

**Groundwater and Sediment
Characterization Report
Sites 303 and 304
Fleet and Industrial Supply Center (FISC)
Fuel Department
Manchester, Washington**



**Prepared for
Department of the Navy
Engineering Field Activity, Northwest
Naval Facilities Engineering Command**

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**GROUNDWATER AND SEDIMENT CHARACTERIZATION REPORT
SITES 303 AND 304
FLEET AND INDUSTRIAL SUPPLY CENTER (FISC)
FUEL DEPARTMENT
MANCHESTER, WASHINGTON**

1.0 INTRODUCTION

This report presents the results of groundwater and sediment characterization activities conducted within Sites 303 (D-Tunnel Tanks) and 304 (Industrial Area) at the Fleet and Industrial Supply Center (FISC). The groundwater and sediment characterization was completed between September 7, 1999, and June 13, 2000, under Contract N44255-98-D-4408, Delivery Order No. 5, with the Engineering Field Activity, Northwest (EFA, NW) Naval Facilities Engineering Command. The primary objective of the sampling program was to demonstrate that groundwater within Sites 303 and 304 and sediments offshore of Site 304 have not been unacceptably impacted by fuel depot operations.

The Manchester FISC is located 7 miles west of Seattle across Puget Sound and 3 miles east of Bremerton on approximately 234 acres of land at Orchard Point in eastern Kitsap County as shown on Figure 1. Manchester FISC is bounded by the community of Manchester to the south, rural lands to the west, and by Puget Sound and Rich Passage to the east and north, respectively.

The site was developed into a major fuel storage facility at the beginning of World War II. The majority of Manchester FISC, which has also been referred to as the Manchester Naval Fuel Department, is currently used for fuel storage. The base consists of above-ground and underground petroleum storage tanks, associated product pipelines, a fuel pier, and various administrative and support buildings located as shown on Figure 2. Fuel products stored at Manchester FISC, either in the past or present, include Navy Special Fuel (Bunker C), marine diesel fuel, jet fuel, lubricating (lube) oil, and aviation gasoline. Petroleum product is typically transferred between the storage tanks and the fuel pier located at the southeastern corner of the base through a network of pipelines.

Several areas at Manchester FISC have been impacted by past releases of petroleum products. As shown on Figure 2, these areas have been identified as Site 302 (PCB Site), Site 303 (D-Tunnel Tanks), and Site 304 (Industrial Area). Historical releases and results of previous site investigations conducted in these areas are summarized in the Project Plan (Hart Crowser, 1999).

2.0 PROJECT OBJECTIVES

The objectives of this study were to:

- ▶ Collect groundwater quality data at Sites 303 and 304 to determine whether the residual petroleum-containing soils are unacceptably impacting the adjacent marine environment;
- ▶ Obtain sediment quality data offshore of Site 304 to determine whether sediment has been unacceptably impacted by fuel depot operations; and
- ▶ Finalize a petroleum management strategy for Sites 303 and 304.

3.0 SEDIMENT AND GROUNDWATER SAMPLING AND ANALYSIS

Sediment and groundwater sampling was performed in general accordance with the project Work Plan dated June 17, 1999. The work completed as part of this investigation included:

- ▶ **Groundwater Sampling Field Work.** Collection of groundwater samples from five wells and two seeps on Site 303, and four wells and one seep on Site 304.
- ▶ **Sediment Sampling Field Work.** Collection of eleven surface sediment samples (and one duplicate sample) offshore of Site 304. Sediment samples from one location (HC-SED-11) could not be collected due to refusal on gravel.

3.1 Groundwater and Seep Sampling and Analysis

Nine groundwater samples were collected from existing monitoring wells shown on Figures 3 (Site 303) and 4 (Site 304). Prior to sampling, each well was monitored for the presence of floating free phase petroleum product using a product/water interface meter. No measurable quantities of product were observed in site wells or seeps. Groundwater elevations were also measured prior to sampling using an electronic water level probe during both low and high tide intervals.

In general, the wells were purged and sampled using low flow sampling (approximately 0.1 liter per minute) techniques. A peristaltic pump was used to purge groundwater within the wells until field parameters (including pH, temperature, specific conductivity, and dissolved oxygen) and turbidity

stabilized. Field parameter measurements, purge volumes (if applicable), and general observations were recorded. Since the depth to water exceeds the range of peristaltic pumps at well OW-2, a disposable bailer was used to purge and collect the groundwater samples. Field parameter measurements and groundwater elevations are presented in Tables 1 and 2, respectively.

In addition, three seep samples were collected between January and June of 2000. HC-Seep 3 was not observed during the first seep sampling event in January; a sample from it was collected when flow was observed in June 2000. Prior to sampling, field parameters (including pH, temperature, specific conductivity, and dissolved oxygen) were recorded. Seep samples were collected using a peristaltic pump. The tubing intake was placed in a manner to minimize the introduction of air or sediment into the sample.

Most of the groundwater and seep samples were submitted to Columbia Analytical Services (CAS) of Kelso, Washington, for analysis of the following parameters:

- ▶ Petroleum hydrocarbons and volatile aromatics using NWTPH-G/BTEX and NWTPH-D extended methods;
- ▶ Total Suspended Solids (TSS);
- ▶ Alkalinity;
- ▶ Dissolved Iron;
- ▶ Nitrate; and
- ▶ Sulfate.

In addition, one trip blank was shipped with the groundwater samples and one trip blank was shipped with the June seep sample and submitted for analysis of TPH-G/BTEX.

3.2 Sediment Sampling and Analysis

Eleven surface (0 to 10 cm) sediment samples were collected in the vicinity of the fuel pier at the locations shown on Figure 5. Additionally, one blind field duplicate (HC-SED-100) was collected at location HC-SED-06. The sampling attempt at HC-SED-11 met with refusal on gravel, and no sample was removed. Undisturbed sediment samples were collected using standard van Veen “grab” type sampler methodology, in accordance with EPA-approved Puget Sound Estuary Protocols and the project Work Plan. Water depth, sample recovery depth, and sample locations were noted in the field. With the following exceptions, the upper 10 cm of sediment were homogenized and collected from the sampler. At locations HC-SED-01 and HC-SED-02, recovery was less than 10 cm because of sampling device refusal on eelgrass.

The sediment samples were submitted to CAS for analysis of constituents of potential concern including:

- ▶ Total Metals (including As, Cd, Cu, Cr, Pb, Ni, and Zn);
- ▶ Volatile Organics;
- ▶ Polycyclic Aromatic Hydrocarbons (PAHs);
- ▶ Phenols;
- ▶ Polychlorinated Biphenyls (PCBs); and
- ▶ Total Organic Carbon (TOC).

To evaluate the source of PAHs in sample HC-SED-07, this sample was submitted to Analytical Resources, Incorporated (ARI) of Seattle, Washington, for expanded forensic PAH analysis.

4.0 GROUNDWATER SAMPLES ANALYTICAL RESULTS

Field parameters, groundwater elevations, and validated analytical results for groundwater samples are presented in Tables 1, 2, and 3, respectively. Groundwater quality data generated as part of this RI were reviewed by an environmental chemist to determine the validity of the data based on the Quality Assurance Project Plan (Hart Crowser, 1999) and general quality control criteria. Based on this review, the analytical results were deemed acceptable for the purposes of this work. Detection limits were below screening levels and no groundwater quality data were rejected based on data deficiencies. For reference, results of the data quality review and laboratory certificates of analysis from CAS and ARI are presented in Appendix A.

4.1 Selection of Screening Levels

Because site groundwater discharges into the adjacent marine surface water body (see Figures 3 and 4) and is not likely a current or potential source of drinking water, groundwater quality data are compared to Method B surface water criteria (including Washington State surface water quality standards – Chapter 173-201A WAC). Shallow groundwater beneath the site is fairly saline and would not likely be used as a domestic water supply due to its close proximity to a marine surface water body. Surface water criteria for petroleum hydrocarbons are based on Ecology's Water Quality Policy Number 9 "Guidelines for Oil and Grease Discharges."

4.2 Total Petroleum Hydrocarbons (TPH)

Petroleum hydrocarbons were not detected in Sites 303 or 304 groundwater samples at concentrations exceeding Method B surface water criteria (Table 3). No measurable quantities of free phase product were detected in Sites 303 and 304 wells and seeps.

Elevated concentrations of diesel-range hydrocarbons were detected in Site 303 wells MW-1 (7.54 mg/L) and MW-2 (1.48 mg/L) and in seeps HC-SEEP 1 (0.76 mg/L) and HC-SEEP 2 (0.3 mg/L). Our review of chromatograms associated with the NWTPH-D extended analysis indicates that these detected hydrocarbons appear to be associated with a heavily weathered diesel-like product and are generally not present in a dissolved form. Since no hydrocarbon sheens were observed in these samples, hydrocarbons detected in the Site 303 groundwater samples are likely associated primarily with suspended particulates generated during the sampling process. Although low flow sampling techniques were used to sample these wells, elevated concentrations of suspended solids were observed (Table 3).

Diesel-range hydrocarbons were also detected in Site 304 well MW-4 (1.9 mg/L) and seep HC-SEEP 3 (0.26 mg/L). A petroleum-like odor was observed in well MW-4 but no hydrocarbon sheen was observed. No petroleum-like odors or sheens were observed in HC-SEEP 3.

4.3 Volatile Aromatic Organics (BTEX)

No volatile aromatic organics were detected in any of the groundwater or seep samples collected from Sites 303 and 304.

5.0 SEDIMENT SAMPLES ANALYTICAL RESULTS

A summary of the field observations and validated analytical results for sediment samples are presented in Tables 4 and 5. Forensic PAH results and ratio calculations for HC-SED-07 are presented in Tables 6 and 7, respectively. Sediment quality data generated as part of this RI were reviewed by an environmental chemist to determine the validity of the data based on the Quality Assurance Project Plan (Hart Crowser, 1999) and general quality control criteria. Based on this review, the analytical results were deemed acceptable for the purposes of this work. Detection limits were generally below screening levels (PAHs in one sample exceeded screening levels due to matrix interference) and no sediment quality data were rejected based on data deficiencies. For

reference, results of the data quality review and laboratory certificates of analysis from CAS and ARI are presented in Appendix A.

5.1 Selection of Screening Levels

Sediment quality results were compared to the Washington State Department of Ecology Sediment Management Standards (SMS – Chapter 173-204 WAC). The sediment quality data were compared to the Marine Sediment Quality Standard (SQS) and Cleanup Screening Level (CSL) criteria.

In general, sediment constituent concentrations were below the SQS criteria. Two samples contained constituent concentrations that exceeded SQS criteria including high molecular weight PAHs (HPAHs) in sample HC-SED-07 and phenols in sample HC-SED-02 (Table 5).

5.2 Polynuclear Aromatic Hydrocarbons (PAHs)

PAH concentrations detected in sample HC-SED-07 were much higher than the range of concentrations observed in the other sediment sampling locations. Given the highly localized nature of the PAH occurrence and the prevalence of HPAHs relative to low molecular weight PAHs (LPAHs), it is unlikely to be associated with fuel oil releases. To further evaluate potential sources of the PAHs, we submitted sample HC-SED-07 to ARI for expanded forensic PAH analysis.

The source of PAHs can be determined using various ratios summarized below:

LPAH/HPAH. The ratio of LPAH to HPAH is higher in fuels than in combustion-related (pyrogenic) and coal-derived sources.

TAH/pPAH. The ratio of total aliphatic hydrocarbons (TAH) to parent, or unsubstituted PAH (pPAH) is generally higher in petroleum fuels hydrocarbons relative to those in creosote sources.

sPAH/pPAH. The ratio of alkyl-substituted PAHs (sPAH) to parent PAHs (pPAH) varies with the source. Pyrogenic and coal-based sources typically contain greater concentrations of pPAHs relative to sPAHs. In addition, the normalized distributions of individual PAHs can be used to evaluate source. For a given PAH compound series (e.g., naphthalenes), fuels typically exhibit “bell-shaped” distributions of parent to substituted PAHs. Pyrogenic sources are dominated by the parent (C0) compound. Weathering can alter these distributions by reducing the parent to substituted PAH ratios – particularly for LPAHs.

As shown in Table 7, forensic ratio comparisons indicate that PAHs in sample HC-SED-07 are derived primarily from combustion products (e.g., burnt wood) and/or from a severely weathered creosote-type product. Distribution of chrysene series compounds also suggests a pyrogenic source (Figure 6). No petroleum- or creosote-like staining or odors were observed in the HC-SED-07 sample. However, a black sandy silt layer containing a metal fragment was observed at this location. This black silt layer was not encountered in any of the other sampling locations and appears to be very localized.

5.3 Phenols

Elevated concentrations of phenol (1.1 mg/kg) and 3- and 4-methylphenol (3.4 mg/kg) were detected in sample HC-SED-02 (Table 5). Although the detected concentrations exceed Marine Sediment Management Standards chemical criteria (note that the sum of 3- and 4-methylphenol concentrations is being compared to the 4-methylphenol criteria), it appears that the phenols are derived from natural organic materials. Sample HC-SED-02 was collected in an area that contained abundant eelgrass and other biota (Table 4). No evidence of petroleum- or creosote-derived odors or sheens was observed in the sample. Detected concentrations of PAHs and other potential constituents of concern were very low and do not indicate the presence of anthropogenic sources.

Phenols are known to occur naturally in plants (Howard, 1989) and are often detected at sites with decaying wood or plant debris. The highest concentrations of phenols were observed in the two sediment samples that were collected in areas containing abundant eelgrass (including HC-SED-01 and HC-SED-02). Previous sediment sampling and analysis conducted prior to pier construction also encountered concentrations of phenol and 4-methylphenol that exceeded SQS criteria (Parametrix, 1990) but were not associated with an obvious anthropogenic source. Sediment collected from the dredge area was biologically tested and is suitable for open water disposal.

6.0 CONCLUSIONS/PETROLEUM MANAGEMENT STRATEGY

Results of groundwater and sediment quality testing at Sites 303 and 304 indicate that petroleum hydrocarbons are not being discharged into the marine environment at concentrations of concern. Given the lack of impacts to the adjacent marine environment and the Navy's current industrial land use, we do not believe that remedial actions are necessary to address residual petroleum contamination in Sites 303 and 304. If changes in land use occur (e.g., base closure), Ecology will be consulted regarding the need for remedial actions. This will be ensured by including a document in the official property records that

describes the area of concern and the requirement to consult with Ecology prior to disposal. The Navy will be able to conduct digging and construction activities (e.g., street and utilities improvements or maintenance) subject to taking necessary preventive measures to protect against short-term and long-term risks from contamination. To ensure that areas of concern are identified, the Fuel Department Facility Map will be updated to show areas of contamination, by shading or cross-hatching, and annotated to show the type of contamination present. A facility Instruction (Department Instruction) will be prepared which will require checking the area of the dig against the Fuel Department Facility Map to identify conflicts or environmental concerns.

7.0 LIMITATIONS

Work for this project was performed, and this report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of Department of the Navy Engineering Field Activity, Northwest for specific application to the referenced property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

8.0 REFERENCES

Hart Crowser, 1999. Project Plan Sites 303 and 304 Groundwater and Sediment Characterization. Manchester Fleet and Industrial Supply Center, Manchester, Washington. Prepared for EFA, NW Contract No. N44255-98-D-4408. Delivery Order No. 5.

Howard, 1989. Handbook of Environmental Fate and Exposure Data for Organic Chemicals – Volume I. Lewis Publishers.

Ecology, 1996. Model Toxics Control Act Cleanup Regulation. Chapter 173-340 WAC. January 1996.

Parametrix, 1990. Environmental Assessment – Fuel Pier Placement, Manchester Defense Fuel Support Point, Naval Supply Center Puget Sound. Manchester, Washington. Prepared for Department of Navy.

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Table 1 - Summary of Groundwater Field Parameters

Sample ID	Date	Field Parameters			
		Dissolved Oxygen in mg/L	Temperature in °C	pH	Conductivity in mS
Site 303					
MW-1	9/7/99	2	11.6	6.9	440
MW-2	9/7/99	2.1	13.7	6.9	577
MW-3	9/7/99	1.9	13.2	6.9	611
MW-4	1/20/00	1.2	8.2	8.0	42
OW-2	9/7/99	2.7	11.7	6.3	720
HC-Seep 1	1/20/00	3.1	9.6	7.6	3100
HC-Seep 2	1/20/00	7.2	9.5	8.6	30
Site 304					
MW-1	9/7/99	2.3	19.3	6.9	404
MW-2	9/7/99	2.3	20	7.2	601
MW-4	9/7/99	2.9	18.5	6.9	403
MW-5	9/7/99	2.6	17.5	6.4	174
HC-Seep 3	6/13/00	NA	14	7.0	490

Table 2 - Groundwater Elevation Measurements

Depth to Water in Feet

Site	Well	Top of Casing in Feet	9/7/1999 Low tide	1/20/00
Site 303	MW-01	30	20.56	18.53
	MW-02	24.9	9.5	6.6
	MW-03	26.2	19.71	18.5
	MW-04	26.2	NA	1.65
	OW-2	NA	28.1	NA
Site 304	MW-01	14.67	4.21	3.82
	MW-02	14.61	4.33	2.46
	MW-04	14.67	5.35	4.77
	MW-05	17.06	8.88	7.74

Groundwater Elevation in Feet

Site	Well	9/7/99	1/20/00
Site 303	MW-01	9.44	11.47
	MW-02	15.4	18.3
	MW-03	6.49	7.7
	MW-04	-	24.55
	OW-2	-	-
Site 304	MW-01	10.46	10.85
	MW-02	10.28	12.15
	MW-04	9.32	9.9
	MW-05	8.18	9.32

Table 3 - Analytical Results for Groundwater and Seep Samples

Sheet 1 of 2

Sample ID:	MTCA	HC-303	HC-303	HC-303	HC-303	HC-303	HC-304	HC-304	HC-304	HC-304	Trip Blank
	Surface Water	MW-1	MW-2	MW-3	MW-4	OW-2	MW-1	MW-2	MW-4	MW-5	
Sampling Date:	Method B	9/7/99	9/7/99	9/7/99	1/20/00	9/7/99	9/7/99	9/7/99	9/7/99	9/7/99	9/7/99
Conventionals in mg/L											
Total Alkalinity as CaCO ₃	--	173	263	189	165	82	178	292	208	72	NA
Nitrate as Nitrogen	--	0.2 U	0.2 U	2 U	0.5	0.2 U	0.2 U	0.2 U	0.2 U	0.8	NA
Total Suspended Solids	--	76 J	90 J	61 J	5 U	646 J	14 J	8 J	16 J	5 J	NA
Sulfate	--	21.4	0.3	301	57.2	354	41.7	45.5	0.2 U	4.9	NA
Dissolved Metals in µg/L											
Iron	--	555	38500	20300	20 U	504	2010	1280	6980	52	NA
BETX in µg/L											
Benzene	43	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	6,910	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	48,500	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Xylenes, Total	16,000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
TPH in mg/L											
Gasoline	1.0	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
PHC as Gasoline	1.0	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.91	0.25 U	0.25 U
Non-PHC as Gasoline	--	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Diesel	10	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	NA
PHC as Diesel	10	7.54	1.48	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	1.9	0.5 U	NA
Non-PHC as Diesel	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Heavy Fuel Oil	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Jet Fuel as Jet A	10	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	NA
Kerosene	10	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	NA
Lube Oil	10	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	NA
Mineral Spirits	10	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	NA

Table 3 - Analytical Results for Groundwater and Seep Samples

Sample ID:	HC-SEEP 1	HC-SEEP 2	HC-SEEP 3	Trip Blank
Sampling Date:	1/20/00	1/20/00	6/13/00	6/13/00
Conventionals in mg/L				
Total Alkalinity as CaCO ₃	137	96	140	NA
Nitrate as Nitrogen	0.8	0.3	1 U	NA
Total Suspended Solids	5	5 U	2.8	NA
Sulfate	165	78	12.6	NA
Dissolved Metals in µg/L				
Iron	498	69.5	NA	NA
BETX in µg/L				
Benzene	0.5 U	0.5 U	1 U	1 U
Ethylbenzene	1 U	1 U	1 U	1 U
Toluene	1 U	1 U	1 U	1 U
Xylenes, Total	1 U	1 U	1 U	1 U
TPH in mg/L				
Gasoline	0.25 U	0.25 U	0.25 U	0.25 U
PHC as Gasoline	0.25 U	0.25 U	NA	NA
Non-PHC as Gasoline	0.25 U	0.25 U	NA	NA
Diesel	0.25 U	0.25 U	0.26	NA
PHC as Diesel	0.764	0.3 J	NA	NA
Non-PHC as Diesel	0.5 U	0.5 U	NA	NA
Heavy Fuel Oil	0.5 U	0.5 U	NA	NA
Jet Fuel as Jet A	0.25 U	0.25 U	NA	NA
Kerosene	0.25 U	0.25 U	NA	NA
Lube Oil	0.5 U	0.5 U	NA	NA
Mineral Spirits	0.25 U	0.25 U	NA	NA

PHC - Fingerprint not matching any target analytes in specified range.

Non-PHC - Non petroleum hydrocarbon components eluting in specified range.

U - Not detected at indicated detection limit.

J - Estimated value

NA - Not analyzed.

Table 4 - Summary of Sediment Sampling Field Observations

Sample Location	Northing	Easting	Depth of Sample in cm	Depth to Mudline in Feet	Tide in Feet	Mudline Elevation in Feet	Visual Observations
HC-SED-01	210022.89	1220134.90	5	9.60	8.8	0.8	Gray, medium SAND with abundant eel grass and shell fragments. Kelp crab present. Refusal on eel grass.
HC-SED-02	210067.61	1220287.20	6.5	9.66	9.0	0.7	Dark gray, medium SAND with abundant eel grass. Shrimp and kelp crab present. Refusal on eel grass.
HC-SED-03	209921.26	1219865.10	10	9.25	9.4	-0.2	Gravelly, medium to coarse SAND with shell fragments.
HC-SED-04	209837.50	1219682.22	10	9.00	9.4	-0.4	Brown to gray, medium SAND with trace gravel and shell fragments. Soft shell clam, worms, and shrimp present.
HC-SED-05	209220.60	1219692.22	10	53.00	9.0	44.0	Dark gray, medium to fine SAND with trace silt. Tube worms present.
HC-SED-06	209558.34	1219791.62	10	50.00	9.0	41.0	Gray, slightly silty, medium SAND. Brittle star present.
HC-SED-07	209357.22	1220073.34	10	52.00	9.0	43.0	Brown to black, sandy SILT. Tube worms present.
HC-SED-08	209301.29	1220858.63	10	52.60	8.6	44.0	Gray, medium SAND with shell fragments. Tube worms present.
HC-SED-09	209444.71	1220301.60	10	52.00	8.4	43.6	Gray, medium SAND with abundant shell fragments and slight creosote-like odor. Hermit crab and worms present.
HC-SED-10	209527.38	1220478.42	10	50.10	7.9	42.2	Gray, medium SAND with scattered shell fragments. Abundant worms present.
HC-SED-11	209710.69	1220176.59	0	50.00	7.8	42.2	No recovery because of refusal on gravel.
HC-SED-12	209790.25	1220334.84	10	34.00	7.5	26.5	Gray, silty SAND with abundant silt stone and scattered shell fragments. One crab and abundant tubes worms present.

Table 5 - Analytical Results for Sediment Samples

Sheet 1 of 6

	Ecology SQS Criteria	Ecology CSL Criteria	HC-SED-01	HC-SED-02	HC-SED-03	HC-SED-04	HC-SED-05
Conventionals in %							
Total Solids			74.9	49.8	82.7	82.1	75.7
Total Organic Carbon			0.52	2.02	0.09	0.2	0.42
Metals in mg/kg dry wt.							
Arsenic	57	93	3.7	5.6	2.2	2.2	1.6
Cadmium	5.1	6.7	0.26	0.4	0.03	0.07	0.1
Chromium	260	270	12.2	16.5	7.3	11	20
Copper	390	390	10.6	19.9	8.38	8.05	12.2
Lead	450	530	10.5	19.7	8.68	10.5	5.32
Nickel			9.1	13.4	6.9	8.9	16.7
Zinc	410	960	29.5	37.4	24	30.7	37.9
LPAHs in mg/kg OC							
Acenaphthene	16	57	3.85 U	0.25 J	22.22 U	10.00 U	4.76 U
Acenaphthylene	66	66	3.85 U	0.15 J	22.22 U	1.50 J	4.76 U
Anthracene	220	1200	0.96 J	0.99 J	5.56 J	3.00 J	2.38 J
Fluorene	23	79	0.38 J	0.30 J	22.22 U	1.50 J	4.76 U
Naphthalene	99	170	0.19 J	0.10 J	22.22 U	0.50 J	0.24 J
Phenanthrene	100	480	8.08	3.07	22.22 J	17.00	2.38 J
Total LPAHs	370	780	9.6	4.9	27.8	23.5	5.0
HPAHs in mg/kg OC							
Benzo(a)anthracene	110	270	4.62	2.48	22.22 J	10.00 J	35.71
Benzo(a)pyrene	99	210	3.85	1.98	11.11 J	10.00 J	12.14
Benzo(b)fluoranthene			3.85 J	2.08	11.11 J	5.00 J	14.76
Benzo(k)fluoranthene			3.85 J	1.68	10.00 J	5.00 J	12.14
Total Benzofluoranthenes	230	450	7.69 J	3.76	21.11 J	10.00 J	26.90
Benzo(g,h,i)perylene	31	78	1.92 J	0.99 J	6.67 J	4.00 J	4.76 J
Chrysene	110	460	6.54	3.22	22.22 J	10.50	30.95
Dibenz(a,h)anthracene	12	33	0.58 J	0.25 J	2.22 J	1.00 J	1.19 J
Fluoranthene	160	1200	13.85	5.94	58.89	24.00	57.14
Indeno(1,2,3-cd)pyrene	34	88	1.92 J	1.19	7.78 J	5.00 J	5.48
Pyrene	1000	1400	11.73	4.90	44.44	26.50	12.62
Total HPAHs	960	5300	60.4	28.5	217.8	111.0	213.8
Semivolatiles in mg/kg OC							
Dibenzofuran	15	58	0.38 J	0.15 J	22.22 U	10.00 U	4.76 U
Phenols in µg/kg dry wt.							
2,4-Dimethylphenol	29	29	6 U	6 U	6 U	6 U	6 U
2-Methylphenol	63	63	6 U	6 U	6 U	6 U	6 U
4-Methylphenol	670	670	140 *	3400 *	20 U*	20 U*	23 *
Pentachlorophenol	360	690	61 U	61 U	61 U	61 U	61 U
Phenol	420	1200	200	1100	20 U	37	73
BTEX in mg/kg OC							
Benzene			0.96 U	0.50 U	5.56 U	2.50 U	1.19 U
Ethylbenzene			0.96 U	0.50 U	5.56 U	2.50 U	1.19 U
Toluene			0.96 U	0.50 U	5.56 U	2.50 U	1.19 U
m,p-Xylenes			0.96 U	0.50 U	5.56 U	2.50 U	1.19 U
o-Xylene			0.96 U	0.50 U	5.56 U	2.50 U	1.19 U

Table 5 - Analytical Results for Sediment Samples

Sheet 2 of 6

	Ecology SQS Criteria	Ecology CSL Criteria	HC-SED-01	HC-SED-02	HC-SED-03	HC-SED-04	HC-SED-05
PCBs in mg/kg OC							
Aroclor 1016			1.92 U	0.50 U	11.11 U	5.00 U	2.38 U
Aroclor 1221			3.85 U	0.99 U	22.22 U	10.00 U	4.76 U
Aroclor 1232			1.92 U	0.50 U	11.11 U	5.00 U	2.38 U
Aroclor 1242			1.92 U	0.50 U	11.11 U	5.00 U	2.38 U
Aroclor 1248			1.92 U	0.50 U	11.11 U	5.00 U	2.38 U
Aroclor 1254			1.92 U	0.50 U	11.11 U	5.00 U	2.38 U
Aroclor 1260			1.92 U	0.50 U	5.56 J	5.00 U	2.38 U
Total PCBs	12	65	1.92 U	0.50 U	5.56 J	5.00 U	2.38 U

* Represents sum of 3 & 4-Methylphenol

U - Not detected at indicated detection limit.

J - Estimated value.

 Boxed values exceed Ecology SQS criteria.

 Boxed values exceed Ecology CSL criteria.

Italicized values represent detection limits greater than SQS criteria.

