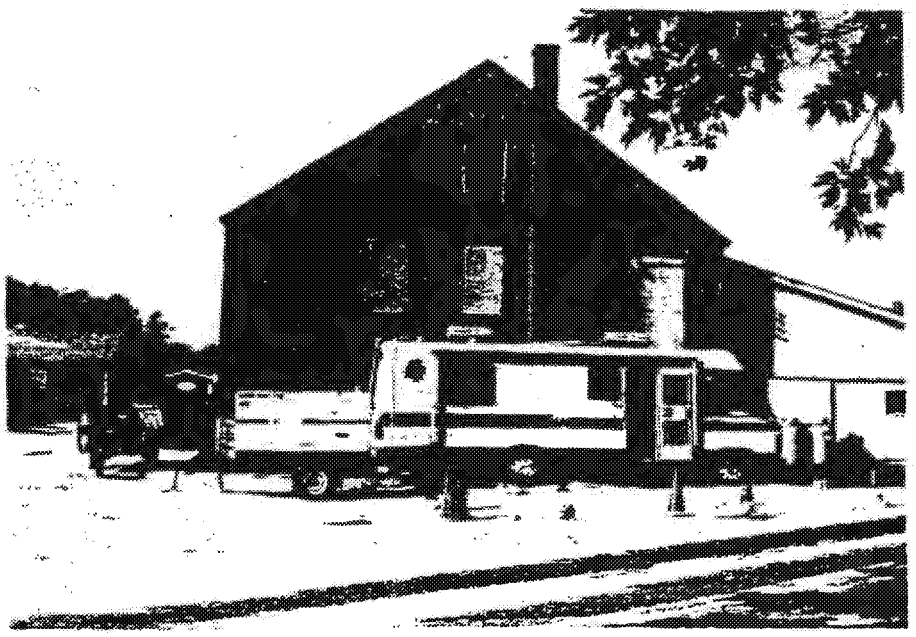


Date Taken: 18 October 1995
Photographer: Region III SATA
Description: Plating Area after vats of materials have been removed and surfaces HEPA vacuumed.



Date Taken: 18 October 1995
Photographer: Region III SATA
Description: Plating Area after vats of materials have been removed and surfaces HEPA vacuumed.

Photograph Log **Peninsula Plating Site**
Blades, Sussex County, Delaware



Date Taken: 19 October 1995
Photographer: Region III SATA
Description: EPA Region III Mobile Command Post used to facilitate removal actions.

APPENDIX K.

TOXICOLOGICAL EVALUATION

TOXICOLOGICAL EVALUATION

FOR

THE FORMER PENINSULA PLATING SITE

BLADES, SUSSEX COUNTY, DELAWARE

November, 1999

(Site Inspection)

DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

DIVISION OF AIR AND WASTE MANAGEMENT

SITE INVESTIGATION & RESTORATION BRANCH
391 LUKENS DRIVE
NEW CASTLE, DELAWARE 19720

Prepared By:

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Environmental Program Manager
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Department of Natural Resources &
Environmental Control
391 Lukens Drive
New Castle, DE 19720

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1.0 Summary

A Site Inspection was performed at the former Peninsula Plating site to collect necessary data to evaluate the potential threat to human health and the environment resulting from historical site-related activities. Sampling was undertaken to characterize the on-site soils and groundwater on the property.

Potential increased cancer risks were found for on-site workers and for theoretical future adult and child residents via the inadvertent ingestion of contaminated surface soils from the site when modeled under a worst case scenario. No increased cancer risk was found when modeled under a groundwater consumption scenario. Currently there is no potable groundwater usage on the site. There are public water supply wells on the adjacent property, however analysis of these wells indicated no impact from the site.

For all potential receptors, non-cancer effects resulting from inadvertent ingestion of soil were not found when modeled using the soil exposure scenario for shallow soil. A non-cancer effect was noted in the modeled future child receptor consuming groundwater from on-site wells slightly above the target threshold.

Increased incremental lifetime cancer risk was evaluated for eight compounds in soil; Benzo(a)pyrene (BaP), Benzo(b)fluoranthene (BbF), Arsenic (as a carcinogen), Dibenz(a,h)anthracene (DahA), Benzo(a)anthracene (BaA), Indeno(1,2,3,-cd)pyrene (IP), Aroclor (total PCBs) and Benzo(k)fluoranthene (BkF).

BaP found in sample TP-9S at 3.3 mg/Kg provided for a cancer risk of 3.7E-05 when modeled for a future adult resident of the site. As modeled for the on-site worker the increased cancer risk for BaP was 8.4E-06. BbF, Arsenic, DahA, BaA and IP all had modeled increased incremental lifetime cancer risks greater than 1.0E-06 when evaluated individually for the future adult resident. Risk for the theoretical future resident when evaluated cumulatively (6.3E-05) fell within the 1.0E-04 to 1.0E-06 acceptable cancer risk range normally used by U.S. EPA, Region III, as did the cumulative modeled risk for the on-site worker (1.4E-05).

The potential for future adverse health effects through the inadvertent ingestion of soil for future adult and child residents, workers and trespassing adults and children as modeled indicate that the non-cancer effects of Iron in shallow soil sample SS-1 was the primary contributor to the hazard index (HI). None of the modeled receptors had an HI in excess of the target of 1.0.

None of the shallow soil samples analyzed for Lead during the study contained Lead at levels exceeding the Delaware Uniform Risk-Based Remediation Standard exceeded the unrestricted use (residential) level of 400 mg/Kg. No reference dose exists for Lead. The highest concentration of Lead in soil detected during this study was 187 mg/Kg in shallow test pit soil sample TP-9S.

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Since there is no defined surface water pathway at the site, no sediment exposure scenario was evaluated during this investigation.

Iron detected in monitoring well samples MW-3 and MW-5 (field duplicate) was the primary contributor to the Hazard Index under a groundwater ingestion scenario. Iron and Manganese in the filtered sample resulted in a modeled hazard index of 1.6 for the future child resident consuming groundwater from the monitoring wells at the site. In the unfiltered sample, Iron, Manganese and Aluminum provide the HI of 1.9 in the future child resident. All other modeled receptors had cumulative HIs less than the target of 1.0.

