

**PRELIMINARY ENVIRONMENTAL ASSESSMENT
OF FOUR FORMER U.S. MILITARY CAMP SITES
YUKON TERRITORY**

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Prepared for:

**Indian and Northern Affairs Canada - Yukon
Arctic Environmental Strategy
Action on Waste Program**

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Indian and Northern Affairs Canada
Arctic Environmental Strategy
Action on Waste
#345, 300 Main Street
WHITEHORSE, YK Y1A 2B5

Attention: Mr. Brett Hartshorne
Manager, Action on Waste
Arctic Environmental Strategy

Dear Sir:

Re: Contract 96-6127, Call-up 96-6127-1: Preliminary
Environmental Investigations - Various Locations - Yukon,
Site #'s 15, 16, 17 & 18
Draft Report

In accordance with the above noted contract, we are pleased to enclose one reproducible copy, one diskette (Word Perfect Format) and ten bound copies of our final report for the following sites:

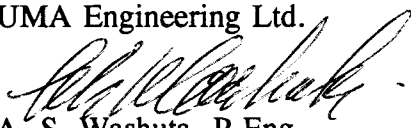
- Takhini - Mile 936 (Site 15) LA 40
- Takhini River - Mile 946.4 (Site 16) LA 41
- Stony Creek - Mile 956 and Mile 956.8 (Site 17) LA 10
- Mendenhall River - Mile 968 (Site 18) LA 42

This final report incorporates your comments regarding our draft report and the results of an internal quality review.

We trust that this report is consistent with your expectations, and we look forward to being of further service to Indian and Northern Affairs Canada.

Yours very truly,

UMA Engineering Ltd.


A. S. Washuta, P.Eng.
Project Manager

ASW/ma
Attach.

cc: T. M. Schulz

EXECUTIVE SUMMARY

Preliminary environmental assessments were completed at four former United States Government military maintenance camps, as follows:

- Takhini - Mile 936 (Site 15)
- Takhini River - Mile 946.4 (Site 16)
- Stony Creek - Mile 956 and Mile 956.8 (Site 17)
- Mendenhall River - Mile 968 (Site 18).

The preliminary environmental assessments form part of the Arctic Environmental Strategy (AES) - Action On Waste Program initiated by Indian and Northern Affairs Canada. The AES Action On Waste Program is researching potential environmental impacts associated with the construction, operation, and abandonment of these sites. The primary objectives of the assessments were to:

- Identify the presence and type of contaminants and evaluate the potential for contaminant migration.
- Assess public safety and environmental risks based on the preliminary site information.
- Provide recommendations for additional assessment and/or remediation as applicable.

As related to these objectives, an information review and brief reconnaissance visit were carried out for each site to identify potential areas of concern. Electromagnetic (EM31) surveys were conducted to detect buried waste materials. A soil sampling program in shallow hand augered test holes and machine excavated testpits, was carried out. Surface water samples were also collected, where available. The laboratory component of the assessment consisted of the analyses for a broad suite of inorganic and organic parameters.

The four sites were visited in September, 1996. Analytical data were interpreted relative to site conditions and soil and water remediation criteria (primarily CCME (1991) criteria). A preliminary qualitative risk assessment was conducted for each site.

A summary of the preliminary environmental assessment and recommended actions is provided in Table 1.

**TABLE 1 - PROJECT SUMMARY - PRELIMINARY ENVIRONMENTAL ASSESSMENT
FOUR SITES - YUKON TERRITORY**

Site Description	Summary of Environmental Assessment	Potential Risks	Recommended Actions
<p>Site 15: Takhini - Mile 936</p> <ul style="list-style-type: none"> • Former military maintenance camp - 3.5 hectares. • Current landowner has regraded area and removed debris. • Former dump site approx. 800 metres northeast of camp site. 	<ul style="list-style-type: none"> • No anomalies identified during reconnaissance EM31 electromagnetic survey of camp site. • Limited amount of exposed debris. • Measured concentrations of inorganic elements and organic compounds below CCME remediation criteria. 	<ul style="list-style-type: none"> • Low public safety risk. • No evidence to support human or ecosystem health risks. 	<ul style="list-style-type: none"> • Consolidation and management of exposed debris at dump site. • Limit access to dump site.
<p>Site 16: Takhini River - Mile 946.4</p> <ul style="list-style-type: none"> • Former military maintenance camp; one building remains standing. • Suspected former dump site approx. 2 km east of camp. • Site is resting area along Takhini - Mendenhall River canoe route. 	<ul style="list-style-type: none"> • No subsurface anomalies were identified in the detailed EM31 electromagnetic survey of the dump site, or reconnaissance level survey of river bank area. • Exposed debris in Takhini River bank. • Remaining building in poor structural condition. • Measured concentrations of inorganic elements and organic compounds below remediation criteria. 	<ul style="list-style-type: none"> • Moderate public safety risk. • Possible human or ecosystem health implications with improper disposal of painted structure. • No other evidence to support human or ecosystem health risks based on current conditions. 	<ul style="list-style-type: none"> • Excavate and dispose of debris adjacent to and within the riverbank and from the river bed. • Demolish the remaining camp building and dispose in an appropriate manner. Burning of painted wood (PCB 5.8 ppm) is to be prohibited. • Collect and dispose/recycle scattered debris.

**TABLE 1 - PROJECT SUMMARY - PRELIMINARY ENVIRONMENTAL ASSESSMENT
FOUR SITES - YUKON TERRITORY**

Site Description	Summary of Environmental Assessment	Potential Risks	Recommended Actions
<p>Site 17: Stony Creek - Mile 956 & 956.8</p> <ul style="list-style-type: none"> • Former military maintenance camp and Canol Pump Station. • No buildings remain. 	<ul style="list-style-type: none"> • Two localized anomalies identified during detailed EM31 electromagnetic survey of possible disposal areas. • Scattered debris present, asbestos containing materials identified. • Apparent localized areas of low level inorganic element and hydrocarbon contamination. PAH compounds and TEH (900 ppm) detected in surface stain. • PAH compounds detected in soil samples collected from upper plateau at Main Site and from Canol Pump Station. Source of PAH compounds unknown. 	<ul style="list-style-type: none"> • Moderate public safety risk due to scattered debris. • Low human health risk due to the low likelihood of exposure and the low measured levels of contaminants. • Very low ecosystem health risk. 	<ul style="list-style-type: none"> • Collect and dispose of surface debris scattered across the site, with specific attention to the proper handling and disposal of asbestos containing material. • Delineate stained areas on the east side of Stony Creek. • Resample the slough water to verify reported results and collect slough sediment sample. • Conduct further detailed investigation at the Canol Pump Station at Mile 956.8 to evaluate the extent and magnitude of potential PAH and hydrocarbon contamination.

**TABLE 1 - PROJECT SUMMARY - PRELIMINARY ENVIRONMENTAL ASSESSMENT
FOUR SITES - YUKON TERRITORY**

Site Description	Summary of Environmental Assessment	Potential Risks	Recommended Actions
<p>Site 18: Mendenhall River - Mile 968</p> <ul style="list-style-type: none"> • Former military maintenance camp encompassing approx. 5 hectares. • Former site of private retail fuel outlet. • No facilities remain. • Yukon Government Campground on Takhini - Mendenhall River Canoe Route. 	<ul style="list-style-type: none"> • Several anomalies identified during EM31 electromagnetic survey of former retail fuel outlet area, shown to be areas of waste disposal. • Scattered debris throughout the campground and along the river valley. • Hydrocarbon contamination identified in the soil at the former retail fuel outlet area. 	<ul style="list-style-type: none"> • Low to moderate public safety risk from scattered debris. • Low human health risks based low likelihood of exposure/inhalation (contamination at depth). • Potential for migration of hydrocarbon constituents to Mendenhall River via groundwater flow system. 	<ul style="list-style-type: none"> • Collect and dispose/recycle scattered debris. • Define the extent and magnitude of hydrocarbon in the soil. • Install up and downgradient monitoring wells from the impacted area to establish horizontal groundwater flow direction and gradients, and to facilitate the sampling of groundwater.

TABLE OF CONTENTS

1.0	INTRODUCTION	1 - 1
1.1	BACKGROUND	1 - 1
1.2	OBJECTIVES AND SCOPE OF WORK	1 - 2
2.0	METHODOLOGY	2 - 1
2.1	INFORMATION REVIEW	2 - 1
2.2	FIELD INVESTIGATION	2 - 2
2.2.1	EM31 Terrain Conductivity Surveys	2 - 3
2.2.2	Sampling Program	2 - 4
2.2.3	Subsurface Investigation	2 - 4
2.2.4	Field Schedule	2 - 5
2.3	ENVIRONMENTAL CRITERIA	2 - 7
2.4	LABORATORY ANALYSES	2 - 8
3.0	RESULTS OF THE STUDY	3 - 1
3.1	SITE NO. 15 - TAKHINI	3 - 1
3.1.1	Site Description	3 - 1
3.1.2	Site Conditions	3 - 2
3.1.3	Subsurface Soil Conditions	3 - 3
3.1.4	Groundwater Conditions	3 - 3
3.1.5	Contaminant Considerations	3 - 3
3.2	SITE NO. 16 - TAKHINI RIVER	3 - 4
3.2.1	Site Description	3 - 4
3.2.2	Site Conditions	3 - 4
3.2.3	Subsurface Soil Conditions	3 - 5
3.2.4	Groundwater Conditions	3 - 5
3.2.5	Contamination Considerations	3 - 5
3.3	SITE NO. 17 - STONY CREEK AND CANOL STATION	3 - 6
3.3.1	Site Description	3 - 6
3.3.2	Site Conditions	3 - 7
3.3.3	Subsurface Soil Conditions	3 - 8
3.3.4	Groundwater Conditions	3 - 8
3.3.5	Contamination Considerations	3 - 8
3.4	SITE NO. 18 - MENDENHALL RIVER	3 - 10
3.4.1	Site Description	3 - 10
3.4.2	Site Condition	3 - 11
3.4.3	Subsurface Soil Conditions	3 - 11
3.4.4	Groundwater Conditions	3 - 12
3.4.5	Contaminant Considerations	3 - 12
4.0	INTERPRETATION OF ANALYTICAL RESULTS	4 - 1
4.1	BACKGROUND CONDITIONS	4 - 1
4.2	SITE 15 - TAKHINI MILE - MILE 936	4 - 2
4.3	SITE 16 - TAKHINI RIVER - MILE 946	4 - 3
4.4	SITE 17 - STONY CREEK - MILE 956 AND 956.8	4 - 4
4.5	SITE 18 - MENDENHALL RIVER - MILE 968	4 - 5

5.0	PRELIMINARY QUALITATIVE ENVIRONMENTAL RISK ASSESSMENT	5 - 1
5.1	SITE 15 - TAKHINI MILE - MILE 936	5 - 2
5.2	SITE 16 - TAKHINI RIVER - MILE 946.4	5 - 3
5.3	SITE 17 - STONY CREEK AND CANOL PUMP STATION - MILE 956 AND MILE 956.8	5 - 4
5.4	SITE 18 - MENDENHALL RIVER	5 - 6
6.0	CONCLUSIONS AND RECOMMENDATIONS	6 - 1
6.1	SITE 18 - MENDENHALL RIVER - MILE 968	6 - 1
6.2	SITE 17 - STONY CREEK AND CANOL PUMP STATION	6 - 2
6.3	SITE 16 - TAKHINI RIVER - MILE 946.4	6 - 3
6.4	SITE 15 - TAKHINI - MILE 936	6 - 4

REFERENCES

- APPENDIX A - EM-31 GEOPHYSICAL RESULTS
- APPENDIX B - TEST PIT LOGS AND SOIL SAMPLE DESCRIPTIONS
- APPENDIX C - ANALYTICAL DATA
- APPENDIX D - QA/QC

LIMITATIONS

The information and data contained in this report, including without limitation the results of any sampling and analyses conducted by UMA Engineering Ltd. ("UMA") pursuant to its Agreement with Indian and Northern Affairs Canada, have been developed or obtained through the exercise of UMA's professional judgement and are set forth to the best of UMA's knowledge, information and belief. Although every effort has been made to confirm that all such information and data is factual, complete and accurate, UMA makes no guarantees or warranties whatsoever, whether expressed or implied, with respect to such information or data.

UMA shall not by the act of issuing this report be deemed to have represented thereby that any sampling and analyses conducted by it have been exhaustive or will identify all contamination of the sites, and persons relying on the results thereof do so at their own risk.

Except as required by law, this report and the information and data contained herein are to be treated as confidential and may be used and relied upon only by Indian and Northern Affairs Canada, its officers and employees and others having legitimate business relations with Indian and Northern Affairs Canada. Any such use and reliance shall be subject to the limitations set forth in the preceding paragraphs.

1.0 INTRODUCTION

1.1 BACKGROUND

UMA Engineering Ltd. was retained by the Department of Indian and Northern Affairs Canada (DIAND) to conduct a preliminary environmental assessment at four sites in the Yukon Territory as part of the Arctic Environmental Strategy (AES) - Action on Waste Program. The AES Action on Waste Program is researching potential environmental impacts associated with the construction, operation, and abandonment of these sites. These sites were former United States government military maintenance camps and include:

- Takhini - Mile 936 - Site 15
- Takhini River - Mile 946.4 - Site 16
- Stony Creek - Mile 956 and Mile 956.8 - Site 17
- Mendenhall River - Mile 968 - Site 18

The primary objectives of the assessment may be described as follows:

- identify the presence and type of contaminants, and evaluate the potential for contaminant migration;
- assess public safety and human and/or environmental health risks based on the preliminary site information;
- provide recommendations for additional assessment and/or remediation, as applicable.

The program discussed in this report consisted of the preliminary environmental investigation of four sites. A brief site description is provided in the following paragraphs.

- a) Takhini Mile 936: This site, a former U.S. military camp, Camp 1W, is located at Mile 936 of the Alaska Highway. Records indicate that in 1945, 12 buildings were on site. No buildings associated with the camp were identified at the time of the 1996 assessment. The current landowner has removed most of the debris from building demolition.

- b) Takhini River Mile 946.4: This site is located adjacent to the west bank of the Takhini River and was formerly a military and highway construction camp in the 1940s and 1950s. The area is presently used as a campsite and forms part of the Takhini River and Mendenhall canoe route. Concrete building foundations and one abandoned building remain on site. Buried debris, consisting primarily of scrap metal, was identified along the river.
- c) Stony Creek Mile 956: This site is located at Historical Mile 956 on the Alaska Highway. It is the former U.S. Army maintenance camp, Camp 2W. Construction materials and metal debris, including one newer vehicle hulk, were scattered across the site.
- Stony Creek Mile 956.8: This site is the former Standard Oil Pump Station B (Canol No.4). Only concrete foundations remain. Two gravel pits (likely dump areas), located north of the pump station, contained cans and other metal debris.
- d) Mendenhall River Mile 968.1: This site is a former U.S. Army Camp and currently serves as a campground. Records indicate that a private service station was operated at this site. The associated underground storage tanks have apparently been removed. Debris dumped over the slope on the south side of the site, towards the Mendenhall River, was also identified.

1.2 OBJECTIVES AND SCOPE OF WORK

The primary objective of the preliminary assessments is to identify any environmental or public safety concerns that have arisen as a result of former operations at these sites. The environmental assessment was conducted in four phases including a review of aerial photographs and other historical information, geophysical surveys, as applicable, a soil and surface water sampling and analytical program, and interpretation of all data. Specific issues were identified as part of a preliminary review of historical information provided by DIAND. These issues and the scope of work carried out at each of the sites are as follows:

Site 15 - Takhini - Mile 936:

- Objective** To assess the impact of potential pesticide use at the former site and buried wastes in the dump area
- Program** Soil samples were tested for metals, PCBs and pesticides. An assessment of the vegetation growth was also carried out.