Table 5 - Analytical Results for Sediment Samples

	HC-SED-06	HC-SED-100 Dup of HC-SED-06	HC-SED-07	HC-SED-08	HC-SED-09
Conventionals in %					
Total Solids	66.8	68.1	47.4	71.5	77.8
Total Organic Carbon	0.5	0.6	1.74	0.41	0.23
Metals in mg/kg dry wt.					
Arsenic	3.2	3.4	21.1	2.7	4
Cadmium	0.25	0.27	0.42	0.16	0.18
Chromium	14.5	14.2	27.8	11.8	12.2
Copper	13	13.9	124	8.66	7.63
Lead	8.01	7.91	63.6	6.5	6.05
Nickel	13.8	13.8	28	11.3	12.4
Zinc	28.8	29.5	165	22.5	21.5
LPAHs in mg/kg OC					
Acenaphthene	4.00 U	3.33 U	7.47	4.88 U	1.30 J
Acenaphthylene	4.00 U	0.67 J	2.64	4.88 U	1.30 J
Anthracene	1.20 J	5.33	109.20	1.46 J	4.35 J
Fluorene	4.00 U	1.17 J	17.24	4.88 U	2.17 J
Naphthalene	0.20 J	0.50 J	2.99	0.24 J	2.17 J
Phenanthrene	2.00 J	7.17	212.64	2.44 J	14.78
Total LPAHs	3.4	14.8	352.2	4.1	26.1
HPAHs in mg/kg OC					
Benzo(a)anthracene	4.40	21.67	396.55	7.32	20.87
Benzo(a)pyrene	4.00 J	13.50	264.37	5.61	15.65
Benzo(b)fluoranthene	4.00 J	13.00	241.38	6.59	15.65
Benzo(k)fluoranthene	4.00 J	13.00	195.40	4.88	12.17
Total Benzofluoranthenes	8.00 J	26.00	436.78	11.46	27.83
Benzo(g,h,i)perylene	1.80 J	4.67	109.20	2.44 J	8.70 J
Chrysene	5.80	45.00	396.55	10.98	22.17
Dibenz(a,h)anthracene	0.60 J	1.67 J	37.36	0.98 J	3.04 J
Fluoranthene	7.00	18.33	747.13	10.00	30.43
Indeno(1,2,3-cd)pyrene	2.00 J	6.67	149.43	4.88 J	10.87
Pyrene	10.60	21.67	747.13	10.24	27.83
Total HPAHs	52.2	185.2	3721.3	75.4	195.2
Semivolatiles in mg/kg OC					
Dibenzofuran	0.20 J	0.50 J	4.83	4.88 U	1.30 J
Phenols in µg/kg dry wt.					
2,4-Dimethylphenol	6 U	6 U	6 U	6 U	6 U
2-Methylphenol	6 U	6 U	7	6 U	6 U
4-Methylphenol	40 *	20 U*	80 *	20 U*	20 U*
Pentachlorophenol	61 U	61 U	61 U	61 U	61 U
Phenol	20 U	20 U	80	20 U	20 U
BTEX in mg/kg OC					
Benzene	1.00 U	0.83 U	0.57 U	1.22 U	2.17 U
Ethylbenzene	1.00 U	0.83 U	0.57 U	1.22 U	2.17 U
Toluene	1.00 U	0.83 U	0.57 U	1.22 U	2.17 U
m,p-Xylenes	1.00 U	0.83 U	0.57 U	1.22 U	2.17 U
o-Xylene	1.00 U	0.83 U	0.57 U	1.22 U	2.17 U

Table 5 - Analytical Results for Sediment Samples

Sheet 4 of 6

	HC-SED-06	HC-SED-100 Dup of HC-SED-06	HC-SED-07	HC-SED-08	HC-SED-09
PCBs in mg/kg OC					
Aroclor 1016	2.00 U	1.67 U	0.57 U	2.44 U	4.35 U
Aroclor 1221	4.00 U	3.33 U	1.15 U	4.88 U	8.70 U
Aroclor 1232	2.00 U	1.67 U	0.57 U	2.44 U	4.35 U
Aroclor 1242	2.00 U	1.67 U	0.57 U	2.44 U	4.35 U
Aroclor 1248	2.00 U	1.67 U	0.57 U	2.44 U	4.35 U
Aroclor 1254	2.00 U	1.67 U	0.57 U	2.44 U	4.35 U
Aroclor 1260	3.20	1.67 U	0.98	2.44 U	4.35 U
Total PCBs	3.20	1.67 U	0.98	2.44 U	4.35 U

Table 5 - Analytical Results for Sediment Samples

	HC-SED-10	HC-SED-12
Conventionals in %		
Total Solids	73.2	61.3
Total Organic Carbon	0.39	0.5
Metals in mg/kg dry wt.		
Arsenic	3.9	6.3
Cadmium	0.15	0.12
Chromium	15.4	27.5
Copper	11	30.6
Lead	9.28	9.45
Nickel	16.2	27.4
Zinc	28.8	62.6
LPAHs in mg/kg OC		
Acenaphthene	5.13 U	4.00 U
Acenaphthylene	5.13 U	4.00 U
Anthracene	2.56 J	1.00 J
Fluorene	0.77 J	0.40 J
Naphthalene	0.26 J	0.40 J
Phenanthrene	5.13 J	2.00 J
Total LPAHs	8.7	3.8
HPAHs in mg/kg OC		
Benzo(a)anthracene	7.44	4.00 J
Benzo(a)pyrene	5.13	2.00 J
Benzo(b)fluoranthene	5.38	2.00 J
Benzo(k)fluoranthene	5.13 J	1.80 J
Total Benzofluoranthenes	10.51	3.80 J
Benzo(g,h,i)perylene	2.56 J	1.20 J
Chrysene	9.23	4.60
Dibenz(a,h)anthracene	0.77 J	0.40 J
Fluoranthene	13.59	7.80
Indeno(1,2,3-cd)pyrene	2.56 J	1.40 J
Pyrene	12.82	6.40
Total HPAHs	75.1	35.4
Semivolatiles in mg/kg OC		
Dibenzofuran	5.13 U	0.40 J
Phenols in µg/kg dry wt.		
2,4-Dimethylphenol	6 U	6 U
2-Methylphenol	6 U	6 U
4-Methylphenol	26 *	65 *
Pentachlorophenol	61 U	61 U
Phenol	20 U	22
BTEX in mg/kg OC		
Benzene	1.28 U	1.00 U
Ethylbenzene	1.28 U	1.00 U
Toluene	1.28 U	1.00 U
m,p-Xylenes	1.28 U	1.00 U
o-Xylene	1.28 U	1.00 U

Table 5 - Analytical Results for Sediment Samples

	HC-SED-10	HC-SED-12
PCBs in mg/kg OC		
Aroclor 1016	2.56 U	2.00 U
Aroclor 1221	5.13 U	4.00 U
Aroclor 1232	2.56 U	2.00 U
Aroclor 1242	2.56 U	2.00 U
Aroclor 1248	2.56 U	2.00 U
Aroclor 1254	2.56 U	2.00 U
Aroclor 1260	2.56 U	2.00 U
Total PCBs	2.56 U	2.00 U

Table 6 - Summary of Forensic Geochemical Analysis of Sample HC-SED-07

Sample ID: HC-SED-07
Sampling Date: 9/17/1999

PAHs in mg/kg	
Naphthalene	0.026
2-Methylnaphthalene	0.02
1-Methylnaphthalene	0.009 J
C2-Naphthalenes	0.041
C3-Naphthalenes	0.052
C4-Naphthalenes	0.045
Acenaphthylene	0.079
Acenaphthene	0.037
Dibenzofuran	0.038
Fluorene	0.082
C1-Fluorenes	0.11
C2-Fluorenes	0.15
C3-Fluorenes	0.005 U
Dibenzothiophene	0.04
C1-Dibenzothiophenes	0.055
C2-Dibenzothiophenes	0.12
C3-Dibenzothiophenes	0.12
Phenanthrene	0.71
Anthracene	0.8
C1-Phenanthrenes/Anthracenes	0.89
C2-Phenanthrenes/Anthracenes	0.71
C3-Phenanthrenes/Anthracenes	0.36
C4-Phenanthrenes/Anthracenes	0.27
Fluoranthene	3.5
Pyrene	7.1
C1-Fluoranthenes/Pyrenes	3.4
Benzo(a)anthracene	2.5
Chrysene	2.8
C1-Chrysenes	1.7
C2-Chrysenes	0.71
C3-Chrysenes	0.34
C4-Chrysenes	0.25
Benzo(b)fluoranthene	2.4
Benzo(k)fluoranthene	2.2
Benzo(a)pyrene	2.5
Indeno(1,2,3-cd)pyrene	1.2
Dibenz(a,h)anthracene	0.39
Benzo(g,h,i)perylene	1
Carbazole	0.18
Total Aliphatics C8-C44 in mg/kg	0.099

U = Not detected at the detection limit indicated.

J = Estimated value.

Table 7 - Forensic PAH Ratio Comparisons

PAH Ratios	Creosote	Combustion Products	Fuel Oil	HC-SED-07
TAH/pPAH	0.085 (a)	1.2 - 960 (b)	66 (d)	2.72
LPAH/HPAH	2.1-6.1 (a)	0.61 (b)	0.81-5.2 (d)	0.277
sPAH/pPAH	0.19-0.39 (a)	0.28 - 0.77 (b)	29 (d)	0.33
C0/C2	6.79 (c)	5.39 (c)	0.36 (c)	3.94
Fo/FI	0.64 (c)	0.02 (c)	16.32 (c)	0.023

Notes:

TAH - Total Aliphatic Hydrocarbons

pPAH - Parent PAH Compounds

LPAH - Low Molecular Weight PAHs

HPAH - High Molecular Weight PAHs

sPAH - Substituted PAHs

C0/C2 - Chrysene (Parent)/C2 - Chrysene

Fo/FI - Fluorene/Fluoranthene

(a) Data derived from Nestler (1974), Ingram et al. (1982), and Merrill and Wade (1985).

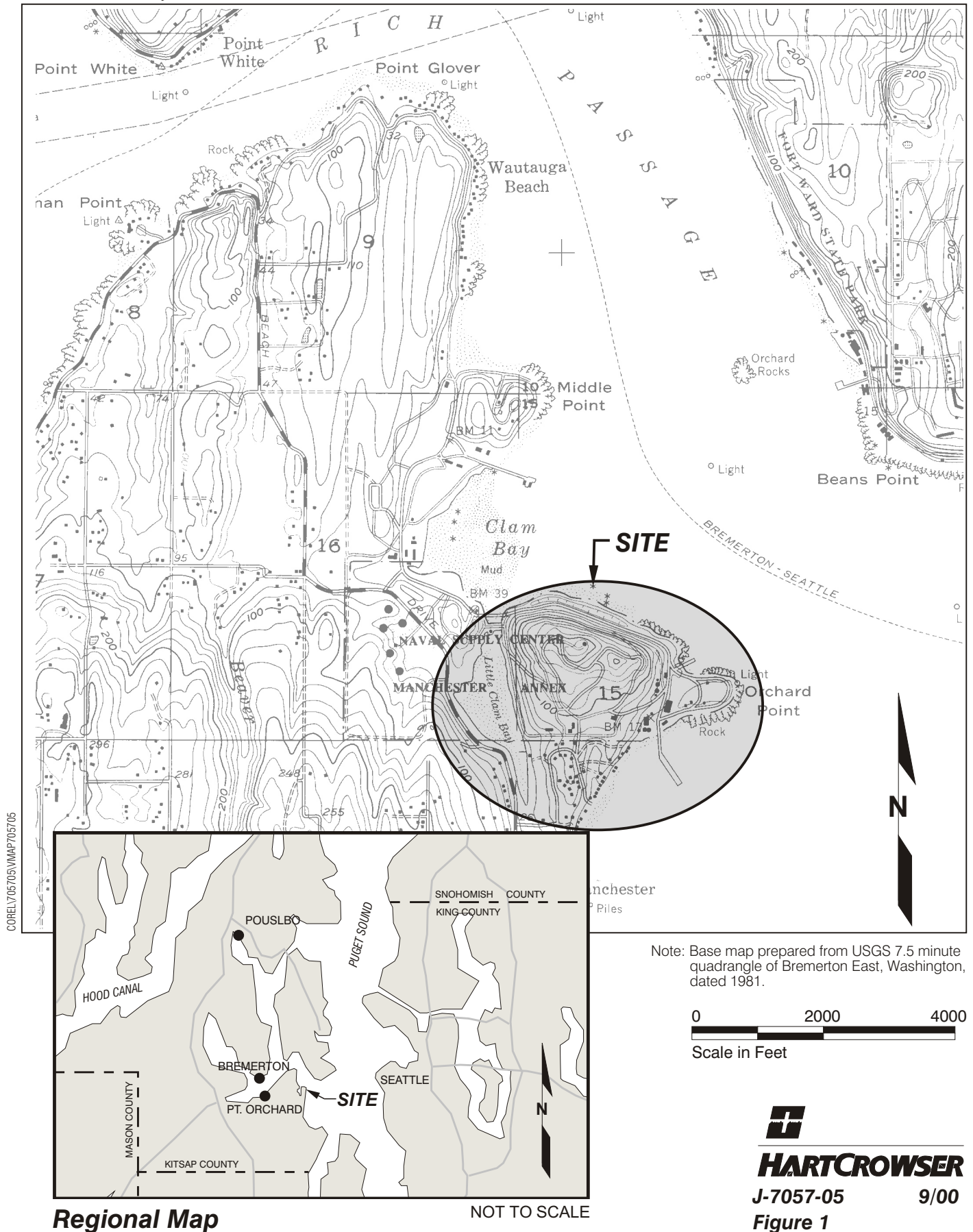
(b) Data derived from Sporstol et al. (1983), Kurlong and Carpenter (1982), and Merrill and Wade (1985).

(c) Battelle, 2000.

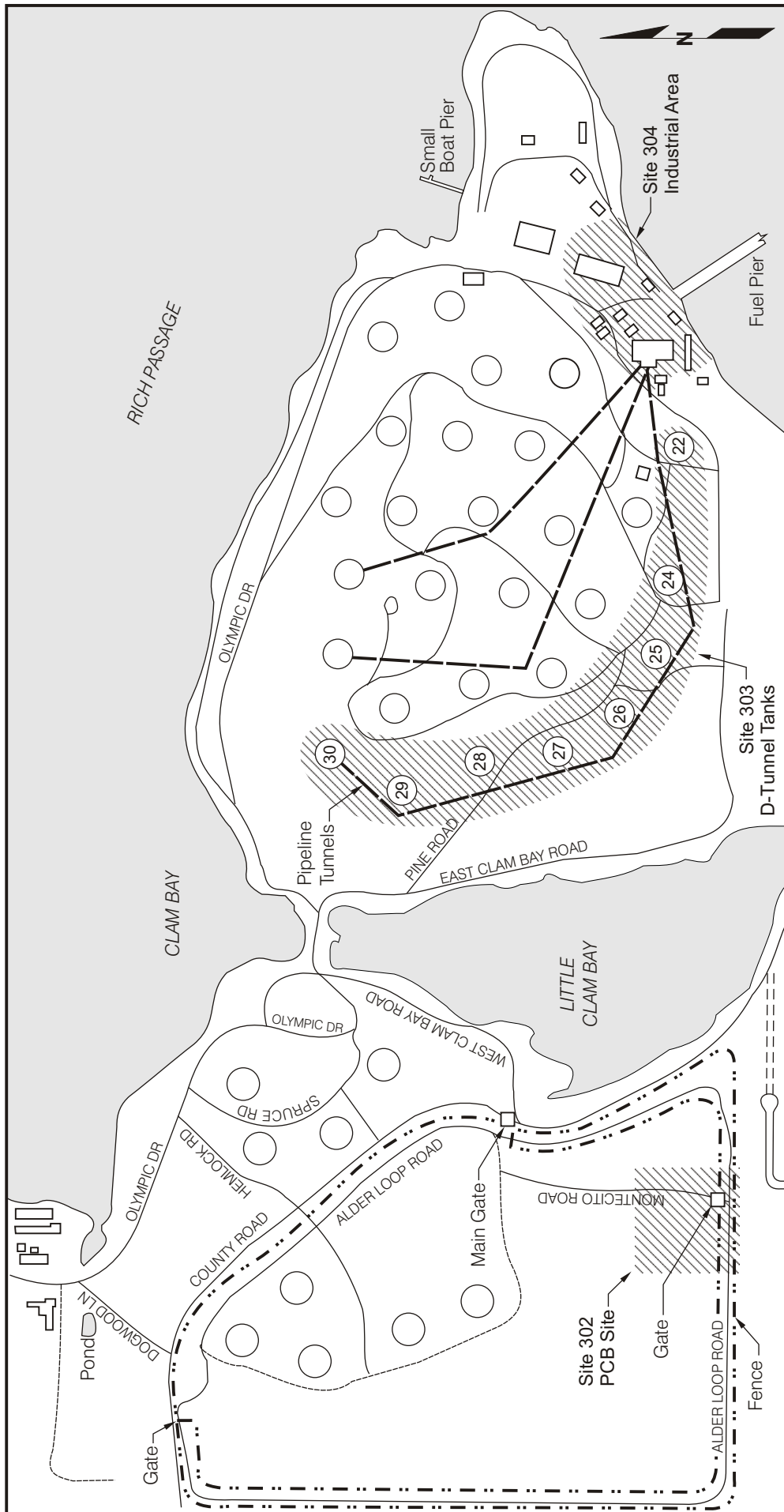
(d) Data derived from Clark and Brown (1977), Furlong and Carpenter (1982), and Merrill and Wade (1985).

Vicinity Map

Manchester, FISC



Site Plan



Note: Map prepared from drawing provided by CLEAN entitled "FISC, Manchester, Site Map".

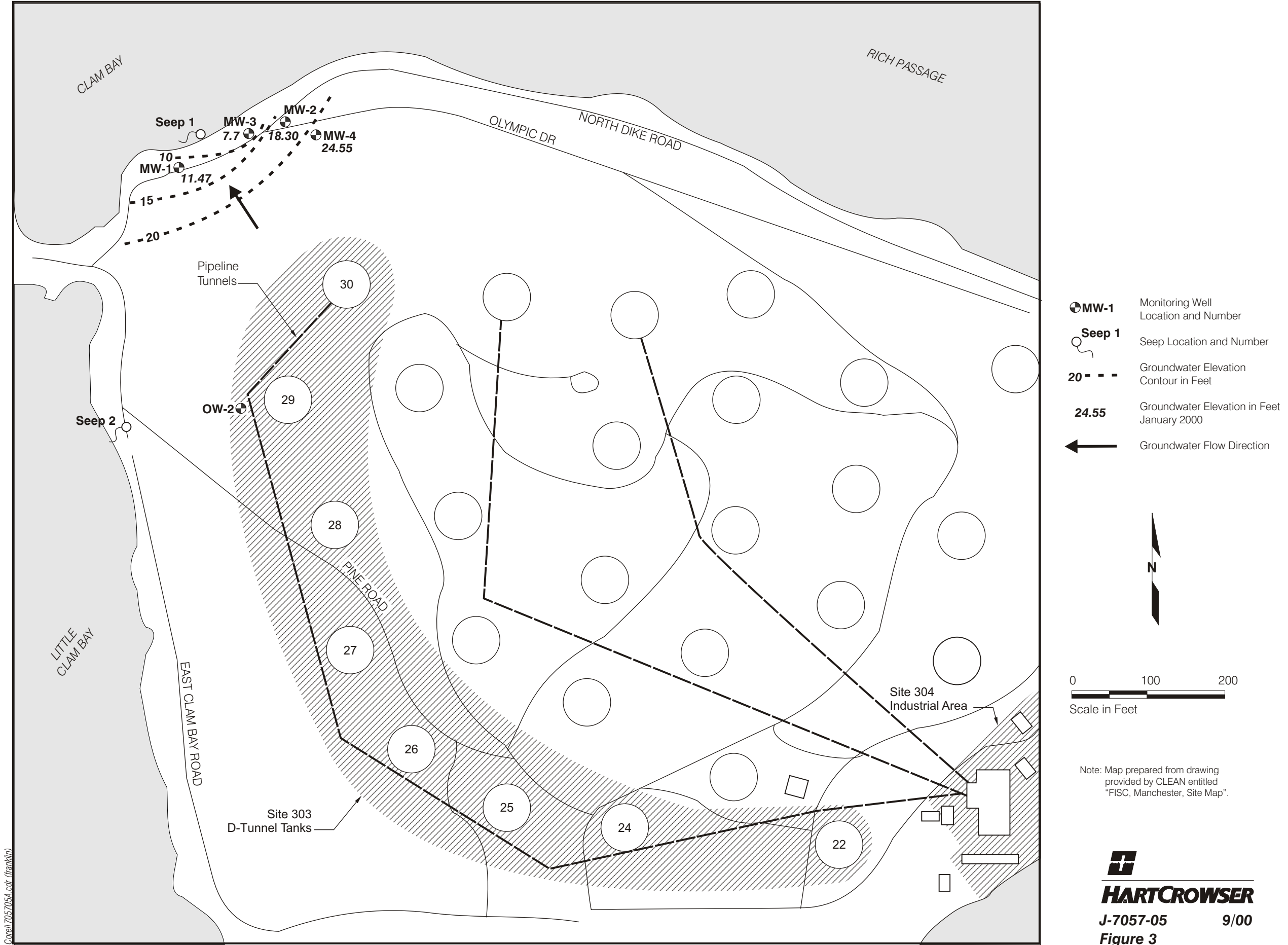


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Figure 2

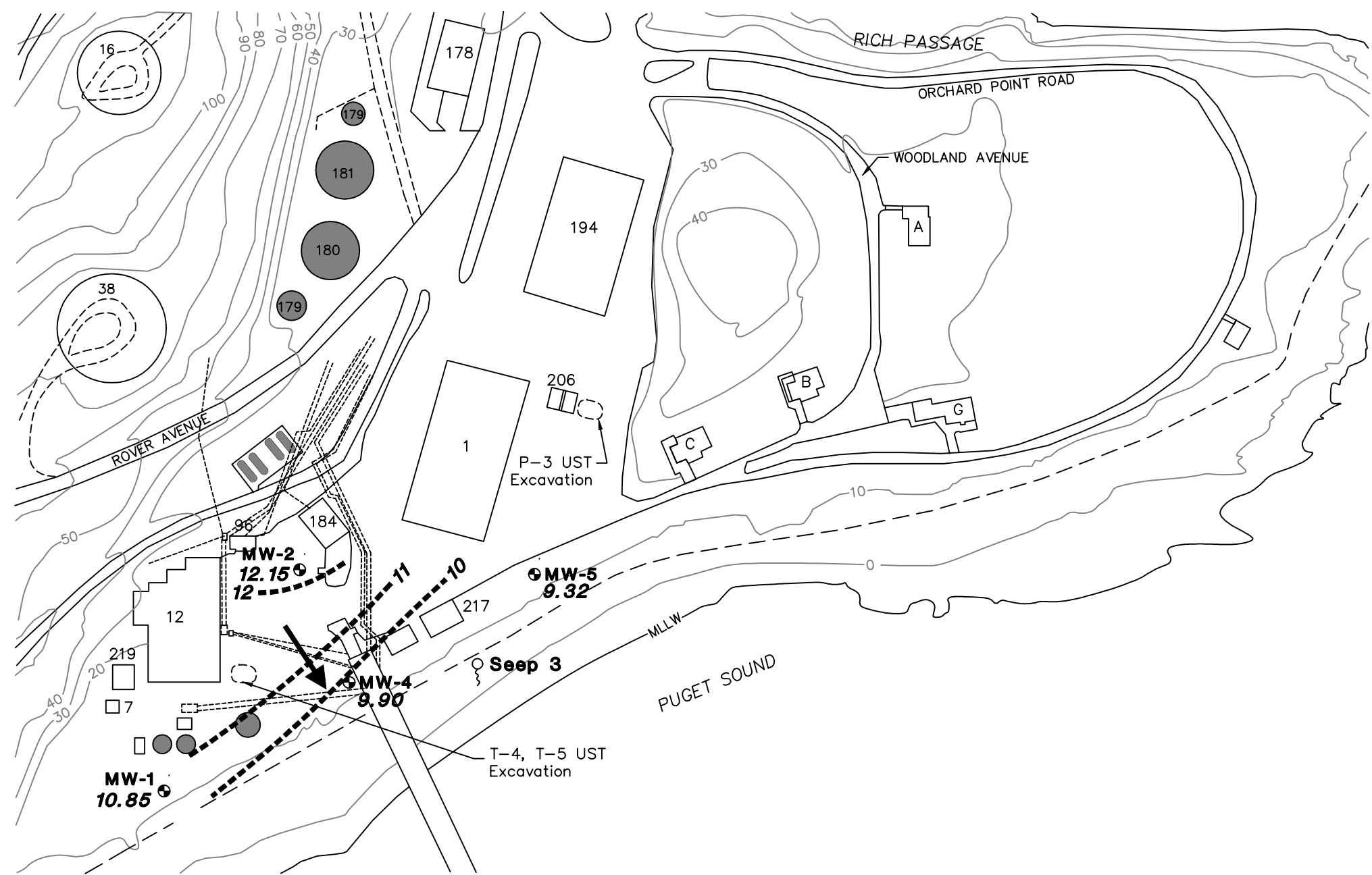
Groundwater and Seep Sampling Plan
Site 303



Core\705705A.cdr (Franklin)

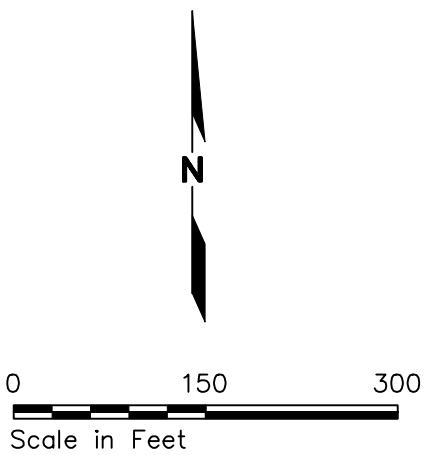
Groundwater and Seep Sampling Plan

Site 304



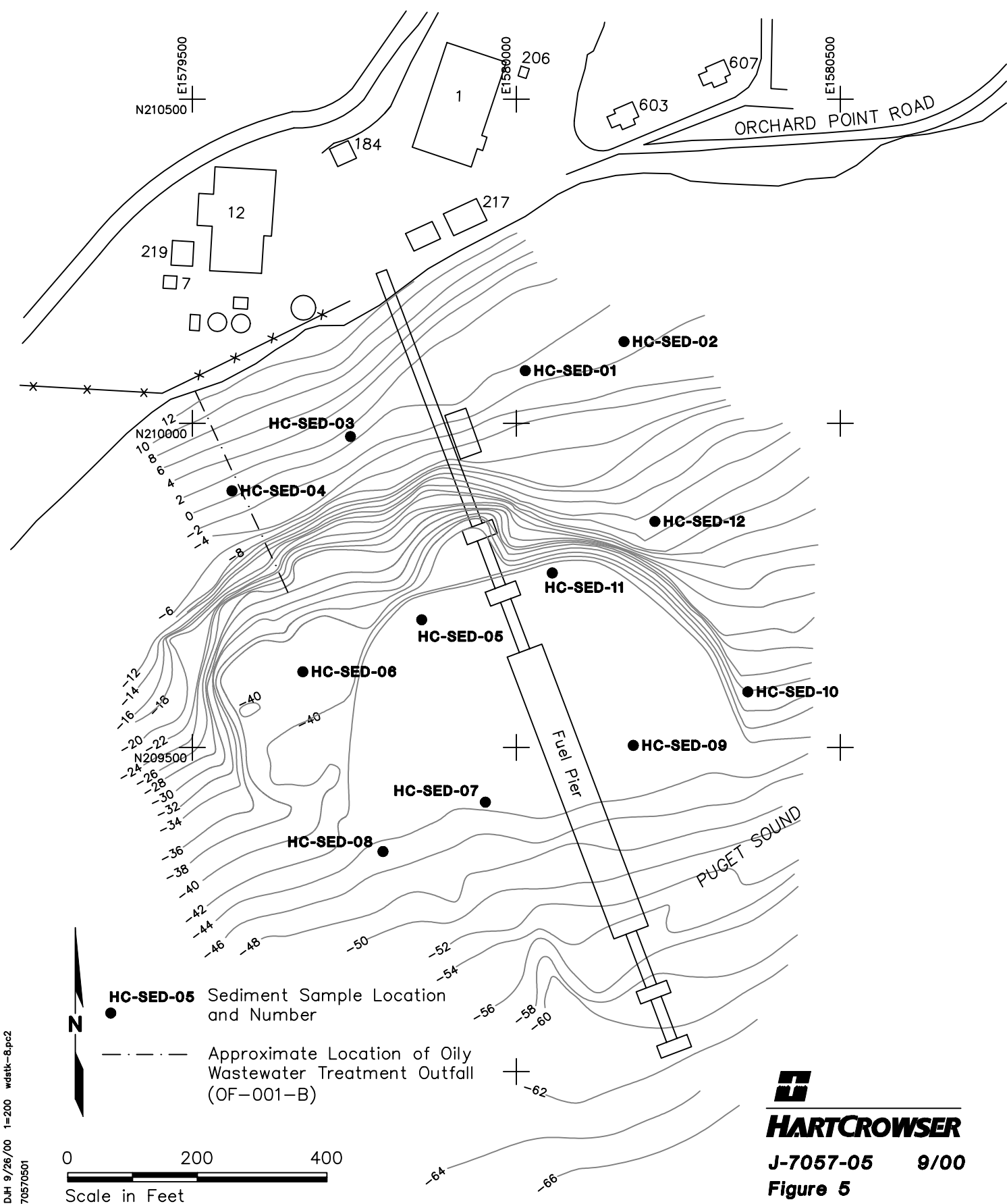
- MW-1** Groundwater Monitoring Well Location and Number
- 16** Underground Petroleum Storage Tank
- 180** Above-Ground Petroleum Storage Tank
- 30** Elevation Contour in Feet above Mean Sea Level
- High Tide Level
- Utility Pipe
- 12** Groundwater Elevation Contour in Feet
- 12.15** Groundwater Elevation in Feet January 2000
- ←** Groundwater Flow Direction
- Seep 3** Seep Location and Number

Note: Base map prepared from drawing provided by Comprehensive Long-Term Environmental Action Navy (CLEAN) entitled "Location of Removed UST and NPDES Sediment Sample Locations", dated May 1995.