2.0 Support Documentation for Toxicological Evaluation

Standard and default toxicological values and assumptions were applied herein and most can be found in the Appendices. The corrected (April 12, 1999) Risk-Based Concentration Table from U.S. EPA, Region III, was used as a screening tool to identify chemicals of concern. Modeled parameters and procedures were based on the Risk Assessment Guidance for Superfund (RAGs) and can be found in the References and/or Appendices as noted above. Lifetime cancer risks were developed for adult resident life exposure and are slightly less conservative than a combined child and adult exposure time of 30 years with adjusted body weight. The reported findings result in an insignificant modeled difference yet the recognition of this application to the model should be sufficient to address any concerns.

Reference dose and cancer slope factors were obtained from the Risk-Based Concentration (April 12, 1999) tables from U.S. EPA, Region III. IRIS was used as a source of toxicological information and the U.S. EPA listing of AWQC for chronic exposure to aquatic organisms was surveyed for exceedances.

Sample analysis data used in this evaluation were compiled from the Organic and Inorganic Data Validation Reports as qualified and received from the DNREC-SIRB Analytical Chemist.

2.1 Exposure Pathways

For the purposes of this evaluation the study area was treated as one site for evaluating the soil and groundwater exposure pathways as a worst-case scenario. In general, the highest concentrations of organic and inorganic contaminants detected during this study were used in the models regardless of the sample location. Only shallow soil samples were used in this evaluation since they contained the highest concentration of contaminants based on field screening and laboratory analytical data.

The Peninsula Plating site is located on River Road west of Market Street in the town of Blades, Sussex County, Delaware. The site is bordered to the south by River Road, to the west by the Conrail railroad tracks, to the east by Market Street and to the north by the Town of Blades municipal office and water wells, residential properties and a wooded area. The surrounding

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land use is primarily residential, with some areas of commercial and light industrial in the surrounding areas.

The Peninsula Plating site is currently no longer in operation. Present on the approximately 5+ acre site are six buildings in various states of repair.

There are six older warehouse/storage type buildings present on the property of various sizes and conditions. The property is zoned as a Manufacturing/Warehouse district. Recently the buildings have been leased out to a variety of companies including a metal plating company, a vending company, a sign company, a trash hauling firm, a steel products company, a bread company distribution center and several other operations. The property is currently vacant except for one building being used for storage.

In 1995, EPA Region III conducted a CERCLA Removal Action at the abandoned plating facility building that contained numerous vats, tanks, drums and small containers of hazardous material left unsecured and abandoned. The materials included flammable liquids, corrosive liquids, oxidizers, cadmium-contaminated liquids and chromium-contaminated solids. Only the plating facility, which occupied approximately one-half of one building, was involved in the removal action.

The site is mostly open space with six buildings across the area. There is a small amount of pavement and the remaining area is bare dirt, sand or grass covered. The site is not fenced. Part of the northern border of the site is wooded and a pile of wood, tires, and miscellaneous debris is located on the edge of the woods. A small ditch is located near the center of the site and runs west toward the railroad track.

Several cans of paint, oil, waste oil and other miscellaneous debris were observed inside a number of the buildings on site. Evidence of trespassing, such as campfires and numerous aerosol spray cans were also observed in one building.

Two public water wells, serving the Town of Blades are located on the adjacent parcel immediately north of the subject property.

A small park is located south of the site across River Road.

The Town of Blades provides water to a population of approximately 960 via 320 service connections. The source of the town's water is from two wells located on the adjacent parcels to the north on the subject property. The wells are screened in the unconfined aquifer, approximately 66 to 96 feet below ground surface.

Surface water coming from the site is expected to flow to the Nanticoke River, 2000 feet to the north, though a combination or overland flow and storm sewer. During storm events, surface water may flow along the railroad right-of-way to the west of the site. No surface water bodies were noted during any of the site visits.

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The Peninsula Plating site is located within the Atlantic Coastal Plain Physiographic Province. The Atlantic Coastal Plain gently slopes southeast towards the Atlantic Ocean forming a thickening wedge of unconsolidated sand, gravel, and clay. According to Sundstrom and Pickett (1970) the sedimentary deposits are underlain by the Basement Complex, which is the continuation downdip of very old metamorphic and igneous Piedmont rocks of northernmost Delaware.

The site is approximately 15 to 20 feet above sea level in a relatively flat area, based on the topographic map. The major hydrogeologic system of the study area is comprised of four (4) geologic divisions, which include (from youngest to oldest): the Nanticoke Deposits, the Beaverdam Formation, the Manokin Formation, and the St. Marys Formation. Approximate thickness of geologic deposits were inferred from the cross section A-A' contained within the Delaware Geologic Survey's map, Geohydrology of the Seaford Area, Delaware, Hydrologic Map No. 9.

The youngest sediments (Nanticoke) occur in deposits that range from 3 to 20 feet thick. These deposits are composed of fine to medium grained, light gray to brown sands, as well as, laminated to massive deposits of gray to brown, clayey sandy silt and silty clayey sand. These deposits may also be capped by the fine to medium, well-sorted sand associated with dunes.

The Beaverdam Formation (approximately 40 to 50 feet thick) is comprised of two distinct rock units that result in a fining-upwards sandy sequence. The lower units consists of gravel in the lowermost beds, and fine upwards to light gray, yellow-orange, sandy gravel, and medium to coarse sand. The upper unit consists of light brown, light gray, and yellow-orange beds of fine to medium sand, sandy silt, and clayey silt, which have a white to yellow silt or clay matrix.

The Manokin Formation (approximately 30 to 40 feet thick) consists of gray to olive-gray sands that generally coarsen upwards from the base, as well as, variable amounts of silt, clay, gravel, and shell. This formation includes the Manokin aquifer system. Beneath this deposit is the St. Marys Formation (approximately 25 to 40 feet thick) which contains gray, bluish-gray, and olive-gray silt and clay with some shell beds and thin sand beds.