Site 16 - Takhini River - Mile 946.6:

- Objective** To evaluate the potential public safety hazards of existing buildings; the impact of potential pesticide use, possible hydrocarbon spills and buried wastes.
- Program** EM-31 geophysical survey of the suspected waste disposal areas. Soil samples were tested for metals, pesticides, PCBs, and hydrocarbons. As well, a paint sample collected from the building was tested for PCBs and metals. A water sample was collected from ponded water and tested for metals.

Site 17 - Stony Creek Mile 956.0:

- Objective** To assess the potential public safety hazards of existing building debris on site, the impact of contaminated paint, pesticide use, and hydrocarbon spills.
- Program** EM-31 geophysical survey of the suspected waste disposal areas. Shallow test pits were excavated using a backhoe in areas with anomalous EM-31 readings. Field screening of collected soil samples was conducted using a Photoionization Detector (PID) to determine the presence of organic vapours. Soil samples were collected from areas up and down gradient of suspected contamination and analyzed for metals, pesticides, PCBs and hydrocarbons.

Site 17 - Stony Creek Mile 956.8:

- Objective** To assess areas of potential pesticide use, hydrocarbon spills and possible waste disposal sites. Evaluate stability of concrete foundations, and extent and type scattered debris on site.
- Program** EM31 geophysical survey of suspected waste disposal areas. Test pits were excavated in anomalous areas using a backhoe. Soil samples were collected and tested for metals, pesticides, PCBs, and hydrocarbons.

Site 18 - Mendenhall River Mile 968.1:

- Objective** To assess potential contamination from pesticide use, PCBs and petroleum hydrocarbons with specific attention to impacts from the private retail fuel outlet formerly located at the site.
- Program** EM-31 geophysical survey was conducted in areas of suspected waste disposal and underground fuel storage facilities. Based on the results of the geophysical survey, shallow test pits were excavated in areas indicating anomalies using a backhoe. Soil samples were collected from test pits and screened using a PID to determine if any volatile hydrocarbons were present in the soil. Soil samples were collected from areas up and down gradient of suspected contamination and analyzed for metals, pesticides, PCBs, and hydrocarbons.

The structure of this report reflects the program objectives and follows the chronological order in which the program was carried out.

- Section 1: An outline of the study objectives and an overview of the program is presented.
- Section 2: The project methodology is provided in this section, and includes a discussion of the field and laboratory procedures. A review and selection of cleanup criteria is also presented.
- Section 3: The results of the field program and analytical laboratory program are presented for each site.

- Section 4: The analytical results are interpreted in the context of the appropriate remediation criteria, and where applicable, potential sources of contaminants are outlined.
- Section 5: A preliminary qualitative environmental risk assessment is presented based on the observations during the site investigation and the results of the analytical testing carried out.
- Section 6: Recommendations for remediation, and/or further assessment are provided for each of the four sites investigated.

2.0 METHODOLOGY

This section describes the project methodology and provides a summary of the results of the information review task, an outline of the work completed in the field, a discussion of cleanup criteria, and laboratory analytical requirements and procedures.

2.1 INFORMATION REVIEW

The four areas investigated were former military maintenance camps, and one site also included a former pump station on the Canol pipeline. Little information was available with respect to the operations of the military maintenance camps; however, it is anticipated that the primary uses would include accommodation and vehicle maintenance areas, as well as associated uses such as waste disposal from operations. Activities associated with the former pump station would be similar to those at the maintenance camps.

As limited historical data are available, the information review task was limited to an evaluation of aerial photographs of the individual sites, legal descriptions of the properties, and a review of the geological maps of the area. Previous research on the site history carried out by DIAND was also reviewed.

Historical aerial photographs, where available, were used to identify the specific location and extent of the sites. The air photos were also compared with the legal plans, the latter which also identified access roads and the location of utilities, including the Canol pipeline. Photomosaics of the sites were obtained from the Department of Transportation - Yukon Territory for use in the field. Geological maps were limited in their applicability due to the scale (1:250,000); however, a general description of the regional geology was provided on the drawings. Previous studies carried out by DIAND on various dates identified current and historic land use, and highlighted potential areas of concern based on previous site reconnaissance visits.

Based on the information review, the activities of greatest concern at these sites are associated with the transfer of petroleum products. These products include benzene, toluene, ethylbenzene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAHs), and chlorinated hydrocarbons which were used for their degreasing properties. Gasoline spills could also have resulted in high concentrations of hydrocarbons and lead in the soils.

Transformer usage at these sites could have resulted in spills and leaks of fluids containing polychlorinated biphenyls (PCBs). In addition, industrial grade paints used in the 1950s and 1960s were known to contain PCBs in varying concentrations. Improper disposal of paint materials, as well as the disposal of paint may have resulted in some impact on the environment.

According to historical reviews, pesticides were routinely used at the sites, along the highway and along the pipeline right-of-way.

There was ample evidence that metal debris may be buried on site. Typically, waste disposal during the operation and closing of the sites consisted of burial or open dumping of the waste in relative close proximity to the site.

2.2 FIELD INVESTIGATION

The environmental site assessment consisted of a field component and a laboratory component. The field component involved:

- reconnaissance of the site to identify areas of concern;
- geophysical program for the evaluation of the potential for buried materials;
- a sampling program which included the use of portable analytical equipment;
- subsurface investigation in areas identified as being of concern during the geophysical survey.

The following outlines the general principles and rationale for the field program, and provides an overall schedule of activities carried out during the site investigation.

2.2.2 Sampling Program

Field investigations were completed at five locations as follows:

Mile No.	Site No. and Name	Historic Site Use	No. of Samples
936	Site No. 15 - Takhini	Former U.S. Military Camp and waste Disposal Site	2 Soil
946.4	Site No. 16 - Takhini River	Former U.S. Military Camp and Waste Disposal Site	2 Soil 1 Surface Water 1 Paint
956.0	Site No. 17M and 17 - Stony Creek	Former U.S. Military Maintenance Camp	5 Soil 2 Surface Water
956.8	Site No. 17C - Canol Pump Station No. 4	Standard Oil Pump Station and Waste Disposal Site	2 Soil
968.1	Site No. 18 - Mendenhall River	Former U.S. Military Camp Retail Fuel Outlet	9 Soil 1 Surface Water

Shallow soil samples were collected using a hand auger at strategic locations at each site. The soil stratigraphy encountered was logged and the depth where the sample was taken was noted. The location of the test hole was referenced to permanent features and/or plotted on airphotos for future reference. A description of all sampling locations is provided in Appendix B and borehole locations are shown on drawings provided in Section 3.

Surface water samples were also collected, where possible, from adjacent small water bodies. No subsurface groundwater samples were taken, as this was beyond the scope of work of this project.

2.2.3 Subsurface Investigation

The subsurface investigation program included the excavation of eight test pits at the Mendenhall River site and three at the Stony Creek site. The test pit locations were selected based on geophysical anomalies as measured by the EM31 surveys. The test pits were excavated using a 416B loader backhoe contracted from Norcope Ltd. of Whitehorse, Yukon.

The soil stratigraphy, as well as any debris encountered in the test pits was logged. Soil samples were collected as grab samples from the excavation and screened with a Microtip™ photoionization detector. These detectors measure concentrations of volatile organic compounds (VOCs) released from the soil. The PID was placed in the headspace of the sample container to measure the concentration of organic vapours released from the sample after 10 minutes.

The depth of the excavation ranged from 0.8 metres to 2.7 metres. All excavations were backfilled upon completion and subsequently compacted with the backhoe bucket. Test pit logs are provided in Appendix B.

2.2.4 Field Schedule

The field investigation was carried out over a six day period by a three person field team, consisting of Rudy Schmidtke, Barry Fedorak and Eva Schulz. The following provides a brief outline of the activities carried out during the investigation.

September 17, 1996 - Day 1

Two members of the team, Eva Schulz and Barry Fedorak, met briefly with DIAND personnel in Yukon. The remainder of the day was used to research available background information on the sites. Pertinent data, including geological maps, previous reports, highway plans, elevation contour maps and airphotos were collected for the site investigation.

September 18, 1996 - Day 2

The team travelled to each site for a brief initial reconnaissance to identify primary areas of concern and estimate the time required for the field investigation. The field team began the detailed field investigation at the Mendenhall River Site - Site 18.

A geophysical survey using the EM31 was carried out at the Mendenhall River site. Several anomalies were recorded in the area east of the river and at the camp site, and identified for further investigation as part of the subsurface test pit program. Hand augured test holes were advanced at select locations to allow collection of soil samples.

September 19, 1996 - Day 3

The field investigation at Stony Creek sites was initiated. Five shallow soil samples, and two surface water samples were collected.

EM31 geophysical surveys were completed at the main camp site. Extensive metal surface debris was observed. Two areas where anomalous EM31 readings were recorded were targeted for further investigation. A reconnaissance EM31 survey was also carried out in the area to the east of the main camp. No subsurface anomalies were detected.

The Canol Pump Station, referred to as Site 17C, including suspected waste disposal sites in abandoned borrow pits, were also investigated. Five shallow soil samples were taken from various locations, including near the pump house foundation, and at the suspected waste disposal areas. Detailed EM31 surveys were carried out in the vicinity of the pump house foundation and adjacent to the new highway near the pump house access road. No subsurface anomalies were noted in these surveys.

September 20, 1996 - Day 4

The field investigation of the Takhini River site - Site 16 was carried out. A detailed EM31 survey was conducted at the suspected dump site, and a reconnaissance level survey was conducted at the main site. No subsurface anomalies were measured in either survey. Soil and surface water samples were obtained from areas suspected of contamination.

The field investigation of the Takhini Site - Site 15 was carried out. The history of the site was discussed with the current landowner. A reconnaissance EM31 geophysical survey was carried out at the main site area; no surface anomalies were noted. Two shallow surface soil samples were collected.

September 21, 1996 - Day 5

The field team developed the analytical testing program and prioritized samples for testing. Surface water was resampled at the Mendenhall River and Takhini sites as the original samples were inadvertently frozen.

September 22, 1996 - Day 6

The test pit investigation at the Mendenhall River and Stony Creek sites was carried out. Excavations at Mendenhall uncovered dump sites with assorted debris including metal cans, vehicle bodies, tires, scrap metal, etc. A test pit also exposed the probable location of the former underground storage tank at the service station. High PID readings were noted in soils sampled from this test pit. One other test pit uncovered a culvert which may have been part of the old approach to this site.

Test pits at the Stony Creek main site uncovered metal debris at the two locations, both of which had been targeted by the EM31 survey. A third test pit was excavated near the pumphouse. No debris or physical signs of contamination were noted.

2.3 ENVIRONMENTAL CRITERIA

The selection of environmental criteria for the assessment of the contaminants at the sites incorporates two principles:

- Absolute or Criteria Based: where numerical values or limits are compared with measured concentrations from field samples.
- Risk Management: where the focus is on identifying the potential for the direct or indirect movement of a contaminant, and the impact that this movement may produce.

Within most regulatory jurisdictions, existing standards and guidelines are subject to interpretation, and remediation criteria are primarily used as a screening tool. Cleanup requirements, are therefore, based on site-specific conditions.

For the purposes of this project, the assessment of risk is based initially on the confirmation of the presence of contaminated media, using the CCME Residential/Parkland (R/P) Remediation Criteria. The risks associated with concentrations below these criteria would be assumed to be minimal, unless a highly sensitive biotic element is present.

CCME Remediation Criteria for Water are divided into four usage categories - freshwater aquatic life, irrigation, livestock watering, and drinking water. For surface waters at these sites, remediation criteria for drinking water standards may be considered relevant where there is some reasonable expectation that the water may be used for drinking. Aquatic life criteria would be relevant if groundwater surfaced and organisms were exposed in a manner such that contaminant concentrations were not significantly reduced. The mobility of many organic and inorganic compounds is attenuated by soils during percolation to the groundwater table.

The CCME criteria do not address levels in soils or water of some chemicals, particularly some of the polycyclic aromatic hydrocarbons and organic contaminants that are analyzed as part of the Volatile Organic Chemicals (VOC) suite. Appropriate criteria equivalent to CCME R/P have been adopted by various provinces, including B.C., Ontario and Alberta. There are also no CCME criteria for Total Petroleum Hydrocarbons (TPH) or Total Extractable Hydrocarbons (TEH). Yukon Territorial Guidelines are used to evaluate hydrocarbon contamination. TPH criteria have been developed to avoid contamination of groundwater resources, and are used as a guideline for evaluating the potential for the more toxic components of TPH - VOC and PAH.

Table 2.1 outlines the parameters and the applicable remediation criteria. Following in Tables 2.2 and 2.3, specific criteria are presented.

2.4 LABORATORY ANALYSES

Laboratory analyses were conducted by EnviroTest Laboratories in Edmonton, Alberta. The parameters analyzed in soil and water included inorganic elements, volatile organic compounds, total purgeable hydrocarbons, total extractable hydrocarbons, polycyclic aromatic hydrocarbons, PCBs and organo-chlorine pesticides.

Volatile Organic Compounds (VOC)

These compounds include, benzene, toluene, ethylbenzene and xylene (BTEX). These parameters are typically found in gasoline and industrial solvents, and are targeted due to their known carcinogenic properties.

TABLE 2.1
SUMMARY OF REMEDIATION/ASSESSMENT CRITERIA
PRELIMINARY ENVIRONMENTAL ASSESSMENT - DIAND YUKON

Constituents	Criteria
SOIL	
• Inorganic Elements	CCME Residential/Parkland Remediation
• PCBs	CCME Residential/Parkland Remediation
• Total Extractable Hydrocarbons (TEH)	Yukon - Residential/Parkland Remediation
• Total Volatile Hydrocarbons (TVH)	Yukon - All Sites
• BTEX ¹	CCME Residential/Parkland Remediation
• Organic - Chlorine Pesticides	BC Ministry of Environment - Level B Remediation Alberta Tier I Assessment
• Polycyclic Aromatic Hydrocarbons (PAH)	CCME Residential/Parkland Remediation BC Ministry of Environment - Level B Remediation
WATER	
• Inorganic Elements	CCME Freshwater Aquatic Life CCME Drinking Water
• PCBs	CCME Freshwater Aquatic Life
• TEH	N/A
• TVH	N/A
• BTEX	CCME Freshwater Aquatic Life CCME Drinking Water
• Organo-Chlorine Pesticides	CCME Freshwater Aquatic Life
• PAH	BC Ministry of Environment

¹ Benzene, Toluene, Ethylbenzene, Xylene.

**TABLE 2.2
SOIL REMEDIATION CRITERIA
COMPARATIVE ENVIRONMENTAL CRITERIA**

Parameters	CCME R/P ¹	BCMOE ²	AB TIER I ³	YUKON
Inorganic Elements				
Silver	20			
Barium	4			
Beryllium				
Cadmium	5			
Cobalt	50			
Chromium	100			
Copper	250			
Molybdenum	10			
Nickel	150			
Lead	500			
Tin	50			
Strontium				
Thallium				
Vanadium	200			
Zinc	500			
PAHs				
Naphthalene	5			
Acenaphthene		10		
Acenaphthylene		10		
Fluorene		10		
Phenanthrene	5			
Anthracene	5			
Fluoranthene		10		
Pyrene	10			
B(a)A/Chrysene/B(c)P				
7,12-Dimethylbenz(a)anthracene				
Benzo(b,j,k)fluoranthene	1			
Benzo(a)pyrene	1			

All concentrations in mg/kg.