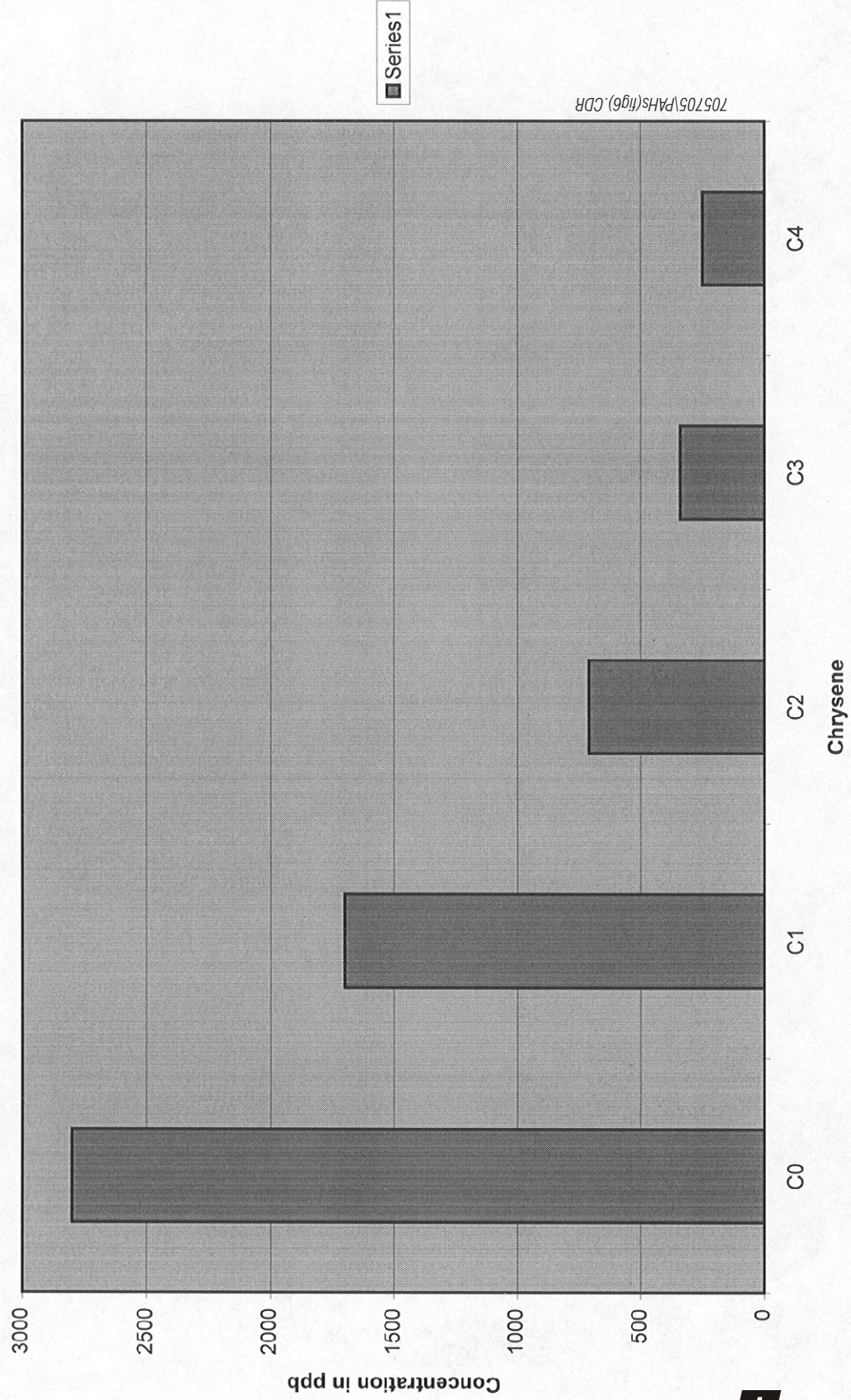
Sediment Sampling Plan

Site 304



Parent vs. Substituted PAHs

Parent vs Substituted PAHs



HARTCROWSER

J-7057-05

9/00

Figure 6

APPENDIX A
CHEMICAL DATA QUALITY REVIEW
AND CERTIFICATES OF ANALYSIS

APPENDIX A CHEMICAL DATA QUALITY REVIEW AND CERTIFICATES OF ANALYSIS

Chemical Data Quality Review

Eleven sediment, nine groundwater, and three seep samples were collected between September 1999 and June 2000. One field duplicate sample and two trip blanks were also collected. The samples were submitted to Columbia Analytical Services of Kelso, Washington for analysis of the following:

Groundwater:

- ▶ NWTPH-Gx;
- ▶ NWTPH-Dx;
- ▶ BTEX (EPA Method 8021);
- ▶ Dissolved Iron (EPA Method 6010);
- ▶ Alkalinity (EPA Method 310.1);
- ▶ Nitrate/Sulfate (EPA Method 300.0); and
- ▶ Total Suspended Solids (EPA Method 160.2).

Sediment:

- ▶ Total Metals (EPA Method 200.8);
- ▶ PAHs/Phenols (EPA Method 8270SIM);
- ▶ BTEX (EPA Method 8260);
- ▶ PCBs (EPA Method 8082);
- ▶ Total Organic Carbon (ASTM D4129-82M); and
- ▶ Total Solids (EPA Method 160.3).

In addition, sample HC-SED-07 was analyzed for forensic geochemical analysis (PAHs and Total Aliphatics) by Analytical Resources, Incorporated (ARI) of Seattle, Washington.

The following criteria were evaluated in the standard data quality review process for the results:

- ▶ Holding Times;
- ▶ Method Blanks;
- ▶ Surrogate Recoveries;
- ▶ Blank Spike/Blank Spike Duplicate (BS/BSD) and Laboratory Control Sample Recoveries;
- ▶ Matrix Spike/Matrix Spike Duplicate (MS/MSD) Recoveries;
- ▶ Laboratory and Field Duplicate Relative Percent Differences (RPDs); and
- ▶ Reporting Limits.

Groundwater Analysis

NWTPH-Gx/NWTPH-Dx/BTEX. All required holding times were met. No method or trip blank contamination was detected. Surrogate, LCS, and MS/MSD recoveries were within laboratory control limits. Laboratory duplicate recoveries were acceptable. Reporting limits were acceptable.

Dissolved Iron. All required holding times were met. No method blank contamination was detected. LCS and MS recoveries were within control limits. Laboratory duplicate RPDs were within control limits. Reporting limits were acceptable.

Conventionals. TSS analysis for all samples in SDG 9906177 exceeded holding time by one day. Associated sample results were qualified as estimated (J). Other holding times were met. No method blank contamination was detected. MS recoveries and laboratory duplicate RPDs were within control limits. Reporting limits for nitrate in sample HC-303-MW-3 were elevated due to matrix interference.

Sediment Analysis

Total Metals. All required holding times were met. No method blank contamination was detected. LCS and MS recoveries were within control limits. Laboratory duplicate RPDs were within control limits. No criteria for field duplicates have been established; however, RPDs were compared against 75 percent for review. The results were within these criteria. Reporting limits were acceptable.

PAHs/Phenols. All required holding times were met. No method blank contamination was detected. Surrogate, LCS, and MS/MSD recoveries were within control limits. No criteria for field duplicates have been established; however, RPDs were compared against 75 percent for review. The results were within these criteria. Sample results below reporting limits were correctly flagged as estimated (J) by the laboratory.

BTEX. All required holding times were met. No method contamination was detected. Surrogate, LCS, and MS/MSD recoveries were within laboratory control limits. No criteria for field duplicates have been established; however, RPDs were compared against 75 percent for review. The results were within these criteria. Reporting limits were elevated in samples HC-SED-02 and HC-SED-07 due to low percent solids.

PCBs. Several samples were re-extracted and re-analyzed because of systematic error by the laboratory. Since sediment samples were frozen, all required holding times were met. No method blank contamination was detected. Surrogate recoveries of decachlorobiphenyl in samples HC-SED-05, HC-SED-08, and HC-SED-09 were above control limits. No qualifiers were assigned since sample results were non-detects. LCS recoveries extracted on September 23, 1999, were above laboratory control limits. No qualifiers were assigned since MS/MSD recoveries were acceptable. No criteria for field duplicates have been established; however, RPDs were compared against 75 percent for review. The results were within these criteria. Reporting limits were acceptable.

Total Organic Carbon. All required holding times were met. No method blank contamination was detected. LCS and MS recoveries were within laboratory control limits. Laboratory duplicate RPD was acceptable. No criteria for field duplicates have been established; however, RPDs were compared against 75 percent for review. The results were within these criteria. Reporting limits were acceptable.

Total Solids. All required holding times were met. No method blank contamination was detected. Laboratory duplicate RPDs were within control limits.

Total Aliphatic/PAHs. All required holding times were met. Naphthalene was detected below the reporting limit in the method blank. No qualifiers were assigned since the sample result was greater than ten times the blank contamination. MS/MSD recoveries of pyrene and benzo(a)pyrene were outside laboratory control limits due to high concentrations in the sample. No qualifiers were assigned since LCS recoveries were acceptable.

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**CERTIFICATES OF ANALYSIS
COLUMBIA ANALYTICAL SERVICES, INC.**



September 30, 1999

Service Request No: K9906177

Kym Anderson
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, WA 98102-3699

Re: Site 303/304/7057-05

Dear Kym:

Enclosed are the results of the sample(s) submitted to our laboratory on September 9, 1999. For your reference, these analyses have been assigned our service request number K9906177.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 243.

Respectfully submitted,

Columbia Analytical Services, Inc.

Richard Craven
Project Chemist

RAC/aw

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
J	Estimated concentration. The value is less than the method reporting limit, but greater than the method detection limit.
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

00002

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Inorganic Parameters

Sample Name: HC-303-MW-1
Lab Code: K9906177-001
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	0.6	1	NA	9/16/99	173	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	0.03	2	NA	9/9/99	ND	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	5	1	NA	9/15/99	76	J
Sulfate	mg/L (ppm)	300.0	0.2	0.02	5	NA	9/9/99	21.4	

7/18/00
JHL

Approved By: MMR Date: 9/22/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Inorganic Parameters

Sample Name: HC-303-MW-2
Lab Code: K9906177-002
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	0.6	1	NA	9/16/99	263	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	0.03	1	NA	9/9/99	ND	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	5	1	NA	9/15/99	90	J
Sulfate	mg/L (ppm)	300.0	0.2	0.02	1	NA	9/9/99	0.3	

7/18/00
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Approved By: MMR Date: 9/22/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Inorganic Parameters

Sample Name: HC-303-MW-3
Lab Code: K9906177-003
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	0.6	1	NA	9/16/99	189	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	0.03	20	NA	9/9/99	< 2	D
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	5	1	NA	9/15/99	61 J	
Sulfate	mg/L (ppm)	300.0	0.2	0.02	50	NA	9/9/99	301	

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JHL

D The MRL is elevated because of matrix interferences and because the sample required diluting.

Approved By: mmk

Date: 9/22/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Inorganic Parameters

Sample Name: HC-303-OW2
Lab Code: K9906177-004
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	0.6	1	NA	9/16/99	82	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	0.03	2	NA	9/9/99	ND	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	5	1	NA	9/15/99	646	J
Sulfate	mg/L (ppm)	300.0	0.2	0.02	50	NA	9/9/99	354	

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Approved By: MMR

Date: 9/22/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Inorganic Parameters

Sample Name: HC-304-MW-1
Lab Code: K9906177-005
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	0.6	1	NA	9/16/99	178	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	0.03	2	NA	9/9/99	ND	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	5	1	NA	9/15/99	14	J
Sulfate	mg/L (ppm)	300.0	0.2	0.02	20	NA	9/9/99	41.7	

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Approved By: MMMR

Date: 9/22/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Inorganic Parameters

Sample Name: HC-304-MW-2
Lab Code: K9906177-006
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	0.6	1	NA	9/16/99	292	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	0.03	2	NA	9/9/99	ND	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	5	1	NA	9/15/99	8J	
Sulfate	mg/L (ppm)	300.0	0.2	0.02	20	NA	9/9/99	45.5	

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Approved By: UMMR

Date: 9/22/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Inorganic Parameters

Sample Name: HC-304-MW-4
Lab Code: K9906177-007
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	0.6	1	NA	9/16/99	208	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	0.03	1	NA	9/9/99	ND	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	5	1	NA	9/15/99	16J	
Sulfate	mg/L (ppm)	300.0	0.2	0.02	1	NA	9/9/99	ND	

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Approved By: CHM/KR

Date: 9/22/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Inorganic Parameters

Sample Name: HC-304-MW-5
Lab Code: K9906177-008
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	0.6	1	NA	9/16/99	72	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	0.03	1	NA	9/9/99	0.8	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	5	1	NA	9/15/99	5J	
Sulfate	mg/L (ppm)	300.0	0.2	0.02	1	NA	9/9/99	4.9	

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Approved By: mmmr

Date: 9/22/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: NA
Date Received: NA

Inorganic Parameters

Sample Name: Method Blank
Lab Code: K9906177-MB
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	0.6	1	NA	9/16/99	ND	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	0.03	1	NA	9/9/99	ND	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	5	1	NA	9/15/99	ND	
Sulfate	mg/L (ppm)	300.0	0.2	0.02	1	NA	9/9/99	ND	

Approved By: MMR

Date: 9/22/99

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06177WET.LJ1 - MBlank 9/22/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Dissolved Iron

Prep Method: CLAA
Analysis Method: 6010B
Test Notes:

Units: ug/L (ppb)
Basis: NA

Sample Name	Lab Code	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
HC-303-MW-1	K9906177-001	20	1	9/21/99	9/23/99	555	
HC-303-MW-2	K9906177-002	20	1	9/21/99	9/23/99	38500	
HC-303-MW-3	K9906177-003	20	1	9/21/99	9/23/99	20300	
HC-303-OW2	K9906177-004	20	1	9/21/99	9/23/99	504	
HC-304-MW-1	K9906177-005	20	1	9/21/99	9/23/99	2010	
HC-304-MW-2	K9906177-006	20	1	9/21/99	9/23/99	1280	
HC-304-MW-4	K9906177-007	20	1	9/21/99	9/23/99	6980	
HC-304-MW-5	K9906177-008	20	1	9/21/99	9/23/99	52	
Method Blank	K9906177-MB	20	1	9/21/99	9/23/99	ND	

Approved By: _____

Date: _____

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Volatile Petroleum Products **Northwest TPH-Gx**

Sample Name: HC-303-MW-1
Lab Code: K9906177-001
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep	Analysis	MRL	Dilution	Date	Date	Result	Result Notes
	Method	Method		Factor	Extracted	Analyzed		
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	

PHC as Gasoline:	Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Gasoline:	Non-Petroleum Hydrocarbon - components eluting in the purgable range of n-C6 - naphthalene.

Approved By: TJ Date: 9/24/99

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06177VOA.ML1 - 1 9/22/99

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Analytical Report

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	

PHC as Gasoline:	Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Gasoline:	Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C ₆ - naphthalene.

Approved By: PJ Date: 9/24/99

Analytical Report

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Sample Name: HC-303-MW-3
Lab Code: K9906177-003
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep	Analysis	MRL	Dilution	Date	Date	Result	Result Notes
	Method	Method		Factor	Extracted	Analyzed		
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	

PHC as Gasoline:	Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Gasoline:	Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By:

Date: 9/24/99

Analytical Report

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	

PHC as Gasoline:	Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Gasoline:	Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By: 19 Date: 9/24/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Volatile Petroleum Products
Northwest TPH-Gx

Sample Name: HC-304-MW-1
Lab Code: K9906177-005
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	

PHC as Gasoline: Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Gasoline: Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By: _____



Date: 9/24/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Volatile Petroleum Products
Northwest TPH-Gx

Sample Name: HC-304-MW-2
Lab Code: K9906177-006
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	

PHC as Gasoline: Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Gasoline: Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By: _____



Date: 9/24/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Volatile Petroleum Products
Northwest TPH-Gx

Sample Name: HC-304-MW-4
Lab Code: K9906177-007
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	910	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	

PHC as Gasoline: Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Gasoline: Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By: TS Date: 9/24/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Volatile Petroleum Products
 Northwest TPH-Gx

Sample Name: HC-304-MW-5
Lab Code: K9906177-008
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	

PHC as Gasoline: Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
 Non-PHC as Gasoline: Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By: *TS* Date: 9/24/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Volatile Petroleum Products
 Northwest TPH-Gx

Sample Name: Trip Blank
Lab Code: K9906177-009
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	

PHC as Gasoline: Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
 Non-PHC as Gasoline: Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By: TG Date: 9/24/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: NA
Date Received: NA

Volatile Petroleum Products Northwest TPH-Gx

Sample Name: Method Blank
Lab Code: K990916-MB
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	9/16/99	ND	

PHC as Gasoline: Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
 Non-PHC as Gasoline: Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By: _____

[Signature]

Date: _____

9/24/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

BTEX

Sample Name: HC-303-MW-1
Lab Code: K9906177-001
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030B	8021B	0.5	1	NA	9/16/99	ND	
Toluene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Ethylbenzene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Xylenes, Total	EPA 5030B	8021B	1	1	NA	9/16/99	ND	

Approved By: Date: 9/24/99

1S22/052595

06177VOA.ML3 - BTEX Sample 9/22/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

BTEX

Sample Name: HC-303-MW-2
Lab Code: K9906177-002
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030B	8021B	0.5	1	NA	9/16/99	ND	
Toluene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Ethylbenzene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Xylenes, Total	EPA 5030B	8021B	1	1	NA	9/16/99	ND	

Approved By: TJDate: 9/24/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

BTEX

Sample Name: HC-303-OW2
Lab Code: K9906177-004
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030B	8021B	0.5	1	NA	9/16/99	ND	
Toluene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Ethylbenzene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Xylenes, Total	EPA 5030B	8021B	1	1	NA	9/16/99	ND	

Approved By: _____



Date: 9/24/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

BTEX

Sample Name: HC-304-MW-1
Lab Code: K9906177-005
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030B	8021B	0.5	1	NA	9/16/99	ND	
Toluene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Ethylbenzene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Xylenes, Total	EPA 5030B	8021B	1	1	NA	9/16/99	ND	

Approved By: _____



Date: _____

9/24/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

BTEX

Sample Name: HC-304-MW-2
Lab Code: K9906177-006
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030B	8021B	0.5	1	NA	9/16/99	ND	
Toluene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Ethylbenzene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Xylenes, Total	EPA 5030B	8021B	1	1	NA	9/16/99	ND	

Approved By: _____

TJ

Date: _____

9/24/99

1S22/052595

06177VOA.ML4 - BTEX Sample 9/22/99

00028

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

BTEX

Sample Name: HC-304-MW-4
Lab Code: K9906177-007
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030B	8021B	0.5	1	NA	9/16/99	ND	
Toluene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Ethylbenzene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Xylenes, Total	EPA 5030B	8021B	1	1	NA	9/16/99	ND	

Approved By: TJ Date: 9/24/99

1S22/052595

06177VOA.ML4 - BTEX(2) 9/22/99

00029

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water


Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

BTEX

Sample Name: HC-304-MW-5
Lab Code: K9906177-008
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030B	8021B	0.5	1	NA	9/16/99	ND	
Toluene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Ethylbenzene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Xylenes, Total	EPA 5030B	8021B	1	1	NA	9/16/99	ND	

Approved By: 

Date: 9/24/99

1822/052595

06177VOA.ML4 - BTEX(3) 9/22/99

00030

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water


Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

BTEX

Sample Name: Trip Blank
Lab Code: K9906177-009
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030B	8021B	0.5	1	NA	9/16/99	ND	
Toluene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Ethylbenzene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Xylenes, Total	EPA 5030B	8021B	1	1	NA	9/16/99	ND	

Approved By: 

Date: 9/24/99

1S22/052595

06177VOA.ML4 - BTEX(4) 9/22/99

00031
Page No. 1

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: NA
Date Received: NA

BTEX

Sample Name: Method Blank
Lab Code: K990916-MB
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030B	8021B	0.5	1	NA	9/16/99	ND	
Toluene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Ethylbenzene	EPA 5030B	8021B	1	1	NA	9/16/99	ND	
Xylenes, Total	EPA 5030B	8021B	1	1	NA	9/16/99	ND	

Approved By: TJ Date: 9/24/99

1S22/052595

06177VOA.ML3 - BTEX Blank 9/22/99

00032
Page No.:

Analytical Report

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Units: ug/L (ppb)
Basis: NA

Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Semivolatile Petroleum Products
Northwest TPH-Dx

Sample Name: HC-303-MW-3
Lab Code: K9906177-003
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Mineral Spirits	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Jet Fuel as Jet A	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Kerosene	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Diesel	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Heavy Fuel Oil	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	
Lube Oil	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	
PHC as Diesel	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	
Non-PHC as Diesel	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	

PHC as Diesel Fuel: Extractable Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Diesel: Non-Petroleum Hydrocarbon components eluting in the extractable range of n-C8 - n-C44.

Approved By: EA Date: 9/24/99

Analytical Report

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Semivolatile Petroleum Products

Northwest TPH-Dx

Units: ug/L (ppb)
Basis: NA

Analyte	Prep	Analysis	MRL	Dilution	Date	Date	Result	Result Notes
	Method	Method		Factor	Extracted	Analyzed		
Mineral Spirits	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Jet Fuel as Jet A	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Kerosene	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Diesel	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Heavy Fuel Oil	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	
Lube Oil	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	
PHC as Diesel	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	
Non-PHC as Diesel	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	

Approved By: _____ Date: 9/24/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99

Semivolatile Petroleum Products
Northwest TPH-Dx

Sample Name: HC-304-MW-4
Lab Code: K9906177-007
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Mineral Spirits	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Jet Fuel as Jet A	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Kerosene	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Diesel	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Heavy Fuel Oil	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	
Lube Oil	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	
PHC as Diesel	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	1900	
Non-PHC as Diesel	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	

PHC as Diesel Fuel: Extractable Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Diesel: Non-Petroleum Hydrocarbon components eluting in the extractable range of n-C8 - n-C44.

Approved By: EL Date: 9/24/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: NA
Date Received: NA

Semivolatile Petroleum Products
Northwest TPH-Dx

Sample Name: Method Blank
Lab Code: K990913-WB
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Mineral Spirits	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Jet Fuel as Jet A	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Kerosene	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Diesel	EPA 3510C	NWTPH-Dx	250	1	9/13/99	9/20/99	ND	
Heavy Fuel Oil	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	
Lube Oil	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	
PHC as Diesel	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	
Non-PHC as Diesel	EPA 3510C	NWTPH-Dx	500	1	9/13/99	9/20/99	ND	

PHC as Diesel Fuel: Extractable Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Diesel: Non-Petroleum Hydrocarbon components eluting in the extractable range of n-C8 - n-C44.

Approved By: EL Date: 9/24/99

1S22/020597p

APPENDIX A

LABORATORY

QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99
Date Extracted: NA
Date Analyzed: 9/10-16/99

Duplicate Summary
Inorganic Parameters

Sample Name: HC-303-MW-1
Lab Code: K9906177-001DUP
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	173	176	174	2	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	ND	ND	ND	-	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	76	78	77	3	
Sulfate	mg/L (ppm)	300.0	0.2	21.4	21.0	21.2	2	

Approved By: UMMR Date: 9/2/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99
Date Extracted: NA
Date Analyzed: 9/10/99

Matrix Spike Summary
 Inorganic Parameters

Sample Name: HC-303-MW-1
Lab Code: K9906177-001MS
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery	Result Notes
								Acceptance Limits	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	4.0	ND	4.2	105	80-120	
Sulfate	mg/L (ppm)	300.0	0.2	10.0	21.4	32.5	111	80-120	

Approved By: mmr Date: 9/22/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99
Date Extracted: 9/21/99
Date Analyzed: 9/23/99

Duplicate Summary
Dissolved Metals

Sample Name: HC-303-MW-1
Lab Code: K9906177-001DUP
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Iron	CLAA	6010B	20	555	545	504	2	

Approved By: _____

Date: _____

9/25/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99
Date Extracted: 9/21/99
Date Analyzed: 9/23/99

**Matrix Spike Summary
Dissolved Metals**

Sample Name: HC-303-MW-1
Lab Code: K9906177-001MS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery	Result Notes
								Acceptance Limits	
Iron	CLAA	6010B	20	1000	555	1540	98	75-125	

Approved By: _____ **Date:** 9/25/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
LCS Matrix: Water

Service Request: K9906177
Date Collected: NA
Date Received: NA
Date Extracted: 9/21/99
Date Analyzed: 9/23/99

**Laboratory Control Sample Summary
 Total Metals**


Sample Name: Laboratory Control Sample
Lab Code: K9906177-LCS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Source: Inorganic Ventures

**CAS
 Percent
 Recovery
 Acceptance
 Limits**

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Iron	CLAA	6010B	2500	2480	99	85-115	

Approved By: _____  **Date:** 9/25/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05

Service Request: K9906177
Date Analyzed: 9/23/99

Iron
EPA Method 6010B
Units: µg/L (ppb)

INITIAL CALIBRATION VERIFICATION (ICV)

	True Value	Measured Value	Percent Recovery
ICV 1 Result	2500	2510	100

CONTINUING CALIBRATION VERIFICATION (CCV)

	True Value	Measured Value	Percent Recovery
CCV 1 Result	5000	5020	100
CCV 2 Result	5000	5100	102
CCV 3 Result	5000	5230	105
CCV 4 Result	5000	5060	101
CCV 5 Result	5000	4980	100
CCV 6 Result	5000	5060	101

CONTINUING CALIBRATION BLANK (CCB)

	MRL	Blank Value
CCB 1 Result	20	ND
CCB 2 Result	20	ND
CCB 3 Result	20	ND
CCB 4 Result	20	ND
CCB 5 Result	20	ND
CCB 6 Result	20	ND

Approved By:  Date: 9/25/99

COMBOQCD/042695

00048

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99
Date Extracted: NA
Date Analyzed: 9/16/99

Surrogate Recovery Summary
Northwest TPH-Gx

Prep Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 1,4-Difluorobenzene
HC-303-MW-1	K9906177-001		112
HC-303-MW-2	K9906177-002		110
HC-303-MW-3	K9906177-003		111
HC-303-OW2	K9906177-004		109
HC-304-MW-1	K9906177-005		111
HC-304-MW-2	K9906177-006		112
HC-304-MW-4	K9906177-007		109
HC-304-MW-5	K9906177-008		111
Trip Blank	K9906177-009		111
HC-303-MW-1	K9906177-001MS		109
HC-303-MW-1	K9906177-001DMS		109
Lab Control Sample	K990916-LCS		104
Method Blank	K990916-MB		112

CAS Acceptance Limits: 70-130

Approved By: TJ Date: 9/24/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99
Date Extracted: NA
Date Analyzed: 9/16/99

Matrix Spike/Duplicate Matrix Spike Summary
 Northwest TPH-Gx

Sample Name: HC-303-MW-1 Units: ug/L (ppb)
Lab Code: K9906177-001MS, K9906177-001DMS Basis: NA
Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Percent Recovery										Result Notes
				Spike Level			Sample Result	CAS Acceptance				Relative Percent Difference		
				MS	DMS	MS		DMS	Limits					
										MS	DMS		MS	
Gasoline	EPA 5030B	NWTPH-Gx	250	1000	1000	ND	1000	1300	100	130	59-135	26		

Approved By: _____



Date: _____

9/24/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
LCS Matrix: Water

Service Request: K9906177
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 9/16/99

Laboratory Control Sample Summary
Northwest TPH-Gx

Sample Name: Lab Control Sample
Lab Code: K990916-LCS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	1000	1000	100	82-155	

Approved By: TJ Date: 9/24/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99
Date Extracted: NA
Date Analyzed: 9/16/99

Surrogate Recovery Summary
BTEX

Prep Method: EPA 5030B
Analysis Method: 8021B

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 1,4-Difluorobenzene
HC-303-MW-1	K9906177-001		95
HC-303-MW-2	K9906177-002		95
HC-303-MW-3	K9906177-003		96
HC-303-OW2	K9906177-004		95
HC-304-MW-1	K9906177-005		96
HC-304-MW-2	K9906177-006		96
HC-304-MW-4	K9906177-007		94
HC-304-MW-5	K9906177-008		95
Trip Blank	K9906177-009		96
HC-303-MW-1	K9906177-001MS		100
HC-303-MW-1	K9906177-001DMS		100
Lab Control Sample	K990916-LCS		101
Method Blank	K990916-MB		96

CAS Acceptance Limits: 70-130

Approved By: _____

TS

Date: _____

9/24/99

QA/QC Report

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99
Date Extracted: NA
Date Analyzed: 9/16/99

Units: ug/L (ppb)
Basis: NA

00053

QA/QC Report

Service Request: K9906177
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 9/16/99

Sample Name: Lab Control Sample
Lab Code: K990916-LCS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS	Result Notes
						Percent Recovery Acceptance Limits	
Benzene	EPA 5030B	8021B	100	99	99	69-118	
Toluene	EPA 5030B	8021B	100	100	100	66-124	
Ethylbenzene	EPA 5030B	8021B	100	100	100	63-127	

LCS/52505
06177VOA.ML3 - LCS 9/22/99

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05

Service Request: K9906177
Date Analyzed: 9/16/99

Continuing Calibration Verification (CCV) Summary
Northwest TPH-Gx

Sample Name: CCV1
Lab Code: 0916F002
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Gasoline	NWTPH-Gx	1000	877	88	
PHC as Gasoline	NWTPH-Gx	1000	877	88	
Non-PHC as Gasoline	NWTPH-Gx	1000	881	88	

Approved By: 

Date: 9/24/99

LCS/52595

06177VOA.ML5 - CCV 9/22/99

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Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05

Service Request: K9906177
Date Analyzed: 9/16/99

Continuing Calibration Verification (CCV) Summary
BTEX

Sample Name: CCV2
Lab Code: 0916F003
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Benzene	8021B	100	99	99	
Toluene	8021B	100	99	99	
Ethylbenzene	8021B	100	98	98	
Xylenes, Total	8021B	300	291	97	

Approved By: _____

TJ

Date: _____

9/24/99

LCS/52595

06177VOA.ML5 - CCV (2) 9/22/99

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05

Service Request: K9906177
Date Analyzed: 9/16/99

Continuing Calibration Verification (CCV) Summary
Northwest TPH-Gx

Sample Name: CCV3
Lab Code: 0916F015
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Gasoline	NWTPH-Gx	1000	851	85	
PHC as Gasoline	NWTPH-Gx	1000	851	85	
Non-PHC as Gasoline	NWTPH-Gx	1000	857	86	

Approved By: _____

TD

Date: _____

9/24/99

LCS/52595

06177VOA.ML5 - CCV (3) 9/22/99

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05

Service Request: K9906177
Date Analyzed: 9/16/99

Continuing Calibration Verification (CCV) Summary
Northwest TPH-Gx

Sample Name: CCV4
Lab Code: 0916F024
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Gasoline	NWTPH-Gx	1000	905	91	
PHC as Gasoline	NWTPH-Gx	1000	905	91	
Non-PHC as Gasoline	NWTPH-Gx	1000	906	91	

Approved By: _____



Date: _____

9/24/99

LCS/52595

06177VOA.ML5 - CCV (4) 9/22/99

00058
Page No.:

QA/QC Report

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99
Date Extracted: 9/13/99
Date Analyzed: 9/20/99

Units: PERCENT
Basis: NA

CAS Acceptance Limits:	50-150	50-150
------------------------	--------	--------

00059
Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
Sample Matrix: Water

Service Request: K9906177
Date Collected: 9/7/99
Date Received: 9/9/99
Date Extracted: 9/13/99
Date Analyzed: 9/20/99

Duplicate Summary
Northwest TPH-Dx

Sample Name: HC-304-MW-5
Lab Code: K9906177-008D
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Mineral Spirits	EPA 3510C	NWTPH-Dx	250	ND	ND	ND	-	
Jet Fuel as Jet A	EPA 3510C	NWTPH-Dx	250	ND	ND	ND	-	
Kerosene	EPA 3510C	NWTPH-Dx	250	ND	ND	ND	-	
Diesel	EPA 3510C	NWTPH-Dx	250	ND	ND	ND	-	
Heavy Fuel Oil	EPA 3510C	NWTPH-Dx	500	ND	ND	ND	-	
Lube Oil	EPA 3510C	NWTPH-Dx	500	ND	ND	ND	-	
PHC as Diesel	EPA 3510C	NWTPH-Dx	500	ND	ND	ND	-	
Non-PHC as Diesel	EPA 3510C	NWTPH-Dx	500	ND	ND	ND	-	

PHC as Diesel Fuel: Extractable Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Diesel: Non-Petroleum Hydrocarbon components eluting in the extractable range of n-C8 - n-C44.