The Columbia aquifer is the unconfined water table aquifer for this area. Included in this aquifer are the Nanticoke Deposits, and the Beaverdam Formation. Also, in regions where the Manokin aquifer is in direct contact with the Columbia aquifer, they function as a single hydrologic unit. The St. Marys Formation forms the low permeability base of the fresh water aquifer system.

The Columbia Group aquifer is recharged through precipitation, and in tern serves as the source of recharge to underlying aquifers. This aquifer also yields most of the fresh water used in this area. Water levels in this aquifer range from 1 to 18 feet below the land surface, and the saturated thickness ranges from approximately 30 to 100 feet. Local variations in lithology and saturated thickness result in varying transmissivities in this region.

The potential for groundwater recharge at the study area is ranked from fair to good. The local groundwater flow at the site is expected to be north toward the Nanticoke River.

A more detailed description of the Peninsula Plating site is presented in the main Site Inspection Report.

The exposure pathway considered in this report is the inadvertent ingestion of soil and the consumption of groundwater.

2.2 Receptors

2.2.1 Present Time Receptors

There are no on-site residents, however there are residential properties across the street from the site. Approximately 2599 people live within one-quarter mile of the site and 10468 residents live within one mile. Present-time exposure scenarios include on-site workers and trespassing children and adults. Details for these exposure estimates and default values can be found in Appendix 1. The pathway and route evaluated consists of inadvertent soil ingestion. There are public water supply wells located adjacent to the site, however there are no drinking water supply wells on the property.

The maximum values for analytes detected in site samples in the soil pathway were screened based upon Risk-Based Concentration Values (RBC) for residential and industrials soils (U.S. EPA, Region III, April 12, 1999) and were also screened against one-tenth of the RBC to account for additive effects.

For inorganic and organic analytes detected, the highest concentrations of the analytes found in shallow soil samples (0 to 2 feet) were used for the evaluation. Only shallow samples were used in this assessment. Since no one sample contained the highest concentration of all analytes, this will result in a conservative, worst case scenario. It should be noted that the modeled risks and potential adverse health effects may not be characteristic of the entire study area.

2.2.2 Future Receptors

The future use of the property has yet to be determined.

Border properties are residential and parkland. For this reason, modeling for future land use will include the inadvertent ingestion of soil by on-site workers, residential adults and children, assuming no remediation, in addition to the present trespasser scenarios.

3.0 Organic Contamination

3.1 Soil

A total of twenty-eight (28) shallow and deep test pit and surface soil samples were collected from the study area during this assessment. The samples were field screened in the DNREC Superfund mobile laboratory for indicator compounds. Following screening, approximately

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seven (7) test pit and surface soil samples were selected for all or part of the US EPA Target Analyte List and Target Compound List (TAL/TCL) analysis at an approved laboratory. A complete list of samples, sample locations and analytical results is contained in the main report.

The validated results of the organic analysis of the soil samples were screened via the Risk-Based Concentration (RBC) tables for residential and industrial soils (U.S. EPA, Region III, April 12, 1999).

The highest concentrations of organic and inorganic contaminants detected in soil samples from the Peninsula Plating site that exceeded the benchmark Risk-Based Concentration for residential and/or industrial soil are shown in Tables 1 and 2. The complete analytical results are shown in the main report.

3.1.1 Benzo(a)pyrene, Benzo(a)anthracene, Benzo(b)fluoranthene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene, Benzo(k)fluoranthene

Benzo (a) pyrene (BaP) and the others are polycyclic aromatic hydrocarbon (PAH) compounds. They are formed during the burning of petroleum products and plant or animal materials. It is also found in coal tar, road and roofing tars and in creosote. Cigarette smoke also contains PAHs. PAHs can enter the body by breathing smoke containing the material or by ingesting it. It is not normally absorbed through the skin, but small amounts may be if the skin has contact with heavy oils containing PAHs.

PAHs have been shown to cause tumors in laboratory animals and are suspected human carcinogens.

3.2 Risks for Present/Future Time Exposures Based on Soil Data

As modeled, BaP in soil sample TP-9S at 3.3 mg/Kg contributed the majority of the increased incremental lifetime cancer risk resulting from organic compounds for the theoretical future adult resident and present on-site worker. The RBC screening value for BaP in soil is 0.088 mg/Kg (residential) and 0.78 mg/Kg (industrial).

Table 1 shows an increased incremental lifetime cancer risk to the future adult resident at this site of 3.7E-05 due to BaP. The increased risk for the on-site worker as modeled was 8.4E-06 for BaP. Individually, the risk modeled for BaP falls within the 1.0E-04 to 1.0E-06 acceptable cancer risk normally applied by U.S. EPA, Region III for the future adult resident scenario.

The additional cancer risks to the future resident receptor resulting from the presence of BbF, DahA, BaA, and IP all exceed the 1.0E-06 target risk when modeled individually, as shown in Table 1. Aroclor and BkF adds slightly to the increased incremental cancer risk for modeled receptors (Table 1).

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4.0 Inorganic Contamination

4.1 Soil

The results of the inorganic analysis of the soil samples were screened via the Risk-Based Concentration for both residential and industrial (U.S. EPA, Region III, April 12, 1999). Only qualified data as per Appendix 2 were utilized.

The only inorganic analyte that exceeded the Risk Based Concentration (for residential and/or industrial soil) benchmarks was Arsenic (as a carcinogen and non-carcinogen).

Three (3) shallow soil samples were submitted to the lab for inorganic analysis based on field screening. The sample locations and analytical results are presented in the main report.

None of the samples analyzed for Lead during the study contained Lead at levels exceeding the Delaware Uniform Risk-Based Remediation Standard for unrestricted use of 400 mg/Kg. No reference dose exists for Lead and it is discussed below. The highest concentration of Lead in soil detected during this study was 187 mg/Kg in shallow test pit soil sample TP-9S.