¹ CCME R/P - Canadian Council of Ministers of Environment Residential/Parkland (Remediation).

² BC MOE - BC Ministry of Environment - Level B (Remediation).

³ AB Tier I - Alberta Environment Assessment Criteria.

⁴ Yukon - Yukon Territorial Guidelines.

**TABLE 2.2
SOIL REMEDIATION CRITERIA
COMPARATIVE ENVIRONMENTAL CRITERIA**

Parameters	CCME R/P ¹	BCMOC ²	AB TIER I ³	YUKON
PAH's (Continued)				
3-Methylcholanthrene		1		
Indeno(1,2,3-cd)pyrene	1			
Dibenzo(a,h)anthracene	1			
Benzo(ghi)perylene		1		
Dibenz(ah,al,aj)pyrene		1		
PCBs (all Aroclors)	5			
Organo-chlorine Pesticides		2*		
HCB		0.46		
Gamma-BHC			0.01	
Beta-BHC			0.01	
Alpha-BHC			0.01	
Ronnel				
Heptachlor		0.084	0.01	
Heptachlor-Epoxide		0.06	0.01	
Aldrin		0.05		
pp-DDE		1.6		
Dieldrin		0.05		
pp-DDD		2.2		
pp-DDT		1.6		
Methoxychlor		4		
Mirex				
Hydrocarbons				
BTEX				
Benzene	0.5	0.24		
Toluene	3	2.1		
Ethylbenzene	5	0.28		
Xylenes	5	25		
Total Volatiles				200
TEH				1,000
All concentrations in mg/kg. ¹ CCME R/P - Canadian Council of Ministers of Environment Residential/Parkland (Remediation). ² BC MOE - BC Ministry of Environment - Level B (Remediation). ³ AB Tier I - Alberta Environment Assessment Criteria. ⁴ Yukon - Yukon Territorial Guidelines.				

**TABLE 2.3
WATER REMEDIATION CRITERIA
COMPARATIVE ENVIRONMENTAL CRITERIA**

Parameters	CCME F/A ¹	CCME DW ²	BCMOE ³	MOEE ⁴
Inorganic Elements				
Silver	0.1	--		1.2
Aluminum	5-100	--		
Barium	--	1,000	1,000	1,000
Beryllium	--	--	5.3	4
Boron	--	5,000	5,000	5,000
Calcium				
Cadmium	0.2-1.8	5		5
Cobalt	--	--	50	100
Chromium	2-20	50	2	50
Copper	2-4	≤1,000	2-8	23
Iron	300	≤300		
Potassium				
Magnesium				
Manganese	--	≤50	100	
Molybdenum	--	--	1,000	7,300
Sodium				200,000
Nickel	25-150	--		100
Lead	1-7	10	3-11	10
Phosphorous				
Silicon				
Tin	--	--		
Strontium				
Titanium				
Thallium	--	--		2
Vanadium	--	--		200
Zinc	30	≤5,000		1,100

All concentrations in ug/L, unless otherwise noted.

¹ CCME F/A = Canadian Council of Ministers of Environment - Fresh Water Aquatic Life.

² CCME DW = CCME Drinking Water Guidelines.

³ BCMOE = BC Ministry of Environment Aquatic Life.

⁴ MOEE = Ontario Ministry of Environment and Energy - Groundwater Criteria for Residential/Parkland Land Use for a Potable Groundwater Condition.

**TABLE 2.3
WATER REMEDIATION CRITERIA
COMPARATIVE ENVIRONMENTAL CRITERIA**

Parameters	CCME F/A ¹	CCME DW ²	BCMOE ³	MOEE ⁴
PAHs				
Naphthalene			1	21
Acenaphthene			6	20
Acenaphthylene				310
Fluorene			12	280
Phenanthrene			0.3	63
Anthracene			0.1	12
Fluoranthene			0.2	130
Pyrene			0.02	0.2
B(a)A/Chrysene/B(c)P				
7,12-Dimethylbenz(a)anthracene				
Benzo(b,j,k)fluoranthene				0.2
Benzo(a)pyrene		0.01	0.01	0.01
3-Methylcholanthrene				
Indeno(1,2,3-cd)pyrene				0.2
Dibenzo(a,h)anthracene				0.2
Benzo(ghi)perylene				0.2
Dibenz(ah,al,aj)pyrene				
PCBs (all Aroclors)	1 ng/L		0.0001	0.2
Organo-chlorine Pesticides				
HCB				0.62
Gamma-BHC				
Beta-BHC				
Alpha-BHC				
Ronnel				
Heptachlor	0.01			0.04
Heptachlor-Epoxide				3
All concentrations in ug/L, unless otherwise noted.				
¹ CCME F/A = Canadian Council of Ministers of Environment - Fresh Water Aquatic Life.				
² CCME DW = CCME Drinking Water Guidelines.				
³ BCMOE = BC Ministry of Environment Aquatic Life.				
⁴ MOEE = Ontario Ministry of Environment and Energy - Groundwater Criteria for Residential/Parkland Land Use for a Potable Groundwater Condition.				

**TABLE 2.3
WATER REMEDIATION CRITERIA
COMPARATIVE ENVIRONMENTAL CRITERIA**

Parameters	CCME F/A ¹	CCME DW ²	BCMOE ³	MOEE ⁴
Organo-chlorine Pesticides (Continued)				
Aldrin	4 ng/L			0.01
pp-DDE				20
Dieldrin	4 ng/L			0.02
pp-DDD				6
pp-DDT	1 ng/L			0.05
Methoxychlor				
Mirex				
Hydrocarbons				
BTEX				
Benzene	300	5		
Toluene	300	≤24		
Ethylbenzene	700	≤2.4		
Xylenes		≤300		
Total Volatiles				
TEH				
All concentrations in ug/L, unless otherwise noted.				
¹ CCME F/A = Canadian Council of Ministers of Environment - Fresh Water Aquatic Life.				
² CCME DW = CCME Drinking Water Guidelines.				
³ BCMOE = BC Ministry of Environment Aquatic Life.				
⁴ MOEE = Ontario Ministry of Environment and Energy - Groundwater Criteria for Residential/Parkland Land Use for a Potable Groundwater Condition.				

Total Purgeable Hydrocarbons (TPH)

TPH is usually represented by C₅ to C₁₀ carbon atoms.

Total Extractable Hydrocarbons (TEH)

TEH concentrations correspond to hydrocarbon compounds composed of C₁₀ to C₃₀ carbon atoms. Fuel oils including diesel are represented by TEH concentrations.

Polycyclic Aromatic Hydrocarbons (PAHs)

The following compounds were included in the PAH analysis: naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene/anthracene, benzo(a)pyrene fluoranthene, pyrene, B(a)A/chrysene/B(a)anthracene, benzo(b,j,k)fluoranthene, indeno(1,2,3-cd)pyrene 3-methylcholanthrene, 7,12-dimethylbenz(a)anthracene, dibenzo(ah)anthracene, benzo(ghi)perylene and dibenz(ah,ai,aj)pyrene.

Polychlorinated Biphenyls (PCBs)

PCBs consist of a class of 209 compounds which were commonly used in transformer fluids, as lubricants, or as paint additives until the late 1970s. The method of analysis used reported results in terms of Aroclor equivalence. Aroclors were commercially available PCB formulations in North America.

Organo-chlorine Pesticides

Pesticides were commonly used for pest control at U.S. Military Camps. The analysis for organo-chlorine pesticides included the following compounds: HCB, Gamma-BHC, Beta-BHC, Alpha-BHC, ronnel, heptachlor, heptachlor epoxide, aldrin, pp-DDE, dieldrin, pp-DDD, pp-DDT, methoxychlor and mirex.

Inorganic Elements

Waste disposal sites commonly contain metal debris, paint and other domestic and industrial wastes. Metals can be leached from the parent material and introduced into the environment. The analysis of metals in soils included the following inorganic elements: silver, barium, beryllium, cadmium, cobalt, chromium, copper, molybdenum, nickel, lead, tin, strontium, thallium, vanadium and zinc. The inorganic analysis for water included the aforementioned elements as well as some aluminum, boron, calcium, iron, potassium, manganese, magnesium, sodium, phosphorus, silicon and titanium.

3.0 RESULTS OF THE STUDY

This section presents the results of the field investigation and laboratory analytical program carried out for the environmental assessment of four former U.S. military sites in the Yukon. For each site, the following information is presented:

- description of site features, topography and vegetation;
- conditions at the time of the 1996 investigation, including a preliminary interpretation of the subsurface conditions from the electromagnetic surveys (EM31);
- subsurface soil and groundwater conditions (where applicable);
- rationale for selection of sampling locations.

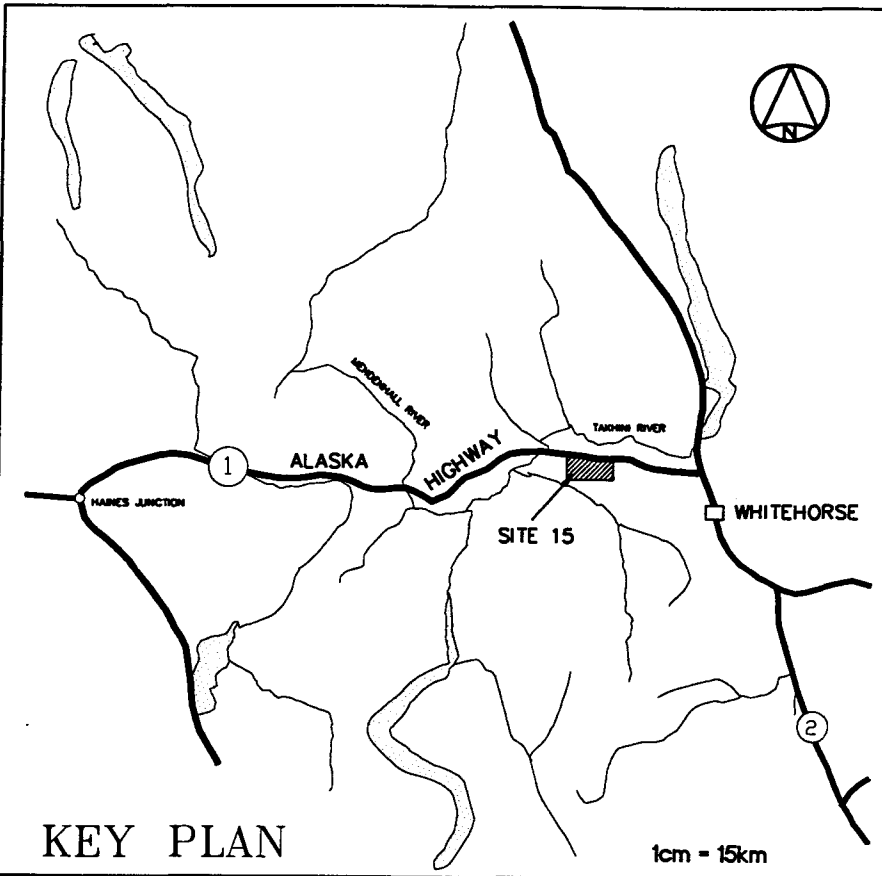
Data collected during the EM-31 geophysical surveys were processed to provide contour drawings of apparent ground conductivity in the areas surveyed. These drawings are provided in Appendix A. Test pit logs and descriptions of sample locations are provided in Appendix B. All analytical data are summarized in Appendix C.

3.1 SITE NO. 15 - TAKHINI

3.1.1 Site Description

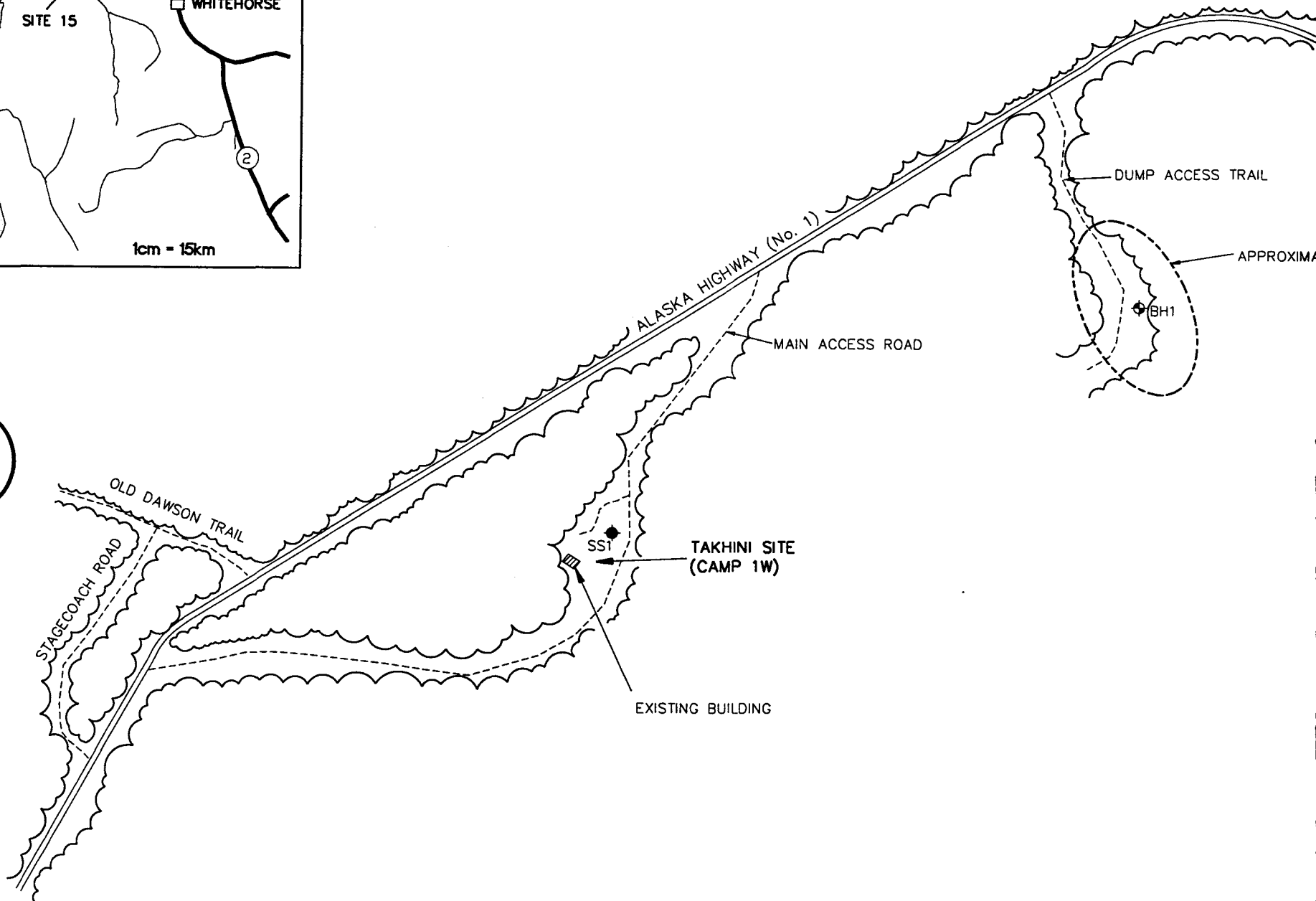
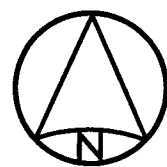
Site 15 - Takhini, a former U.S. Military Camp - Camp 1W, is located near Mile 936 of the Alaska Highway, approximately 30 kilometres west of Whitehorse. An overall site plan indicating the camp location, and the associated dump site, is shown on Drawing 3-1. The original camp occupied an area of approximately 3.5 ha and is currently owned by Mr. Kolaritsch. A more recent one storey building has been constructed south of the former camp. Several residences are also present south of the main access road. A dump site is located approximately 650 m east of the camp and 500 m south of the Alaska Highway. There is a separate access road from the highway to the dump.