Approved By: _____ Date: 9/24/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05
LCS Matrix: Water

Service Request: K9906177
Date Collected: NA
Date Received: NA
Date Extracted: 9/13/99
Date Analyzed: 9/20/99

Laboratory Control Sample Summary
Northwest TPH-Dx

Sample Name: Lab Control Sample
Lab Code: K990913-WL
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Diesel	EPA 3510C	NWTPH-Dx	1600	1360	85	46-108	
Lube Oil	EPA 3510C	NWTPH-Dx	1600	1280	80	50-150	

Approved By: EL Date: 9/24/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05

Service Request: K9906177
Date Analyzed: 9/20/99

Initial Calibration Verification (ICV) Summary
Northwest TPH-Dx

Sample Name: ICV
Lab Code: 0920F005,0920F007
Test Notes:

Units: mg/L (ppm)
Basis: NA

ICV Source: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Diesel	8015B	2000	2290	115	
Lube Oil	8015B	1000	998	100	

Approved By: _____ *EL* **Date:** 9/24/99

LCS/52595

06177PHC.MM2 - ICV 9/23/99

00062
Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05

Service Request: K9906177
Date Analyzed: 9/20/99

Continuing Calibration Verification (CCV) Summary
Northwest TPH-Dx

Sample Name: CCV1
Lab Code: 0920F035,0920F037
Test Notes:

Units: mg/L (ppm)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Diesel	8015B	1000	1110	111	
Lube Oil	8015B	1000	1020	102	

Approved By: _____ *CA* **Date:** 9/24/99

LCS/52595

06177PHC.MM2 - CCV 9/23/99

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Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05

Service Request: K9906177
Date Analyzed: 9/20/99

Continuing Calibration Verification (CCV) Summary
Northwest TPH-Dx

Sample Name: CCV2
Lab Code: 0920F063,0920F065
Test Notes:

Units: mg/L (ppm)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Diesel	8015B	1000	1140	114	
Lube Oil	8015B	1000	1060	106	

Approved By: _____ Date: 9/24/99

LCS/52595

06177PHC.MM2 - CCV (2) 9/23/99

00064
Page No.:

QA/QC Report

Service Request: K9906177
Date Analyzed: 9/21/99

Continuing Calibration Verification (CCV) Summary

Units: mg/L (ppm)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Diesel	8015B	1000	1110	111	
Lube Oil	8015B	1000	1030	103	

LCS/52595

06177PHC.MM2 - CCV (3) 9/23/99

00065

Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05

Service Request: K9906177
Date Analyzed: 9/20/99

Continuing Calibration Blank (CCB) Summary
Northwest TPH-Dx

Sample Name: CCB1
Lab Code: 0920F011
Test Notes:

Units: mg/L (ppm)
Basis: NA

Analyte	Analysis Method	MRL	Result	Result Notes
Diesel	8015B	0.25	ND	
Lube Oil	8015B	0.5	ND	

Approved By: _____ *EL* **Date:** 9/24/99

LCS/52595

06177PHC.MM2 - CCB 9/23/99

00066
Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Site 303/304/7057-05

Service Request: K9906177
Date Analyzed: 9/20/99

Continuing Calibration Blank (CCB) Summary
Northwest TPH-Dx

Sample Name: CCB2
Lab Code: 0920F075
Test Notes:

Units: mg/L (ppm)
Basis: NA

Analyte	Analysis Method	MRL	Result	Result Notes
Diesel	8015B	0.25	ND	
Lube Oil	8015B	0.5	ND	

Approved By: _____ *Ed* **Date:** 9/24/99

LCS/52595

00067

APPENDIX B

CHAIN OF CUSTODY

INFORMATION

Sample Custody Record

Samples Shipped to: CAS



HARTCROWSER

19906177

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB <u>7057-05</u> LAB NUMBER _____						REQUESTED ANALYSIS										NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS				
PROJECT NAME <u>Site 303/304</u>						NWTPHG/BTEX	NWTPH PX	TSS	SO4	NO3	Alkalinity	Diss Fe									
HART CROWSER CONTACT <u>K. Anderson</u>																					
SAMPLED BY: <u>KCA</u>																					
LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX																
1	HC-303-MW-1		9/7/99	1430		X	X	X	X	X	X	X						9	extra volume for MS/MSD		
2	HC-303-MW-2			1450		X	X	X	X	X	X	X						8			
3	HC-303-MW-3			1515		X	X	X	X	X	X	X						8			
4	HC-303-OW2			1615		X	X	X	X	X	X	X						8			
5	HC-304-MW-1			1215		X	X	X	X	X	X	X						8			
6	HC-304-MW-2			1100		X	X	X	X	X	X	X						8			
7	HC-304-MW-4			1030		X	X	X	X	X	X	X						8			
8	HC-304-MW-5			1310		X	X	X	X	X	X	X						8			
9	Trip Blank					X	X	X	X	X	X	X						2			
						X															
RELINQUISHED BY <u>[Signature]</u> DATE <u>9/8/99</u>						RECEIVED BY <u>[Signature]</u> DATE <u>9/9/99</u>														TOTAL NUMBER OF CONTAINERS	
SIGNATURE <u>K. Anderson</u>						SIGNATURE <u>[Signature]</u>														SAMPLE RECEIPT INFORMATION	
PRINT NAME <u>HC</u>						PRINT NAME <u>[Signature]</u>														CUSTODY SEALS:	
COMPANY <u>HC</u>						COMPANY <u>CAS</u>														<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A GOOD CONDITION <input type="checkbox"/> YES <input type="checkbox"/> NO TEMPERATURE _____ SHIPMENT METHOD: <input type="checkbox"/> HAND <input type="checkbox"/> COURIER <input type="checkbox"/> OVERNIGHT	
RELINQUISHED BY						RECEIVED BY														COOLER NO.:	
DATE						DATE														STORAGE LOCATION:	
TIME						TIME														TURNAROUND TIME:	
SIGNATURE						SIGNATURE														<input type="checkbox"/> 24 HOURS <input type="checkbox"/> 1 WEEK <input type="checkbox"/> 48 HOURS <input type="checkbox"/> STANDARD <input type="checkbox"/> 72 HOURS OTHER _____	
PRINT NAME						PRINT NAME															
COMPANY						COMPANY															
See Lab Work Order No. _____						for Other Contract Requirements															

**Columbia Analytical Services Inc.
Cooler Receipt And Preservation Form**

SHORT HOLD TIME

Project/Client HART CROWSER Work Order K99 06177

Cooler received on 9/9/99 and opened on 9/9/99 by AP

1. Were custody seals on outside of cooler?
If yes, how many and where? FX ☒ YES ☐ NO
2. Were seals intact and signature & date correct? ☒ YES ☐ NO
3. COC # _____
Temperature of cooler(s) upon receipt: 3.8 5.6 _____
Temperature Blank: 6.0 5.9 _____
4. Were custody papers properly filled out (ink, signed, etc.)? ☒ YES ☐ NO
5. Type of packing material present STYRO + B wrap
6. Did all bottles arrive in good condition (unbroken)? ☒ YES ☐ NO
7. Were all bottle labels complete (i.e. analysis, preservation, etc.)? ☒ YES ☐ NO
8. Did all bottle labels and tags agree with custody papers? ☒ YES ☐ NO
9. Were the correct types of bottles used for the tests indicated? ☒ YES ☐ NO
10. Were all of the preserved bottles received at the lab with the appropriate pH? ☒ YES ☐ NO
11. Were VOA vials checked for absence of air bubbles, and if present, noted below? ☒ YES ☐ NO
12. Did the bottles originate from CAS/K or a branch laboratory? _____ ☒ YES ☐ NO

Explain any discrepancies AIR BUBBLE IN TRIP BLANK (1 OF 2)

Samples that required preservation or received outside of temperature range at the lab(circle)

Sample ID	Reagent	Volume	Lot Number	Initials

00070



October 27, 1999

Service Request No: K9906520

Kym Anderson
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, WA 98102-3699

Re: Manchester/Site 303/7057-05

Dear Kym:

Enclosed are the results of the sample(s) submitted to our laboratory on September 21, 1999. For your reference, these analyses have been assigned our service request number K9906520.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 243.

Respectfully submitted,

Columbia Analytical Services, Inc.

Richard Craven
Project Chemist

RAC/ll

Page 1 of 1397

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
J	Estimated concentration. The value is less than the method reporting limit, but greater than the method detection limit.
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

COLUMBIA ANALYTICAL SERVICES, INC.

Client: Hart Crowser Inc.
Project: Manchester/Site 303
Sample Matrix: Sediment

Service Request No.: K9906520
Date Received: 21-September-99

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for sample(s) designated for Tier IV data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), Matrix/Duplicate Matrix Spike (MS/DMS), Laboratory Control Sample (LCS), Initial/Continuing Calibration Verification Standards (ICV/CCV), and Initial/Continuing Calibration Blanks (ICB/CCB).

All EPA recommended holding except as noted below, times have been met for analyses in this sample delivery group.

The following difficulties were experienced during analysis of this batch:

General Chemistry: There were no QC failures observed.

Metals: There were no QC failures observed.

EPA Method 8082: Review of the quality control data associated with the initial analysis of the samples for PCBs indicated a possible systematic error in the processing which might cause a high bias of sample results. There was also indications that one of the samples might have been contaminated with PCBs not native to the matrix. The questioned samples were reextracted and reanalyzed. Since the reanalysis was completed after hold times had expired both the initial and reanalysis data are provided. Since the samples were stored cooled, and PCBs do not degrade readily, we believe the delay did not impact the final results, and the reanalysis is more representative of actual sample concentration.

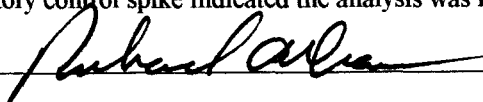
Volatile Organic Compounds: Samples HC-SED-02 and HC-SED-07 have elevated detection limits due to low percent solids in the samples.

There were no QC failures observed.

Semivolatile Organic Compounds: Due to a laboratory error the matrix spike samples failed to meet control limits in the initial analysis. The spikes were prepared again and reanalyzed, and met all criteria. The reanalysis was completed after hold times expired, however the delay did not affect the sample results.

The fluorophenol surrogate was outside control limits in the method blank. All sample surrogates were acceptable, and the laboratory control spike indicated the analysis was in control, so no corrective action was taken.

Approved by



Date

10/28/99

00003

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Total Solids

Prep Method: NONE
Analysis Method: 160.3M
Test Notes:

Units: PERCENT
Basis: Wet

Sample Name	Lab Code	Date Analyzed	Result	Result Notes
HC-SED-01	K9906520-001	9/22/99	74.9	
HC-SED-02	K9906520-002	9/22/99	49.8	
HC-SED-03	K9906520-003	9/22/99	82.7	
HC-SED-04	K9906520-004	9/22/99	82.1	
HC-SED-05	K9906520-005	9/22/99	75.7	
HC-SED-06	K9906520-006	9/22/99	66.8	
HC-SED-07	K9906520-007	9/22/99	47.4	
HC-SED-08	K9906520-008	9/22/99	71.5	
HC-SED-09	K9906520-009	9/22/99	77.8	
HC-SED-10	K9906520-010	9/22/99	73.2	
HC-SED-12	K9906520-011	9/22/99	61.3	
HC-SED-100	K9906520-012	9/22/99	68.1	

Approved By: 41
TSOLIDS.XLT_Sample/01071998a

Date: 12/4/99

00004

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Carbon, Total Organic

Prep Method: NONE
Analysis Method: ASTM D4129-82M
Test Notes:

Units: PERCENT
Basis: Dry

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
HC-SED-01	K9906520-001	0.05	0.01	1	NA	10/1/99	0.52	
HC-SED-02	K9906520-002	0.05	0.01	1	NA	10/1/99	2.02	
HC-SED-03	K9906520-003	0.05	0.01	1	NA	10/1/99	0.09	
HC-SED-04	K9906520-004	0.05	0.01	1	NA	10/1/99	0.20	
HC-SED-05	K9906520-005	0.05	0.01	1	NA	10/1/99	0.42	
HC-SED-06	K9906520-006	0.05	0.01	1	NA	10/6/99	0.50	
HC-SED-07	K9906520-007	0.05	0.01	1	NA	10/6/99	1.74	
HC-SED-08	K9906520-008	0.05	0.01	1	NA	10/6/99	0.41	
HC-SED-09	K9906520-009	0.05	0.01	1	NA	10/6/99	0.23	
HC-SED-10	K9906520-010	0.05	0.01	1	NA	10/6/99	0.39	
HC-SED-12	K9906520-011	0.05	0.01	1	NA	10/6/99	0.50	
HC-SED-100	K9906520-012	0.05	0.01	1	NA	10/6/99	0.60	
Method Blank	K9906520-MB	0.05	0.01	1	NA	10/1/99	ND	
Method Blank	K9906520-MB	0.05	0.01	1	NA	10/6/99	ND	

M

Modified

Approved By: _____

Date: _____

10-6-99

1A/020597p

06520WET.LJ1 - Sample 10/6/99

00005

Page No.:

TOTAL METALS
- Cover Page -
INORGANIC ANALYSIS DATA PACKAGE

Contract: Hart Crowser, Inc.

SDG No.: K9906520

Lab Code KLAB

Case No.: 7057-05

SAS No.:

SOW No.: SW846

<u>Sample No.</u>	<u>Lab Sample ID.</u>
HC-SED-01	K9906520-001
HC-SED-02	K9906520-002
HC-SED-03	K9906520-003
HC-SED-04	K9906520-004
HC-SED-05	K9906520-005
HC-SED-06	K9906520-006
HC-SED-07	K9906520-007
HC-SED-08	K9906520-008
HC-SED-09	K9906520-009
HC-SED-09D	K9906520-009D
HC-SED-09S	K9906520-009S
HC-SED-10	K9906520-010
HC-SED-12	K9906520-011
HC-SED-100	K9906520-012

Were ICP interelement corrections applied?

Yes/No YES

Were ICP background corrections applied?

Yes/No YES

If yes-were raw data generated before
application of background corrections?

Yes/No NO

Comments:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: 

Name: GREG JASPER

Date: 10/6/99

Title: SENIOR ANALYTICAL CHEMIST

TOTAL METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-SED-01

Contract: Hart Crowser, Inc

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K9906520

Matrix (soil/water): SEDIMENT

Lab Sample ID: K9906520-001

Level (low/med): LOW

Date Received: 09/21/99

% Solids: 74.9

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	3.7			MS
7440-43-9	Cadmium	0.26			MS
7440-47-3	Chromium	12.2			MS
7440-50-8	Copper	10.6			MS
7439-92-1	Lead	10.5			MS
7440-02-0	Nickel	9.1			MS
7440-66-6	Zinc	29.5			MS

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments:

00007

TOTAL METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-SED-02

Contract: Hart Crowser, IncLab Code: KLABCase No.: 7057-05

SAS No.:

SDG NO.: K9906520Matrix (soil/water): SEDIMENTLab Sample ID: K9906520-002Level (low/med): LOWDate Received: 09/21/99% Solids: 49.8Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	5.6			MS
7440-43-9	Cadmium	0.40			MS
7440-47-3	Chromium	16.5			MS
7440-50-8	Copper	19.9			MS
7439-92-1	Lead	19.7			MS
7440-02-0	Nickel	13.4			MS
7440-66-6	Zinc	37.4			MS

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments: _____

00008

TOTAL METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-SED-03

Contract: Hart Crowser, Inc

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K9906520

Matrix (soil/water): SEDIMENT

Lab Sample ID: K9906520-003

Level (low/med): LOW

Date Received: 09/21/99

% Solids: 82.7

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	2.2			MS
7440-43-9	Cadmium	0.03			MS
7440-47-3	Chromium	7.3			MS
7440-50-8	Copper	8.38			MS
7439-92-1	Lead	8.68			MS
7440-02-0	Nickel	6.9			MS
7440-66-6	Zinc	24.0			MS

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments:

00009

TOTAL METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-SED-04

Contract: Hart Crowser, IncLab Code: KLABCase No.: 7057-05

SAS No.:

SDG NO.: K9906520Matrix (soil/water): SEDIMENTLab Sample ID: K9906520-004Level (low/med): LOWDate Received: 09/21/99% Solids: 82.1Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	2.2			MS
7440-43-9	Cadmium	0.07			MS
7440-47-3	Chromium	11.0			MS
7440-50-8	Copper	8.05			MS
7439-92-1	Lead	10.5			MS
7440-02-0	Nickel	8.9			MS
7440-66-6	Zinc	30.7			MS

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments: _____

00010

TOTAL METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-SED-05

Contract: Hart Crowser, Inc

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K9906520

Matrix (soil/water): SEDIMENT

Lab Sample ID: K9906520-005

Level (low/med): LOW

Date Received: 09/21/99

% Solids: 75.7

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	1.6			MS
7440-43-9	Cadmium	0.10			MS
7440-47-3	Chromium	20.0			MS
7440-50-8	Copper	12.2			MS
7439-92-1	Lead	5.32			MS
7440-02-0	Nickel	16.7			MS
7440-66-6	Zinc	37.9			MS

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments:

00011

TOTAL METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-SED-06

Contract: Hart Crowser, IncLab Code: KLABCase No.: 7057-05

SAS No.:

SDG NO.: K9906520Matrix (soil/water): SEDIMENTLab Sample ID: K9906520-006Level (low/med): LOWDate Received: 09/21/99% Solids: 66.8Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	3.2			MS
7440-43-9	Cadmium	0.25			MS
7440-47-3	Chromium	14.5			MS
7440-50-8	Copper	13.0			MS
7439-92-1	Lead	8.01			MS
7440-02-0	Nickel	13.8			MS
7440-66-6	Zinc	28.8			MS

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments:

00012

TOTAL METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-SED-07

Contract: Hart Crowser, IncLab Code: KLABCase No.: 7057-05

SAS No.:

SDG NO.: K9906520Matrix (soil/water): SEDIMENTLab Sample ID: K9906520-007Level (low/med): LOWDate Received: 09/21/99% Solids: 47.4Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	21.1			MS
7440-43-9	Cadmium	0.42			MS
7440-47-3	Chromium	27.8			MS
7440-50-8	Copper	124			MS
7439-92-1	Lead	63.6			MS
7440-02-0	Nickel	28.0			MS
7440-66-6	Zinc	165			MS

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments:

00013

TOTAL METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-SED-08

Contract: Hart Crowser, Inc

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K9906520

Matrix (soil/water): SEDIMENT

Lab Sample ID: K9906520-008

Level (low/med): LOW

Date Received: 09/21/99

% Solids: 71.5

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	2.7			MS
7440-43-9	Cadmium	0.16			MS
7440-47-3	Chromium	11.8			MS
7440-50-8	Copper	8.66			MS
7439-92-1	Lead	6.50			MS
7440-02-0	Nickel	11.3			MS
7440-66-6	Zinc	22.5			MS

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments:

00014

TOTAL METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-SED-09

Contract: Hart Crowser, Inc

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K9906520

Matrix (soil/water): SEDIMENT

Lab Sample ID: K9906520-009

Level (low/med): LOW

Date Received: 09/21/99

% Solids: 77.8

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	4.0			MS
7440-43-9	Cadmium	0.18			MS
7440-47-3	Chromium	12.2			MS
7440-50-8	Copper	7.63			MS
7439-92-1	Lead	6.05			MS
7440-02-0	Nickel	12.4			MS
7440-66-6	Zinc	21.5			MS

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments:

00015

TOTAL METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-SED-10

Contract: Hart Crowser, IncLab Code: KLABCase No.: 7057-05

SAS No.:

SDG NO.: K9906520Matrix (soil/water): SEDIMENTLab Sample ID: K9906520-010Level (low/med): LOWDate Received: 09/21/99% Solids: 73.2Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	3.9			MS
7440-43-9	Cadmium	0.15			MS
7440-47-3	Chromium	15.4			MS
7440-50-8	Copper	11.0			MS
7439-92-1	Lead	9.28			MS
7440-02-0	Nickel	16.2			MS
7440-66-6	Zinc	28.8			MS

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments: _____

00016

TOTAL METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-SED-12

Contract: Hart Crowser, Inc

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K9906520

Matrix (soil/water): SEDIMENT

Lab Sample ID: K9906520-011

Level (low/med): LOW

Date Received: 09/21/99

% Solids: 61.3

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	6.3			MS
7440-43-9	Cadmium	0.12			MS
7440-47-3	Chromium	27.5			MS
7440-50-8	Copper	30.6			MS
7439-92-1	Lead	9.45			MS
7440-02-0	Nickel	27.4			MS
7440-66-6	Zinc	62.6			MS

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments:

00017

TOTAL METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-SED-100

Contract: Hart Crowser, Inc

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K9906520

Matrix (soil/water): SEDIMENT

Lab Sample ID: K9906520-012

Level (low/med): LOW

Date Received: 09/21/99

% Solids: 68.1

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

CAS No.	Analyte	Concentration	C	Q	M
7440-38-2	Arsenic	3.4			MS
7440-43-9	Cadmium	0.27			MS
7440-47-3	Chromium	14.2			MS
7440-50-8	Copper	13.9			MS
7439-92-1	Lead	7.91			MS
7440-02-0	Nickel	13.8			MS
7440-66-6	Zinc	29.5			MS

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments:

00018

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-01
Lab Code: K9906520-001
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	B
Aroclor 1221	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	B
Aroclor 1232	EPA 3540C	8082	15	4	1	9/23/99	10/5/99	ND	B
Aroclor 1242	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	B
Aroclor 1248	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	5	J

B The MRL is elevated because of matrix interferences.

Approved By: _____

Jan

Date: 10-7-99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-01
Lab Code: K9906520-001Re
Test Notes: H

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	10/20/99	10/23/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	

H The analysis was performed past the recommended hold time; see case narrative.

Approved By: _____



Date: 10-28-99

1S22/020597p

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00020

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-02
Lab Code: K9906520-002
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	15	4	1	9/23/99	10/5/99	ND	B
Aroclor 1221	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	B
Aroclor 1232	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	B
Aroclor 1242	EPA 3540C	8082	15	4	1	9/23/99	10/5/99	ND	B
Aroclor 1248	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	10	J

B The MRL is elevated because of matrix interferences.

Approved By: _____

Jay

Date: 10-7-99

1S22/020597p

00021

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-02
Lab Code: K9906520-002Re
Test Notes: H

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	10/20/99	10/27/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	10/20/99	10/27/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	10/20/99	10/27/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	10/20/99	10/27/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	10/20/99	10/27/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	10/20/99	10/27/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	10/20/99	10/27/99	ND	

H The analysis was performed past the recommended hold time; see case narrative.

Approved By: _____



Date: 10-28-99

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00022

Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-03
Lab Code: K9906520-003
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	15	4	1	9/23/99	10/5/99	ND	B
Aroclor 1221	EPA 3540C	8082	40	4	1	9/23/99	10/5/99	ND	B
Aroclor 1232	EPA 3540C	8082	25	4	1	9/23/99	10/5/99	ND	B
Aroclor 1242	EPA 3540C	8082	15	4	1	9/23/99	10/5/99	ND	B
Aroclor 1248	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	7	J

B The MRL is elevated because of matrix interferences.

Approved By: _____

1S22/020597p

Date 10-7-99

00023

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-03
Lab Code: K9906520-003Re
Test Notes: H

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	10/20/99	10/23/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	5	J

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The analysis was performed past the recommended hold time; see case narrative.

Approved By: _____

Date: 10-28-99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-04
Lab Code: K9906520-004
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	7	J

Approved By: _____

Date: 10-2-99

1S22/020597p

00025

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-04
Lab Code: K9906520-004Re
Test Notes: H

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	10/20/99	10/24/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	10/20/99	10/24/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	10/20/99	10/24/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	10/20/99	10/24/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	10/20/99	10/24/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	10/20/99	10/24/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	10/20/99	10/24/99	ND	

H The analysis was performed past the recommended hold time; see case narrative.

Approved By: _____



Date: 10-28-99

1S22/020597p

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Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-05
Lab Code: K9906520-005
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	

Approved By: _____

Date: 10-7-99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-06
Lab Code: K9906520-006
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	5	J

Approved By:  Date: 10-7-99

1S22/020597p

00028

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-06
Lab Code: K9906520-006Re
Test Notes: H

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	10/20/99	10/24/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	10/20/99	10/24/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	10/20/99	10/24/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	10/20/99	10/24/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	10/20/99	10/24/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	10/20/99	10/24/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	10/20/99	10/24/99	16	

H

The analysis was performed past the recommended hold time; see case narrative.

Approved By: _____



Date: _____

10-28-99

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Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-07
Lab Code: K9906520-007
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	B
Aroclor 1221	EPA 3540C	8082	40	4	1	9/23/99	10/5/99	ND	B
Aroclor 1232	EPA 3540C	8082	40	4	1	9/23/99	10/5/99	ND	B
Aroclor 1242	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	B
Aroclor 1248	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	137	
Aroclor 1260	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	

B The MRL is elevated because of matrix interferences.

Approved By: _____



Date: 10-7-99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-07
Lab Code: K9906520-007Re
Test Notes: H

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method			Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
			MRL	MDL					
Aroclor 1016	EPA 3540C	8082	10	4	1	10/20/99	10/27/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	10/20/99	10/27/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	10/20/99	10/27/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	10/20/99	10/27/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	10/20/99	10/27/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	10/20/99	10/27/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	10/20/99	10/27/99	17	

H The analysis was performed past the recommended hold time; see case narrative.

Approved By: _____

Date: 10-28-99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-08
Lab Code: K9906520-008
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	

Approved By: _____



Date: 10-7-99

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

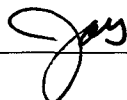
Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-09
Lab Code: K9906520-009
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	

Approved By: _____



Date: _____

10-7-99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-10
Lab Code: K9906520-010
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	

Approved By: _____

Date: 10-7-99

1S22/020597p

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-12
Lab Code: K9906520-011
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	

Approved By: _____

Date: 10-7-99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-100
Lab Code: K9906520-012
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	

Approved By: _____



Date: 10-7-99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: NA
Date Received: NA

Polychlorinated Biphenyls (PCBs)

Sample Name: Method Blank
Lab Code: KWG9903203-4
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	9/23/99	10/5/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	9/23/99	10/5/99	ND	

Approved By: _____



Date: _____

10-7-99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: NA
Date Received: NA

Polychlorinated Biphenyls (PCBs)

Sample Name: Method Blank
Lab Code: KWG9903675-3
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Aroclor 1016	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1221	EPA 3540C	8082	20	4	1	10/20/99	10/23/99	ND	
Aroclor 1232	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1242	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1248	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1254	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	
Aroclor 1260	EPA 3540C	8082	10	4	1	10/20/99	10/23/99	ND	

Approved By: _____

Date: 10-28-99

1822/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Volatile Organic Compounds

Sample Name: HC-SED-01
Lab Code: K9906520-001
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
Toluene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
Ethylbenzene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
<i>m,p</i> -Xylenes	EPA 5030A	8260B	5	3	1	NA	9/30/99	ND	
<i>o</i> -Xylene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	

Approved By: 
06520 VOA.ML1-182p 10/14/99

Date: 10/15/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Volatile Organic Compounds

Sample Name: HC-SED-02
Lab Code: K9906520-002
Test Notes: F

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030A	8260B	10	2	2	NA	9/30/99	ND	
Toluene	EPA 5030A	8260B	10	2	2	NA	9/30/99	ND	
Ethylbenzene	EPA 5030A	8260B	10	2	2	NA	9/30/99	ND	
<i>m,p</i> -Xylenes	EPA 5030A	8260B	10	3	2	NA	9/30/99	ND	
<i>o</i> -Xylene	EPA 5030A	8260B	10	2	2	NA	9/30/99	ND	

F

The MRL is elevated because of the low percent solids in the sample as received.