4.2 Risks for Present/Future Time Exposures Based on Soil Data

Increased incremental cancer risk was modeled for Arsenic as a carcinogen for the theoretical future residents and on-site workers. Utilizing the Arsenic level found in sample TP-9S at a concentration of 3.1 mg/Kg, Table 1 shows an increased cancer risk for the future adult resident of 7.2E-06. For the on-site worker the increased incremental lifetime cancer risk was modeled at 1.6E-06 for Arsenic. Arsenic in both the future resident and on-site worker scenarios falls within the normally accepted risk range of 1.0E-04 to 1.0E-06. The total modeled risk via soil exposure to organic and inorganic compounds combined as modeled for the future residents was 6.3E-05 and for the present on-site worker was 1.4E-05. Both modeled risks fell within the 1.0E-04 to 1.0E-06 normally accepted range (Table 1). The presence of Arsenic and BaP in the surface soils was the primary factor in increased risk at the site.

4.3 Present/Future Time Potential Adverse Effects

The present-time adverse health effects were modeled for inadvertent ingestion of soil and are shown in Table 2. The majority of the potential adverse health effects as modeled resulted from the presence of Iron and Arsenic in shallow soil at the site. None of the modeled analytes had an HQ greater than 1.0 for any of the receptor scenarios.

When the additive effects of Manganese were included, the resulting Hazard Indexes were 0.04 for the on-site worker, 0.013 for the trespassing adult and 0.12 for the trespassing child. (Table 2).

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For the theoretical future adult and child residing at the site, the cumulative HIs were 0.05 for the adult and 0.54 for the child, with none of the modeled receptors exceeding the target of 1.0. (Table 2).

Some information on some of the major contributors to the Hazard Index or other potential adverse health effects is included below.

4.3.1 Iron

Iron is an essential element and therefore, any risk value must protect against deficiency as well as toxicity.

Acute Iron poisoning has been seen in small children who accidentally ingested iron supplements. Acute oral toxicity can affect the stomach and intestines, heart, liver and brain.

Several studies have noted a relationship between very high Iron intake and chronic Iron toxicity, and effects to the liver, heart and pancreas, including cirrhosis, cardiac dysfunction and diabetes.

4.3.2 Arsenic

Arsenic is found naturally in the earth's crust. It is also a by-product of smelting of metals and burning of fossil fuels. The primary use of Arsenic is in weed and insect pesticides and as a wood preservative. It is also used in lead-base alloys for hardening lead used in batteries, bearings and cable and as a rust inhibitor in antifreeze.

Systemic effects of Arsenic ingestion include irritation of the digestive tract, decreased production of red and white blood cells, abnormal heart function, blood vessel damage, liver and kidney injury and impaired nerve function.

One of the most common characteristics of ingestion of inorganic Arsenic is the appearance of dark and light spots on the skin, or small corns or warts on the palms, soles and trunk. Arsenic ingestion has also been connected to increased incidence of some forms of cancer. In contrast, there is also some evidence that small amounts (normal dietary intake) of Arsenic may be beneficial to good health.

4.5 Groundwater

Three monitoring wells and one public water supply well were sampled during the Peninsula Plating Site Inspection. Well and sample locations are described in the main report. Analytical results are also presented in the report. Although no drinking water wells are found within the study area, the analytical results from the monitor wells were modeled under a drinking water scenario as an evaluation of a future worst case. It should be noted that the development of local groundwater for drinking water purposes is highly unlikely due to the presence of a public water supply.

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Groundwater contamination was modeled for both filtered and unfiltered inorganic samples to characterize the potential risks and adverse health effects. The highest concentration of screened analytes from the water samples were evaluated under the groundwater scenario (Tables 3 and 4).

4.5.1 Organic Contamination

No organic compounds were detected in monitoring well or the public water supply well samples greater than benchmark screening levels. The only organic compound detected consisted of Bis(2-ethylhexyl)phthalate in MW-1 and MW-2 at 1.0 ug/L and is likely a result of sampling or lab contamination.

4.5.2 Inorganic Contamination

Two inorganic analytes exceeded one-tenth of the Risk-Based Concentration for Tap Water (U.S. EPA, Region III, April 12, 1999) and/or the National Primary Drinking Water Standards (MCLs) (U.S. EPA, February, 1994) in filtered groundwater samples. Three analytes exceeded the RBC benchmark in unfiltered samples.

In the groundwater samples, these analytes were Iron which exceeded one-tenth of the RBC of 11,000 ug/L in MW-3/5 (6410 ug/L – unfiltered, 6330 ug/L - filtered) and Manganese which exceeded the MCL value of 50 ug/L in MW-3 (79.2 ug/L – unfiltered, 79.8ug/L - filtered).

In the unfiltered MW-2 sample, Aluminum was detected at a concentration of 4600 ug/L.

4.6 Risks for Future Time Exposures Based on Groundwater Data

Based upon the lack of carcinogenic compounds or analytes in groundwater samples, no increased incremental cancer risk was modeled for drinking water consumption.

4.7 Future Time Potential Adverse Effects Based on Groundwater Data

For non-cancer, systemic toxicity evaluated as possible adverse human health effects, the presence of Iron and Manganese in the filtered groundwater sample from MW-3/5 provided for total Hazard Index of 0.68 for the future resident adult and 1.60 for the future resident child. The cumulative HI for future on-site workers at the site consuming filtered local groundwater was 0.24. Only the future resident child had a hazard index greater than the target of 1.0 (Table 3)

In the unfiltered groundwater sample, the non-cancer effects of Iron, Aluminum and Manganese, provided for the modeled HI. Modeled HIs for the future adult and child were 0.81 and 1.91, respectively. The HI for the on-site worker consuming local groundwater was 0.29. (Table 4)

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5.0 Across Media Summaries of Cancer Risks and Adverse Health Effects

An across media summary was not evaluated as part of this Toxicological Evaluation. The soil pathway is the primary pathway of concern for present time receptors. There are no drinking water wells on the subject property. Water from the neighboring public supply wells on the adjacent property showed no impact from the site and is tested routinely by the Division of Public Health.

6.0 Recommendations and Summary

The site is unfenced and trespassers have access to the entire parcel. The site is mostly bared soil, grass and low vegetation with six building located on the property.