The main site area, located at the foot of the mountains, slopes gently to the north. In the vicinity of the dump site, terrain can be considered mountainous, with rugged relief and numerous bedrock outcrops. The site is generally forested, primarily with mature white spruce (*Picea glauca*), and trembling aspen (*Populus tremuloides*). The



KEY PLAN

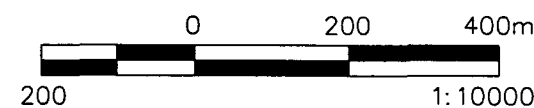
1cm = 15km



TAKHINI MILE-SITE 15	
LOCATION	SAMPLE
SS1	15-SS1, (15-SS2 DUPLICATE)
BH1	15-BH1-0.3

LEGEND

- BH1 BORE HOLE
- EXISTING TRAILS
- TREELINE
- EXISTING BUILDING/STRUCTURE
- SAMPLING LOCATION



NOTE:
LOCATIONS OF EXISTING FEATURES
ARE APPROXIMATE



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SITE No. 15-TAKHINI		
TITLE:	LOCATION PLAN	
JOB No.	4440 035 00 02	DATE: NOVEMBER 1996
DRAWN:	MMF	DWG. No. 3-1
CHECKED:	BF	



EM31 Geophysical over disturbed area - SITE 15



Debris area at SITE 15 dump site, soil sample 15 BH1-0.3



SITE 15 - Overview of dump site

understorey plants are dominated by prickly rose shrubs, (*Rosa acicularis*), wild strawberry (*Fragaria virginiana*), fireweed (*Epilobium angustifolium*), and various horsetail species (*Equisetum sp.*). The area in the vicinity of the residence has been disturbed.

Discussions concerning the site history were held with Mr. Kolaritsch, the current landowner. Mr. Kolaritsch has salvaged some of the camp construction materials, cleared scattered debris, and graded and contoured the former camp area. He has also constructed some facilities utilizing the concrete foundations from the former camp facilities. He noted that some of the debris scattered on site is the result of his activities. Mr. Kolaritsch identified the former dump site used by the U.S. military and indicated that the dump area has also been used by local residents for domestic and construction waste disposal.

3.1.2 Site Conditions

No original Camp 1W buildings remain at the Takhini site, with the exception of one partial building frame on the west side of the site. Large debris were present in some areas but appeared to be more recent. Some scattered wood and metal debris were identified in the forested areas on the west side of the camp.

In the vicinity of the existing building, the area to the north has been regraded, and to the east a shallow mound of material was observed. A reconnaissance EM-31 geophysical survey was conducted in this area, but no significant anomalies were recorded. Low apparent conductivity readings were recorded over the mound indicating possible shallow bedrock.

Piles of debris were found at the dump site, and included both recent and older metal cans, wood, scrap metal, paper, plastic, and a recent vehicle chassis.

3.1.3 Subsurface Soil Conditions

The geological map of the area shows the surficial geology to consist of glacial deposits, alluvium and some volcanic ash which is the result of an eruption that had occurred in Alaska (GSC Map 1048A, 1957). Based on observations of surface sediments and the stratigraphy in shallow boreholes, it appears that surficial deposits at the main camp and dump site are similar and consist primarily of silt, fine sand or organics. Bedrock outcrops are noted throughout the site.

3.1.4 Groundwater Conditions

The Takhini River is located approximately 10 km to the east of the main site area. Regionally, it is anticipated that groundwater flow would trend easterly towards the Takhini River. Mr. Kolaritsch has two wells for water supplies, one within the overburden at a depth of approximately 25 metres, the second within the bedrock at some greater depth.

3.1.5 Contaminant Considerations

No obvious signs of contamination were evident at this site. Therefore, sampling targeted areas which potentially would have been impacted by past activities. One soil sample, TM-15-SS1, was collected at the main camp area between the mounded areas at a depth of 0.1 metres (m) and analyzed for inorganic element concentrations, PCBs, and organo-chlorine pesticides. Measured concentrations of all inorganic elements were below the CCME R/P Criteria. Organic compounds were below detection limits.

A second soil sample, TM-15-BH1, was collected from the dump area at a depth of 0.3 m and analyzed for inorganic elements. Measured concentrations of inorganic elements were all below CCME R/P criteria.

No other soil samples from this area were analyzed as there were no other indications of other contaminants in relation to military activities at this site.

There were no ponds or obvious drainage channels at the site; therefore no surface water samples were taken. Groundwater is present at depth and would not likely have been impacted by past operations.

3.2 SITE NO. 16 - TAKHINI RIVER

3.2.1 Site Description

Site 16 - Takhini River, a former military maintenance camp, is located at Mile 946.4 of the Alaska Highway, approximately 45 km west of Whitehorse, at an elevation of 670 metres above sea level. The former camp was situated south of the Alaska Highway and west of Takhini River. An overall site plan is provided in Drawing 3-2.

Records show eleven buildings were originally constructed at the site. At the time of the 1996 investigation, one building remained in the main camp area. A suspected old dump site, potentially associated with camp operations, is located approximately 2 kilometres east of the Takhini River camp at Mile 945.0. A residence was noted to the south of this area.

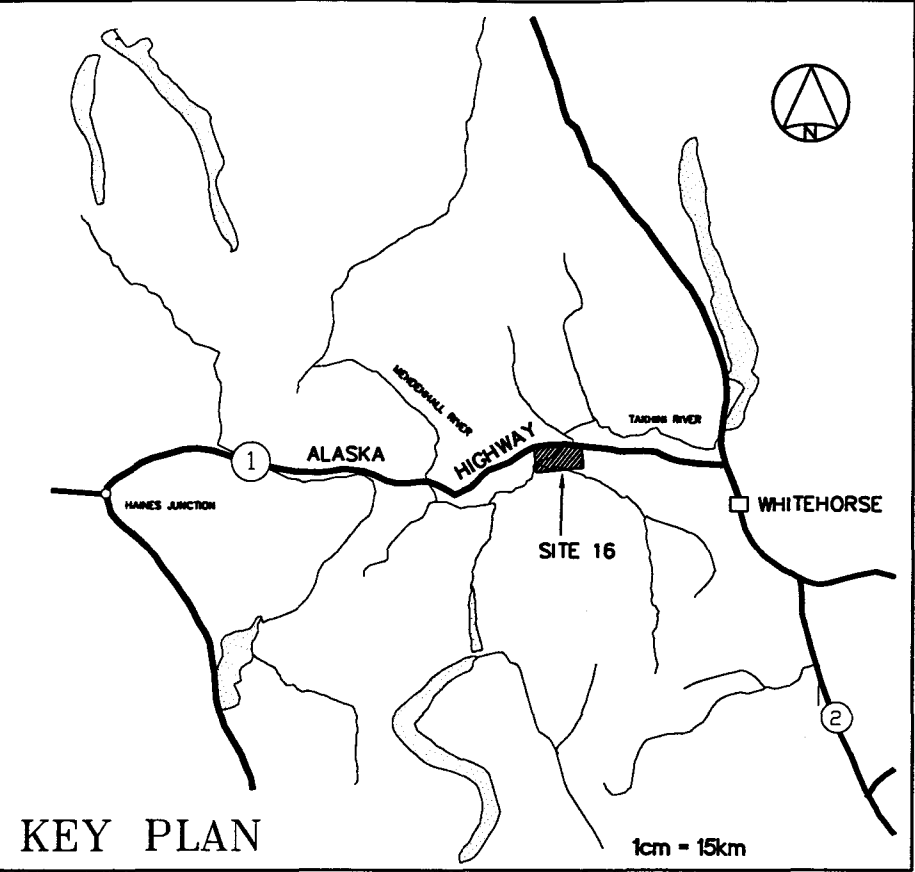
Generally, the terrain is flat and gently slopes to the Takhini river to the south and east. The forest vegetation is dominated by white spruce (*Picea glauca*) and trembling aspen (*Populus tremuloides*) in the drier areas, with balsam poplar (*Populus balsamifera*) in the natural riverbank area. Various willow species (*Salix sp.*) and river birch (*Betula occidentalis*) were identified in the riverbank understorey. Forbs of the of the *Epilobium sp.* and *Equisetum sp.* were also noted in the understorey at the site.

3.2.2 Site Conditions

The remaining camp building which was founded on blocks, appeared to be a residence and was in poor condition. The concrete foundations of the other buildings identified in historical records were identifiable. Debris, including metal cans, empty barrels, plastic, wood, and scrap metal, was scattered across the site. A large pile of debris, primarily building materials (wood and metal), was observed on the north side of the site. Partially buried debris was noted on the west side of the camp. Near the south end of the camp, metal debris was observed within the riverbank, at the top of the bank and in the river.

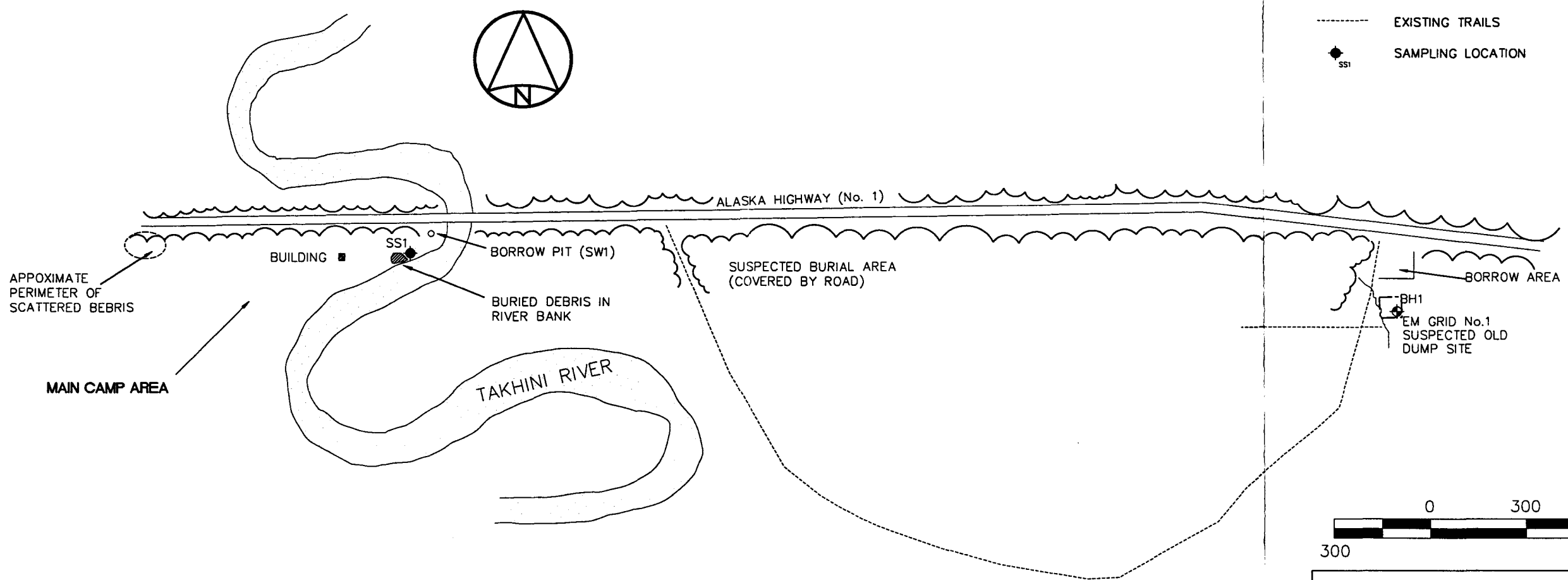
A reconnaissance EM31 survey was carried out over the suspected disposal areas on the main site, including the top of the riverbank, the western portion of the site, and other apparently disturbed areas. No anomalies were measured during these surveys.

TAKHINI RIVER SITE NO. 16	
LOCATION	SAMPLE
SS1	TR16-SS1 (SEDIMENT)
BH1	TRD16-SS1
BH1	TRD16-BH1-0.1
BORROW PIT	TR16-SW1 (WATER)
BUILDING	TR16-PAI (PAINT)



LEGEND

- BORE HOLES
- TREELINE
- EXISTING BUILDING\STRUCTURE
- GEOPHYSICAL SURVEY GRID (EM GRID No.1)
- EXISTING TRAILS
- SAMPLING LOCATION



NOTE:
LOCATIONS OF EXISTING FEATURES
ARE APPROXIMATE

uma UMA Engineering Ltd.
Engineers, Planners and Surveyors

SITE No. 16-TAKHINI		
TITLE:	LOCATION PLAN	
JOB No.	4440 035 00 02	DATE: NOVEMBER 1996
DRAWN:	MMF	DWG. No. 3-2
CHECKED:	BF	





SITE 16 - Damaged building - interior paint sample obtained



SITE 16 - Concrete foundations



SITE 16 - Debris in Takhini River



SITE 16 - Close up view of debris embedded in river bank

At the dump site to the east of the former camp, it appeared that some burning had taken place, as evidenced by the charred timbers in the area. Minimal surface debris was noted. To assist in the evaluation of the dump site, a detailed EM31 geophysical survey was carried out, encompassing an area of 30 metres by 65 metres, with readings obtained at 5 metre intervals. No anomalies were measured during this survey.

3.2.3 Subsurface Soil Conditions

The surficial geology in the main area is mapped as alluvial deposits (CGS Map 1048A, 1957). This was consistent with observations of the riverbank stratigraphy. At the dump site, glacial deposits were observed.

3.2.4 Groundwater Conditions

It is anticipated that the groundwater table in the overburden is relatively shallow in close proximity to the Takhini River based on the current water level and the topography. Horizontal groundwater flow is anticipated to trend towards the south and east from the site towards the Takhini River. Groundwater was not encountered in any of the shallow boreholes augered at this site.

3.2.5 Contamination Considerations

The soil sampling program focused on areas of potential waste disposal near the riverbank and at the dump site east of the camp.

Adjacent to the river, where debris was observed, it was noted that the vegetation was less developed than the surrounding area and there appeared to be backfilled trenches leading from the site to the river. A sediment sample, TR16-SS1 was collected from the riverbank to assess potential contamination and was tested for BTEX, TPH, TEH, metals, PCBs, PAH, and pesticide concentrations. The concentrations measured in this sample were below applicable remediation criteria.

Surface water runoff from the main site tended to collect in an abandoned borrow pit in the northern portion of the site. The pond was sampled (TR16-SW1) for inorganic elements, PCBs, and pesticides. The measured concentrations of inorganic and organic constituents in the water sample were well below CCME Remediation Criteria for freshwater aquatic (F/A) life.

As indicated previously, one building remained from the former camp. As older industrial grade paints often contained PCBs, lead, and other metals, a sample of the paint from this structure was obtained for analyses (TR16-PA1). High concentrations of metals including barium, cadmium, cobalt, chromium, molybdenum, nickel, lead and zinc, and a PCB concentration of 5.8 ppm were measured.