Approved By: 
06520 VOA.ML1-1S2p(2) 10/14/99

Date: 10/15/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Volatile Organic Compounds

Sample Name: HC-SED-03
Lab Code: K9906520-003
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
Toluene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
Ethylbenzene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
<i>m,p</i> -Xylenes	EPA 5030A	8260B	5	3	1	NA	9/30/99	ND	
<i>o</i> -Xylene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	

Approved By:

06520 VOA.ML1 - 182p (3) 10/14/99

Date:

10/15/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Volatile Organic Compounds

Sample Name: HC-SED-04
Lab Code: K9906520-004
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
Toluene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
Ethylbenzene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
<i>m,p</i> -Xylenes	EPA 5030A	8260B	5	3	1	NA	9/30/99	ND	
<i>o</i> -Xylene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	

Approved By: _____
06520 VOA.ML1 - 182p (4) 10/14/99

Date: 10/15/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Volatile Organic Compounds

Sample Name: HC-SED-05
Lab Code: K9906520-005
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
Toluene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
Ethylbenzene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
<i>m,p</i> -Xylenes	EPA 5030A	8260B	5	3	1	NA	9/30/99	ND	
<i>o</i> -Xylene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	

Approved By: 
06520 VOA.ML1-1S2p (5) 10/14/99

Date: 10/19/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Volatile Organic Compounds

Sample Name: HC-SED-06
Lab Code: K9906520-006
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
Toluene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
Ethylbenzene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
<i>m,p</i> -Xylenes	EPA 5030A	8260B	5	3	1	NA	9/30/99	ND	
<i>o</i> -Xylene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	

Approved By: 
06520 VOA.ML1-132p (6) 10/14/99

Date: 10/15/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Volatile Organic Compounds

Sample Name: HC-SED-07
Lab Code: K9906520-007
Test Notes: F

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030A	8260B	10	2	2	NA	10/1/99	ND	
Toluene	EPA 5030A	8260B	10	2	2	NA	10/1/99	ND	
Ethylbenzene	EPA 5030A	8260B	10	2	2	NA	10/1/99	ND	
<i>m,p</i> -Xylenes	EPA 5030A	8260B	10	3	2	NA	10/1/99	ND	
<i>o</i> -Xylene	EPA 5030A	8260B	10	2	2	NA	10/1/99	ND	

F The MRL is elevated because of the low percent solids in the sample as received.

Approved By: _____
06520 VOA:MLI-182p (7) 10/14/99

Date: 10/15/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Volatile Organic Compounds

Sample Name: HC-SED-08
Lab Code: K9906520-008
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
Toluene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
Ethylbenzene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
<i>m,p</i> -Xylenes	EPA 5030A	8260B	5	3	1	NA	10/1/99	ND	
<i>o</i> -Xylene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	

Approved By:  Date: 10/15/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Volatile Organic Compounds

Sample Name: HC-SED-09
Lab Code: K9906520-009
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
Toluene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
Ethylbenzene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
<i>m,p</i> -Xylenes	EPA 5030A	8260B	5	3	1	NA	10/1/99	ND	
<i>o</i> -Xylene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	

Approved By: PA Date: 10/28/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

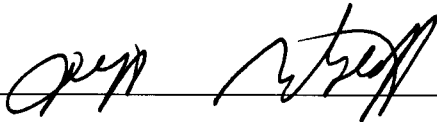
Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Volatile Organic Compounds

Sample Name: HC-SED-10
Lab Code: K9906520-010
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
Toluene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
Ethylbenzene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
<i>m,p</i> -Xylenes	EPA 5030A	8260B	5	3	1	NA	10/1/99	ND	
<i>o</i> -Xylene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	

Approved By:  Date: 10/15/99

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

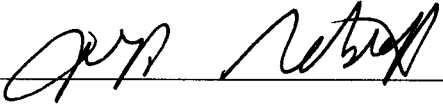
Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Volatile Organic Compounds

Sample Name: HC-SED-12
Lab Code: K9906520-011
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
Toluene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
Ethylbenzene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
<i>m,p</i> -Xylenes	EPA 5030A	8260B	5	3	1	NA	10/1/99	ND	
<i>o</i> -Xylene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	

Approved By: 
06520 VOA.MLI-1S2p (11) 10/14/99

Date: 10/19/99

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Page No.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Volatile Organic Compounds

Sample Name: HC-SED-100
Lab Code: K9906520-012
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
Toluene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
Ethylbenzene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	
<i>m,p</i> -Xylenes	EPA 5030A	8260B	5	3	1	NA	10/1/99	ND	
<i>o</i> -Xylene	EPA 5030A	8260B	5	2	1	NA	10/1/99	ND	

Approved By:

06520 VOA.ML1-1S2p (12) 10/14/99

Date:

10/15/99

00050

COLUMBIA ANALYTICAL SERVICES, INC.**Analytical Report**

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

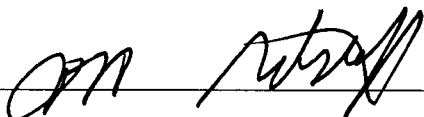
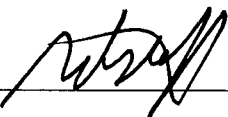
Service Request: K9906520
Date Collected: NA
Date Received: NA

Volatile Organic Compounds

Sample Name: Method Blank
Lab Code: K990930-MB
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
Toluene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
Ethylbenzene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	
<i>m,p</i> -Xylenes	EPA 5030A	8260B	5	3	1	NA	9/30/99	ND	
<i>o</i> -Xylene	EPA 5030A	8260B	5	2	1	NA	9/30/99	ND	

Approved By:  
06520 VOA-MET-182p (13) 10/14/99

Date: 10/15/99

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Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
 Project: Manchester/Site 303/7057-05
 Sample Matrix: Sediment

Service Request: K9906520
 Date Collected: 9/17/99
 Date Received: 9/21/99

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: HC-SED-01
 Lab Code: K9906520-001
 Test Notes:

Units: ug/Kg (ppb)
 Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Phenol	EPA 3550B	SIM	20	8	1	9/28/99	9/30/99	200	
2-Methylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
4-Methylphenol	EPA 3550B	SIM	20	20	1	9/28/99	9/30/99	140	*
2,4-Dimethylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
Naphthalene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	1	J
Acenaphthylene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Acenaphthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Dibenzofuran	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	2	J
Fluorene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	2	J
Pentachlorophenol	EPA 3550B	SIM	61	50	1	9/28/99	9/30/99	ND	
Phenanthrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	42	
Anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	5	J
Fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	72	
Pyrene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	61	
Benz(a)anthracene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	24	
Chrysene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	34	
Benzo(b)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	20	J
Benzo(k)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	20	J
Benzo(a)pyrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	20	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	10	J
Dibenz(a,h)anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	3	J
Benzo(g,h,i)perylene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	10	J

* 3- and 4-Methylphenol coelute. Quantitated using 4-Methylphenol.

Approved By: _____

L. L. L. L.

Date: 10/6/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
 Project: Manchester/Site 303/7057-05
 Sample Matrix: Sediment

Service Request: K9906520
 Date Collected: 9/17/99
 Date Received: 9/21/99

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: HC-SED-02
 Lab Code: K9906520-002
 Test Notes:

Units: ug/Kg (ppb)
 Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Phenol	EPA 3550B	SIM	400	8	10	9/28/99	9/30/99	1100	
2-Methylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
4-Methylphenol	EPA 3550B	SIM	400	20	10	9/28/99	9/30/99	3400	*
2,4-Dimethylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
Naphthalene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	2	J
Acenaphthylene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	3	J
Acenaphthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	5	J
Dibenzofuran	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	3	J
Fluorene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	6	J
Pentachlorophenol	EPA 3550B	SIM	61	50	1	9/28/99	9/30/99	ND	
Phenanthrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	62	
Anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	20	J
Fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	120	
Pyrene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	99	
Benz(a)anthracene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	50	
Chrysene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	65	
Benzo(b)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	42	
Benzo(k)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	34	
Benzo(a)pyrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	40	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	24	
Dibenz(a,h)anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	5	J
Benzo(g,h,i)perylene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	20	J

* 3- and 4-Methylphenol coelute. Quantitated using 4-Methylphenol.

Approved By:  Date: 10/6/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
 Project: Manchester/Site 303/7057-05
 Sample Matrix: Sediment

Service Request: K9906520
 Date Collected: 9/17/99
 Date Received: 9/21/99

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: HC-SED-03
 Lab Code: K9906520-003
 Test Notes:

Units: ug/Kg (ppb)
 Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Phenol	EPA 3550B	SIM	20	8	1	9/28/99	9/29/99	ND	
2-Methylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/29/99	ND	
4-Methylphenol	EPA 3550B	SIM	20	20	1	9/28/99	9/29/99	ND	*
2,4-Dimethylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/29/99	ND	
Naphthalene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	ND	
Acenaphthylene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	ND	
Acenaphthene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	ND	
Dibenzofuran	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	ND	
Fluorene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	ND	
Pentachlorophenol	EPA 3550B	SIM	61	50	1	9/28/99	9/29/99	ND	
Phenanthrene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	20	J
Anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	5	J
Fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	53	
Pyrene	EPA 3550B	SIM	20	3	1	9/28/99	9/29/99	40	
Benz(a)anthracene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	20	J
Chrysene	EPA 3550B	SIM	20	3	1	9/28/99	9/29/99	20	J
Benzo(b)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	10	J
Benzo(k)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	9	J
Benzo(a)pyrene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	10	J
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	7	J
Dibenz(a,h)anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	2	J
Benzo(g,h,i)perylene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	6	J

* 3- and 4-Methylphenol coelute. Quantitated using 4-Methylphenol.

Approved By: _____

Luke Stof

Date: 10/6/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: HC-SED-04
Lab Code: K9906520-004
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Phenol	EPA 3550B	SIM	20	8	1	9/28/99	9/29/99	37	
2-Methylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/29/99	ND	
4-Methylphenol	EPA 3550B	SIM	20	20	1	9/28/99	9/29/99	ND	*
2,4-Dimethylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/29/99	ND	
Naphthalene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	1	J
Acenaphthylene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	3	J
Acenaphthene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	ND	
Dibenzofuran	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	ND	
Fluorene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	3	J
Pentachlorophenol	EPA 3550B	SIM	61	50	1	9/28/99	9/29/99	ND	
Phenanthrene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	34	
Anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	6	J
Fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	48	
Pyrene	EPA 3550B	SIM	20	3	1	9/28/99	9/29/99	53	
Benz(a)anthracene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	20	J
Chrysene	EPA 3550B	SIM	20	3	1	9/28/99	9/29/99	21	
Benzo(b)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	10	J
Benzo(k)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	10	J
Benzo(a)pyrene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	20	J
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	10	J
Dibenz(a,h)anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	2	J
Benzo(g,h,i)perylene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	8	J

* 3- and 4-Methylphenol coelute. Quantitated using 4-Methylphenol.

Approved By: _____

Lali Stang

Date: 10/6/99

00055

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: HC-SED-05
Lab Code: K9906520-005
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Phenol	EPA 3550B	SIM	20	8	1	9/28/99	9/30/99	73	
2-Methylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
4-Methylphenol	EPA 3550B	SIM	20	20	1	9/28/99	9/30/99	23	*
2,4-Dimethylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
Naphthalene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	1	J
Acenaphthylene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Acenaphthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Dibenzofuran	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	ND	
Fluorene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Pentachlorophenol	EPA 3550B	SIM	61	50	1	9/28/99	9/30/99	ND	
Phenanthrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	10	J
Anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	10	J
Fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	240	
Pyrene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	53	
Benz(a)anthracene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	150	
Chrysene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	130	
Benzo(b)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	62	
Benzo(k)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	51	
Benzo(a)pyrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	51	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	23	
Dibenz(a,h)anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	5	J
Benzo(g,h,i)perylene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	20	J

* 3- and 4-Methylphenol coelute. Quantitated using 4-Methylphenol.

Approved By: _____



Date: 10/6/99

00056

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
 Project: Manchester/Site 303/7057-05
 Sample Matrix: Sediment

Service Request: K9906520
 Date Collected: 9/17/99
 Date Received: 9/21/99

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: HC-SED-06
 Lab Code: K9906520-006
 Test Notes:

Units: ug/Kg (ppb)
 Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Phenol	EPA 3550B	SIM	20	8	1	9/28/99	9/30/99	ND	
2-Methylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
4-Methylphenol	EPA 3550B	SIM	20	20	1	9/28/99	9/30/99	40	*
2,4-Dimethylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
Naphthalene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	1	J
Acenaphthylene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Acenaphthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Dibenzofuran	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	1	J
Fluorene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Pentachlorophenol	EPA 3550B	SIM	61	50	1	9/28/99	9/30/99	ND	
Phenanthrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	10	J
Anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	6	J
Fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	35	
Pyrene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	53	
Benz(a)anthracene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	22	
Chrysene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	29	
Benzo(b)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	20	J
Benzo(k)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	20	J
Benzo(a)pyrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	20	J
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	10	J
Dibenz(a,h)anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	3	J
Benzo(g,h,i)perylene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	9	J

* 3- and 4-Methylphenol coelute. Quantitated using 4-Methylphenol.

Approved By: _____

L. L. L. L.

Date: 10/6/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: HC-SED-07
Lab Code: K9906520-007
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Phenol	EPA 3550B	SIM	20	8	1	9/28/99	9/30/99	80	
2-Methylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	7	
4-Methylphenol	EPA 3550B	SIM	20	20	1	9/28/99	9/30/99	80	*
2,4-Dimethylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
Naphthalene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	52	
Acenaphthylene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	46	
Acenaphthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	130	
Dibenzofuran	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	84	
Fluorene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	300	
Pentachlorophenol	EPA 3550B	SIM	61	50	1	9/28/99	9/30/99	ND	
Phenanthrene	EPA 3550B	SIM	400	2	20	9/28/99	9/30/99	3700	
Anthracene	EPA 3550B	SIM	400	1	20	9/28/99	9/30/99	1900	
Fluoranthene	EPA 3550B	SIM	400	2	20	9/28/99	9/30/99	13000	
Pyrene	EPA 3550B	SIM	400	3	20	9/28/99	9/30/99	13000	
Benz(a)anthracene	EPA 3550B	SIM	400	2	20	9/28/99	9/30/99	6900	
Chrysene	EPA 3550B	SIM	400	3	20	9/28/99	9/30/99	6900	
Benzo(b)fluoranthene	EPA 3550B	SIM	400	2	20	9/28/99	9/30/99	4200	
Benzo(k)fluoranthene	EPA 3550B	SIM	400	2	20	9/28/99	9/30/99	3400	
Benzo(a)pyrene	EPA 3550B	SIM	400	2	20	9/28/99	9/30/99	4600	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	400	1	20	9/28/99	9/30/99	2600	
Dibenz(a,h)anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	650	
Benzo(g,h,i)perylene	EPA 3550B	SIM	400	1	20	9/28/99	9/30/99	1900	

* 3- and 4-Methylphenol coelute. Quantitated using 4-Methylphenol.

Approved By: _____



Date: 10/6/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
 Project: Manchester/Site 303/7057-05
 Sample Matrix: Sediment

Service Request: K9906520
 Date Collected: 9/17/99
 Date Received: 9/21/99

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: HC-SED-08
 Lab Code: K9906520-008
 Test Notes:

Units: ug/Kg (ppb)
 Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Phenol	EPA 3550B	SIM	20	8	1	9/28/99	9/30/99	ND	
2-Methylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
4-Methylphenol	EPA 3550B	SIM	20	20	1	9/28/99	9/30/99	ND	*
2,4-Dimethylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
Naphthalene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	1	J
Acenaphthylene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Acenaphthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Dibenzofuran	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	ND	
Fluorene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Pentachlorophenol	EPA 3550B	SIM	61	50	1	9/28/99	9/30/99	ND	
Phenanthrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	10	J
Anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	6	J
Fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	41	
Pyrene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	42	
Benz(a)anthracene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	30	
Chrysene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	45	
Benzo(b)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	27	
Benzo(k)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	20	
Benzo(a)pyrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	23	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	20	J
Dibenz(a,h)anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	4	J
Benzo(g,h,i)perylene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	10	J

* 3- and 4-Methylphenol coelute. Quantitated using 4-Methylphenol.

Approved By: R. L. Lister Date: 10/6/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
 Project: Manchester/Site 303/7057-05
 Sample Matrix: Sediment

Service Request: K9906520
 Date Collected: 9/17/99
 Date Received: 9/21/99

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: HC-SED-09
 Lab Code: K9906520-009
 Test Notes:

Units: ug/Kg (ppb)
 Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Phenol	EPA 3550B	SIM	20	8	1	9/28/99	9/30/99	ND	
2-Methylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
4-Methylphenol	EPA 3550B	SIM	20	20	1	9/28/99	9/30/99	ND	*
2,4-Dimethylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
Naphthalene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	5	J
Acenaphthylene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	3	J
Acenaphthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	3	J
Dibenzofuran	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	3	J
Fluorene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	5	J
Pentachlorophenol	EPA 3550B	SIM	61	50	1	9/28/99	9/30/99	ND	
Phenanthrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	34	
Anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	10	J
Fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	70	
Pyrene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	64	
Benz(a)anthracene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	48	
Chrysene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	51	
Benzo(b)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	36	
Benzo(k)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	28	
Benzo(a)pyrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	36	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	25	
Dibenz(a,h)anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	7	J
Benzo(g,h,i)perylene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	20	J

* 3- and 4-Methylphenol coelute. Quantitated using 4-Methylphenol.

Approved By: _____

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Date: 10/6/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
 Project: Manchester/Site 303/7057-05
 Sample Matrix: Sediment

Service Request: K9906520
 Date Collected: 9/17/99
 Date Received: 9/21/99

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: HC-SED-10
 Lab Code: K9906520-010
 Test Notes:

Units: ug/Kg (ppb)
 Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Phenol	EPA 3550B	SIM	20	8	1	9/28/99	9/30/99	ND	
2-Methylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
4-Methylphenol	EPA 3550B	SIM	20	20	1	9/28/99	9/30/99	26	*
2,4-Dimethylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
Naphthalene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	1	J
Acenaphthylene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Acenaphthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Dibenzofuran	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	ND	
Fluorene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	3	J
Pentachlorophenol	EPA 3550B	SIM	61	50	1	9/28/99	9/30/99	ND	
Phenanthrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	20	J
Anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	10	J
Fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	53	
Pyrene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	50	
Benz(a)anthracene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	29	
Chrysene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	36	
Benzo(b)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	21	
Benzo(k)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	20	J
Benzo(a)pyrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	20	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	10	J
Dibenz(a,h)anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	3	J
Benzo(g,h,i)perylene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	10	J

* 3- and 4-Methylphenol coelute. Quantitated using 4-Methylphenol.

Approved By: _____

L. L. L. L. L.

Date: 10/6/99

00061

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: HC-SED-12
Lab Code: K9906520-011
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Phenol	EPA 3550B	SIM	20	8	1	9/28/99	9/30/99	22	
2-Methylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
4-Methylphenol	EPA 3550B	SIM	20	20	1	9/28/99	9/30/99	65	*
2,4-Dimethylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
Naphthalene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	2	J
Acenaphthylene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Acenaphthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Dibenzofuran	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	2	J
Fluorene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	2	J
Pentachlorophenol	EPA 3550B	SIM	61	50	1	9/28/99	9/30/99	ND	
Phenanthrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	10	J
Anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	5	J
Fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	39	
Pyrene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	32	
Benz(a)anthracene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	20	J
Chrysene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	23	
Benzo(b)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	10	J
Benzo(k)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	9	J
Benzo(a)pyrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	10	J
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	7	J
Dibenz(a,h)anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	2	J
Benzo(g,h,i)perylene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	6	J

* 3- and 4-Methylphenol coelute. Quantitated using 4-Methylphenol.

Approved By: _____



Date: 10/6/99

00062

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: HC-SED-100
Lab Code: K9906520-012
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Phenol	EPA 3550B	SIM	20	8	1	9/28/99	9/30/99	ND	
2-Methylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
4-Methylphenol	EPA 3550B	SIM	20	20	1	9/28/99	9/30/99	ND	*
2,4-Dimethylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/30/99	ND	
Naphthalene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	3	J
Acenaphthylene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	4	J
Acenaphthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	ND	
Dibenzofuran	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	3	J
Fluorene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	7	J
Pentachlorophenol	EPA 3550B	SIM	61	50	1	9/28/99	9/30/99	ND	
Phenanthrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	43	
Anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	32	
Fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	110	
Pyrene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	130	
Benz(a)anthracene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	130	
Chrysene	EPA 3550B	SIM	20	3	1	9/28/99	9/30/99	270	
Benzo(b)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	78	
Benzo(k)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	78	
Benzo(a)pyrene	EPA 3550B	SIM	20	2	1	9/28/99	9/30/99	81	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	40	
Dibenz(a,h)anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	10	J
Benzo(g,h,i)perylene	EPA 3550B	SIM	20	1	1	9/28/99	9/30/99	28	

* 3- and 4-Methylphenol coelute. Quantitated using 4-Methylphenol.

Approved By: _____



Date: 10/6/99

00063

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: NA
Date Received: NA

Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: Method Blank
Lab Code: KWG9903260-4
Test Notes:

Units: ug/Kg (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Phenol	EPA 3550B	SIM	20	8	1	9/28/99	9/29/99	ND	
2-Methylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/29/99	ND	
4-Methylphenol	EPA 3550B	SIM	20	20	1	9/28/99	9/29/99	ND	*
2,4-Dimethylphenol	EPA 3550B	SIM	6	6	1	9/28/99	9/29/99	ND	
Naphthalene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	ND	
Acenaphthylene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	ND	
Acenaphthene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	ND	
Dibenzofuran	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	ND	
Fluorene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	ND	
Pentachlorophenol	EPA 3550B	SIM	61	50	1	9/28/99	9/29/99	ND	
Phenanthrene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	ND	
Anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	ND	
Fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	ND	
Pyrene	EPA 3550B	SIM	20	3	1	9/28/99	9/29/99	ND	
Benz(a)anthracene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	ND	
Chrysene	EPA 3550B	SIM	20	3	1	9/28/99	9/29/99	ND	
Benzo(b)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	ND	
Benzo(k)fluoranthene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	ND	
Benzo(a)pyrene	EPA 3550B	SIM	20	2	1	9/28/99	9/29/99	ND	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	ND	
Dibenz(a,h)anthracene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	ND	
Benzo(g,h,i)perylene	EPA 3550B	SIM	20	1	1	9/28/99	9/29/99	ND	

* 3- and 4-Methylphenol coelute. Quantitated using 4-Methylphenol.

Approved By: _____

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Date: 10/6/99

APPENDIX A

LABORATORY

QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99
Date Extracted: NA
Date Analyzed: 10/1/99

**Duplicate Summary
Carbon, Total Organic**

Sample Name: HC-SED-01
Lab Code: K9906520-001DUP
Test Notes:

Units: PERCENT
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Carbon, Total Organic	NONE	ASTM D4129-82M	0.05	0.52	0.49	0.50	6	

M Modified

Approved By: _____

Date: _____

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99
Date Extracted: NA
Date Analyzed: 10/1/99

Matrix Spike Summary
Carbon, Total Organic

Sample Name: HC-SED-01
Lab Code: K9906520-001MS
Test Notes:

Units: PERCENT
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS	Result Notes
								Percent Recovery Acceptanc Limits	
Carbon, Total Organic	NONE	ASTM D4129-82M	0.05	2.92	0.52	3.44	100	75-125	

M

Modified

Approved By: _____

Date: _____

10-6-99

MS/020597p

06520WET.LJ1 - MS 10/6/99

00068

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
LCS Matrix: Sediment

Service Request: K9906520
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 10/1/99

Laboratory Control Sample Summary
Carbon, Total Organic

Sample Name: Lab Control Sample
Lab Code: K9906520-LCS
Test Notes:

Units: PERCENT
Basis: Dry

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Carbon, Total Organic	NONE	ASTM D4129-82M	1.16	1.15	99	85-115	

M Modified

Approved By:  Date: 10-6-99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05

Service Request: K9906520
Date Collected: NA
Date Received: NA
Date Analyzed: 10/1,6/99

Carbon, Total Organic
ASTM D4129-82M
Units: PERCENT
Dry Weight Basis

CONTINUING CALIBRATION VERIFICATION (CCV)

	True Value	Measured Value	Percent Recovery
CCV 1 Result	20.0	19.4	97
CCV 2 Result	20.0	19.9	98
CCV 1 Result	20.0	19.9	100
CCV 2 Result	20.0	19.5	98

CONTINUING CALIBRATION BLANK (CCB)

	MRL	Blank Value
CCB 1 Result	0.05	ND
CCB 2 Result	0.05	ND
CCB 1 Result	0.05	ND
CCB 2 Result	0.05	ND

Approved By: _____

COMBOQCD/042695

Date: _____

10-6-99

00070

TOTAL METALS

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Contract: Hart Crowser, Inc

Lab Code: KLAB Case No.: 7057-05 SAS No.:

SDG NO.: K9906520

Initial Calibration Source: ICV Source

Continuing Calibration Source: CCV Source

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Arsenic	50	49.1	98	25	24.7	99	24.8	99	MS
Cadmium	25	25.5	102	25	25.5	102	25.3	101	MS
Chromium	20	19.4	97	25	24.4	98	24.6	98	MS
Copper	25	24.0	96	25	24.6	98	25.0	100	MS
Lead	50	50.5	101	25	25.0	100	25.0	100	MS
Nickel	50	47.8	96	25	24.7	99	24.9	100	MS
Zinc	50	49.2	98	25	24.9	100	25.0	100	MS

TOTAL METALS

- 2a -

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Contract: Hart Crowser, IncLab Code: KLABCase No.: 7057-05

SAS No.:

SDG NO.: K9906520

Initial Calibration Source:

Continuing Calibration Source: CCV Source

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Arsenic				25	24.9	100	25.2	101	MS
Cadmium				25	24.9	100	24.9	100	MS
Chromium				25	24.5	98	25.5	102	MS
Copper				25	25.1	100	25.2	101	MS
Lead				25	25.4	102	24.8	99	MS
Nickel				25	24.4	98	24.7	99	MS
Zinc				25	24.7	99	24.7	99	MS

TOTAL METALS
- 2b -
CRDL STANDARD FOR AA AND ICP

Contract: Hart Crowser, Inc.Lab Code: KLAB Case No.: 7057-05 SAS No.: SDG No.: K9906520

AA CRDL Standard Source:

ICP CRDL Standard Source: ICP Std Source

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	Initial True	Initial Found	Initial %R	Final Found	Final %R
Arsenic				1.0	0.98	98		
Cadmium				1.0	0.95	95		
Chromium				1.0	1.02	102		
Copper				1.0	0.96	96		
Lead				1.0	0.98	98		
Nickel				1.0	1.02	102		
Zinc				1.0	1.01	101		

TOTAL METALS

- 3 -

BLANKS

Contract: Hart Crowser, Inc.Lab Code: KLABCase No.: 7057-05

SAS No.:

SDG NO.: K9906520Preparation Blank Matrix (soil/water): SOILPreparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Preparation Blank		M
			1	C	2	C	3	C	C		
Arsenic			0.4	U	0.4	U	0.4	U	0.2	U	MS
Cadmium			0.04	U	0.04	U	0.04	U	0.02	U	MS
Chromium			0.1	U	0.1	U	0.1	U	0.1	J	MS
Copper			0.06	U	0.06	U	0.06	U	0.03	U	MS
Lead			0.04	U	0.04	U	0.04	U	0.02	U	MS
Nickel			0.4	U	0.4	U	0.4	U	0.2	U	MS
Zinc			0.4	U	0.4	U	0.4	U	0.2	U	MS

00074

TOTAL METALS
- 5a -
SPIKE SAMPLE RECOVERY

SAMPLE NO.

HC-SED-09S

Contract: Hart Crowser, Inc.Lab Code: KLABCase No.: 7057-05

SAS No.:

SDG NO.: K9906520Matrix (soil/water): SEDIMENTLevel (low/med): LOW% Solids for Sample: 77.8

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Arsenic	60 - 130	53.0		4.04		51.4	95		MS
Cadmium	60 - 130	13.0		0.183		12.9	99		MS
Chromium	60 - 130	62.1		12.2		51.4	97		MS
Copper	60 - 130	66.4		7.63		64.3	91		MS
Lead	60 - 130	131		6.05		129	97		MS
Nickel	60 - 130	128		12.4		129	90		MS
Zinc	60 - 130	138		21.5		129	90		MS

Comments: _____

00075

TOTAL METALS

- 6 -

DUPLICATES

SAMPLE NO.

HC-SED-09D

Contract: Hart Crowser, Inc.Lab Code: KLABCase No.: 7057-05

SAS No.:

SDG NO.: K9906520Matrix (soil/water): SEDIMENTLevel (low/med): LOW% Solids for Sample: 77.8% Solids for Duplicate: 77.8Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Arsenic		4.0		3.0		31		MS
Cadmium		0.18		0.13		32		MS
Chromium		12.2		10.8		12		MS
Copper		7.63		7.06		8		MS
Lead		6.05		5.46		10		MS
Nickel		12.4		10.7		15		MS
Zinc		21.5		18.7		14		MS

00076

TOTAL METALS

- 7 -

LABORATORY CONTROL SAMPLE

Contract: Hart Crowser, Inc

Lab Code: KLAB Case No.: 7057-05 SAS No.: SDG NO.: K9906520

Solid LCS Source:

Aqueous LCS Source: INORG VENT

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Arsenic				82.4	73.3		62.0	138 89
Cadmium				94.3	75.2		55.0	144 80
Chromium				97.8	83.2		69.0	131 85
Copper				81.3	66.1		50.0	113 81
Lead				190	153		60.0	140 81
Nickel				164	128		67.0	133 78
Zinc				103	86.0		62.7	142 83

00077

TOTAL METALS
-10-
METHOD DETECTION LIMITS

Contract: Hart Crowser, Inc.

Lab Code: KLAB Case No.: 7057-05 SAS No.: SDG NO.: K9906520

ICP ID Number: VG ICPMS Date: 07/15/99

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Mass	Back-ground	MRL (ug/L)	MDL (ug/L)	M
Arsenic	75		1.0	0.4	MS
Cadmium	111		0.04	0.04	MS
Chromium	52		0.4	0.1	MS
Copper	65		0.20	0.06	MS
Lead	208		0.04	0.04	MS
Nickel	60		0.4	0.4	MS
Zinc	66		1.0	0.4	MS

Comments _____

TOTAL METALS

- 12 -

ICP LINEAR RANGES

Contract: Hart Crowser, Inc.