Based on the modeled scenarios, parts of the study area may pose a present and future time exposure risk and exceedances of the target for increased incremental lifetime cancer risk for workers and future residents from organic and inorganic contaminants. The modeled risk results from inadvertent ingestion of surface soils containing PAHs and Arsenic. All modeled risks evaluated fall within the 1.0E-04 to 1.0E-06 acceptable cancer risk normally used by U.S. EPA, Region III, both individually and cumulatively.

The potential for adverse health effects for theoretical future resident children, as modeled, indicate that non-cancerous effects from inorganic analytes in the surface soil via inadvertent consumption at the site are a minimal concern based on analytical results.

Lead was absent in all soil samples at levels exceeding the Delaware Uniform Risk-Based Remediation Standard for unrestricted use of 400 mg/Kg.

There is minimal present time risk since the site is currently vacant. However, should soils be disturbed during future excavation and construction, they would require proper handling.

The potential for adverse health effects for theoretical future resident children, as modeled, indicate that non-cancerous effects from inorganic analytes in the surface soil via inadvertent consumption at the site are of little concern, with an HI less than 1.0 (0.54).

It should be noted that the information contained in this evaluation is based on a limited number of samples collected across a relatively large area. In general, the highest concentration of organic and inorganic contaminants were used in the calculations as a very conservative, worst case scenario. The modeled risks should not be considered to be representative or characteristic of the entire study area or any individual property. Further evaluation, including additional sampling and analysis would be necessary to fully define the potential risks in particular areas of the site.

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7.0 Uncertainties Associated With Toxicity Assessment

In concluding this report, it should be noted that there are many uncertainties associated with the use of toxicological information in health risk assessments that are related to uncertainties intrinsic to toxicology, the models applied, and the interpretations of such derived results. Chief among these uncertainties are the use of dose-response information from high-dose studies to predict adverse health effects at low dose and also the applicability of experimental animal studies to predict effects in humans. However, these and other uncertainties are intrinsic limitations to the risk assessment process which cannot be resolved quantitatively given the current understanding of toxicology and human health. These uncertainties are addressed in part by consistent application of conservative assumptions regarding the toxic effects of chemicals, such as uncertainty factors for reference doses and upper bound estimates for cancer slope factors. Such procedures are intended to protect public health and are expected, in many cases, to overstate potential impacts on human health.

The summation of risks for analytes within and across media may also contribute to such worst case evaluation. Additional uncertainty, also not the case for this site, is usually incorporated by accepting the non-threshold theory for carcinogenicity, wherein any exposure to a carcinogen may result in a theoretical increased lifetime risk of cancer.

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FUTURE SITE USE SCENARIO
CARCINOGENIC RISK – SHALLOW SOIL

Analytes	Location	Concentration mg/kg	Data Qualifier	Resident Exposure		Toxicological Values Applied		EPA Cancer Weight of Evidence
				Adults	Children	Oral RfD (Source)	Oral Potency Slope (Source)	
Benzo(a)pyrene	TP-9S	3.3	NQ	**3.7 E - 05**	---	---	7.30 E + 00 (i)	B2
Benzo(b)fluoranthene	TP-9S	6.8	NQ	**7.7 E - 06**	---	---	7.30 E - 01 (e)	B2
Arsenic (as carc.)	TP-9S	3.1	NQ	**7.2 E - 06**	---	3.00 E - 04 (i)	1.50 E + 00 (i)	A
Dibenz(a,h)anthracene	TP-9S	0.48	NQ	**5.4 E - 06**	---	---	7.30 E + 00 (e)	B2
Benzo(a)anthracene	TP-9S	2.2	NQ	**2.5 E - 06**	---	---	7.30 E - 01 (e)	B2
Indeno(1,2,3-cd)pyrene	TP-9S	2.2	NQ	**2.5 E - 06**	---	---	7.30 E - 01 (e)	B2
Aroclor (Total PCB's)	TP-3S	0.033	NQ	1.0 E - 07	---	---	7.70 E + 00 (i)	B2
Benzo(k)fluoranthene	TP-9S	2.9	NQ	3.3 E - 07	---	---	7.30 E - 02 (e)	B2
Total Increased Incremental Lifetime Cancer Risk				**6.3 E - 05***				

PRESENT/FUTURE SITE USE SCENARIO
CARCINOGENIC RISK – SHALLOW SOIL

Analytes	Location	Concentration mg/kg	Data Qualifier	On-Site Worker	Toxicological Values Applied		EPA Cancer Weight of Evidence
					Oral RfD (Source)	Oral Potency Slope (Source)	
Benzo(a)pyrene	TP-9S	3.3	NQ	**8.4 E - 06**	---	7.30 E + 00 (i)	B2
Benzo(b)fluoranthene	TP-9S	6.8	NQ	**1.7 E - 06**	---	7.30 E - 01 (e)	B2
Arsenic (as carc.)	TP-9S	3.1	NQ	**1.6 E - 06**	3.00 E - 04 (i)	1.50 E + 00 (i)	A
Dibenz(a,h)anthracene	TP-9S	0.48	NQ	**1.2 E - 06**	---	7.30 E + 00 (e)	B2
Benzo(a)anthracene	TP-9S	2.2	NQ	5.6 E - 07	---	7.30 E - 01 (e)	B2
Indeno(1,2,3-cd)pyrene	TP-9S	2.2	NQ	5.6 E - 07	---	7.30 E - 01 (e)	B2
Aroclor (Total PCB's)	TP-3S	0.033	NQ	2.3 E - 08	---	7.70 E + 00 (i)	B2
Benzo(k)fluoranthene	TP-9S	2.9	NQ	7.3 E - 08	---	7.30 E - 02 (e)	B2
Total Increased Incremental Lifetime Cancer Risk				**1.4 E - 05***			

* Rounded Total from additional decimal places
** By inhalation only
IRIS-2(i), withdrawn from IRIS-2(x), HEAST alternative method (a), withdrawn from HEAST (y), EPA-ECAO (e), other EPA documents (o)
Shaded areas = Exceedances of 1.0 x 10E-06 for Cancer Risk or 1 for Hazard Quotient
NOTE: Dose-Response Modeling Paradigm – See Appendix 6

D = Diluted sample
NA = Not available
NQ, J, K, L, [ ] = Data qualifiers applied – see Appendix 5
Carcinogen Weight-of-Evidence – See Appendix 5

TABLE 2. QUALIFIED AND RISK-BASED CONCENTRATION-SCREENING YIELDING ANALYTES OF CONCERN EVALUATED TOXICOLOGICALLY AS NON- CARCINOGENIC EXPOSURE SCENARIOS FOR THE PENINSULA PLATING SITE.