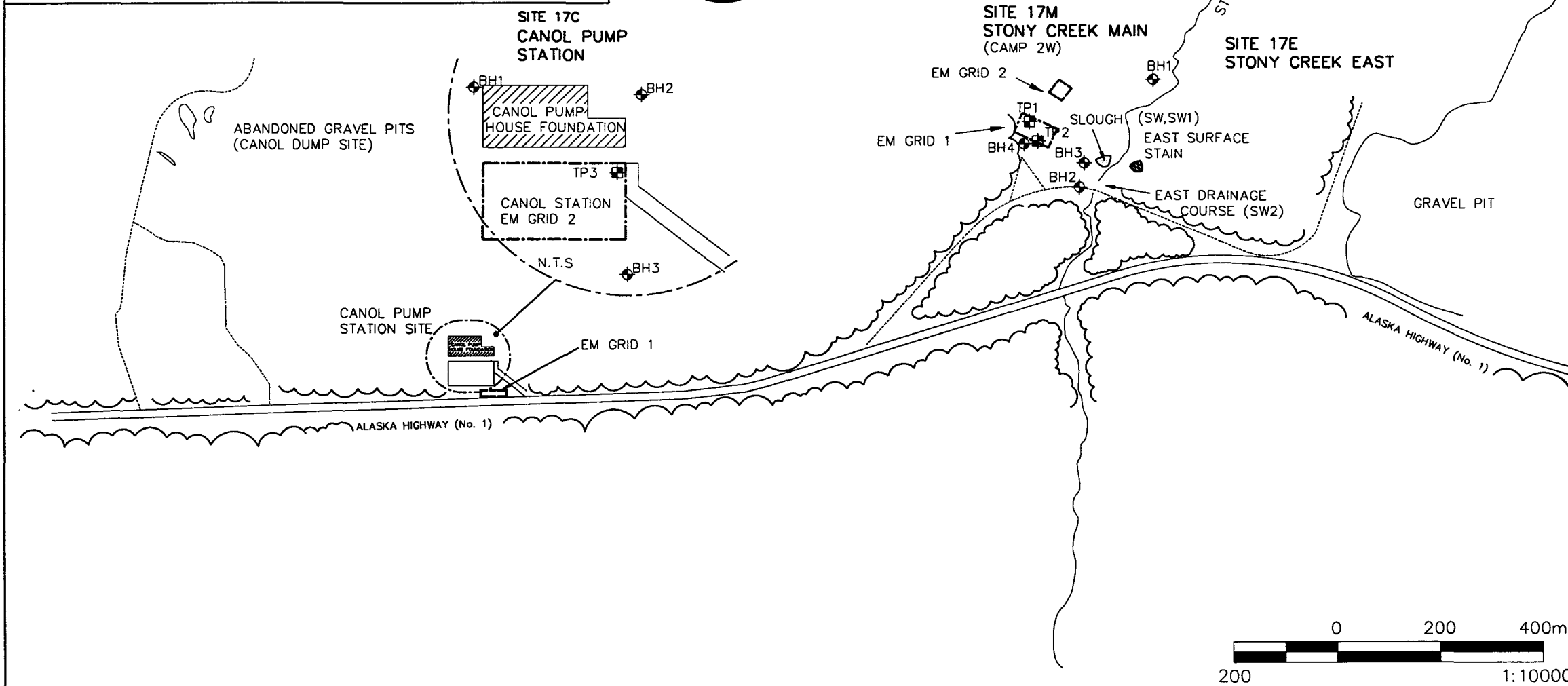
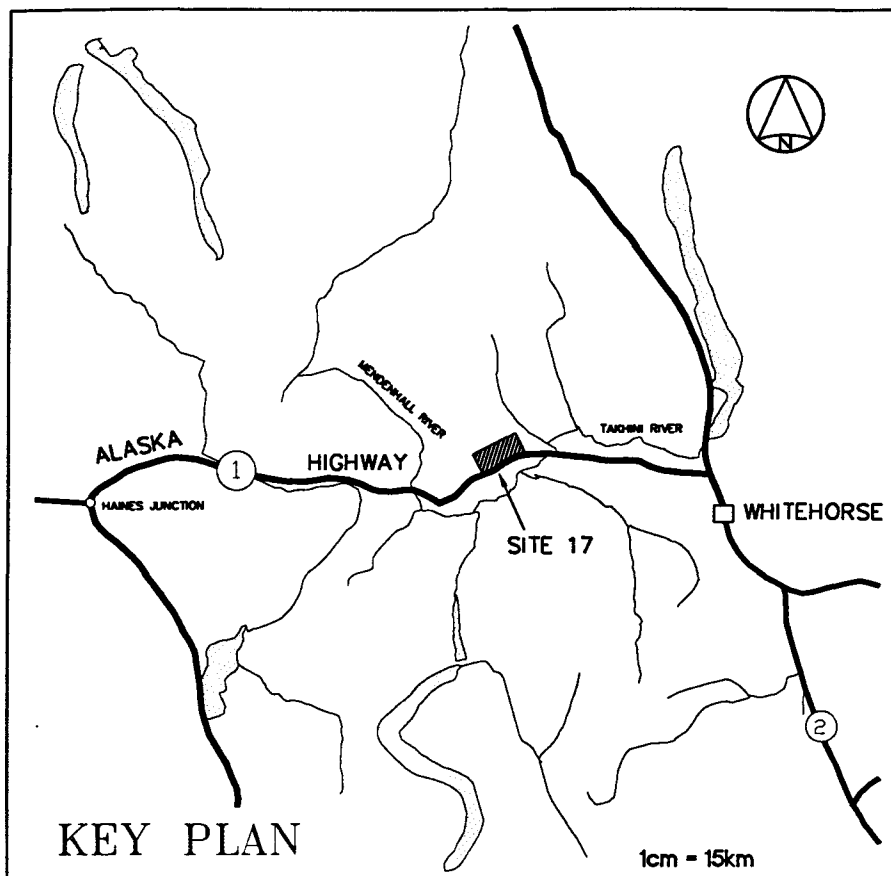
At the dump area, east of the main site, vegetation lacked the advanced growth of the surrounding area. It could not be determined if this was a result of a forest fire that had gone through the area in the late 1950's. As the scattered metal debris was observed in the area, a soil sample, TRD-BH1-0.1, was collected at 0.1 metres below ground surface and was submitted for analyses of inorganic elements. Measured concentrations of specific inorganic elements were below CCME R/P Remediation Criteria.

3.3 SITE NO. 17 - STONY CREEK AND CANOL STATION

3.3.1 Site Description

Site 17, located approximately 62 km west of Whitehorse, on the north side of the Alaska Highway, was comprised of three separate areas as shown on Drawing 3-3. These areas included the main camp, on the west side of Stony Creek (Site 17M) and the east side of Stony Creek, Site 17E, both at approximately Mile 956. The third area comprised the Canol Pump Station, Site 17C at Mile 956.8. Sites 17M and 17E, a former U.S. Military Maintenance facility, encompassed an area of approximately 6 ha. An abandoned tent camp, an access to an outfitter, and a dump site are adjacent to the eastern portion of the site.

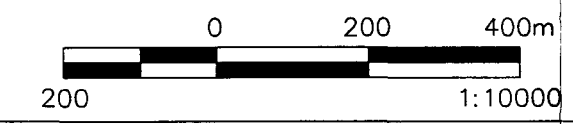
The sites at Mile 956 were located on two separate plateaus, south of a large ridge. Generally, the plateaus slope to the east and south east towards the Stony Creek valley. The area west of Stony Creek slopes gently towards the creek. A slough is located on the west side of Stony Creek, at Site 17M. The upper plateau areas on the west side of Stony Creek have very little forest vegetation. Good grass cover is present and a large number of prickly rose shrubs (*Rosa acicularis*) and wild strawberry (*Fragaria virginiana*) were noted. The east and west sides of Stony Creek are dominated by various willow species (*Salix sp.*) and river birch (*Betula occidentalis*) in the



STONY CREEK - SITE 17	
STONY CREEK EAST	
LOCATION	SAMPLE
EAST SURFACE STAIN	17-SS1
EAST DRAINAGE COURSE	17-SW2
CANOL PUMP STATION SITE	
LOCATION	SAMPLE
CANOL BH1	-----
CANOL BH2	17C-BH2-0.3
CANOL BH3	17C-BH3-0.3
CANOL TP3	-----
STONY CREEK MAIN	
LOCATION	SAMPLE
MAIN BH1	-----
MAIN BH2	-----
MAIN BH3	-----
MAIN BH4	17M-BH4-0.2
MAIN SLOUGH	17M-SW, 17M-SW1
MAIN TP1	17M-TP1-0.6

LEGEND

	BH5	BORE HOLES
	TP5	TEST PITS
		TRAILS
		EXISTING TREELINE
		EXISTING BUILDING\STRUCTURE
		GEOPHYSICAL SURVEY GRID (EM GRID)



NOTE: LOCATIONS OF EXISTING FEATURES ARE APPROXIMATE

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SITE No.17-STONY CREEK		
TITLE:	LOCATION PLAN	
JOB No.	4440 035 00 02	DATE: NOVEMBER 1996
DRAWN:	MMF	DWG. No. 3-3
CHECKED:	BF	



SITE 17M - Overall view of site, view north



SITE 17M - Water sample location at slough



SITE 17M - Debris exposed in TP1



SITE 17C - Canol pump house foundation

understorey. Site 17E has a good forest cover dominated by trembling aspen (*Populus tremuloides*) with some white spruce (*Picea glauca*). A small drainage channel, draining into Stony Creek was also observed at this site.

At Site 17C, the Canol Pump Station, only the pump house foundation remains. The site is located south of a large ridge, and slopes gently to the south towards the Alaska Highway. Several abandoned borrow areas were noted in the vicinity. Vegetation is dominated by trembling aspen forest cover with some white spruce. The understorey consists of prickly rose shrubs and grasses. The forest growth area has been affected by a forest fire that had gone through the area in the late 1950's.

3.3.2 Site Conditions

No buildings remain at Sites 17M and 17E. Waste consisting primarily of building materials was noted in the vicinity of the concrete foundations. Several small debris areas, consisting primarily of metal cans and scrap metal, were observed across the site. The main dump site, located northeast of Site 17E, contained one vehicle chassis, a large piece of chain, and various wood and metal debris, including empty small oil cans and empty 45 gallon drums, scattered at various locations in the forested area.

Two detailed EM31 geophysical surveys were carried out at Site 17M. Grid No. 1 encompassed an area of approximately 86 metres by 92 metres, in the main camp site where the majority of foundations and associated building debris were observed. A grid spacing of approximately 7.5 metres was used. Two localized areas, where anomalous EM-31 readings were measured, were targeted for further investigation during the subsequent test pit excavation program. Test pit TP1, excavated on the west side of Grid No. 1, uncovered a small waste disposal pit. Debris included metal, wood, and pipes and what appeared to be remnants of the Canol pipeline. Test pit TP2, excavated approximately 30 metres north of TP1, uncovered a 25 mm and 75 mm diameter steel pipe. Test pit locations are shown on Drawing 3-3.

Grid No. 2 was surveyed on the upper plateau, north of the main camp. The survey covered an area of approximately 50 metres by 165 metres, with a grid spacing of 5 and 8 metres. No subsurface anomalies were identified in this area.

A reconnaissance EM31 geophysical survey was carried out at Site 17E. No anomalies were measured in this area.

At Site 17C, the pump house structure has been removed. Metal debris and concrete rubble were observed adjacent to the access road at the entrance to the site. Abandoned borrow areas, west of the site, contained small piles of debris, primarily empty metal cans.

Two detailed EM-31 geophysical surveys were carried at Site 17C. Grid No.1 , covered an area of approximately 50 m x 12 metres, west of the access road to the pump station, and adjacent to the highway. Grid No. 2, located south of the pump house foundation in a gravelled, disturbed area, encompassed an area of approximately 25 metres by 20 metres. A 2 metre grid spacing was used in both surveys. No anomalies were detected in either survey. One test pit, TP3, was excavated in the disturbed area, to complement the data from geophysical survey. The test pit location is shown on Drawing 3-3. No debris or staining were observed in the test pit.

3.3.3 Subsurface Soil Conditions

Based on geological mapping of the area, the surficial stratigraphy is described as glacial deposits at higher elevations, with alluvial and glaciofluvial deposits adjacent to Stony Creek (CGS Map 1048A, 1957). Surficial deposits in the three test pits excavated consisted of damp, silty clay or silty sand, consistent with the regional geological mapping.

3.3.4 Groundwater Conditions

Regionally, it is anticipated that horizontal groundwater tends to flow towards Stony Creek; however, the depth to groundwater was not ascertained during this site investigation. Groundwater was not encountered in any of the test pits excavated

3.3.5 Contamination Considerations

Five soil samples and two water samples were collected from Site 17.

Sample 17M-BH4-0.2 was retrieved from the disturbed area on the upper plateau, north of the main camp area (Site 17M). A sweet odour had been detected in the soil at this location, and debris was scattered in the vicinity. The sample was analyzed for inorganic elements,

BTEX, TPH, TEH, PCBs, PAH and pesticides. Very low levels of PAH were measured, as well as trace amounts of organo-chlorine pesticides; however, concentrations were well below applicable remediation criteria.

Sample 17M-TP1-0.6, was collected from TP1 and submitted for analyses of inorganic elements due to the presence of metal debris in the test pit. A volatile vapour measurement of 0.3 ppm was recorded using a PID for this sample. The concentrations of all inorganic elements were below CCME R/P criteria, with the exception of zinc and copper. A zinc concentration of 605 ppm was measured, approximately 20 percent greater than the 500 ppm criteria. The copper concentration was measured at 115 ppm, as compared to the 100 ppm criteria. Test pit locations are shown on Drawing 3-3.

Localized hydrocarbon staining at Site 17E was characterized by Sample 17-SS1. Analyses included measurement of inorganic elements, BTEX, TPH, TEH, PCBs, PAH and pesticides. Low concentrations of PAH compounds were detected, and a TEH concentration of 900 ppm was measured. Zinc and lead concentrations were somewhat elevated above background conditions; however, the measured concentrations were below CCME R/P criteria. Concentrations of all other analytes were below method detection limits.

One water sample, 17M-SW, was collected from the standing water in the slough at the main site. A second surface water sample, 17-SW2, was collected from flowing water in the drainage channel on the east side of Stony Creek. Both sampling locations are potential receptors of surface water runoff from Sites 17M and 17E, respectively. Sample locations are shown on Drawing 3-3.

Sample 17M-SW was submitted for analyses of inorganic elements, and the full suite of organic compounds. Concentrations of aluminum, barium, manganese, phosphorous and zinc were elevated above expected background levels, and were slightly above CCME freshwater aquatic life criteria where those criteria have been established. No organic compounds were detected.

Sample 17-SW2 was tested for inorganic elements, PCBs and TEH. Measured concentrations of inorganic elements were below CCME Freshwater Aquatic Life Criteria, with the exception of zinc which was measured at a concentration equivalent to the criteria. PCBs and TEH were not detected.

A representative sample of tile insulation material found north of Site 17M on the Upper Plateau was submitted for analyses of asbestos. The fibre wrapping on the insulation (25 percent of the sample) was found to contain 70 percent chrysotile (white) asbestos.

No obvious signs of contamination were apparent at Site 17C, the Canol Pump Station. Two soil samples, 17C-BH2-0.3 and 17C-BH3-0.3, collected from areas that would likely have been impacted from past operations were submitted for analyses. Both samples were analyzed for inorganic elements, PCBs, and hydrocarbons. Sample 17C-BH2-0.3 was also analyzed for PAH, while Sample 17C-BH3-0.3 was analyzed for pesticides. The measured concentrations of all analytes were below applicable remediation criteria. Low concentrations of PAHs and total volatile compounds were measured in Sample 17C-BH2-0.3. The location of the test pits are indicated on Drawing 3-3.