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K9906520

ICP ID Number: VG ICPMS

Date: 07/15/99

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Arsenic	15.00	1000.0	MS
Cadmium	15.00	1000.0	MS
Chromium	15.00	200.0	MS
Copper	15.00	1000.0	MS
Lead	15.00	1000.0	MS
Nickel	15.00	1000.0	MS
Zinc	15.00	1000.0	MS

Comments: _____

TOTAL METALS

- 13 -

PREPARATION LOG

Contract: Hart Crowser, Inc.Lab Code: KLABCase No.: 7057-05

SAS No.:

SDG NO.: K9906520Method MS

Sample No.	Preparation Date	Weight (grams)	Volume (mL)
K9906520-001	9/28/99	1.00	100
K9906520-002	9/28/99	2.00	100
K9906520-003	9/28/99	1.00	100
K9906520-004	9/28/99	1.00	100
K9906520-005	9/28/99	1.00	100
K9906520-006	9/28/99	2.00	100
K9906520-007	9/28/99	2.00	100
K9906520-008	9/28/99	1.00	100
K9906520-009	9/28/99	1.00	100
K9906520-009D	9/28/99	1.00	100
K9906520-009S	9/28/99	1.00	100
K9906520-010	9/28/99	1.00	100
K9906520-012	9/28/99	2.00	100
K9906520-011	9/28/99	2.00	100
LCSS	9/28/99	1.00	100
PBS	9/28/99	1.00	100

00080

TOTAL METALS

- 14 -

ANALYSIS RUN LOG

Contract Hart Crowser, Inc.Lab Code: KLABCase No.: 7057-05

SAS No.:

SDG No.: K9906520Instrument ID Number: VG ICPMSMethod: MSStart Date: 10/1/99End Date: 10/1/99

Sample No.	D/F	Time	% R	Analytes																											
				A L	S B	A S	B A	B E	C D	C A	C R	C O	C U	F E	P B	M G	M N	H G	N I	K E	S G	A A	N L	T V	Z N	C N					
S0	1.00	08:25				X			X	X		X	X				X								X						
S25	1.00	08:29				X			X	X		X	X				X								X						
ICV	1.00	08:33				X			X	X		X	X				X								X						
CCV1	1.00	08:37				X			X	X		X	X				X								X						
CCB1	1.00	08:41				X			X	X		X	X				X								X						
CRDL1	1.00	08:45				X			X	X		X	X				X								X						
ZZZZZZ	1.00	08:49																													
ZZZZZZ	1.00	08:53																													
ZZZZZZ	1.00	08:57																													
ZZZZZZ	1.00	09:01																													
CCV2	1.00	09:05				X			X	X		X	X				X								X						
CCB2	1.00	09:09				X			X	X		X	X				X								X						
ZZZZZZ	1.00	09:13																													
ZZZZZZ	1.00	09:17																													
PBS	5.00	09:21				X			X	X		X	X				X								X						
LCSS	20.00	09:25				X			X	X		X	X				X								X						
K9906520-009	5.00	09:29				X			X	X		X	X				X								X						
K9906520-009D	5.00	09:33				X			X	X		X	X				X								X						
K9906520-009S	5.00	09:37				X			X	X		X	X				X								X						
K9906520-001	5.00	09:41				X			X	X		X	X				X								X						
K9906520-002	5.00	09:45				X			X	X		X	X				X								X						
K9906520-003	5.00	09:49				X			X	X		X	X				X								X						
CCV3	1.00	09:53				X			X	X		X	X				X								X						
CCB3	1.00	09:57				X			X	X		X	X				X								X						
K9906520-004	5.00	10:01				X			X	X		X	X				X								X						
K9906520-005	5.00	10:05				X			X	X		X	X				X								X						
K9906520-006	5.00	10:09				X			X	X		X	X				X								X						
K9906520-007	5.00	10:13				X			X	X		X	X				X								X						
K9906520-008	5.00	10:17				X			X	X		X	X				X								X						
K9906520-010	5.00	10:21				X			X	X		X	X				X								X						
K9906520-011	5.00	10:25				X			X	X		X	X				X								X						
K9906520-012	5.00	10:29				X			X	X		X	X				X								X						
ZZZZZZ	1.00	10:33																													
ZZZZZZ	1.00	10:37																													

* - Denotes additional elements (other than the standard elements) are represented on another Form 14

00081

TOTAL METALS

- 14 -

ANALYSIS RUN LOG

Contract Hart Crowser, Inc.Lab Code: KLABCase No.: 7057-05

SAS No.:

SDG No.: K9906520Instrument ID Number: VG ICPMSMethod: MSStart Date: 10/1/99End Date: 10/1/99

Sample No.	D/F	Time	% R	Analytes																			
				A L	S B	A S	B A	B E	C D	C A	C R	C O	C U	F E	P B	M G	M N	H G	N I	K E	S G	A A	N L
CCV4	1.00	10:41				X			X		X		X		X				X				X
CCB4	1.00	10:45				X			X		X		X		X				X				X

* - Denotes additional elements (other than the standard elements) are represented on another Form 14

Form XIV - IN

00082

SW-846

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99
Date Extracted: 9/23/99
Date Analyzed: 10/5/99

Surrogate Recovery Summary
Polychlorinated Biphenyls (PCBs)

Prep Method: EPA 3540C
Analysis Method: 8082

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery Decachlorobiphenyl
HC-SED-01	K9906520-001		173 A
HC-SED-02	K9906520-002		164 A
HC-SED-03	K9906520-003		180 A
HC-SED-04	K9906520-004		170 A
HC-SED-05	K9906520-005		165 A
HC-SED-06	K9906520-006		172 A
HC-SED-07	K9906520-007		203 A
HC-SED-08	K9906520-008		151 A
HC-SED-09	K9906520-009		166 A
HC-SED-10	K9906520-010		112
HC-SED-12	K9906520-011		121
HC-SED-100	K9906520-012		118
HC-SED-04	K9906520-004MS		127
HC-SED-04	K9906520-004DMS		121
Lab Control Sample	KWG9903203-3		184 A
Method Blank	KWG9903203-4		143 A

CAS Acceptance Limits: 20-142

A Outside acceptance limits; see case narrative.

Approved By: _____

Date: 10-7-99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99
Date Extracted: 10/20/99
Date Analyzed: 10/23 - 27/99

Surrogate Recovery Summary
Polychlorinated Biphenyls (PCBs)

Prep Method: EPA 3540C
Analysis Method: 8082

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery Decachlorobiphenyl
HC-SED-01	K9906520-001Re		99
HC-SED-02	K9906520-002Re		108
HC-SED-03	K9906520-003Re		106
HC-SED-04	K9906520-004Re		106
HC-SED-06	K9906520-006Re		99
HC-SED-07	K9906520-007Re		118
HC-SED-03	K9906520-003MS		105
HC-SED-03	K9906520-003DMS		104
Lab Control Sample	KWG9903675-3		112
Method Blank	KWG9903675-4		107

CAS Acceptance Limits: 20-142

Approved By: _____



Date: 10-28-99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99
Date Extracted: 9/23/99
Date Analyzed: 10/5/99

Matrix Spike/Duplicate Matrix Spike Summary
 Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-04
Lab Code: K9906520-004MS, K9906520-004DMS
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Spike Level		Sample Result	Spike Result		Percent Recovery		CAS Acceptance Limits	Relative Percent Difference	Result Notes
				MS	DMS		MS	DMS	MS	DMS			
Aroclor 1016	EPA 3540C	8082	10	250	250	ND	275	278	110	111	30-150	1	
Aroclor 1260	EPA 3540C	8082	10	250	250	7	324	339	127	133	30-150	5	

Approved By: _____



Date: 10-7-99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99
Date Extracted: 10/20/99
Date Analyzed: 10/23-24/99

Matrix Spike/Duplicate Matrix Spike Summary
Polychlorinated Biphenyls (PCBs)

Sample Name: HC-SED-03
Lab Code: K9906520-003MS, K9906520-003DMS
Test Notes: H

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Spike Level		Sample Result	Spike Result		Percent Recovery		CAS Acceptance Limits	Relative Percent Difference	Result Notes
				MS	DMS		MS	DMS	MS	DMS			
Aroclor 1016	EPA 3540C	8082	10	400	400	ND	410	387	103	97	30-150	6	
Aroclor 1260	EPA 3540C	8082	10	400	400	5	500	480	124	119	30-150	4	

Approved By: _____

Date: _____

10-28-99

DMS/020597p

06520SVG.JG1 - DMS 10/28/99

Page No.

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
LCS Matrix: Sediment

Service Request: K9906520
Date Collected: NA
Date Received: NA
Date Extracted: 9/23/99
Date Analyzed: 10/5/99


Laboratory Control Sample Summary
 Polychlorinated Biphenyls (PCBs)

Sample Name: Lab Control Sample
Lab Code: KWG9903203-3
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery	Result Notes
						Acceptance Limits	
Aroclor 1016	EPA 3540C	8082	270	445	165	30-150	A
Aroclor 1260	EPA 3540C	8082	270	534	198	30-150	A

A Outside acceptance limits; see case narrative.

Approved By:  Date: 10-7-99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
LCS Matrix: Sediment

Service Request: K9906520
Date Collected: NA
Date Received: NA
Date Extracted: 10/20/99
Date Analyzed: 10/23/99

Laboratory Control Sample Summary
Polychlorinated Biphenyls (PCBs)

Sample Name: Lab Control Sample
Lab Code: KWG9903675-1
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery	Result Notes
						Acceptance Limits	
Aroclor 1016	EPA 3540C	8082	400	330	82	30-150	
Aroclor 1260	EPA 3540C	8082	400	495	124	30-150	

Approved By: _____

Date: 10-28-99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99
Date Extracted: NA
Date Analyzed: 9/30-10/1/99

Surrogate Recovery Summary
Volatile Organic Compounds

Prep Method: EPA 5030A
Analysis Method: 8260B

Units: PERCENT
Basis: Dry

Sample Name	Lab Code	Test Notes	P e r c e n t R e c o v e r y		
			Dibromofluoromethane	Toluene-d8	4-Bromofluorobenzene
HC-SED-01	K9906520-001		105	102	106
HC-SED-02	K9906520-002		102	102	106
HC-SED-03	K9906520-003		105	100	107
HC-SED-04	K9906520-004		108	101	108
HC-SED-05	K9906520-005		109	103	108
HC-SED-06	K9906520-006		119	102	107
HC-SED-07	K9906520-007		108	102	108
HC-SED-08	K9906520-008		109	104	109
HC-SED-09	K9906520-009		109	103	112
HC-SED-10	K9906520-010		111	104	111
HC-SED-12	K9906520-011		112	103	112
HC-SED-100	K9906520-012		111	103	111
HC-SED-01	K9906520-001MS		103	101	103
HC-SED-01	K9906520-001DMS		103	101	105
Lab Control Sample	K990930-LCS		104	100	103
Method Blank	K990930-MB		107	101	105

CAS Acceptance Limits: 75-132 85-109 49-131

Approved By: _____

Date: _____

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99
Date Extracted: NA
Date Analyzed: 9/30/99

Matrix Spike/Duplicate Matrix Spike Summary
Volatile Organic Compounds

Sample Name: HC-SED-01 Units: ug/Kg (ppb)
Lab Code: K9906520-001MS, K9906520-001DMS Basis: Dry
Test Notes:

Analyte	Prep Method	Analysis Method	Percent Recovery										Relative Percent Difference	Result Notes
			MRL	Spike Level		Sample Result	Spike Result		CAS Acceptance Limits					
				MS	DMS		MS	DMS	MS	DMS				
Benzene	EPA 5030A	8260B	5	57	66	ND	46	53	81	80	57-121	1		
Toluene	EPA 5030A	8260B	5	57	66	ND	44	50	77	76	34-134	1		

Approved By: _____

DMS/052595

Date: _____

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Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
LCS Matrix: Sediment

Service Request: K9906520
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 9/30/99

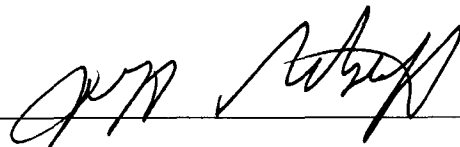
Laboratory Control Sample Summary
Volatile Organic Compounds

Sample Name: Lab Control Sample
Lab Code: K990930-LCS
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Benzene	EPA 5030A	8260B	50	48	96	78-116	
Toluene	EPA 5030A	8260B	50	48	96	77-118	

Approved By: _____



Date: _____

10/15/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99
Date Extracted: 9/28-10/5/99
Date Analyzed: 9/29-10/12/99

Surrogate Recovery Summary
 Base Neutral/Acid Semivolatile Organic Compounds

Prep Method: EPA 3550B
Analysis Method: SIM

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	P e r c e n t			R e c o v e r y		TPH
			2FPHL	PHLD6	NBZ	2FBPH	246TBPHL	
HC-SED-01	K9906520-001		43	54	49	52	72	81
HC-SED-02	K9906520-002		49	63	60	60	84	79
HC-SED-03	K9906520-003		52	64	69	74	62	90
HC-SED-04	K9906520-004		57	69	64	64	83	92
HC-SED-05	K9906520-005		65	66	63	75	77	92
HC-SED-06	K9906520-006		55	64	59	64	74	90
HC-SED-07	K9906520-007		47	48	58	65	81	79
HC-SED-08	K9906520-008		55	54	64	67	83	86
HC-SED-09	K9906520-009		58	56	61	71	76	85
HC-SED-10	K9906520-010		57	71	73	67	86	94
HC-SED-12	K9906520-011		58	71	70	66	88	96
HC-SED-100	K9906520-012		55	53	60	62	86	81
HC-SED-03	K9906520-003MS		68	75	67	69	77	86
HC-SED-03	K9906520-003DMS		66	74	70	66	73	84
Lab Control Sample	KWG9903260-3		61	69	71	69	80	91
Method Blank	KWG9903260-4		30 A	42	62	69	39	91

CAS Acceptance Limits: 31-106 37-104 22-123 15-117 12-116 19-140

2FPHL 2-Fluorophenol
 PHLD6 Phenol-d5
 NBZ Nitrobenzene-d5
 2FBPH 2-Fluorobiphenyl
 246TBPHL 2,4,6-Tribromophenol
 TPH p-Terphenyl-d14

A Outside acceptance limits; see case narrative.

Approved By: LW Date: 10/18/99

00092

SUR6/052595

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9906520
Date Collected: 9/17/99
Date Received: 9/21/99
Date Extracted: 10/5/99
Date Analyzed: 10/12/99

Matrix Spike/Duplicate Matrix Spike Summary
Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: HC-SED-03
Lab Code: K9906520-003MS, K9906520-003DMS
Test Notes: H

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Spike Level		Sample Result	Spike Result		Percent Recovery		CAS Advisory Limits	Relative Percent Difference	Result Notes
				MS	DMS		MS	DMS	MS	DMS			
Phenol	EPA 3550B	SIM	20	240	240	ND	180	180	75	75	20-99	<1	
Acenaphthene	EPA 3550B	SIM	20	240	240	ND	170	170	71	71	26-104	<1	
Pentachlorophenol	EPA 3550B	SIM	61	240	240	ND	150	130	62	54	10-145	14	
Pyrene	EPA 3550B	SIM	20	240	240	40	220	200	75	67	18-144	10	

H

The analysis was performed past the recommended hold time; see case narrative.

Approved By: _____

LW

Date: _____

10/18/99

DMS/052595

00093

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
LCS Matrix: Sediment

Service Request: K9906520
Date Collected: NA
Date Received: NA
Date Extracted: 9/28/99
Date Analyzed: 9/29/99

Laboratory Control Sample Summary
 Base Neutral/Acid Semivolatile Organic Compounds

Sample Name: Lab Control Sample
Lab Code: KWG9903260-3
Test Notes:

Units: ug/Kg (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS	Result Notes
						Percent Recovery Advisory Limits	
Phenol	EPA 3550B	SIM	240	160	67	21-110	
Acenaphthene	EPA 3550B	SIM	240	160	67	29-109	
Pentachlorophenol	EPA 3550B	SIM	240	190	79	10-120	
Pyrene	EPA 3550B	SIM	240	200	83	39-149	

Approved By: _____

LW

Date: _____

10/18/99

00094

APPENDIX B

CHAIN OF CUSTODY

INFORMATION

Sample Custody Record

DATE 9/17/99 PAGE 1 OF 1



HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699

19906520

JOB NUMBER <u>7057-05</u> LAB NUMBER _____						TESTING										NO. OF CONTAINERS	OBSERVATIONS / COMMENTS / COMPOSITING INSTRUCTIONS	
PROJECT MANAGER <u>KYM ANDERSON</u>						Total Metals *	PATHS-SIM	phenols-SIM	PCBS	TOC	BTEX							
PROJECT NAME <u>MANCHESTER / SITE 303</u>																		
SAMPLED BY: <u>WILL DAWSON</u>																		
LAB NO.	SAMPLE	TIME	date	STATION	MATRIX													
	HC-SB0-01	1058	9.17.99	#1	SOIL													3
	HC-SB0-02	1125		#2														3
	HC-SB0-03	1157		#3														3
	HC-SB0-04	1219		#4														3
	HC-SB0-05	1236		#5														3
	HC-SB0-06	1300		#6														3
	HC-SB0-07	1328		#7														3
	HC-SB0-08	1410		#8														3
	HC-SB0-09	1425		#9														3
	HC-SB0-10	1455		#10														3
	HC-SB0-12	1523		#12														3
	HC-SB0-100	1309		#100														3

RELINQUISHED BY		DATE	RECEIVED BY		DATE	TOTAL NUMBER OF CONTAINERS		METHOD OF SHIPMENT	
SIGNATURE <u>[Signature]</u>			SIGNATURE			36		FEP-EX	
PRINTED NAME <u>William Dawson</u>		TIME	PRINTED NAME		TIME	SPECIAL SHIPMENT/HANDLING OR STORAGE REQUIREMENTS			
COMPANY <u>Hart Crowser</u>			COMPANY						
RELINQUISHED BY		DATE	RECEIVED BY		DATE	* As, Cd, Cr, Cu, Pb, Ni, Zn see work order for reporting limits DISTRIBUTION: 1. PROVIDE WHITE AND YELLOW COPIES TO LABORATORY 2. RETURN PINK COPY TO PROJECT MANAGER 3. LABORATORY TO FILL IN SAMPLE NUMBER AND SIGN FOR RECEIPT 4. LABORATORY TO RETURN WHITE COPY TO HART CROWSER			
SIGNATURE			SIGNATURE						
PRINTED NAME		TIME	PRINTED NAME		TIME				
COMPANY			COMPANY						

Columbia Analytical Services Inc.
Cooler Receipt And Preservation Form

Project/Client Hart Crowser Work Order K99 06520

Cooler received on 9/2/99 and opened on 9/2/99 by DW

1. Were custody seals on outside of cooler?
If yes, how many and where? 1 front YES NO
2. Were seals intact and signature & date correct? YES NO
3. COC # _____
Temperature of cooler(s) upon receipt: 4.2 _____
Temperature Blank: 6.2 _____
4. Were custody papers properly filled out (ink, signed, etc.)? YES NO
5. Type of packing material present Bubble wrap
6. Did all bottles arrive in good condition (unbroken)? YES NO
7. Were all bottle labels complete (i.e. analysis, preservation, etc.)? YES NO
8. Did all bottle labels and tags agree with custody papers? YES NO
9. Were the correct types of bottles used for the tests indicated? YES NO
10. Were all of the preserved bottles received at the lab with the appropriate pH? YES NO
11. Were VOA vials checked for absence of air bubbles, and if present, noted below? YES NO
12. Did the bottles originate from CAS/K or a branch laboratory? YES NO

Explain any discrepancies _____

Samples that required preservation or received outside of temperature range at the lab(circle)

Sample ID	Reagent	Volume	Lot Number	Initials

00097



December 20, 1999

Service Request No: K9908644

Kym Anderson
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, WA 98102-3699

Re: Manchester/Site 303/7057-05

Dear Kym:

Enclosed are the results of the sample(s) submitted to our laboratory on December 2, 1999. For your reference, these analyses have been assigned our service request number K9908644.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 243.

Respectfully submitted,

Columbia Analytical Services, Inc.

Richard Craven
Project Chemist

RAC/ee

Page 1 of 2013

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
J	Estimated concentration. The value is less than the method reporting limit, but greater than the method detection limit.
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

COLUMBIA ANALYTICAL SERVICES, INC.

Client: Hart Crowser Inc.
Project: Manchester/Site 303
Sample Matrix: Sediment

Service Request No.: K9908644
Date Received: 2-December-99

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for sample(s) designated for Tier III data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Surrogate recoveries have been reported for all applicable organic analyses. Additional quality control analyses reported herein include: Matrix/Duplicate Matrix Spike (MS/DMS) and Laboratory Control Sample (LCS).

All EPA recommended holding times have been met for analyses in this sample delivery group.

The following difficulties were experienced during analysis of this batch:

Request for analysis for this work was received after hold times had expired.

Due to high background levels of Pyrene and Benzo(a)pyrene the spike recoveries of those analytes were unreliable, and not applicable for method performance evaluation.

Approved by



Date

12/17/99

00003

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9908644
Date Collected: 9/17/99
Date Received: 12/2/99

Total Solids

Prep Method: NONE
Analysis Method: 160.3M
Test Notes:

Units: PERCENT
Basis: Wet

Sample Name	Lab Code	Date Analyzed	Result	Result Notes
HC-SED-07	K9908644-001	12/6/99	56.0	

Approved By: ly
TSOLIDS.XLT_Sample/01071998a

Date: 12/14/99

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9908644
Date Collected: 9/17/99
Date Received: 12/2/99

Polynuclear Aromatic Hydrocarbons

Sample Name: HC-SED-07
Lab Code: K9908644-001
Test Notes: H

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	5	0.4	2	12/7/99	12/14/99	26	
2-Methylnaphthalene	EPA 3550B	SIM	5	0.5	2	12/7/99	12/14/99	20	
1-Methylnaphthalene	EPA 3550B	SIM	5	0.3	2	12/7/99	12/14/99	9	J
C2-Naphthalenes	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	41	
C3-Naphthalenes	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	52	
C4-Naphthalenes	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	45	
Acenaphthylene	EPA 3550B	SIM	5	0.2	2	12/7/99	12/14/99	79	
Acenaphthene	EPA 3550B	SIM	5	0.5	2	12/7/99	12/14/99	37	
Dibenzofuran	EPA 3550B	SIM	5	0.5	2	12/7/99	12/14/99	38	
Fluorene	EPA 3550B	SIM	5	0.5	2	12/7/99	12/14/99	82	
C1-Fluorenes	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	110	
C2-Fluorenes	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	150	
C3-Fluorenes	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	ND	
Dibenzothiophene	EPA 3550B	SIM	5	0.3	2	12/7/99	12/14/99	40	
C1-Dibenzothiophenes	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	55	
C2-Dibenzothiophenes	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	120	
C3-Dibenzothiophenes	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	120	
Phenanthrene	EPA 3550B	SIM	5	0.8	2	12/7/99	12/14/99	710	
Anthracene	EPA 3550B	SIM	5	0.6	2	12/7/99	12/14/99	800	
C1-Phenanthrenes/Anthracene	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	890	
C2-Phenanthrenes/Anthracene	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	710	
C3-Phenanthrenes/Anthracene	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	360	
C4-Phenanthrenes/Anthracene	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	270	
Fluoranthene	EPA 3550B	SIM	100	0.6	20	12/7/99	12/15/99	3500	
Pyrene	EPA 3550B	SIM	100	0.8	20	12/7/99	12/15/99	7100	
C1-Fluoranthenes/Pyrenes	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	3400	
Benz(a)anthracene	EPA 3550B	SIM	100	0.7	20	12/7/99	12/15/99	2500	
Chrysene	EPA 3550B	SIM	100	0.6	20	12/7/99	12/15/99	2800	
C1-Chrysenes	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	1700	
C2-Chrysenes	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	710	
C3-Chrysenes	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	340	
C4-Chrysenes	EPA 3550B	SIM	5	5	2	12/7/99	12/14/99	250	
Benzo(b)fluoranthene	EPA 3550B	SIM	100	0.8	20	12/7/99	12/15/99	2400	
Benzo(k)fluoranthene	EPA 3550B	SIM	100	0.6	20	12/7/99	12/15/99	2200	
Benzo(a)pyrene	EPA 3550B	SIM	100	0.5	20	12/7/99	12/15/99	2500	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	100	0.7	20	12/7/99	12/15/99	1200	
Dibenz(a,h)anthracene	EPA 3550B	SIM	5	0.5	2	12/7/99	12/14/99	390	
Benzo(g,h,i)perylene	EPA 3550B	SIM	5	0.4	2	12/7/99	12/14/99	1000	
Carbazole	EPA 3550B	SIM	5	0.6	2	12/7/99	12/14/99	180	

H

The extraction was performed past the recommended hold time; see case narrative.

Approved By: *C. L. Jones*
 08/18/99 MAY 11 12/16/99
 1544052393

Date:

DEC 16 1999

00005

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9908644
Date Collected: NA
Date Received: NA

Polynuclear Aromatic Hydrocarbons

Sample Name: Method Blank
Lab Code: KWG9904334-4
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Naphthalene	EPA 3550B	SIM	5	0.4	1	12/7/99	12/14/99	0.6	J
2-Methylnaphthalene	EPA 3550B	SIM	5	0.5	1	12/7/99	12/14/99	ND	
1-Methylnaphthalene	EPA 3550B	SIM	5	0.3	1	12/7/99	12/14/99	ND	
C2-Naphthalenes	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
C3-Naphthalenes	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
C4-Naphthalenes	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
Acenaphthylene	EPA 3550B	SIM	5	0.2	1	12/7/99	12/14/99	ND	
Acenaphthene	EPA 3550B	SIM	5	0.5	1	12/7/99	12/14/99	ND	
Dibenzofuran	EPA 3550B	SIM	5	0.5	1	12/7/99	12/14/99	ND	
Fluorene	EPA 3550B	SIM	5	0.5	1	12/7/99	12/14/99	ND	
C1-Fluorenes	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
C2-Fluorenes	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
C3-Fluorenes	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
Dibenzothiophene	EPA 3550B	SIM	5	0.3	1	12/7/99	12/14/99	ND	
C1-Dibenzothiophenes	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
C2-Dibenzothiophenes	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
C3-Dibenzothiophenes	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
Phenanthrene	EPA 3550B	SIM	5	0.8	1	12/7/99	12/14/99	ND	
Anthracene	EPA 3550B	SIM	5	0.6	1	12/7/99	12/14/99	ND	
C1-Phenanthrenes/Anthracene	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
C2-Phenanthrenes/Anthracene	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
C3-Phenanthrenes/Anthracene	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
C4-Phenanthrenes/Anthracene	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
Fluoranthene	EPA 3550B	SIM	5	0.6	1	12/7/99	12/14/99	ND	
Pyrene	EPA 3550B	SIM	5	0.8	1	12/7/99	12/14/99	ND	
C1-Fluoranthenes/Pyrenes	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
Benz(a)anthracene	EPA 3550B	SIM	5	0.7	1	12/7/99	12/14/99	ND	
Chrysene	EPA 3550B	SIM	5	0.6	1	12/7/99	12/14/99	ND	
C1-Chrysenes	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
C2-Chrysenes	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
C3-Chrysenes	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
C4-Chrysenes	EPA 3550B	SIM	5	5	1	12/7/99	12/14/99	ND	
Benzo(b)fluoranthene	EPA 3550B	SIM	5	0.8	1	12/7/99	12/14/99	ND	
Benzo(k)fluoranthene	EPA 3550B	SIM	5	0.6	1	12/7/99	12/14/99	ND	
Benzo(a)pyrene	EPA 3550B	SIM	5	0.5	1	12/7/99	12/14/99	ND	
Indeno(1,2,3-cd)pyrene	EPA 3550B	SIM	5	0.7	1	12/7/99	12/14/99	ND	
Dibenz(a,h)anthracene	EPA 3550B	SIM	5	0.5	1	12/7/99	12/14/99	ND	
Benzo(g,h,i)perylene	EPA 3550B	SIM	5	0.4	1	12/7/99	12/14/99	0.7	J
Carbazole	EPA 3550B	SIM	5	0.6	1	12/7/99	12/14/99	ND	

Approved By: _____

C. Hines

Date: _____

DEC 16 1999

1S44/052595

08644SVM.AY1 - MB 12/16/99

00006

Page No.:

APPENDIX A

LABORATORY

QC RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9908644
Date Collected: 9/17/99
Date Received: 12/2/99

Duplicate Summary

Total Solids

Prep Method: NONE
Analysis Method: 160.3M
Test Notes:

Units: PERCENT
Basis: Wet

Sample Name	Lab Code	Date Analyzed	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
HC-SED-07	K9908644-001DUP	12/6/99	56.0	50.6	53.3	10	

Approved By: 

TSOLIDS.XLT_DUP/09291998a

Date: 12/10/99

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9908644
Date Collected: 9/17/99
Date Received: 12/2/99
Date Extracted: 12/7/99
Date Analyzed: 12/14-15/99

Surrogate Recovery Summary
Polynuclear Aromatic Hydrocarbons

Prep Method: EPA 3550B
Analysis Method: SIM

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	P e r c e n t R e c o v e r y		
			Fluorene-d10	Fluoranthene-d10	Terphenyl-d14
HC-SED-07	K9908644-001		100	98	99
HC-SED-07	K9908644-001MS		106	112	96
HC-SED-07	K9908644-001DMS		105	103	97
Lab Control Sample	KWG9904334-3		83	85	86
Method Blank	KWG9904334-4		89	85	98

CAS Acceptance Limits: 13-144 13-144 15-145

Approved By: _____

C. Hines

Date: **DEC 16 1999**

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
Sample Matrix: Sediment

Service Request: K9908644
Date Collected: 9/17/99
Date Received: 12/2/99
Date Extracted: 12/7/99
Date Analyzed: 12/14/99

Matrix Spike/Duplicate Matrix Spike Summary
Polynuclear Aromatic Hydrocarbons

Sample Name: HC-SED-07 Units: ug/Kg (ppb)
Lab Code: K9908644-001MS, K9908644-001DMS Basis: Dry
Test Notes: H

Analyte	Prep Method	Analysis Method	MRL	Percent Recovery									Relative Percent Difference	Result Notes
				Spike Level		Sample Result	Spike Result		CAS Acceptance					
				MS	DMS		MS	DMS	MS	DMS	Limits			
Acenaphthene	EPA 3550B	SIM	5	140	150	37	190	180	109	95	12-133	14		
Pyrene	EPA 3550B	SIM	100	140	150	7100	NA	NA	NC	NC	10-160	NC		
Benzo(a)pyrene	EPA 3550B	SIM	100	140	150	2500	NA	NA	NC	NC	10-160	NC		

NA Not Applicable; see case narrative.
H The extraction was performed past the recommended hold time; see case narrative.