PRESENT/FUTURE SITE USE SCENARIO
HAZARD QUOTIENT – SHALLOW SOIL

Analytes	Location	Concentration mg/kg	Data Qualifier	Trespassing Child Exposure	Trespassing Adult Exposure	Toxicological Values Applied Oral RfD (Source)	Oral Potency Slope (Source)	EPA Cancer Weight of Evidence
Iron	SS-1	7,080	NQ	0.0672	0.0072	3.00 E - 01 (e)	---	---
Arsenic	TP-9S	3.1	NQ	0.0294	0.0031	3.00 E - 04 (i)	1.50 E + 00 (i)	A
Manganese	TP-9S	178	NQ	0.0253	0.0027	2.00 E - 02 (i)	---	D
Total Non-Cancer/Systemic Hazard Index for Shallow Soil				0.1220*	0.0130*			

PRESENT/FUTURE SITE USE SCENARIO
HAZARD QUOTIENT – SHALLOW SOIL

Analytes	Location	Concentration mg/kg	Data Qualifier	On-Site Worker	Toxicological Values Applied Oral RfD (Source)	Oral Potency Slope (Source)	EPA Cancer Weight of Evidence
Iron	SS-1	7,080	NQ	0.0230	3.00 E - 01 (e)	---	---
Arsenic	TP-9S	3.1	NQ	0.0101	3.00 E - 04 (i)	1.50 E + 00 (i)	A
Manganese	TP-9S	178	NQ	0.0087	2.00 E - 02 (i)	---	D
Total Non-Cancer/Systemic Hazard Index for Shallow Soil				0.0419*			

FUTURE SITE USE SCENARIO
HAZARD QUOTIENT – SHALLOW SOIL

Analytes	Location	Concentration mg/kg	Data Qualifier	Resident Adult Exposure	Resident Child Exposure	Toxicological Values Applied Oral RfD (Source)	Oral Potency Slope (Source)	EPA Cancer Weight of Evidence
Iron	SS-1	7,080	NQ	0.0323	0.3017	3.00 E - 01 (e)	---	---
Arsenic	TP-9S	3.1	NQ	0.0141	0.1321	3.00 E - 04 (i)	1.50 E + 00 (i)	A
Manganese	TP-9S	178	NQ	0.0121	0.1137	2.00 E - 02 (i)	---	D
Total Non-Cancer/Systemic Hazard Index for Shallow Soil				0.0586*	0.5476*			

* Rounded Total from additional decimal places
** By inhalation only
IRIS-2(i), withdrawn from IRIS-2(x), HEAST alternative method (a), withdrawn from HEAST (y), EPA-ECAO (e), other EPA documents (o)
Shaded areas = Exceedances of 1.0 x 10E-06 for Cancer Risk or 1 for Hazard Quotient
NOTE: Dose-Response Modeling Paradigm – See Appendix 6

D = Diluted sample
NA = Not available
NQ, J, K, L, [ ] = Data qualifiers applied – see Appendix 5
Carcinogen Weight-of-Evidence – See Appendix 5

TABLE 3. QUALIFIED AND RISK-BASED CONCENTRATION-SCREENING YIELDING ANALYTES OF CONCERN EVALUATED TOXICOLOGICALLY AS NON- CARCINOGENIC EXPOSURE SCENARIOS FOR THE PENINSULA PLATING SITE.

FUTURE SITE USE SCENARIO
HAZARD QUOTIENT – GROUNDWATER (FILTERED)

Analytes	Location	Concentration mg/kg	Data Qualifier	Resident Adult Exposure	Resident Child Exposure	Toxicological Values Applied		EPA Cancer Weight of Evidence
						Oral RfD (Source)	Oral Potency Slope (Source)	
Iron	MW-5	6,330	NQ	0.5780	**1.3488**	3.00 E - 01 (e)	---	---
Manganese	MW-3	79.8	NQ	0.1093	0.2550	2.00 E - 02 (i)	---	D
Total Non-Cancer/Systemic Hazard Index for Groundwater (Filtered)				0.6873*	**1.6039***			

FUTURE SITE USE SCENARIO
HAZARD QUOTIENT – GROUNDWATER (FILTERED)

Analytes	Location	Concentration mg/kg	Data Qualifier	On-Site Worker	Toxicological Values Applied		EPA Cancer Weight of Evidence
					Oral RfD (Source)	Oral Potency Slope (Source)	
Iron	MW-5	6,330	NQ	0.2064	3.00 E - 01 (e)	---	---
Manganese	MW-3	79.8	NQ	0.0390	2.00 E - 02 (i)	---	D
Total Non-Cancer/Systemic Hazard Index for Groundwater (Filtered)				0.2454*			

* Rounded Total from additional decimal places
** By inhalation only
IRIS-2(i), withdrawn from IRIS-2(x), HEAST alternative method (a), withdrawn from HEAST (y), EPA-ECAO (e), other EPA documents (o)
Shaded areas = Exceedances of 1.0 x 10E-06 for Cancer Risk or 1 for Hazard Quotient
NOTE: Dose-Response Modeling Paradigm – See Appendix 6

D = Diluted sample
NA = Not available
NQ, J, K, L, [ ] = Data qualifiers applied – see Appendix 5
Carcinogen Weight-of-Evidence – See Appendix 5

TABLE 4. QUALIFIED AND RISK-BASED CONCENTRATION-SCREENING YIELDING ANALYTES OF CONCERN EVALUATED TOXICOLOGICALLY AS NON- CARCINOGENIC EXPOSURE SCENARIOS FOR THE PENINSULA PLATING SITE.