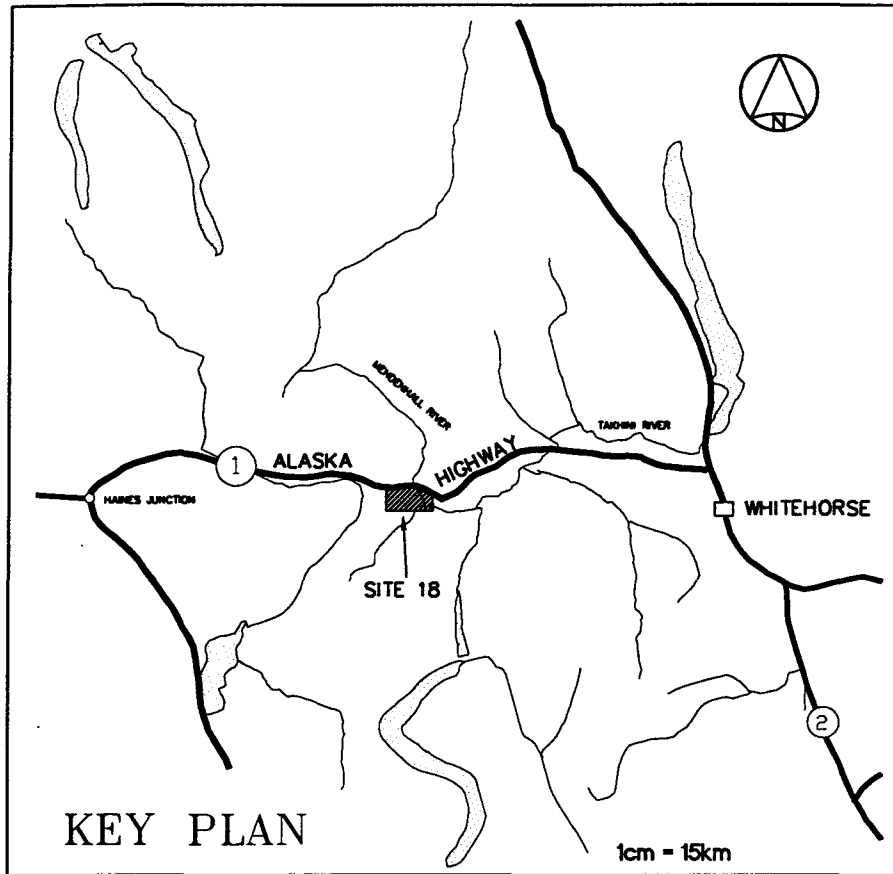
3.4 SITE NO. 18 - MENDENHALL RIVER

3.4.1 Site Description

Site 18, Mendenhall River, a former U.S. Military Maintenance Camp, is located at Mile 968 of the Alaska Highway, approximately 80 kilometres west of Whitehorse. The site encompasses an area of about 5 hectares adjacent to the east side of Mendenhall River, south of the Alaska Highway. Records show that a private retail fuel outlet was operated in this area. Records also indicate that the Yukon Territorial Government operates a campground in the area adjacent to the river. An overall site plan is provided on Drawing 3-4.

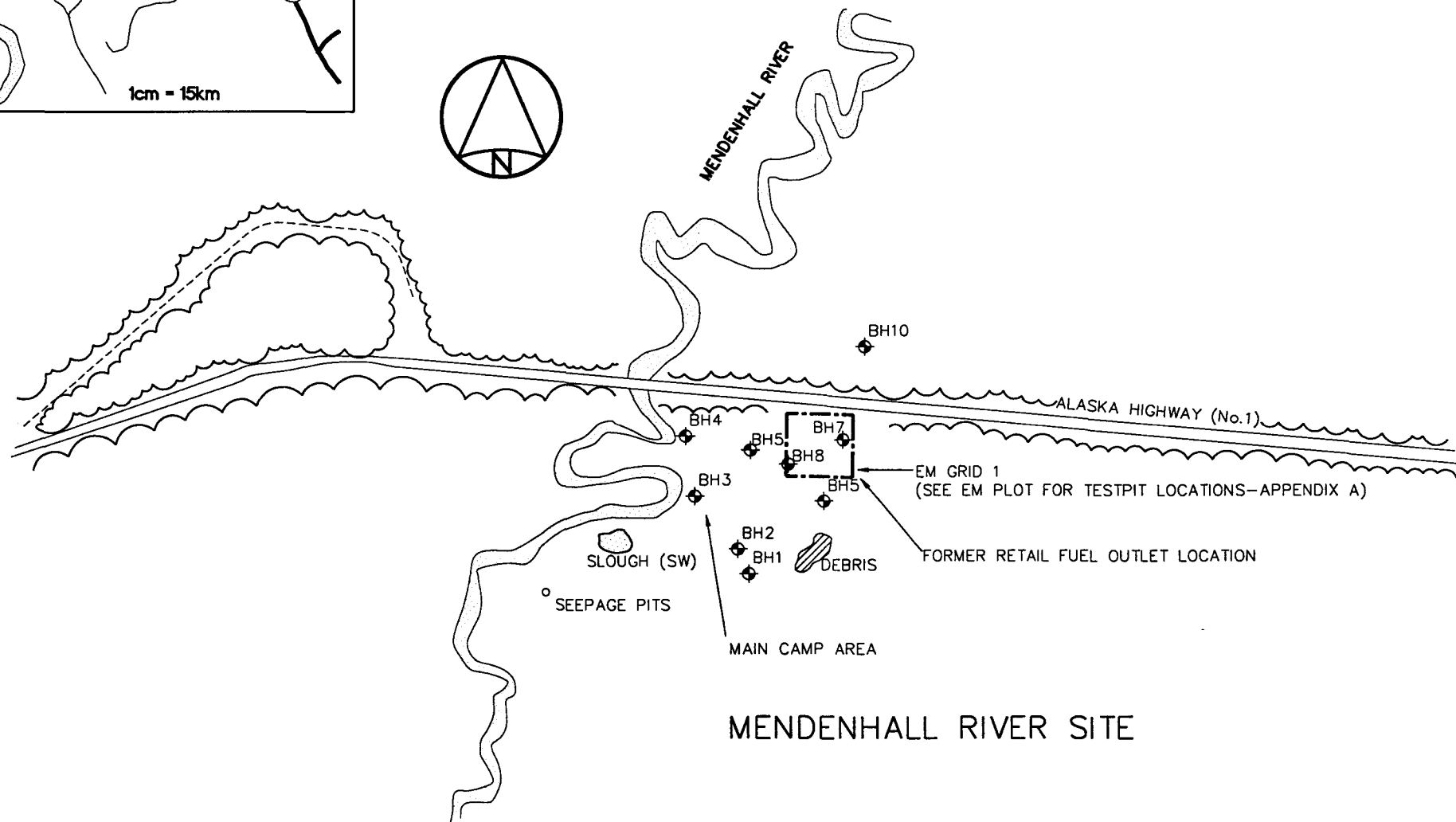
Concrete building foundations were identifiable in the campground area. A cleared area, adjacent to the highway, appeared to be the site of the former retail fuel outlet.

The topography at this site is generally flat, with a relatively steep slope towards the west to the Mendenhall River. There are localized low lying areas containing standing water. The forest vegetation is dominated by mature white spruce (*Picea glauca*) with some trembling aspen (*Populus tremuloides*). This site was quite dry at the time of the investigation and it is at a higher elevation than the other sites making the white spruce more prevalent. Grasses and prickly rose shrubs (*Rosa acicularis*) are also identified at this site.

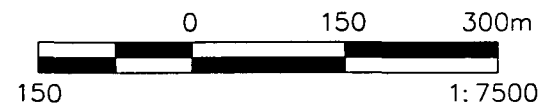


KEY PLAN

1cm = 15km



MENDENHALL RIVER SITE



NOTE:
LOCATIONS OF EXISTING FEATURES
ARE APPROXIMATE



UMA Engineering Ltd.
Engineers, Planners and Surveyors

MENDENHALL RIVER - SITE 18	
LOCATION	SAMPLE
BH1	18-BH1-0.2
BH2	18-BH2-0.2,0.3
BH3	-----
BH4	18-BH4-0.1
BH5	18-BH5-0.1
BH6	-----
BH7	18-BH7-0.3
BH8	-----
BH9	-----
BH10	18-BH10-0.2
SLOUGH	18-SW (WATER)
TP1	18-TP1-1.2
TP4	18-TP4-2.0
TP5	18-TP5-1.1
TP6	-----
TP7	-----

LEGEND

- BH1 LOCATION OF TESTHOLES
- TP1 LOCATION OF TEST PITS (SEE EM PLOT)
- TREELINE
- GEOPHYSICAL SURVEY GRID (EM GRID No.1)
- TRAILS

SITE No.18-MENDENHALL RIVER		
TITLE: LOCATION PLAN		
JOB No. 4440 035 00 02	DATE: NOVEMBER 1996	
DRAWN: MMF	DWG. No. 3-4	
CHECKED: BF		



SITE 18 - Debris area at south end of site



SITE 18 - Typical building foundation



SITE 18 - Vehicle excavated at TP5



SITE 18 - Debris at test pit, TP6



SITE 18 - Test pit, TP4, suspected location of underground storage tank

3.4.2 Site Condition

No buildings remained from the former U.S. Military Camp; however there was building material debris scattered around the site near the remaining building foundations. Surficial dump sites were observed on the east slope of the Mendenhall River Valley, adjacent to the current campground. Debris included wood, scrap metal, small motor oil cans, other metal cans, an occasional empty 45 gallon barrel, as well as more recent domestic type wastes. Several suspect shallow pits were observed in the river valley. No visible staining was observed at the main camp area. Some minor stains were associated with the debris areas.

The area of the former retail fuel outlet has been cleared, and no buildings remain, with the exception of a concrete foundation suspected as the being the former pump island. It appeared that some regrading/disturbance had occurred in this area.

A reconnaissance level survey was carried out at the main camp area; no anomalies were detected. A detailed EM-31 geophysical survey was carried out over the retail fuel outlet site. The grid encompassed an area of 80 metres by 80 metres, with readings obtained at 2 metre and 5 metre intervals.

Several subsurface anomalies were detected during the detailed geophysical survey that were targeted for further investigation during the test pit excavation program. A total of eight test pits were excavated, and debris/metal was encountered in five of the pits, TP1, TP5, TP6, TP7, and TP8. In TP4, strong hydrocarbon odours were detected. This area was assumed to be the location of the former underground storage tank. Drawing 3-4 shows the location of the test pits.

3.4.3 Subsurface Soil Conditions

The surficial geology of the area is mapped as glacial tills with stratified silts (CGS Map 1019A, 1953). The test pits excavated in the area, generally encountered silt fill overlying native silt materials. Native deposits were dry to damp, and dense, generally consistent with the regional geological mapping.

3.4.4 Groundwater Conditions

Regionally, horizontal groundwater in the overburden deposits is anticipated to flow towards the Mendenhall River, east of the site. Groundwater was not encountered in any of the test pits excavated (maximum depth of excavation 2.4 metres).

3.4.5 Contaminant Considerations

Nine soil samples and one water sample were obtained from the Mendenhall River site. The background soil sample was collected north of Site 18, in an undisturbed area on the north side of the highway.

Six soil samples were collected from shallow hand-auger boreholes in and around debris areas at the former military camp. Samples were submitted for analyses of inorganic elements, PCBs, BTEX, TEH, TVH, and pesticides, as deemed appropriate. All measured concentrations were below the applicable remediation criteria. Low concentrations of extractable hydrocarbons were measured in Samples 18-BH2-0.2 (25 ppm) and 18-BH4-0.1 (9.6 ppm). In Sample 18-BH2-0.2, volatile hydrocarbons were also measured at low concentrations. This sample was collected downgradient of the debris pile near the south side of the site, in an area that appeared to contain several square seepage pits. The location of Sample 18-BH4-0.2 was adjacent to a wooden structure, partially embedded in the riverbank.

An area of standing water west of the large debris pile at the south side of the site was sampled (18-SW), and submitted for analyses of inorganic elements and organic compounds including BTEX, TPH, TEH, PAH, PCB, pesticides. Measured concentrations of all inorganic elements were below CCME freshwater aquatic life criteria with the exception of zinc, which was measured at a concentration slightly greater than the criteria. No organic compounds were detected.

The remaining three soil samples were collected from subsequent test pit excavations in the area of the former retail fuel outlet. Sample 18-TP4-2.0, was retrieved from test pit TP4, the suspected location of the former underground fuel storage tank. PID readings for this sample ranged from 385 ppm to 403 ppm as measured in air. The sample was submitted for analyses of lead, TEH, BTEX, TPH and PAH. A TEH concentration of 2500 ppm was measured; however, only low concentrations of volatile hydrocarbon compounds were detected. The measured TEH concentration likely represents diesel

fuel in the soil. Several PAH compounds were detected, with measured concentrations below remediation criteria. Lead was measured at a concentration of 16 ppm, well below CCME R/P remediation criteria.

Two samples, 18-TP1-1.2 and 18-TP5-1.1, collected from test pits which contained various types of debris were submitted for inorganic element analyses. PID measurements recorded for the samples collected from the test pits were very low. Hydrocarbon in soil was not suspected and only inorganic element concentrations were measured. Reported inorganic element concentrations were well below CCME R/P criteria.

The remaining building foundation at the site appeared to contain fibrous material. A sample of the foundation was submitted for bulk sample analysis of asbestos content. The results of the analysis did not detect the presence of any asbestos in the sample collected.

4.0 INTERPRETATION OF ANALYTICAL RESULTS

This section provides an interpretation of the field and laboratory analytical programs as related to the identification of potential environmental risk associated with the sites investigated. A discussion of the background and remediation criteria used is also presented.

4.1 BACKGROUND CONDITIONS

Background inorganic element conditions were estimated from the analyses of a soil sample (18BH10-0.2) collected in the vicinity of the Mendenhall River site, on the north side of the Alaska highway. The limited scope of the analytical program did not allow for a detailed assessment of background conditions at each of the four sites investigated. Analyses of organic contaminants was not carried out on the background sample. The assumption was made that organic chemical products present at greater than the detection limit in assessment samples would imply some environmental impact due to past operations.

In Table 4.1, the results of the inorganic element analyses of the background sample are compared with CCME Assessment and Residential/Parkland (R/P) Remediation Criteria.

TABLE 4.1 BACKGROUND INORGANIC ELEMENT CONCENTRATIONS (ppm)			
Inorganic Element	CCME Assessment Criteria	CCME R/P Remediation Criteria	Background Sample 18BH-10-0.2
Silver	2	20	<1
Barium	200	500	555
Beryllium	4	4	<1
Cadmium	0.5	5	<0.5
Cobalt	10	50	15
Chromium	20	250	54.8
Copper	30	100	42
Molybdenum	2	10	<1
Nickel	20	100	39
Lead	25	500	15
Tin	5	50	<5
Strontium	---	---	89
Thallium	0.5	---	<1
Vanadium	25	200	60
Zinc	60	500	95.9

R/P = Residential/Parkland

Assessment criteria for inorganic elements generally represent average concentrations based on a variety of site conditions and are to be used as a guide only. Site specific geologic influences are not addressed.

Background concentrations were elevated above CCME Assessment Criteria for a number of elements, including barium, cobalt, chromium, copper, nickel, vanadium and zinc, and may be indicative of the geological setting of the area. All inorganic element concentrations were below CCME R/P criteria, with the exception of barium. Barium is usually associated with potassium-bearing minerals and is reported to be relatively immobile. Barium is not essential to plants; however, concentrations in the 10 000 to 20 000 ppm range are considered to be toxic. The concentration detected in Sample 18-BH10-0.2 is significantly below this range.