Approved By: C. L. Jones Date: DEC 16 1999

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester/Site 303/7057-05
LCS Matrix: Sediment

Service Request: K9908644
Date Collected: NA
Date Received: NA
Date Extracted: 12/7/99
Date Analyzed: 12/15/99

Laboratory Control Sample Summary
Polynuclear Aromatic Hydrocarbons

Sample Name: Lab Control Sample
Lab Code: KWG9904334-3
Test Notes:

Units: ug/Kg (ppb)
Basis: Dry

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery	Result Notes
						Acceptance Limits	
Acenaphthene	EPA 3550B	SIM	500	380	76	36-119	
Pyrene	EPA 3550B	SIM	500	410	82	37-137	
Benzo(a)pyrene	EPA 3550B	SIM	500	440	88	24-137	

Approved By: _____

C. Harris

Date: _____

DEC 16 1999



January 12, 2000

Service Request No: K9909278

Mike Ehlebract
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, WA 98102-3699

Dear Mike:

Enclosed are the results of the rush sample(s) submitted to our laboratory on December 2, 1999. For your reference, these analyses have been assigned our service request number K9909278.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

The carbon range for diesel is C-12 through C-24. The aliphatic range reported is C-8 through C-44.

Please call if you have any questions. My extension is 3343.

Respectfully submitted,

Columbia Analytical Services, Inc.

Richard A. Craven
Project Chemist

RAC/ee

Page 1 of 72

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
J	Estimated concentration. The value is less than the method reporting limit, but greater than the method detection limit.
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: NA
Sample Matrix: Sediment

Service Request: K9909278
Date Collected: 9/17/99
Date Received: 12/2/99

Total Aliphatics

Sample Name: HC-SED-07
Lab Code: K9909278-001
Test Notes:

Units: mg/Kg (ppm)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Total Aliphatics C8 - C44	3550B	GC-FID	50	1	12/28/99	1/5/00	99	G

G The MRL is elevated because an insufficient sample quantity was available for optimum analysis.

Approved By: MA Date: 1/12/00

1822/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: NA
Sample Matrix: Sediment

Service Request: K9909278
Date Collected: NA
Date Received: NA

Total Aliphatics

Sample Name: Method Blank
Lab Code: K991228-SB
Test Notes:

Units: mg/Kg (ppm)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Total Aliphatics C8 - C44	3550B	GC-FID	20	1	12/28/99	1/5/00	ND	

Approved By: _____ *TV* Date: 1/6/00

1S22/020597p

09278PHC.MM1 - MB 1/6/00

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Page No.:

APPENDIX A

LABORATORY

QC RESULTS

00005

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: NA
Sample Matrix: Sediment

Service Request: K9909278
Date Collected: 9/17/99
Date Received: 12/2/99
Date Extracted: 12/28/99
Date Analyzed: 1/5/00

Surrogate Recovery Summary
Total Aliphatics

Prep Method: 3550B
Analysis Method: GC-FID

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 1-Chlorohexadecane
HC-SED-07	K9909278-001		95
HC-SED-07	K9909278-001MS		92
HC-SED-07	K9909278-001DMS		81
Lab Control Sample	K991228-SL		89
Method Blank	K991228-SB		91

CAS Acceptance Limits: 50-150

Approved By: _____ Date: 1/6/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: NA
Sample Matrix: Sediment

Service Request: K9909278
Date Collected: 9/17/99
Date Received: 12/2/99
Date Extracted: 12/28/99
Date Analyzed: 1/5/00

Matrix Spike/Duplicate Matrix Spike Summary
Total Aliphatics

Sample Name: HC-SED-07
Lab Code: K9909278-001MS, K9909278-001DMS
Test Notes: Units: mg/Kg (ppm)
Basis: Dry

Analyte	Prep Method	Analysis Method	MRL	Percent Recovery									CAS Acceptance Limits	Relative Percent Difference	Result Notes
				Spike Level		Sample Result	Spike Result								
				MS	DMS		MS	DMS	MS	DMS					
Total Aliphatics C8 - C	3550B	GC-FID	50	460	480	99	615	596	112	104	50-150	7			

Approved By: JAR Date: 1/6/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: NA
LCS Matrix: Sediment

Service Request: K9909278
Date Collected: NA
Date Received: NA
Date Extracted: 12/28/99
Date Analyzed: 1/5/00

**Laboratory Control Sample Summary
 Total Aliphatics**

Sample Name: Lab Control Sample
Lab Code: K991228-SL
Test Notes:

Units: mg/Kg (ppm)
Basis: Dry

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery	Result Notes
						Acceptance Limits	
Total Aliphatics C8 - C44	3550B	GC-FID	140	149	106	60-140	

Approved By: _____ *W* **Date:** 1/6/00

QA/QC Report

Service Request: K9909278
Date Analyzed: 1/5/00

Sample Name	True Value	Result	Percent Recovery
CCV1	1750	1550	89
CCV2	1750	1570	90

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Page No.:



February 14, 2000

Service Request No: K2000512

Kym Anderson
Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, WA 98102-3699

Re: Manchester Site 303/304/7057-05

Dear Kym:

Enclosed are the results of the sample(s) submitted to our laboratory on January 22, 2000. For your reference, these analyses have been assigned our service request number K2000512.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 3343.

Respectfully submitted,

Columbia Analytical Services, Inc.

Richard Craven
Project Chemist

RAC/aw

Page 1 of 418

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
J	Estimated concentration. The value is less than the method reporting limit, but greater than the method detection limit.
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00

Inorganic Parameters

Sample Name: HC-SEEP#1
Lab Code: K2000512-001
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	1	NA	1/28/00	137	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	5	NA	1/24/00	0.8	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	1	NA	1/24/00	5	
Sulfate	mg/L (ppm)	300.0	0.2	50	NA	1/24/00	165	

Approved By: _____



Date: _____

2/7/00

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00

Inorganic Parameters

Sample Name: HC-SEEP#2
Lab Code: K2000512-002
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	1	NA	1/28/00	96	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	2	NA	1/24/00	0.3	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	1	NA	1/24/00	ND	
Sulfate	mg/L (ppm)	300.0	0.2	20	NA	1/24/00	78.0	

Approved By: _____

1S22/020597p

Date: 2/7/00

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00

Inorganic Parameters

Sample Name: HC-303-MW4
Lab Code: K2000512-003
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	1	NA	1/28/00	165	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	2	NA	1/24/00	0.5	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	1	NA	1/24/00	ND	
Sulfate	mg/L (ppm)	300.0	0.2	20	NA	1/24/00	57.2	

Approved By: _____

1S22/020597p

Date: 2/7/00

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: NA
Date Received: NA

Inorganic Parameters

Sample Name: Method Blank
Lab Code: K2000512-MB
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	1	NA	1/28/00	ND	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	1	NA	1/24/00	ND	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	1	NA	1/24/00	ND	
Sulfate	mg/L (ppm)	300.0	0.2	1	NA	1/24/00	ND	

Approved By: _____



Date: 2/7/00

1S22/020597p

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Page No.: 00006

DISSOLVED METALS
COVER PAGE - INORGANIC ANALYSIS DATA PACKAGE

Contract: Hart Crowser, Inc.

SDG No.: K2000512

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SOW No.: SW-846

Sample No.

HC-SEEP#1
HC-SEEP#2
HC-SEEP#2D
HC-SEEP#2S
HC-303-MW4

Lab Sample ID.

K2000512-001
K2000512-002
K2000512-002D
K2000512-002S
K2000512-003

Were ICP interelement corrections applied?

Yes/No YES

Were ICP background corrections applied?

Yes/No YES

If yes-were raw data generated before
application of background corrections?

Yes/No NO

Comments: _____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on floppy diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: Eileen M Arnold

Name: Eileen M Arnold

Date: 2/3/2010

Title: Sr. Chemist

DISSOLVED METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-SEEP#1

Contract: Hart Crowser, Inc.

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K2000512

Matrix (soil/water): WATER

Lab Sample ID: K2000512-001

Level (low/med): LOW

Date Received: 01/22/00

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

CAS No.	Analyte	Concentration	C	Q	M
7439-89-6	Iron	498			P

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments:

DISSOLVED METALS

-1-

INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-SEEP#2

Contract: Hart Crowser, Inc.

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K2000512

Matrix (soil/water): WATER

Lab Sample ID: K2000512-002

Level (low/med): LOW

Date Received: 01/22/00

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

CAS No.	Analyte	Concentration	C	Q	M
7439-89-6	Iron	69.5			P

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments:

DISSOLVED METALS
-1-
INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

HC-303-MW4

Contract: Hart Crowser, Inc.

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K2000512

Matrix (soil/water): WATER

Lab Sample ID: K2000512-003

Level (low/med): LOW

Date Received: 01/22/00

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

CAS No.	Analyte	Concentration	C	Q	M
7439-89-6	Iron	20.0	U		P

Color Before:

Clarity Before:

Texture:

Color After:

Clarity After:

Artifacts:

Comments:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00

Semivolatile Petroleum Products
Northwest TPH-Dx

Sample Name: HC-SEEP#1
Lab Code: K2000512-001
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Mineral Spirits	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Jet Fuel as Jet A	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Kerosene	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Diesel	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Heavy Fuel Oil	EPA 3510C	NWTPH-Dx	500	30	1	1/25/00	1/27/00	ND	
Lube Oil	EPA 3510C	NWTPH-Dx	500	30	1	1/25/00	1/27/00	ND	
PHC as Diesel	EPA 3510C	NWTPH-Dx	500	20	1	1/25/00	1/27/00	764	
Non-PHC as Diesel	EPA 3510C	NWTPH-Dx	500	20	1	1/25/00	1/27/00	ND	

PHC as Diesel Fuel: Extractable Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Diesel: Non-Petroleum Hydrocarbon components eluting in the extractable range of n-C8 - n-C44.

Approved By: Manthe Date: 2/7/00

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00

Semivolatile Petroleum Products
 Northwest TPH-Dx

Sample Name: HC-SEEP#2 **Units:** ug/L (ppb)
Lab Code: K2000512-002 **Basis:** NA
Test Notes:

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Mineral Spirits	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Jet Fuel as Jet A	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Kerosene	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Diesel	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Heavy Fuel Oil	EPA 3510C	NWTPH-Dx	500	30	1	1/25/00	1/27/00	ND	
Lube Oil	EPA 3510C	NWTPH-Dx	500	30	1	1/25/00	1/27/00	ND	
PHC as Diesel	EPA 3510C	NWTPH-Dx	500	20	1	1/25/00	1/27/00	300	J
Non-PHC as Diesel	EPA 3510C	NWTPH-Dx	500	20	1	1/25/00	1/27/00	ND	

PHC as Diesel Fuel: Extractable Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
 Non-PHC as Diesel: Non-Petroleum Hydrocarbon components eluting in the extractable range of n-C8 - n-C44.

Approved By: Mmanthe Date: 2/7/00

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00

Semivolatile Petroleum Products
Northwest TPH-Dx

Sample Name: HC-303-MW4
Lab Code: K2000512-003
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Mineral Spirits	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Jet Fuel as Jet A	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Kerosene	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Diesel	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Heavy Fuel Oil	EPA 3510C	NWTPH-Dx	500	30	1	1/25/00	1/27/00	ND	
Lube Oil	EPA 3510C	NWTPH-Dx	500	30	1	1/25/00	1/27/00	ND	
PHC as Diesel	EPA 3510C	NWTPH-Dx	500	20	1	1/25/00	1/27/00	ND	
Non-PHC as Diesel	EPA 3510C	NWTPH-Dx	500	20	1	1/25/00	1/27/00	ND	

PHC as Diesel Fuel: Extractable Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Diesel: Non-Petroleum Hydrocarbon components eluting in the extractable range of n-C8 - n-C44.

Approved By:

MManthe

Date:

2/7/00

1S22/020597p

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00013

Page No.:

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: NA
Date Received: NA

Semivolatile Petroleum Products
Northwest TPH-Dx

Sample Name: Method Blank
Lab Code: K000125-WB
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Mineral Spirits	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Jet Fuel as Jet A	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Kerosene	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Diesel	EPA 3510C	NWTPH-Dx	250	20	1	1/25/00	1/27/00	ND	
Heavy Fuel Oil	EPA 3510C	NWTPH-Dx	500	30	1	1/25/00	1/27/00	ND	
Lube Oil	EPA 3510C	NWTPH-Dx	500	30	1	1/25/00	1/27/00	ND	
PHC as Diesel	EPA 3510C	NWTPH-Dx	500	20	1	1/25/00	1/27/00	ND	
Non-PHC as Diesel	EPA 3510C	NWTPH-Dx	500	20	1	1/25/00	1/27/00	ND	

PHC as Diesel Fuel: Extractable Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Diesel: Non-Petroleum Hydrocarbon components eluting in the extractable range of n-C8 - n-C44.

Approved By:

M. Manthe

Date:

2/7/00

1S22/020597p

00014

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00


**Volatile Petroleum Products
 Northwest TPH-Gx**

Sample Name: HC-SEEP#1
Lab Code: K2000512-001
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	1/25/00	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	1/25/00	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	1/25/00	ND	

PHC as Gasoline: Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
 Non-PHC as Gasoline: Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By:  **Date:** 2-2-00

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00

**Volatile Petroleum Products
 Northwest TPH-Gx**

Sample Name: HC-SEEP#2
Lab Code: K2000512-002
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	1/25/00	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	1/25/00	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	1/25/00	ND	

PHC as Gasoline: Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
 Non-PHC as Gasoline: Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By:  **Date:** 2-2-00

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00

Volatile Petroleum Products Northwest TPH-Gx

Sample Name: HC-303-MW4
Lab Code: K2000512-003
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	1/25/00	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	1/25/00	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	1/25/00	ND	

PHC as Gasoline:	Volatile or Middle Distillate Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Gasoline:	Non-Petroleum Hydrocarbon components eluting in the purgable range of n-C6 - naphthalene.

Approved By: MS Date: 2-2-00
LS22/020597p

Analytical Report

Service Request: K2000512
Date Collected: NA
Date Received: NA

Units: ug/L (ppb)
Basis: NA

Analyte	Prep	Analysis	MRL	Dilution	Date	Date	Result	Result Notes
	Method	Method		Factor	Extracted	Analyzed		
Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	1/25/00	ND	
PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	1/25/00	ND	
Non-PHC as Gasoline	EPA 5030B	NWTPH-Gx	250	1	NA	1/25/00	ND	

Approved By: _____ Date: 2-2-00
1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00

BTEX

Sample Name: HC-SEEP#1
Lab Code: K2000512-001
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030B	8021B	0.5	1	NA	1/25/00	ND	
Toluene	EPA 5030B	8021B	1	1	NA	1/25/00	ND	
Ethylbenzene	EPA 5030B	8021B	1	1	NA	1/25/00	ND	
Xylenes, Total	EPA 5030B	8021B	1	1	NA	1/25/00	ND	

Approved By: _____



Date: _____

2-1-00

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00

BTEX

Sample Name: HC-SEEP#2
Lab Code: K2000512-002
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030B	8021B	0.5	1	NA	1/25/00	ND	
Toluene	EPA 5030B	8021B	1	1	NA	1/25/00	ND	
Ethylbenzene	EPA 5030B	8021B	1	1	NA	1/25/00	ND	
Xylenes, Total	EPA 5030B	8021B	1	1	NA	1/25/00	ND	

Approved By: _____



Date: 2-1-00

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00

BTEX

Sample Name: HC-303-MW4
Lab Code: K2000512-003
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030B	8021B	0.5	1	NA	1/25/00	ND	
Toluene	EPA 5030B	8021B	1	1	NA	1/25/00	ND	
Ethylbenzene	EPA 5030B	8021B	1	1	NA	1/25/00	ND	
Xylenes, Total	EPA 5030B	8021B	1	1	NA	1/25/00	ND	

Approved By:  Date: 2-1-00

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: NA
Date Received: NA

BTEX

Sample Name: Method Blank
Lab Code: K000125-MB
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030B	8021B	0.5	1	NA	1/25/00	ND	
Toluene	EPA 5030B	8021B	1	1	NA	1/25/00	ND	
Ethylbenzene	EPA 5030B	8021B	1	1	NA	1/25/00	ND	
Xylenes, Total	EPA 5030B	8021B	1	1	NA	1/25/00	ND	

Approved By: _____

Date: 2-1-00

1S22/020597p

APPENDIX A

LABORATORY

QC

RESULTS

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00
Date Extracted: NA
Date Analyzed: 1/24-28/00

**Duplicate Summary
Inorganic Parameters**

Sample Name: HC-SEEP#2 #1
Lab Code: K2000512-001DUP
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	2	137	140	138	2	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	0.8	0.8	0.8	< 1	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	5	ND	ND	ND	-	L
Sulfate	mg/L (ppm)	300.0	0.2	165	155	160	6	

L

Duplicate analysis was performed on Sample HC-SEEP#2; Lab Code K2000512-002.

Approved By: _____



Date: _____

2/7/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00
Date Extracted: NA
Date Analyzed: 1/24/00

Matrix Spike Summary
Inorganic Parameters

Sample Name: HC-SEEP#2
Lab Code: K2000512-001MS
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery	Result Notes
								Acceptanc Limits	
Nitrate as Nitrogen	mg/L (ppm)	300.0	0.2	10.0	0.8	9.8	90	80-120	
Sulfate	mg/L (ppm)	300.0	0.2	100	165	259	94	80-120	

Approved By: _____ Date: 2/1/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
LCS Matrix: Water

Service Request: K2000512
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 1/24-28/00

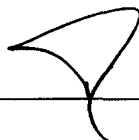
Laboratory Control Sample Summary
Inorganic Parameters

Sample Name: Lab Control Sample
Lab Code: K2000512-LCS
Test Notes:

Basis: NA

Analyte	Units	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Alkalinity as CaCO ₃ , Total	mg/L (ppm)	310.1	219	220	100	85-115	
Nitrate as Nitrogen	mg/L (ppm)	300.0	9.3	9.4	101	90-110	
Solids, Total Suspended (TSS)	mg/L (ppm)	160.2	489	442	90	85-115	
Sulfate	mg/L (ppm)	300.0	200	202	101	90-110	

Approved By: _____



Date: 2/7/00

LCS/072898p

00512WET.LJ1 - LCS 2/7/00

Page No.:

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05

Service Request: K2000512
Date Collected: NA
Date Received: NA
Date Analyzed: 1/24/00

Nitrate as Nitrogen
EPA Method 300.0
Units: mg/L (ppm)

CONTINUING CALIBRATION VERIFICATION (CCV)

	True Value	Measured Value	Percent Recovery
CCV 6 Result	2.0	2.0	100
CCV 7 Result	2.0	2.0	100
CCV 8 Result	2.0	2.0	100

CONTINUING CALIBRATION BLANK (CCB)

	MRL	Blank Value
CCB 6 Result	0.2	ND
CCB 7 Result	0.2	ND
CCB 8 Result	0.2	ND

Approved By: _____
COMBOQCD/042695

Date: 2/7/00

00027

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05

Service Request: K2000512
Date Collected: NA
Date Received: NA
Date Analyzed: 1/24/00

Sulfate
EPA Method 300.0
Units: mg/L (ppm)

CONTINUING CALIBRATION VERIFICATION (CCV)

	True Value	Measured Value	Percent Recovery
CCV 6 Result	5.0	5.1	102
CCV 7 Result	5.0	5.1	102
CCV 8 Result	5.0	5.1	102

CONTINUING CALIBRATION BLANK (CCB)

	MRL	Blank Value
CCB 6 Result	0.2	ND
CCB 7 Result	0.2	ND
CCB 8 Result	0.2	ND

Approved By: _____
COMBOQCD/042695

Date: 2/7/00

00028
10/6/95

DISSOLVED METALS

-2A-

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Contract: Hart Crowser, Inc.

Lab Code: KLAB Case No.: 7057-05 SAS No.:

SDG NO.: K2000512

Initial Calibration Source: Inorganic Ventures

Continuing Calibration Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Iron	2500.0	2477.50	99.1	5000.0	5075.90	101.5	5114.64	102.3	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

00029

DISSOLVED METALS

-2A-

INITIAL AND CONTINUING CALIBRATION VERIFICATION

Contract: Hart Crowser, Inc.

Lab Code: KLAB Case No.: 7057-05 SAS No.:

SDG NO.: K2000512

Initial Calibration Source:

Continuing Calibration Source: Inorganic Ventures

Concentration Units: ug/L

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Iron				5000.0	5176.86	103.5			P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

DISSOLVED METALS
-2B-
CRDL STANDARD FOR AA AND ICP

Contract: Hart Crowser, Inc.

Lab Code: KLAB Case No.: 7057-05 SAS No.:

SDG No.: K2000512

AA CRDL Standard Source:

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	Initial True	Final Found	%R	Found	%R
Iron				40.0	42.94	107.3		

00031

DISSOLVED METALS

-3-

BLANKS

Contract: Hart Crowser, Inc.

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K2000512

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
	C		1	C	2	C	3	C	C		
Iron	20.0	U	20.0	U	20.0	U	20.0	U	20.000	U	P

DISSOLVED METALS

-4-

ICP INTERFERENCE CHECK SAMPLE

Contract: Hart Crowser, Inc.

Lab Code: KLAB Case No.: 7057-05 SAS No.: SDG NO.: K2000512

ICP ID Number: TJA ICP-OES ICS Source: Inorganic Ventures

Concentration Units): ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Iron	200000	200000	178164	175999.2	88.0	178166	176769.3	88.4

DISSOLVED METALS
-5A-
SPIKE SAMPLE RECOVERY

SAMPLE NO.

HC-SEEP#2S

Contract: Hart Crowser, Inc.

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K2000512

Matrix (soil/water): WATER

Level (low/med): LOW

% Solids for Sample: 0.0

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

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Iron	75 - 125	1142.2600		69.5100		1000.00	107.3		P

Comments:

00034

DISSOLVED METALS

-6-

DUPLICATES

SAMPLE NO.

HC-SEEP#2D

Contract: Hart Crowser, Inc.

Lab Code: KLAB Case No.: 7057-05 SAS No.: SDG NO.: K2000512

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate:

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

Analyte	Control Limit	Sample (S) C	Duplicate (D) C	RPD	Q	M
Iron	20.0	69.5100	67.6200	2.8		P

DISSOLVED METALS

-7-

LABORATORY CONTROL SAMPLE

Contract: Hart Crowser, Inc.

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K2000512

Solid LCS Source:

Aqueous LCS Source: Inorganic Ventures

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Iron	2500.0	2440.76	97.6					

DISSOLVED METALS

-9-

ICP SERIAL DILUTIONS

SAMPLE NO.

HC-SEEP#1L

Contract: Hart Crowser, Inc.

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K2000512

Matrix (soil/water): WATER

Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I) C	Serial Dilution Result (S) C	% Differ- ence	Q	M
Iron	498.04	534.05	7.2		P

00037

DISSOLVED METALS
-10-
METHOD DETECTION LIMITS

Contract: Hart Crowser, Inc.

Lab Code: KLAB Case No.: 7057-05 SAS No.: _____ SDG NO.: K2000512

ICP ID Number: TJA ICP-OES Date: 10/15/99

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length	Back-ground	MRL (ug/L)		M
Iron	259.90		20.0		P

Comments _____

DISSOLVED METALS

-11A-

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Contract: Hart Crowser, Inc.Lab Code: KLABCase No.: 7057-05

SAS No.:

SDG NO.: K2000512ICP ID Number: TJA ICP-OESDate: 1/15/99

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Al	Ca	Fe	Mg	As
Aluminum	308.20	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.80	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	193.60	0.0079000	0.0000000	0.0007540	0.0000000	0.0000000
Barium	493.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.00	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	228.60	0.0000000	0.0000000	-0.0000540	0.0000000	0.0111000
Calcium	317.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.70	0.0000000	0.0000000	-0.0000158	0.0000000	0.0000000
Cobalt	228.60	-0.0000150	0.0000000	0.0000166	0.0000000	0.0000000
Copper	324.70	0.0000000	0.0000000	-0.0000578	0.0000000	0.0000000
Iron	259.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.30	0.0008100	0.0000000	0.0002360	0.0000000	0.0000000
Magnesium	383.20	0.0000000	0.0000000	0.0284000	0.0000000	0.0000000
Manganese	257.60	0.0000000	0.0000000	-0.0001990	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000384	0.0000000	0.0000000
Potassium	766.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.00	0.0002900	0.0000000	-0.0022000	0.0000000	0.0000000
Silver	328.00	0.0000000	0.0000000	-0.0001800	0.0000000	0.0000000
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.80	0.0000000	0.0000000	0.0038400	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	-0.0000150	0.0000000	0.0000000
Zinc	213.80	0.0000000	0.0000000	0.0001240	0.0000000	0.0000000

Comments: _____

00039

DISSOLVED METALS

-11B-

ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Contract: Hart Crowser, Inc.Lab Code: KLABCase No.: 7057-05

SAS No.:

SDG NO.: K2000512ICP ID Number: TJA ICP-OESDate: 1/15/99

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Co	Cr	Mn	Ti	V
Aluminum	308.20	-0.0166000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.80	-0.0023200	0.0084200	0.0000000	0.0015800	-0.0083500
Arsenic	193.60	0.0007400	0.0012500	-0.0009020	0.0000000	0.0188000
Barium	493.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.00	0.0000000	0.0000000	0.0000000	0.0000420	0.0042500
Cadmium	228.60	-0.0065100	0.0000000	0.0000000	0.0000000	0.0001070
Calcium	317.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0010600
Chromium	267.70	0.0000000	0.0000000	0.0000000	0.0001280	0.0009890
Cobalt	228.60	0.0000000	0.0003600	0.0000000	0.0017000	0.0000000
Copper	324.70	0.0000000	0.0000000	0.0000000	-0.0004020	-0.0000960
Iron	259.90	0.0000000	0.0000000	0.0016600	0.0000000	0.0005780
Lead	220.30	-0.0211000	-0.0006150	0.0000000	0.0007240	0.0000000
Magnesium	383.20	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.60	0.0000000	0.0000480	0.0000000	0.0000000	-0.0000930
Nickel	231.60	0.0004700	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.00	0.0012700	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.00	0.0000000	0.0000000	0.0001630	0.0000000	-0.0051700
Sodium	588.90	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.80	0.0000000	0.0000000	-0.0136000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	-0.0025100	-0.0001070	0.0003060	0.0000000
Zinc	213.80	0.0000000	0.0000000	0.0000000	-0.0000600	0.0000000

Comments: _____

DISSOLVED METALS

-12-

ICP LINEAR RANGES (QUARTERLY)

Contract: Hart Crowser, Inc.

Lab Code: KLAB Case No.: 7057-05 SAS No.: SDG NO.: K2000512

ICP ID Number: TJA ICP-OES Date: 10/15/99

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Iron	5.00	400000.0	P

Comments: _____

DISSOLVED METALS

-13-

PREPARATION LOG

Contract: Hart Crowser, Inc.

Lab Code: KLAB

Case No.: 7057-05

SAS No.:

SDG NO.: K2000512

Method P

Sample No.	Preparation Date	Weight (grams)	Volume (mL)
HC-303-MW4	1/26/00		50
HC-SEEP#1	1/26/00		50
HC-SEEP#2	1/26/00		50
HC-SEEP#2D	1/26/00		50
HC-SEEP#2S	1/26/00		50
LCSW	1/26/00		50
PBW	1/26/00		50

DISSOLVED METALS

-14-

ANALYSIS RUN LOG

Contract Hart Crowser, Inc.Lab Code KLABCase No.: 7057-05

SAS No.:

SDG No.: K2000512Instrument ID Number: TJA ICP-OESMethod: PStart Date: 1/26/00End Date: 1/26/00

Sample No.	D/F	Time	% R	Analytes																											
				A L	S B	A S	B A	B E	C D	C A	C R	C O	C U	F E	P B	M G	M N	H G	N I	K	S E	A G	N A	T L	V	Z N	C N				
S0	1.00	20:28										X																			
S	1.00	20:30																													
S	1.00	20:32										X																			
ICV	1.00	20:33										X																			
ZZZZZZ	1.00	20:37																													
ICB	1.00	20:40										X																			
CCV1	1.00	20:45										X																			
ZZZZZZ	1.00	20:49																													
CCB1	1.00	20:53										X																			
MRL	5.00	20:57										X																			
ICSA	1.00	20:59										X																			
ICSAB	1.00	21:02										X																			
PBW	1.00	21:17										X																			
LCSW	1.00	21:19										X																			
HC-SEEP#1	1.00	21:22										X																			
HC-SEEP#2	1.00	21:24										X																			
HC-SEEP#2D	1.00	21:26										X																			
HC-SEEP#2S	1.00	21:28										X																			
HC-SEEP#1L	5.00	21:30										X																			
CCV2	1.00	21:33										X																			
CCB2	1.00	21:35										X																			
HC-303-MW4	1.00	21:39										X																			
ICSA	1.00	21:42										X																			
ICSAB	1.00	21:44										X																			
CCV3	1.00	21:47										X																			
CCB3	1.00	21:59										X																			

* - Denotes additional elements (other than the standard CLP elements) are represented on another Form 14

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00
Date Extracted: 1/25/00
Date Analyzed: 1/27/00

**Surrogate Recovery Summary
 Northwest TPH-Dx**

Prep Method: EPA 3510C
Analysis Method: NWTPH-Dx

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery	
			o-Terphenyl	n-Triacontane
HC-SEEP#1	K2000512-001		79	76
HC-SEEP#2	K2000512-002		74	71
HC-303-MW4	K2000512-003		74	69
HC-SEEP#2	K2000512-002D		74	68
Lab Control Sample	K000125-WL		85	79
Method Blank	K000125-WB		84	79

CAS Acceptance Limits: 50-150 50-150

Approved By: M Manthe **Date:** 2/7/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00
Date Extracted: 1/25/00
Date Analyzed: 1/27/00

Duplicate Summary
Northwest TPH-Dx

Sample Name: HC-SEEP#2
Lab Code: K2000512-002D
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Mineral Spirits	EPA 3510C	NWTPH-Dx	250	ND	ND	ND	-	
Jet Fuel as Jet A	EPA 3510C	NWTPH-Dx	250	ND	ND	ND	-	
Kerosene	EPA 3510C	NWTPH-Dx	250	ND	ND	ND	-	
Diesel	EPA 3510C	NWTPH-Dx	250	ND	ND	ND	-	
Heavy Fuel Oil	EPA 3510C	NWTPH-Dx	500	ND	ND	ND	-	
Lube Oil	EPA 3510C	NWTPH-Dx	500	ND	ND	ND	-	
PHC as Diesel	EPA 3510C	NWTPH-Dx	500	300	300	300	<1	
Non-PHC as Diesel	EPA 3510C	NWTPH-Dx	500	ND	ND	ND	-	

PHC as Diesel Fuel: Extractable Petroleum Hydrocarbon fingerprint not matching any of the target analytes.
Non-PHC as Diesel: Non-Petroleum Hydrocarbon components eluting in the extractable range of n-C8 - n-C44.