FUTURE SITE USE SCENARIO

HAZARD QUOTIENT – GROUNDWATER (UNFILTERED)

Analytes	Location	Concentration mg/kg	Data Qualifier	Resident Adult Exposure	Resident Child Exposure	Toxicological Values Applied Oral RfD (Source)	Oral Potency Slope (Source)	EPA Cancer Weight of Evidence
Iron	MW-3	6410	NQ	0.5853	**1.3659**	3.00 E - 01 (e)	---	---
Aluminum	MW-2	4600	NQ	0.1260	0.2940	1.00 E + 00 ( )	---	
Manganese	MW-3	79.2	NQ	0.1084	0.2531	2.00 E - 02 (i)	---	D
Total Non-Cancer/Systemic Hazard Index Groundwater (Unfiltered)				0.8199*	**1.9131***			

FUTURE SITE USE SCENARIO

HAZARD QUOTIENT – GROUNDWATER (UNFILTERED)

Analytes	Location	Concentration mg/kg	Data Qualifier	On-Site Worker	Toxicological Values Applied Oral RfD (Source)	Oral Potency Slope (Source)	EPA Cancer Weight of Evidence
Iron	MW-3	6410	NQ	0.2090	3.00 E - 01 (e)	---	---
Aluminum	MW-2	4600	NQ	0.0450	1.00 E + 00 ( )	---	
Manganese	MW-3	79.2	NQ	0.0387	2.00 E - 02 (i)	---	D
Total Non-Cancer/Systemic Hazard Index for Groundwater (Unfiltered)				0.2928*			

* Rounded Total from additional decimal places
** By inhalation only
IRIS-2(i), withdrawn from IRIS-2(x), HEAST alternative method (a), withdrawn from HEAST (y), EPA-ECAO (e), other EPA documents (o)
Shaded areas = Exceedances of 1.0 x 10E-06 for Cancer Risk or 1 for Hazard Quotient
NOTE: Dose-Response Modeling Paradigm – See Appendix 6

D = Diluted sample
NA = Not available
NQ, J, K, L, [ ] = Data qualifiers applied – see Appendix 5
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APPENDIX 1: TOXICOLOGICAL EXPOSURE ASSUMPTION, DEFINITIONS, AND EXPOSURE PARAMETERS APPLIED IN THIS RISK EVALUATION

Reasonable Maximum Exposure	Applied herein as the maximum analyte concentrations reported for a designated medium and exposure scenario
Target Cancer Risk	1.00×10^{-6} (specific contaminant)
Target Hazard Index/Quotient Value	1 (Unity) (specific contaminant)
Acceptable Risk Range (U.S. EPA, Region III)	1.00×10^{-4} to 1.00×10^{-6}
Body Weight	Adult: 70 Kg Child: 15 Kg
Averaging Time (Years of Life)	70 Years
Drinking Water Ingestion Rate	Adult: 2 L/day Child: 1 L/day Age Adjusted: 1.09 (L-y/Kg-d)
Soil Ingestion	Adult: 100 mg/day (conservative Child: 200 mg/day Worker 100 mg/day (very conservative) Age Adjusted: 114.29 (mg-y/Kg-d)
Exposure Frequency	Residential: 350 days/year Occupational 250 days/year
Exposure Duration	Residential: 30 years Occupational: 25 years
Child Trespasser	Two episodes per week for 39 weeks over six years
Adult Trespasser	May vary but is generally two episodes per week for 39 weeks over 24 years

RELEVANT COMMENTS/NOTES/BENCHMARKS & SCREENING

The upper-bound estimate of carcinogenic risk is expressed in terms of the number of excess cancers over a lifetime in an exposed population under a specific exposure scenario. For instance, a carcinogenic risk of 1.0×10^{-6} (1.0 x 10E-06 or 1.0E-06) is defined as 1 additional cancer per 1 million exposed individuals. In general, the U.S. EPA (Region III, Technical Section and others) defines incremental carcinogenic risk within the 1.0E-06 to 1.0E-04 range being acceptable, with 1.0E-06 being the point-of -departure. This supports a cleanup initiation point of 1.0E-04. The target risk of *de minimis* risk level is considered also to be 1.0E-06.

A non-carcinogenic threat is expressed in terms of a Hazard Quotient (HQ). An HQ is the ratio between the dose of a single substance over a specified period of time compared to the RfD for

that substance. The Hazard Index (HI) is the sum of more than one HQ for multiple substances or multiple exposure routes and pathways. When the HQ or the HI exceeds unity, there may be concern for potential non-cancer health effects. The target non-cancer risk here is unity.

Systemic effects, usually non-carcinogenic, requires absorption and distribution of the toxicant to a site distant from the point of entry, and at which point effects are produced. Most chemicals that produce systemic toxicity usually do not cause a similar degree of toxicity in all organs. Normally the major toxicity is demonstrated in one or more organs. These are referred to as the target organs for that chemical.

The combined carcinogenic risks and non-carcinogenic threats over a 30 year residential exposure duration (6 years as a child resident plus 24 years as an adult resident) are presented. It is recognized that a recently applied philosophical change is now being applied by Region III to estimate exposures to carcinogens and is used to derive the benchmark values. Previous versions of the benchmark table noted estimated exposures to carcinogens on the basis of 30 years of adult exposure. Now the calculations for three media have been changed to reflect 30 years of combined childhood and adult exposure, using **age adjusted factors** via integrated weight and ingestion/inhalation estimates for combined child/adult exposures. This has lowered the appropriate risk based concentrations for carcinogens in tap water, in ambient air, and in occupational and residential soil slightly. Other exposure rates such as for fish consumption remained the same.

The study herein does not apply the ingestion adjusted estimated exposure for carcinogens, and thus the modeled values for adults exposed to carcinogens in drinking water and soil ingestion or air will show slightly less risk. In time, as it is evident that the use of this age-adjustment factor has been followed without revision/change for a reasonable period of time, then our models will begin applying it routinely, but until a consistent pattern emerges, the past model parameters will continue to be used. The previous revision based upon body weight changes lasted for three months and wasted considerable time and effort related to revising the models. The most recently released and "corrected" benchmark values are used for screen purposes, thus analytes of concern are included based on the new philosophy and corrected tables.