A background water sample was not obtained for this study. Generally, measured concentrations of analytes were compared to CCME Remediation criteria for freshwater aquatic life.

4.2 SITE 15 - TAKHINI MILE - MILE 936

The former facilities at the military camp at Mile 936 have been demolished and disposed of. No evidence of contamination (soil staining, leachate, stressed vegetation) was observed during the 1996 site investigation, which is consistent with observations made by Mr. Kolaritsch, the current land owner.

Analyses of soil samples taken from this site measured inorganic elements concentrations below CCME R/P criteria. One soil sample was analyzed for organo-chlorine pesticides and PCBs. Measured concentrations of the organic constituents were below method detection limits.

There do not appear to be any significant environmental impacts as a result of the former military camp operation at this site based on this preliminary assessment.

4.3 SITE 16 - TAKHINI RIVER - MILE 946

One wood frame building remains from the former military camp situated at Mile 946. Near the former camp site, some debris was found in the river, and within the riverbank. A dump site, located approximately two kilometres east of the camp, is anticipated to have been associated with the camp operations. (pers. comm. Mr. Kolaritsch).

Analyses of soil samples taken from the river sediment and from the dump site measured inorganic element concentrations below CCME R/P criteria. The sediment sample (TR16-SS1) was also analyzed for BTEX, extractable hydrocarbons, PCBs, PAHs and organo-chlorine pesticides. All organic parameters, with the exception of one PAH compound (naphthalene), were below detection limits. Naphthalene was detected at a concentration of 0.02 ppm, well below CCME R/P remediation criteria. **This measured concentration is very low and at the method detection limit. It does not represent a significant environmental impact.**

A sample representing surface water runoff from the main camp area was tested for inorganic elements, PCBs and pesticides. All measured concentrations were below respective detection limits.

A paint sample (TR16-PA1) from the existing structure was analyzed for metals and PCBs. Chromium, nickel, lead and zinc concentrations were high and PCBs were detected at a concentration of 5.8 ppm. These concentrations are typical of industrial grade paints used in the 1940s to 1960s.

Overall, there do not appear to be significant environmental impacts at this site as a result of former military camp operations.

4.4 SITE 17 - STONY CREEK - MILE 956 AND 956.8

Site 17 is comprised of three areas, a former U.S. Military Maintenance Facility (Site 17M and Site 17E) and the Canol Pump Station B (Site 17C).

Three soil samples, obtained from the maintenance camp area were submitted for analyses. One sample, 17-SS1, taken to investigate surface staining, was found to have slightly elevated concentrations of lead and zinc, but concentrations were below CCME R/P remediation criteria. Eight of the PAH compounds were detected; however all were below comparative remediation criteria. **It is suspected that the surface staining may be the result of localized waste oil spills in the area.**

A second sample, 17M-BH4-0.2, obtained from a pit area, was also found to contain very low levels of PAH constituents. **The source of the PAH contamination could not be ascertained.**

The third soil sample, 17M-TP1-0.6 was collected from test pit, TP1, excavated in an area identified as potentially anomalous during the EM 31 geophysical survey. Measured zinc and copper exceeded CCME R/P criteria. The source of zinc and copper was not readily apparent; however, it is suspected that it may be the result of surface water percolation and resultant leaching from metal debris within the area. **The extent of contamination is likely to be localized in the area of waste disposal.**

Two surface water samples were collected from the main camp area, one from a stagnant pond of water, the second from a drainage channel which feeds into Stony Creek. In the sample taken from the pond/slough, concentrations of several inorganic elements, aluminum, barium, manganese, phosphorous, and zinc, were elevated and were above freshwater aquatic life criteria (where criteria have been established). **The source of the elevated concentrations of inorganic elements was not apparent.** No organic compounds were detected.

A representative sample of the insulation material, analyzed for asbestos content, was found to contain chrysotile asbestos.

At the Canol Pump Station, two soil samples were taken in areas likely to have been impacted by past use. Low concentrations of PAHs and total volatile compounds were detected in the sample nearest the pump house, 17C-BH2-0.2. No other parameters were identified as being of concern. **The source of the PAH compounds in the soil was not readily apparent. As PAH compounds were detected in the vicinity of the pumphouse, it is suspected that surrounding soils affected by PAH compounds may exist at other locations.**

4.5 SITE 18 - MENDENHALL RIVER - MILE 968

Site 18 was the location of a former U.S. Military Maintenance Facility and, more recently, was the site of a former retail fuel outlet. The former retail fuel outlet was located adjacent to the highway.

Six soil samples were collected from the maintenance facility area and were submitted for laboratory analyses. In two of the six samples tested, measured concentrations of specific parameters indicated limited impact. One sample, 18-BH2-0.3, taken to investigate potential seepage downgradient of a debris pile, was found to contain low concentrations of extractable and volatile hydrocarbons. A second sample, 18-BH4-0.1, adjacent to a wooden structure, was also found to contain low concentrations of extractable hydrocarbons below Yukon Remediation Criteria. **The low concentrations do not appear to pose a significant environmental risk to this area.** However, further investigation is required to determine whether extractable and volatile hydrocarbon concentrations in the soil form part of a more highly impacted area.

Measured concentrations of inorganic and organic parameters, in a surface water sample collected from a slough at the main site, showed no parameter concentrations were above remediation criteria, with the exception of zinc. Measured concentrations of zinc were elevated slightly above CCME Freshwater Aquatic Life Criteria.

5.0 PRELIMINARY QUALITATIVE ENVIRONMENTAL RISK ASSESSMENT

The assessment of environmental risk may be evaluated on the basis of the following three components:

- physical or public safety hazards;
- human health risks;
- ecological risks.

This section describes the primary considerations for each of the three components, and relates these to the conditions encountered at the four sites investigated along the Alaska Highway. The preliminary assessment presented in this section does not constitute a comprehensive risk assessment for each site under investigation. The assessment is qualitative and not quantitative.

Physical/Public Safety Hazards: Safety is the condition of being secure from undergoing or causing injury or loss, and may generally be referred to as the prevention of "slip-trip-fall" type injuries. As access to these areas is generally uncontrolled, and in some cases, public use is encouraged (i.e. campground facilities), the identification of physical hazards, and the required protection methods is to be included in the assessment of environmental risk.

Assessment of Human Health Risk includes the characterization of type, concentration, and extent of contamination, identification of exposure pathways, and evaluation of the likelihood of exposure impact.

The primary objective of the site investigation was to identify and characterize the types of contaminants present, as described in Section 4.0. To adequately assess site related risks, all potential pathways that allow contaminant migration must be addressed. These pathways include:

- Air: inhalation of volatiles and fine particulates; dermal contact; settling at other locations.
- Soil: ingestion of soil; impacted soils may release contaminants over time, or when disturbed.

- Ground and surface water: consumption of contaminated drinking water.
- Biological: ingestion of bioaccumulative, persistent organic contaminants in food sources.

Ecological Risk relates to the potential adverse impacts on overall ecosystem health, and correspondingly, the ability of the ecosystem to sustain itself. Evaluation of the risk includes a visual assessment of the use of the area by wildlife, direct signs of impacts such as the presence of dead or stunted vegetation, and identification of the potential for migration of contaminants.

The focus of the qualitative risk assessment is the determination of the availability of receptors and the likelihood of impact at each site under investigation.

5.1 SITE 15 - TAKHINI MILE - MILE 936

The facilities from the former U.S. military maintenance facility (CAM 1W) have been removed and disposed of. Debris is present at the main site area, some of which is attributable to current land use. The general site areas has been regraded by the current land owner. Scattered debris is present around the former dump site located east of the former Camp 1W. No obvious signs of contamination were observed during the site investigation or measured in soil samples submitted for analyses.

Public Safety Risk

Scattered debris in the vicinity of the dump site presents a low risk, due to the small volumes and relative inaccessibility. Mr. Kolaritsch has blocked access to the dump site to prevent continued dumping in this area.

Human Health Risk

No obvious signs of contamination were evident at this site. As a result, soil sampling was limited to localized suspect areas. Contamination was not detected in the soil samples submitted to the laboratory for analyses.

No surface water or groundwater samples were collected at this site. Mr. Kolaritsch indicated that his groundwater wells are installed at depths greater than 25 metres. Due to the thickness of relatively impermeable soils, groundwater has not likely been impacted by past operations.

The results of this preliminary investigation did not provide any evidence for human health risks at the Takhini Mile Site. The human health risk at both the former Camp 1W and associated dump site is considered insignificant at this time.

Ecosystem Health Risk

There was no evidence to support any impacts on the local ecosystem.

To reduce any present or future public safety or health risks at the dump site, it is recommended that the existing debris be managed on site in an appropriate manner and a gate be installed to prevent inadvertent access and dumping of waste.

5.2 SITE 16 - TAKHINI RIVER - MILE 946.4

The facilities from the former U.S. military maintenance facility have been removed and disposed of, with the exception of one building. The building is on blocks and is in poor condition. Debris is present at the surface and in the bank of the Takhini River. This site is used as a campground along the Takhini-Mendenhall River canoe route. Scattered debris is found around the former dump site located east of the former facility. No obvious signs of contamination (soil staining, leachate, vegetation stress) were observed at the time of the site investigation at either location.

Public Safety Risk

The Takhini site is frequently visited by tourists. Scattered debris in the vicinity of the Takhini River and the building in poor structural condition present a moderate risk to public safety.

Human Health Risk

No obvious signs of environmental impact were evident at this site. The limited soil sampling program focused on suspected waste disposal areas. The measured concentrations in soil and water of specific chemical parameters are not of concern.

PCBs and high concentrations of metals were measured in the sample of paint taken from the remaining building. These constituents are relatively immobile under static conditions; however, improper disposal or burning of these materials may pose a human health risk.

The results of this preliminary investigation did not provide any evidence for human health risks at the Takhini River Site.

Ecosystem Health Risk

The presence of metal debris in the riverbank and on the shoreline appears to present insignificant risks to the local ecosystem at this time. Continued erosion of the riverbank will result in exposing additional waste materials over time, and may increase risk to the ecosystem should potentially hazardous materials be exposed.

5.3 SITE 17 - STONY CREEK AND CANOL PUMP STATION - MILE 956 AND MILE 956.8

Stony Creek bisects the former site into two main areas (17M and 17E). Sites 17M and 17E, at Mile 956 comprised the former U.S. military camp. All facilities from the camp have been demolished, and waste materials are scattered around the site. Asbestos containing materials have also been identified within the surface debris. Localized stained soil areas were observed at Site 17E. Public use of the site appears limited.

No facilities exist at the Canol pump station, Site 17C, other than a concrete foundation.

Public Safety Risk

Although the site likely sees little public traffic, scattered debris in the vicinity of Site 17M presents a moderate risk because of the sharp edges on the scrap metal and protruding nails in the lumber. Asbestos containing material found in some of the surface debris also presents a low to moderate risk to the public.

Human Health Risk

The human health risk attributed to this site was rated as low. None of the surface soil samples collected at Site 17M and 17E were found to contain any constituents, that were analyzed, in excess of remediation criteria; however, measured concentrations of lead and zinc in a sample collected from localized soil staining at Site 17E were found to exceed anticipated background conditions. A TEH concentration of 900 ppm was measured in the same sample.

One subsurface soil sample collected from Site 17E was found to contain copper and zinc in excess of CCME R/P remediation criteria. The zone of elevated concentrations appears to be localized in the waste disposal area.

Human health risks associated with ingestion of soil, dermal contact, or inhalation of particulate or vapour phase contaminants are low given the current conditions at the site.

The results of this preliminary investigation did not provide any significant risk to human health at the Stony Creek and Canol Sites.

Ecosystem Health Risk

Ecosystem health risk is considered to be very low for this site.

At Site 17M, a water sample taken from a slough, contained elevated concentrations of several inorganic elements, some of which were slightly in excess of freshwater aquatic life criteria. This surface water was stagnant and contained some suspended sediments. The sample collected likely does not represent actual chemical conditions. Exceedance of CCME Freshwater Aquatic life criteria in the stagnant water body are not of concern at this time. Resampling and analyses is recommended to verify previously reported results.

5.4 SITE 18 - MENDENHALL RIVER

Site 18 includes the abandoned U.S. military camp, and former retail fuel outlet. All facilities from the camp and retail fuel outlet have been demolished, and waste materials are scattered around the site. The site is currently used as a campground along the Takhini-Mendenhall canoe route. The presence of a campsite at Mendenhall River provides the potential for extended human exposure to surface debris. The identified hydrocarbon contamination in the subsurface near the Mendenhall River is cause for concern.

Public Safety Risk

The Mendenhall site is frequently visited by tourists. Scattered debris throughout the campground and along the river valley represents a low to moderate public safety risk.

Human Health Risk

The human health risk attributed to this site is considered low. None of the surface soil samples collected at main camp were found to contain any constituents in excess of remediation criteria. One subsurface soil sample, taken from the suspected location of the former underground storage tank site at the retail fuel outlet was found to contain TEH at a concentration of 2500 ppm at a depth of 2 metres. Several PAH compounds were detected in the same sample, but the measured concentrations were below CCME R/P/BCMOE Level B remediation criteria.

Human health risks associated with ingestion of soil, dermal contact, or inhalation of particulate or vapour phase contaminants are low given that the hydrocarbon contamination identified at the retail fuel outlet site was measured at 2 metres below ground surface.

No groundwater investigations were conducted as part of the preliminary assessment. Further investigation through the installation of monitoring wells is required to determine whether hydrocarbon constituents have migrated vertically to the groundwater table. The relationship between the Mendenhall River and the groundwater flow system in the overburden also requires investigation.

Ecosystem Health Risk

At this time, it is unknown whether hydrocarbon constituents have migrated into the Mendenhall River via groundwater and whether any impacts to the Mendenhall River ecosystem have or will occur. Further investigation in affected areas will be required.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The recommendations for cleanup and/or further assessment at the four former U.S. military sites investigated, have been based on observations of the site conditions during the 1996 investigation, interpretation of analytical data and a preliminary qualitative assessment of public safety issues and potential environmental risk, as described in the preceding sections. The sites have been ranked in priority, relative to each other for cleanup and/or further assessment requirements, as follows:

- Site 18 - Mendenhall River
- Site 17 - Stony Creek and Canol Pump Station
- Site 16 - Takhini River
- Site 15 - Takhini

Recommendations for cleanup/further assessment at each site are provided in the following subsections.

6.1 SITE 18 - MENDENHALL RIVER - MILE 968

Low to moderate public safety and environmental risks exist at the Mendenhall Site given that the site is used as a campground and the presence of hydrocarbon contamination in the subsurface. Scattered surface debris consisting of sharp metal and construction material are of public safety concern. Significant concentrations of hydrocarbon constituents were measured in soil samples collected from test pits around the former fuel retail outlet. Given that hydrocarbon impacted soil was found at 2 metres below ground surface in TP4, downward vertical movement of hydrocarbon constituents to the groundwater table is possible. If the Mendenhall River is an effluent river (groundwater flowing into the river), there is the potential for the migration and discharge of hydrocarbon constituents into the Mendenhall River. To determine whether there is any risk to the river water quality or ecosystem, further investigation is required.

Based on the results of the preliminary environmental assessment, the following remedial actions and investigations are recommended:

- Collection and disposal/recycling of scattered debris.
- Completion of additional test pitting and test drilling to define the extent and magnitude of hydrocarbon in the soil.
- Installation of up and downgradient monitoring wells from the impacted area to establish horizontal groundwater flow direction and gradients and to facilitate the sampling of groundwater.
- Installation of at least one monitoring well nest to determine vertical groundwater flow direction and gradient.