Approved By: MManthu Date: 2/7/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
LCS Matrix: Water

Service Request: K2000512
Date Collected: NA
Date Received: NA
Date Extracted: 1/25/00
Date Analyzed: 1/27/00

Laboratory Control Sample Summary
 Northwest TPH-Dx

Sample Name: Lab Control Sample
Lab Code: K000125-WL
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS	Result Notes
						Percent Recovery Acceptance Limits	
Diesel	EPA 3510C	NWTPH-Dx	1600	1240	78	46-108	
Lube Oil	EPA 3510C	NWTPH-Dx	1600	1470	92	50-150	

Approved By: Mmanthe Date: 2/7/00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05

Service Request: K2000512
Date Analyzed: 1/27/00

Continuing Calibration Verification (CCV) Summary
Northwest TPH-Dx
Units: µg/mL (ppm)

Analyte	True Value	CCV1 Result	Percent Recovery	CCV2 Result	Percent Recovery	CCV3 Result	Percent Recovery
Diesel	1000	969	97	1000	100	1010	101
Lube Oil	1000	1060	106	1090	109	1110	111

Approved By: MManthel Date: 2/7/00

CCV 1-4/102194

00512PHC.LL1 - CCV 2/4/00

00047

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00
Date Extracted: NA
Date Analyzed: 1/25/00

Surrogate Recovery Summary
Northwest TPH-Gx

Prep Method: EPA 5030B
Analysis Method: NWTPH-Gx

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 1,4-Difluorobenzene
HC-SEEP#1	K2000512-001		94
HC-SEEP#2	K2000512-002		94
HC-303-MW4	K2000512-003		94
HC-SEEP#2	K2000512-002MS		106
HC-SEEP#2	K2000512-002DMS		110
Lab Control Sample	K200125-LCS		110
Method Blank	K200125-MB		96

CAS Acceptance Limits: 70-130

Approved By: _____



Date: 2-2-00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water


Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00
Date Extracted: NA
Date Analyzed: 1/25/00

Matrix Spike Summary
Northwest TPH-Gx

Sample Name: HC-SEEP#2
Lab Code: K2000512-002MS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS	Result Notes
								Percent Recovery Acceptance Limits	
Gasoline	EPA 5030B	NWTPH-Gx	250	1000	ND	920	92	59-135	

Approved By:  **Date:** 2-2-00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report


Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00
Date Extracted: NA
Date Analyzed: 1/25/00

Matrix Spike/Duplicate Matrix Spike Summary
 Northwest TPH-Gx

Sample Name: HC-SEEP#2 Units: ug/L (ppb)
Lab Code: K2000512-002MS, K2000512-002DMS Basis: NA
Test Notes:

Analyte	Prep Method	Analysis Method	MRL	Spike Level		Sample Result	Spike Result		Percent Recovery					Relative Percent Difference	Result Notes		
									CAS		Acceptance Limits	CAS					
									MS	DMS		MS	DMS			MS	DMS
Gasoline	EPA 5030B	NWTPH-Gx	250	1000	1000	ND	920	960	92	96	59-135	4					

Approved By:  Date: 2-2-00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
LCS Matrix: Water


Service Request: K2000512
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 1/25/00

Laboratory Control Sample Summary
Northwest TPH-Gx

Sample Name: Lab Control Sample
Lab Code: K000125-LCS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS	Result Notes
						Percent Recovery Acceptance Limits	
Gasoline	EPA 5030B	NWTPH-Gx	1000	910	91	60-120	

Approved By:  **Date:** 2-2-00

LCS/020597p
00512VOA.ST3 - LCS 2/2/00

Page No.:

00051

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05

Service Request: K2000512
Date Analyzed: 1/25/00

Continuing Calibration Verification (CCV) Summary
Northwest TPH-Gx

Sample Name: CCV1
Lab Code: 0125F012
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Gasoline	EPA 5030B	1000	939	94	
PHC as Gasoline	EPA 5030B	1000	974	97	
Non-PHC as Gasoline	EPA 5030B	1000	977	98	

Approved By: _____



Date: 2-2-00

LCS/52595

00512VOA.ST4 - CCV 1/31/00

Page No.:

00052

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05

Service Request: K2000512
Date Analyzed: 1/26/00

Continuing Calibration Verification (CCV) Summary
Northwest TPH-Gx

Sample Name: CCV2
Lab Code: 0125F029
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Gasoline	EPA 5030B	1000	944	94	
PHC as Gasoline	EPA 5030B	1000	977	98	
Non-PHC as Gasoline	EPA 5030B	1000	980	98	

Approved By:  **Date:** 2-2-00

LCS/52595
00512VOA.ST4 - CCV (2) 1/31/00

00053

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00
Date Extracted: NA
Date Analyzed: 1/25/00

Surrogate Recovery Summary
BTEX

Prep Method: EPA 5030B
Analysis Method: 8021B

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 1,4-Difluorobenzene
HC-SEEP#1	K2000512-001		104
HC-SEEP#2	K2000512-002		105
HC-303-MW4	K2000512-003		105
HC-SEEP#2	K2000512-002MS		126
HC-SEEP#2	K2000512-002DMS		128
Lab Control Sample	K000125-LCS		126
Method Blank	K000125-MB		105

CAS Acceptance Limits: 70-130

Approved By: ms Date: 2-1-00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00
Date Extracted: NA
Date Analyzed: 1/25/00

**Matrix Spike Summary
BTEX**

Sample Name: HC-SEEP#2
Lab Code: K2000512-002MS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS	Result Notes
								Percent Recovery Acceptance Limits	
Benzene	EPA 5030B	8021B	0.5	16	ND	14	88	67-131	
Toluene	EPA 5030B	8021B	1	74	ND	66	89	64-129	
Ethylbenzene	EPA 5030B	8021B	1	17	ND	15	88	61-126	

Approved By:  **Date:** 2-1-00

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05
Sample Matrix: Water

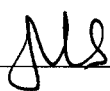
Service Request: K2000512
Date Collected: 1/20/00
Date Received: 1/22/00
Date Extracted: NA
Date Analyzed: 1/25/00

Matrix Spike/Duplicate Matrix Spike Summary
BTEX

Sample Name: HC-SEEP#2
Lab Code: K2000512-002MS, K2000512-002DMS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Spike Level		Sample Result	Percent Recovery						Relative Percent Difference	Result Notes
							Spike Result		CAS Acceptance Limits		CAS Acceptance Limits			
Benzene	EPA 5030B	8021B	0.5	16	16	ND	14	14	88	88	67-131	<1		
Toluene	EPA 5030B	8021B	1	74	74	ND	66	66	89	89	64-129	<1		
Ethylbenzene	EPA 5030B	8021B	1	17	17	ND	15	15	88	88	61-126	<1		

Approved By:  Date: 2-1-00

QA/QC Report

Service Request: K2000512
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 1/25/00

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS	Result Notes
						Percent Recovery Acceptance Limits	
Benzene	EPA 5030B	8021B	16	13	81	69-118	
Toluene	EPA 5030B	8021B	74	66	89	66-124	
Ethylbenzene	EPA 5030B	8021B	17	15	88	63-127	

00057

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05

Service Request: K2000512
Date Analyzed: 1/25/00

Continuing Calibration Verification (CCV) Summary
BTEX

Sample Name: CCV1
Lab Code: 0125F013
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Benzene	8021B	100	109	109	
Toluene	8021B	100	102	102	
Ethylbenzene	8021B	100	105	105	
Xylenes, Total	8021B	300	301	100	

Approved By: _____

JS

Date: 2-1-00

LCS/52595

00512VOA.ST2 - CCV 1/31/00

00038

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: Hart Crowser, Inc.
Project: Manchester Site 303/304/7057-05

Service Request: K2000512
Date Analyzed: 1/26/00


Continuing Calibration Verification (CCV) Summary
BTEX

Sample Name: CCV2
Lab Code: 0125F030
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Analysis Method	True Value	Result	Percent Recovery	Result Notes
Benzene	8021B	100	110	110	
Toluene	8021B	100	104	104	
Ethylbenzene	8021B	100	106	106	
Xylenes, Total	8021B	300	304	101	

Approved By: _____



Date: _____

2-1-00

LCS/52595

00512VOA.ST2 - CCV (2) 1/31/00

Page No.:

00059

APPENDIX B

CHAIN OF

CUSTODY

DOCUMENTS

Sample Custody Record

Samples Shipped to: CAS

K2000512



Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB <u>7057-05</u> LAB NUMBER _____ PROJECT NAME <u>Manchester Site 303/304</u> HART CROWSER CONTACT <u>Anderson</u> SAMPLED BY: <u>KCA/MWE</u>						REQUESTED ANALYSIS TSS <input checked="" type="checkbox"/> NWT PHG/BTEX <input checked="" type="checkbox"/> NWT PHD <input checked="" type="checkbox"/> Alkalinity <input checked="" type="checkbox"/> NO3 only <input checked="" type="checkbox"/> SO4 <input checked="" type="checkbox"/> Diss Fe * <input checked="" type="checkbox"/>										NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS		
LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX														
	HC-SEEP#1		1/29/00	2100	water	X	X	X	X	X	X	X					7		
	HC-SEEP#2			1630		X	X	X	X	X	X	X					8	(extra for MS/MSD)	
	HC-303-MW4			1715		X	X	X	X	X	X	X					7		
* Sample filtered in the field																			
RELINQUISHED BY		DATE	RECEIVED BY		DATE	SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:										TOTAL NUMBER OF CONTAINERS			
SIGNATURE <u>[Signature]</u> PRINT NAME <u>Kym Anderson</u> COMPANY <u>Hart Crowser</u>		TIME <u>1100</u>	SIGNATURE <u>[Signature]</u> PRINT NAME <u>Deb Wood</u> COMPANY <u>CAS-also</u>		TIME <u>1100</u>	stored at Hart Crowser to be shipped										SAMPLE RECEIPT INFORMATION CUSTODY SEALS: <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A GOOD CONDITION: <input type="checkbox"/> YES <input type="checkbox"/> NO TEMPERATURE _____ SHIPMENT METHOD: <input type="checkbox"/> HAND <input type="checkbox"/> COURIER <input type="checkbox"/> OVERNIGHT			
RELINQUISHED BY		DATE	RECEIVED BY		DATE	COOLER NO.:										STORAGE LOCATION:		TURNAROUND TIME:	
SIGNATURE		TIME	SIGNATURE		TIME	<u>A2</u>										<u>A2</u>		<input type="checkbox"/> 24 HOURS <input type="checkbox"/> 1 WEEK <input type="checkbox"/> 48 HOURS <input type="checkbox"/> STANDARD <input type="checkbox"/> 72 HOURS OTHER _____	
PRINT NAME			PRINT NAME			See Lab Work Order No. _____													
COMPANY			COMPANY			for Other Contract Requirements													

White and Yellow Copies to Lab

Pink to Project Manager

Lab to Return White Copy to Hart Crowser

Gold to Sample Custodian

**Columbia Analytical Services Inc.
Cooler Receipt And Preservation Form**

SHORT HOLD TIME

Project/Client Mr. Crowder Work Order K20 0512

Cooler received on 1/22/99 and opened on 1/22/99 by AP

1. Were custody seals on outside of cooler?
If yes, how many and where? 1 E FX ☒ YES ☐ NO
2. Were seals intact and signature & date correct? ☒ YES ☐ NO
3. COC # _____
Temperature of cooler(s) upon receipt: 3.1 _____
Temperature Blank: 1.8 _____
4. Were custody papers properly filled out (ink, signed, etc.)? ☒ YES ☐ NO
5. Type of packing material present BURAP, STYRO
6. Did all bottles arrive in good condition (unbroken)? ☒ YES ☐ NO
7. Were all bottle labels complete (i.e. analysis, preservation, etc.)? ☒ YES ☐ NO
8. Did all bottle labels and tags agree with custody papers? ☒ YES ☐ NO
9. Were the correct types of bottles used for the tests indicated? ☒ YES ☐ NO
10. Were all of the preserved bottles received at the lab with the appropriate pH? YES ☒ NO
11. Were VOA vials checked for absence of air bubbles, and if present, noted below? ☒ YES ☐ NO
12. Did the bottles originate from CAS/K or a branch laboratory? _____ ☒ YES ☐ NO

Explain any discrepancies _____

Samples that required preservation or received outside of temperature range at the lab(circle)

Sample ID	Reagent	Volume	Lot Number	Initials
HC-303-MW4	HNO ₃	2ml	M28025	AP

CERTIFICATES OF ANALYSIS
ANALYTICAL RESOURCES INCORPORATED

**CERTIFICATES OF ANALYSIS
ANALYTICAL RESOURCES INCORPORATED**



Analytical Resources, Incorporated
Analytical Chemists and Consultants

July 5, 2000

Mike Ehlebracht
Hart Crowser, Inc.
1910 Fairview Ave. East
Seattle, WA 98102

RE: Client Project: 4654-39 Manchester FISC
ARI Job: BT23

Dear Mike:

Please find enclosed a copy of chain-of-custody (COC) records and analytical results for the above referenced project. Analytical Resources, Inc. (ARI) accepted one water sample in good condition on June 13, 2000.

The samples were analyzed for extended diesel range hydrocarbons referencing WDOE method WTPH-D extended with a silica gel clean-up; gasoline range hydrocarbons referencing WDOE method WTPH-G, BTEX referencing US EPA method 8020, alkalinity referencing standard method 2320, total suspended solids referencing US EPA method 160.2, and nitrate and sulfate referencing US EPA method 300.0.

The sample was analyzed on the ion chromatograph for nitrate and sulfate at a ten times dilution due to the level of sulfate in the sample.

No further analytical complications were noted. A copy of this report and the supporting data will remain on file with ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,

ANALYTICAL RESOURCES, INC.

Mary Lou Fox
Project Manager
206-389-6155
marylou@arilabs.com

MLF/mlf
Enclosure

11.5

[illegible]

Gold to Sample Custodian

TOTAL GASOLINE RANGE HYDROCARBONS
WTPHg Range Toluene to C12 by GC/FID

Matrix: Water
Data Release Authorized: *CH*
Reported: 06/24/00 *6/24/00*

QC Report No: BT23-Hart Crowser, Incorporated
Project: Manchester FISC
4654-39
Date Received: 06/13/00

Lab ID	Client Sample ID	Date Analyzed	Dilution Factor	Gas Range	Gas ID	Surr A Rec	Surr B Rec
BT23-0614MB	Method Blank	06/14/00	1:1	0.25 U	NO	102%	98.8%
00-9399-BT23A	SEEP3/61300	06/15/00	1:1	0.25 U	NO	105%	105%
00-9400-BT23B	Trip Blank	06/15/00	1:1	0.25 U	NO	104%	102%

Surrogate A is Trifluorotoluene.
Surrogate B is Bromobenzene.

Values reported in ppm (mg/L).

Quantitation on total peaks in the gasoline range from Toluene to C12.

Data Qualifiers

U Compound not detected at the given detection limit.
X Value detected above linear range of instrument. Dilution required.
J Indicates an estimated value below the calculated detection limit.
S No value reported due to saturation of the detector. Dilution required.
D Indicates the surrogate was not detected because of dilution of the extract.
NR Indicates no recovery due to matrix interference.

FORM-1 TPH-g

WATER TPHg SYSTEM MONITORING COMPOUND SUMMARY

Matrix: Water

QC Report No: BT23

LIMS ID	Lab ID	Client ID	TFT	BB	TOT OUT
00-9399MB	061400MB	Method Blank	102%	98.8%	0
00-9399LCD	BT23LCD	LCDuplicate	%	%	0
00-9399	BT23A	SEEP3/61300	105%	105%	0
00-9400	BT23B	Trip Blank	104%	102%	0

	MB/LCS QC LIMITS	SAMPLE QC LIMITS
(TFT) = Trifluorotoluene	(60.0-130)	(60.0-130)
(BB) = Bromobenzene	(60.0-130)	(60.0-130)

ADVISORY LIMITS

- # Column to be used to flag recovery values
- * Values outside of required QC limits
- D System Monitoring Compound diluted out

ORGANICS ANALYSIS DATA SHEET
BETX by Method 8020



Sample No: Method Blank

Lab Sample ID: BT23MB
LIMS ID: 00-9399
Matrix: Water

QC Report No: BT23-Hart Crowser, Incorporated
Project: Manchester FISC
4654-39
Date Sampled: NA
Date Received: NA

Data Release Authorized: C/t
Reported: 06/24/00 4/24/00

Date analyzed: 06/14/00

Volume Purged: 5.0 mL
Dilution: 1:1

Reported in ppb (ug/L)

CAS Number	Analyte	Value
71-43-2	Benzene	1.0 U
108-88-3	Toluene	1.0 U
100-41-4	Ethylbenzene	1.0 U
	m,p-Xylene	1.0 U
95-47-6	o-Xylene	1.0 U

BETX 8020 Surrogate Recovery

Trifluorotoluene 100%
Bromobenzene 97.4%

Data Qualifiers

- U Indicates compound was analyzed for, but not detected at the given detection limit.
- J Indicates an estimated value when that result is less than the calculated detection limit.
- E Indicates a value above the linear range of the detector.
Dilution Required
- S Indicates no value reported due to saturation of the detector.
- D Indicates the surrogate was diluted out.
- B Found in associated method blank.
- Y Indicates a raised reporting limit due to matrix interferences.
The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- NA Indicates compound was not analyzed.
- NR Indicates no recovery due to interferences.

ORGANICS ANALYSIS DATA SHEET
BETX by Method 8020



Sample No: SEEP3/61300

Lab Sample ID: BT23A
LIMS ID: 00-9399
Matrix: Water

QC Report No: BT23-Hart Crowser, Incorporated
Project: Manchester FISC
4654-39
Date Sampled: 06/13/00
Date Received: 06/13/00

Data Release Authorized: *ck*
Reported: 06/24/00 *4/24/00*

Date analyzed: 06/15/00

Volume Purged: 5.0 mL
Dilution: 1:1

Reported in ppb (ug/L)

CAS Number	Analyte	Value
71-43-2	Benzene	1.0 U
108-88-3	Toluene	1.0 U
100-41-4	Ethylbenzene	1.0 U
	m,p-Xylene	1.0 U
95-47-6	o-Xylene	1.0 U

BETX 8020 Surrogate Recovery

Trifluorotoluene 105%
Bromobenzene 104%

Data Qualifiers

- U Indicates compound was analyzed for, but not detected at the given detection limit.
J Indicates an estimated value when that result is less than the calculated detection limit.
E Indicates a value above the linear range of the detector.
Dilution Required
S Indicates no value reported due to saturation of the detector.
D Indicates the surrogate was diluted out.
B Found in associated method blank.
Y Indicates a raised reporting limit due to matrix interferences. The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
NA Indicates compound was not analyzed.
NR Indicates no recovery due to interferences.

ORGANICS ANALYSIS DATA SHEET
BETX by Method 8020



Sample No: Trip Blank

Lab Sample ID: BT23B
LIMS ID: 00-9400
Matrix: Water

QC Report No: BT23-Hart Crowser, Incorporated
Project: Manchester FISC
4654-39
Date Sampled: 06/13/00
Date Received: 06/13/00

Data Release Authorized: (1r
Reported: 06/24/00 4/1/00

Date analyzed: 06/15/00

Volume Purged: 5.0 mL
Dilution: 1:1

Reported in ppb (ug/L)

CAS Number	Analyte	Value
71-43-2	Benzene	1.0 U
108-88-3	Toluene	1.0 U
100-41-4	Ethylbenzene	1.0 U
	m,p-Xylene	1.0 U
95-47-6	o-Xylene	1.0 U

BETX 8020 Surrogate Recovery

Trifluorotoluene 102%
Bromobenzene 101%

Data Qualifiers

- U Indicates compound was analyzed for, but not detected at the given detection limit.
- J Indicates an estimated value when that result is less than the calculated detection limit.
- E Indicates a value above the linear range of the detector.
Dilution Required
- S Indicates no value reported due to saturation of the detector.
- D Indicates the surrogate was diluted out.
- B Found in associated method blank.
- Y Indicates a raised reporting limit due to matrix interferences.
The analyte may be present at or below the listed concentration, but in the opinion of the analyst, confirmation was inadequate.
- NA Indicates compound was not analyzed.
- NR Indicates no recovery due to interferences.

ORGANICS ANALYSIS DATA SHEET
BETX by Method 8020



Lab Sample ID: BT23LCS
LIMS ID: 00-9399
Matrix: Water

QC Report No: BT23-Hart Crowser, Incorporated
Project: Manchester FISC
4654-39

Data Release Authorized: *clt*
Reported: 06/24/00 *4/27/00*

LCS/LCSDUPLICATE ANALYSIS

Date Analyzed: 06/14/00

CONSTITUENT	SPIKE FOUND	SPIKE ADDED	% REC	% RPD
Lab Control Sample				
Benzene	26.1	25.0	104%	
Toluene	25.1	25.0	100%	
Ethylbenzene	24.6	25.0	98.4%	
m,p-Xylene	49.5	50.0	99.0%	
o-Xylene	24.6	25.0	98.4%	

LCDuplicate

Benzene	25.7	25.0	103%	1.5%
Toluene	24.6	25.0	98.4%	2.0%
Ethylbenzene	24.3	25.0	97.2%	1.2%
m,p-Xylene	49.0	50.0	98.0%	1.0%
o-Xylene	24.2	25.0	96.8%	1.6%

BETX SURROGATE REC	LCS	LCSD
Trifluorotoluene	105%	93.5%
Bromobenzene	106%	94.8%

Values reported in parts per billion (ug/L)

BETX SPIKE CONTROL LIMITS

Percent Recovery 75-130%

WATER BETX SYSTEM MONITORING COMPOUND SUMMARY

Matrix: Water

QC Report No: BT23

LIMS ID	Lab ID	Client ID	TFT	BB	TOT OUT
00-9399MB	061400MB	Method Blank	100%	97%	0
00-9399LC	061400LC	Lab Control	105%	106%	0
00-9399LCD	BT23LCD	LCDuplicate	94%	95%	0
00-9399	BT23A	SEEP3/61300	105%	104%	0
00-9400	BT23B	Trip Blank	102%	101%	0

	MB/LCS QC LIMITS	SAMPLE QC LIMITS
(TFT) = Trifluorotoluene	(60-130)	(60-130)
(BB) = Bromobenzene	(60-130)	(60-130)

ADVISORY LIMITS

- # Column to be used to flag recovery values
- * Values outside of required QC limits
- D System Monitoring Compound diluted out

TOTAL DIESEL RANGE HYDROCARBONS
WA TPHd Range C12 to C24 by GC/FID
and Motor Oil
Silica-Cleaned

LIMS ID: 00-9399

QC Report No: BT23-Hart Crowser, Incorporated

Matrix: Water

Project: Manchester FISC

4654-39

Data Release Authorized: *6/23/00*

Date Received: 06/13/00

Reported: 06/23/00

Lab ID	Sample ID	Date Analyzed	Dilution Factor	Diesel Range	*HC ID	Motor Oil Range	Surrogate Recovery
BT23MB	Method Blank	06/16/00	1:1	0.25 U	---	0.50 U	87.0%
BT23A	SEEP3/61300	06/17/00	1:1	0.26	NO	0.50 U	79.0%

Surrogate is Methyl-Arachidate.

- * ID indicates, in the opinion of the analyst, the petroleum product with the best pattern match. 'NO' indicates that there was not a good match for any of the requested products. Values reported in ppm (mg/L).
Diesel quantitation on total peaks in the range from C12 to C24.
Motor Oil quantitation on total peaks in the Motor Oil Standard range.

Data Qualifiers

- U Compound not detected at the given detection limit.
E Value detected above linear range of instrument. Dilution required.
J Indicates an estimated value below the calculated detection limit.
S No value reported due to saturation of the detector. Dilution required.
D Indicates the surrogate was not detected because of dilution of the extract.
E Indicates a value above the linear range of the detector. Dilution required.
NR Indicates no recovery due to matrix interference.

TOTAL DIESEL RANGE HYDROCARBONS
WA TPHd Range C12 to C24 by GC/FID
Silica-Cleaned



Lab Sample ID: BT23SB QC Report No: BT23-Hart Crowser, Incorporated
LIMS ID: 00-9399 Project: Manchester FISC
Matrix: Water 4654-39

Data Release Authorized: *06/23/00*
Reported: 06/23/00

LABORATORY CONTROL SAMPLE RECOVERY REPORT
Date analyzed: 06/16/00

CONSTITUENT	SPIKE FOUND	SPIKE ADDED	% RECOVERY
Diesel Range Hydrocarbons	1.82	2.50	72.8%

TPHd Surrogate Recovery

Surr Rec 81.0%

Values reported in parts per million (mg/L)

QA Report - Method Blank Analysis


Matrix: Water

QC Report No: BT23-Hart Crowser, Incorporated

Project: Manchester FISC

4654-39

Date Received: NA

Data Release Authorized 

Reported: 07/03/00 Dr. M.A. Perkins

METHOD BLANK RESULTS
CONVENTIONALS

Analysis Date & Batch	Constituent	Units	Result
06/16/00 06160#1	Total Suspended Solids	mg/L	< 1.0 U
06/13/00 06130#1	N-Nitrate	mg-N/L	< 0.1 U
06/13/00 06130#1	Sulfate	mg/L	< 0.1 U

Final Report
Laboratory Analysis of Conventional Parameters

Sample No: SEEP3/61300

Lab Sample ID: BT23A

QC Report No: BT23-Hart Crowser, Incorporated

LIMS ID: 00-9399

Project: Manchester FISC

Matrix: Water

4654-39

Date Sampled: 06/13/00

Data Release Authorized: *MB*

Date Received: 06/13/00

Reported: 07/03/00 Dr. M.A. Perkins

Analyte	Analysis		RL	Units		Result
	Date & Batch	Method				
Alkalinity	06/27/00 06270#1	SM 2320	1.0	mg/L CaCO3		140
Total Suspended Solids	06/16/00 06160#1	EPA 160.2	1.1	mg/L		2.8
N-Nitrate	06/13/00 06130#1	EPA 300.0	1.0	mg-N/L	<	1.0 U
Sulfate	06/13/00 06130#1	EPA 300.0	1.0	mg/L		12.6


RL Analytical reporting limit

U Undetected at reported detection limit

Report for BT23 received 06/13/00

QA Report - Laboratory Control Samples

QC Report No: BT23-Hart Crowser, Incorporated
Project: Manchester FISC
4654-39

Data Release Authorized: 

Date Received: NA

Reported: 07/03/00 Dr. M.A. Perkins

LABORATORY CONTROL SAMPLES
CONVENTIONALS

Constituent	Units	Measured Value	True Value	Recovery
Laboratory Control Sample				
Alkalinity	mg/L CaCO ₃	118	118	100%
Date analyzed: 06/27/00 Batch ID: 06270#1				

QA Report - Standard Reference Material Analysis

QC Report No: BT23-Hart Crowser, Incorporated
Project: Manchester FISC
4654-39

Data Release Authorized *mb*
Reported: 07/03/00 Dr. M.A. Perkins

Date Received: NA

STANDARD REFERENCE MATERIAL ANALYSIS
CONVENTIONALS

Constituent	Units	Value	True Value	Recovery
SPEX #15-121				
N-Nitrate	mg-N/L	2.8	3.0	93.3%
Date analyzed: 06/13/00 Batch ID: 06130#1				
SPEX #17-44				
Sulfate	mg/L	3.1	3.0	103%
Date analyzed: 06/13/00 Batch ID: 06130#1				

QA Report - Replicate Analysis

Matrix: Water

QC Report No: BT23-Hart Crowser, Incorporated

Project: Manchester FISC

4654-39

Date Received: 06/13/00


Data Release Authorized: *MP*

Reported: 07/03/00 Dr. M.A. Perkins

DUPLICATE ANALYSIS RESULTS
CONVENTIONALS

Constituent	Units	Sample Value	Duplicate Value	RPD
ARI ID: 00-9399, BT23 A Client Sample ID: SEEP3/61300				
Alkalinity	mg/L CaCO ₃	140	150	6.9%
N-Nitrate	mg-N/L	< 1.0 U	< 1.0 U	NA
Sulfate	mg/L	12.6	12.9	2.4%

QA Report - Matrix Spike/Matrix Spike Duplicate Analysis

Matrix: Water
QC Report No: BT23-Hart Crowser, Incorporated
Project: Manchester FISC
4654-39
Date Received: 06/13/00
Data Release Authorized 
Reported: 07/03/00 Dr. M.A. Perkins

MATRIX SPIKE QA/QC REPORT
CONVENTIONALS

Constituent	Units	Sample Value	Spike Value	Spike Added	Recovery
ARI ID: 00-9399, BT23 A Client Sample ID: SEEP3/61300					
N-Nitrate	mg-N/L	< 1.0	8.9	10.0	89.1%
Sulfate	mg/L	12.6	22.5	10.0	99.0%

MS/MSD Recovery Limits: 75 - 125 %