Benchmark values are concentrations in various media providing cancer risks reported at 1.0E-06 or a HQ, non-cancer risk reported at unity or 1. These values have been generally applied as a screening level to identify analyte exceedances in this report so that such compounds may be considered for inclusion in risk assessment models. Risk-Based concentration Tables are provided via U.S. EPA Region III by Senior Toxicologist, Roy L. Smith, Ph.D., in the Technical Support Section (3HW13) on a quarterly basis and as noted in the references in this document. It is important to note that the accompanying comments relevant to the table provides the following information, comments and disclaimers.

> "The table contains reference does and carcinogenic potency slopes (obtained from IRIS through...., HEAST through...., OHEA-Cincinnati, and other EPA sources) for nearly 600 chemicals. These toxicity constants have been combined with 'standard' exposure scenarios to calculate chemical concentrations

corresponding to a fixed level of risk (i.e., a hazard quotient of 1, or lifetime cancer risk of 10E-06, whichever occurs at a lower concentration) in water, air, fish tissue, and soil.

The Region III toxicologists use this table as a risk-based screen for Superfund sites, and as a desk reference for emergencies and other requests for immediate information. The table also provides a useful benchmark for evaluating preliminary site investigation data and contractor-prepared preliminary remediation goals. The table has no official status as either regulation or guidance, and should be used only as a predictor of generic single-contaminant health risk estimates. The table is specifically not intended as (1) a stand-alone decision-making tool, (2) a substitute for EPA guidance for preparing baseline risk assessments, (3) a source of site-specific cleanup levels, or (4) a rule to determine if a waste is hazardous under RCRA. In general, chemical concentration above the levels in the table suggest a need for a closer look by a toxicologist, but should not be used a the sole basis for taking any action.

APPENDIX 2: GLOSSARY OF DATA QUALIFIERS APPLIED TO RESULTS OF LABORATORY ANALYSES*

Identification Codes (Confidence concerning presence or absence of analytes.)

U	Not detected. The associated number indicates approximate sample concentration necessary to be detected.
NQ	No Qualifier - Identification confirmed
B	Not detected substantially above the level reported in laboratory or field blanks.
R	Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
N	Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

Quantitation Codes (Can be used for both positive results and sample quantitation limits.)

J	Analyte present. Reported value may not be accurate or precise.
K	Analyte present. Reported value may be biased high. Actual value is expected to be lower
L	Analyte present. Reported value may be biased low. Actual value is expected to be higher.
[]	Analyte present. As values approach the Instrument Detection Limit (IDL) the quantitation may not be accurate. (Above R but lower than J.)
UJ	Not detected, quantitation may be inaccurate or imprecise.
UL	Not detected., quantitation limit is probably higher.

Other Codes

Q	No analytical result.

* Codes normally utilized in risk assessment include: NQ, J, K, and L. Values in brackets are normally not used, but could be applied if judged appropriate. Brackets are considered higher in confidence than R but lower than J.

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APPENDIX 3: DATA SELECTION PROCEDURES APPLIED FOR DEVELOPMENT OF CHEMICAL OF CONCERN

For inclusion, data:

A. Had no delimiting qualifiers, or were J, K, L or [] qualified.

B. Was the highest concentration encountered for specific medium.

C. Were analytes of concern with completed exposure pathways and exceedances of toxicological benchmarks, but not generally within an order of magnitude of such benchmarks unless specified. The latter is often discussed but not included in the calculations.

D. Had surface soil exposures for present and future risks which were given preference over subsurface sample data. Deep soil exposures discussed but not developed into scenarios.

E. Had filtered groundwater samples that were applied over non-filtered but unfiltered data usually is discussed.

F. Had results showing inconsistencies, differences between duplicates, high or low background levels, et cetera. Such results were noted and discussed but normally excluded from consideration in the exposure scenarios.

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APPENDIX 4: MAXIMUM CONTAMINANT LEVELS, MAXIMUM CONTAMINANT LEVEL GOALS, AND SECONDARY MAXIMUM CONTAMINANT LEVELS

Maximum Contaminant Level Goal (MCLG)

An MCLG is a non-enforceable analyte concentration of a drinking water contaminant set at a level that will result in no known or anticipated adverse health effects and allows an adequate margin of safety.

Maximum Contaminant Level (MCL)

An MCL is an enforceable standard as a drinking water regulation set by the U.S. EPA under the Safe Drinking Water Act and adopted by the State. The standard relates to drinking water delivered to any user of a public system. It is a value as close to the MCLG as feasible with treatment technologies and costs considered. The MCL is protective of adverse human health effects. It may or may not pose a risk greater than 1.0E-06. For certain analytes, especially those having long-time-established MCLs, it has been found at times to be the case whereby, for a specific chemical, the MCL may show an increased incremental lifetime cancer risk greater than the target value.

Secondary Maximum Contaminant Level (SMCL)

An SMCL is non-regulatory health guidance value which relates to the aesthetic quality of drinking water. Contributing factors include taste, odor, color, hardness.....

Reference Dose (RfD)

An estimate of a daily exposure to the human population that is likely to be without appreciable risk of deleterious effects over a lifetime.

Drinking Water Equivalent Level (DWEL)

A lifetime exposure concentration of adverse, non-cancer health effects, that assumes all of the exposure to a contaminant is from a drinking water source.

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APPENDIX 5: EPA WEIGHT-0F-EVIDENCE CLASSIFICATION SYSTEM FOR POTENTIAL CARCINOGENS

Category	Group Description	Evidence of Support
Group A*	Human Carcinogen	Sufficient evidence from epidemiological studies to support a casual association between exposure and cancer in humans.
Group B1*	Probable Human Carcinogen	Limited evidence in humans from epidemiological studies
Group B2*	Possible Human Carcinogen	Sufficient evidence in animals, inadequate evidence in humans.
Group C	Possible Human Carcinogen	Limited evidence in animals and/or carcinogenic properties in short-term studies.
Group D	Not Classified	Inadequate evidence in animals.
Group E	Not Classified	No evidence in at least two adequate animal tests or in both epidemiological and animal studies

* Cancer Slope Values usually available via EPA, Integrated Risk Information System.

Source: U.S. EPA, 1986.

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