6.2 SITE 17 - STONY CREEK AND CANOL PUMP STATION

Based on the preliminary assessment of Sites 17M and 17E at Mile 956, environmental risks attributed to this site were considered low. Soil stain areas at Site 17E are localized with elevated concentrations of lead, zinc and TEH. At Site 17M, elevated concentrations of zinc and copper were measured in a soil sample collected at test pit TP1 at a depth of 0.6 m, and elevated concentrations of several inorganic elements were measured in the water sample taken from the slough at Site 17M. It is uncertain whether the water sample collected from the slough is representative due to the amount of suspended sediments included in the sample.

Recommendations for the Site at Mile 956 include:

- Delineation testing of stained areas at Site 17E to confirm the extent and depth, and correspondingly the volume of affected soil. Based on the measured concentrations of metals and TEH, the stained areas should at minimum be capped to prevent aerial transport.
- Collection and analyses of sediments in the slough to confirm the elevated concentrations of inorganic elements measured in the water.
- Resampling of the slough water to verify reported results.
- Collection and disposal of surface debris scattered around the site, with specific attention paid to the proper handling and disposal of asbestos containing materials.

At the Canol Pump Station, one soil sample, 17-BH2-0.2, several PAH compounds were detected; however, no apparent source was ascertained. Although PAH concentrations in this sample were below remediation criteria, **it is recommended that further investigation be conducted to evaluate the extent and magnitude of potential hydrocarbon and PAH contamination.**

6.3 SITE 16 - TAKHINI RIVER - MILE 946.4

The Takhini River site at Mile 946.4 is considered to pose insignificant environmental risk, based on the results of the soil and water analyses of samples collected at this site.

Given the use of this site as a campground, moderate public safety risk is associated with the presence of debris in and around the river. The debris in the riverbank will continue to be eroded during periods of high water flow, exposing additional debris.

The presence of the partially damaged building on site also poses a moderate public safety risk. The building paint was found to contain PCBs as well as high concentrations of several metals. Although no specific human health risks are associated with the paint (metals and PCBs in their current state are relatively immobile), improper disposal or burning of these materials could pose some health risks.

No further assessment is recommended for this site based on the preliminary assessment; however, additional testing in conjunction with the cleanup of the site as outlined below is recommended. **Recommended remedial action for this area includes:**

- Excavation and disposal of debris adjacent to and within the riverbank, and from the river bed. Additional soil samples should be analyzed during the removal of soil and debris from the riverbank to confirm that all waste materials and associated products have been removed. Due to the proximity to the river, precautions must be taken to prevent any environmental impact from the excavation operation.
- Demolition and proper disposal of the remaining building, noting that burning of painted wood materials is not allowed.
- Collection and disposal/recycling of debris scattered around this site.

6.4 SITE 15 - TAKHINI - MILE 936

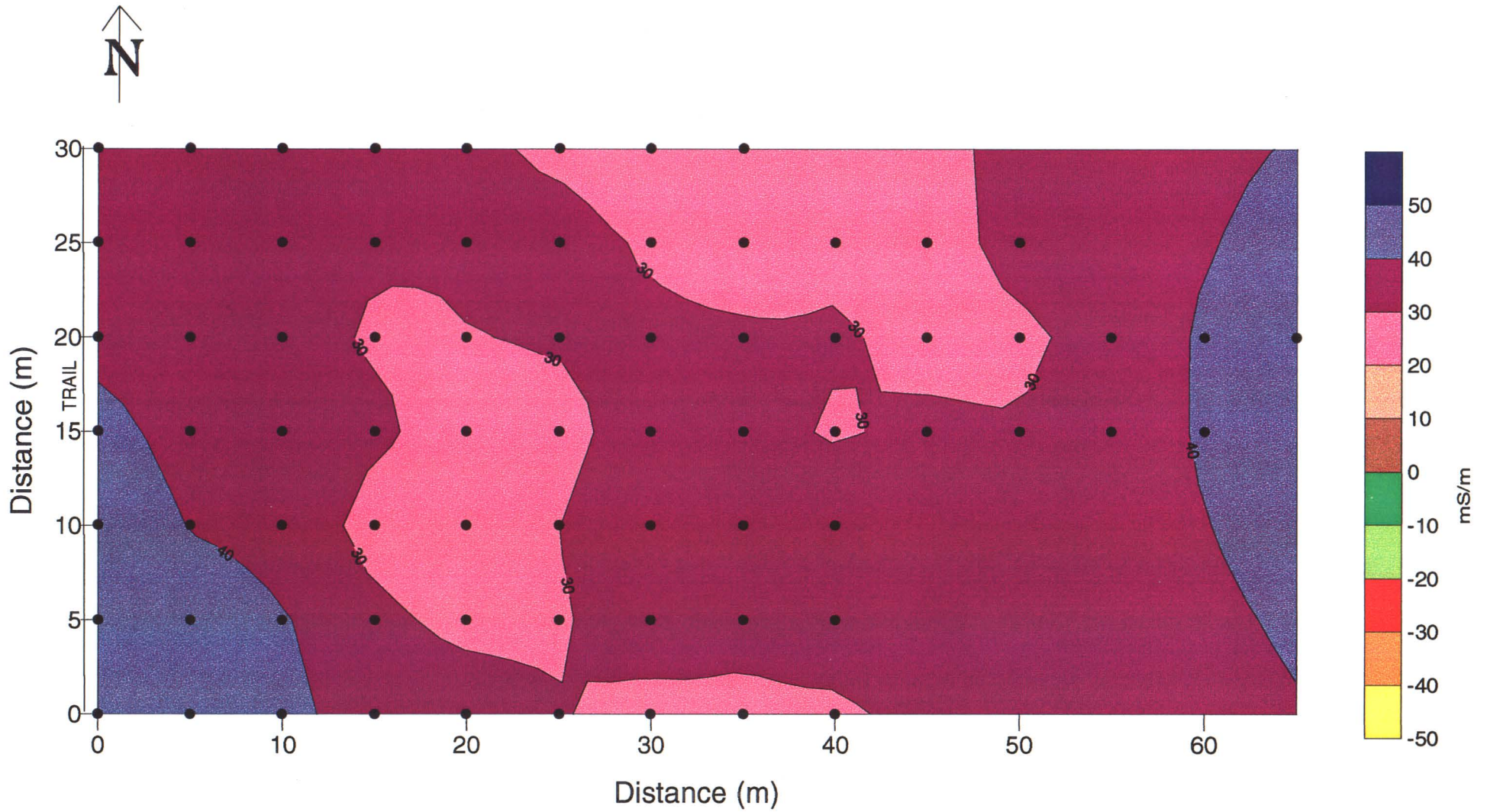
The Takhini site at Mile 936 is considered to pose insignificant risk to the environment, based on the lack of evidence of impact, and on the results of the limited soil sampling program carried out. There is a minimal amount of scattered debris at the dump and at the main site, some of which is attributable to the current land owner. The debris poses minimal risk to public safety given the limited accessibility.

No further investigation is recommended for this site. Cleanup requirements should consider the collection and proper disposal or recycling of waste materials scattered at the dump area and main site. It is also recommended that a gate be installed at the dump site to prevent inadvertent access and dumping of waste.

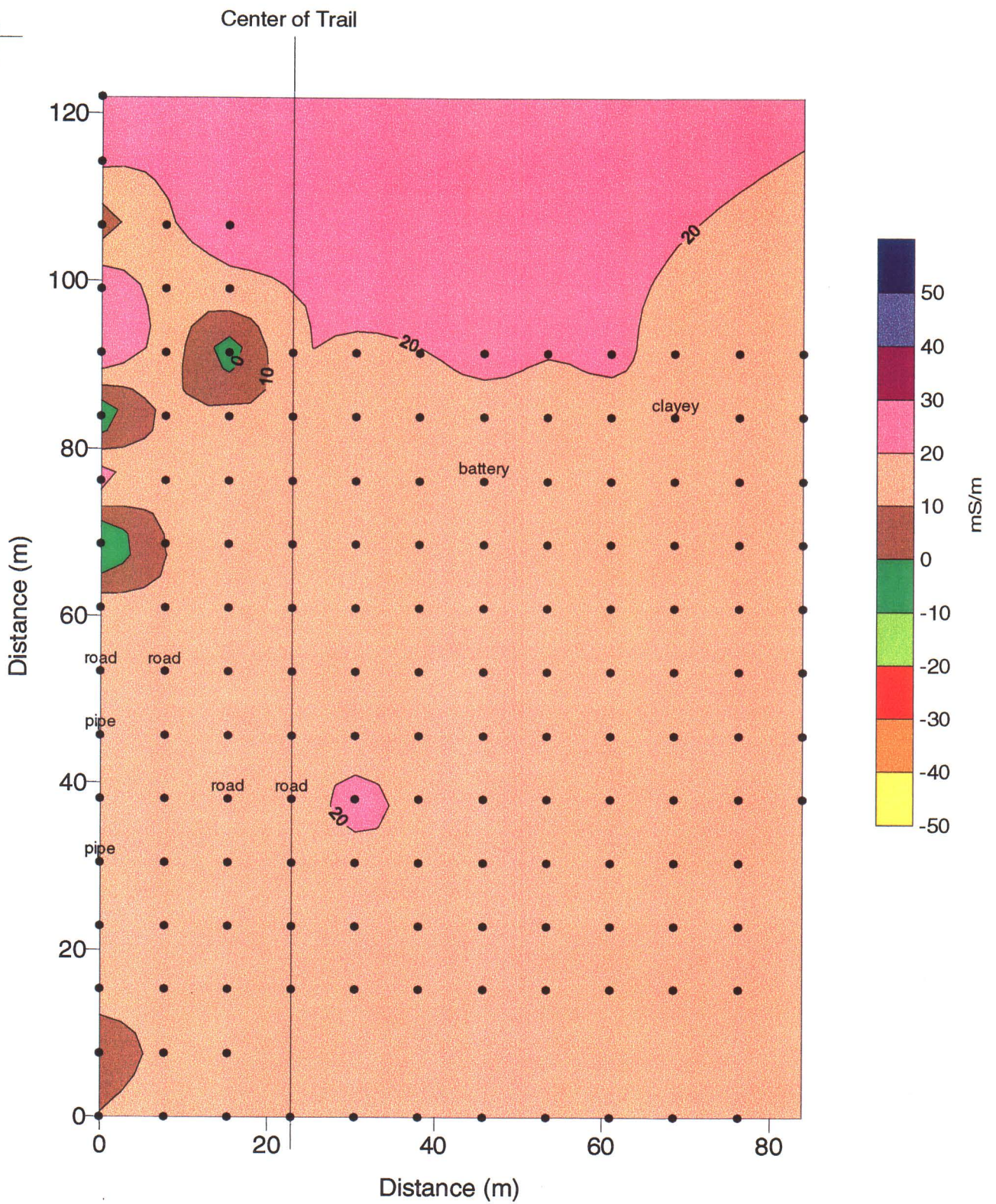
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3. CCME, 1991. CCME Interim Canadian Environmental Quality Criteria for Contaminated Sites. Report CCME EPC-CS34.
4. DIAND, 1996. Contract 96-6127. Historical Information for Sites 15, 16, 17 and 18.
5. Geology of Whitehorse, Yukon Territory; Geological Survey of Canada, Department of Mines and Technical Surveys, 1961. Map 109 3A.
6. Geological Map of Yukon Territory; Geological Survey of Canada, Department of Mines and Technical Surveys, 1957. Map 104 8A.
7. Kolaristch, September 1996 (personal communication).
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9. Yukon Community and Transportation Services, Transportation Engineering Branch. Alaska Highway km 1018 to km 1616, Drawings 82/101, 85/101.
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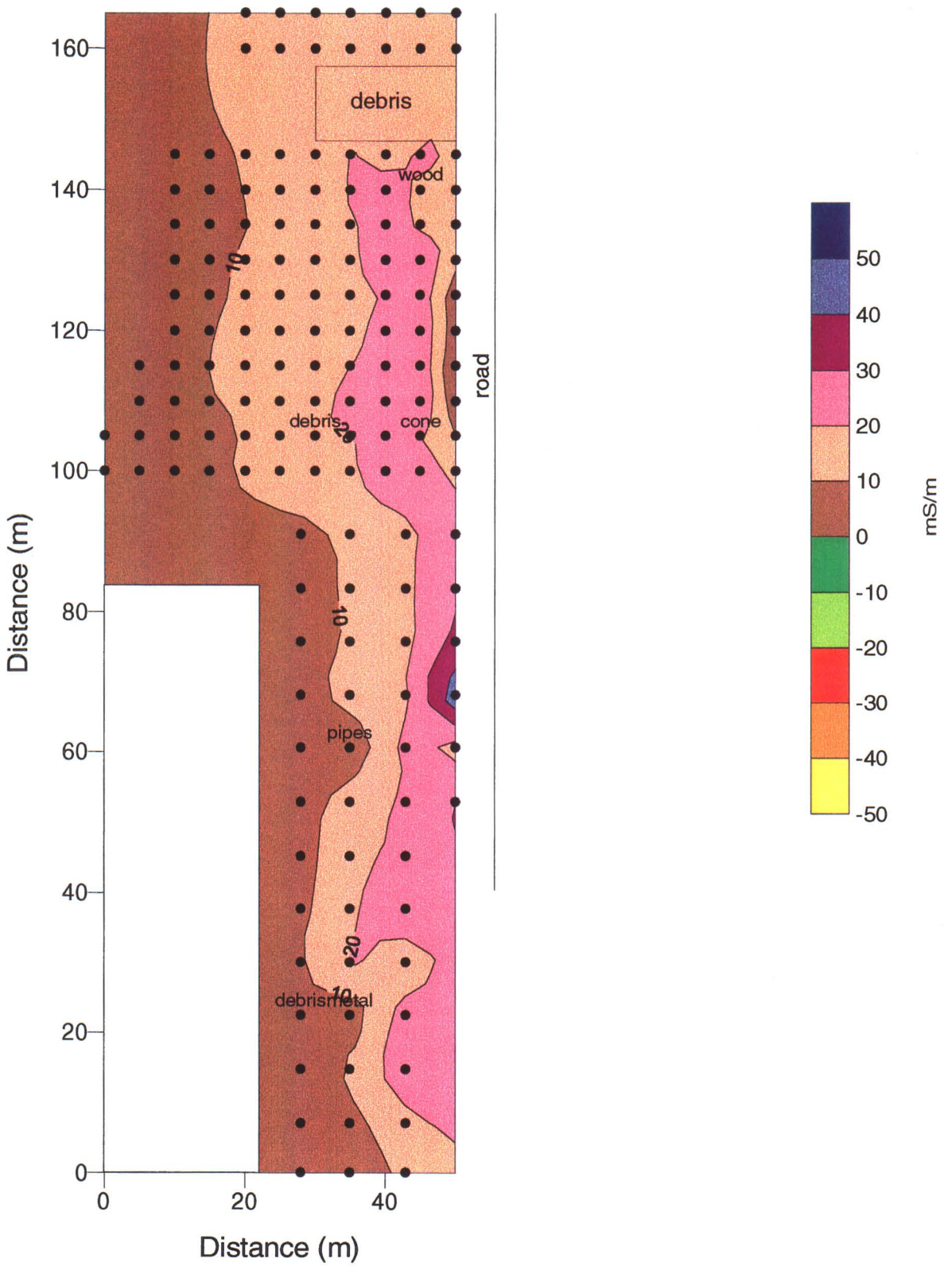
APPENDIX A
EM-31 GEOPHYSICAL RESULTS



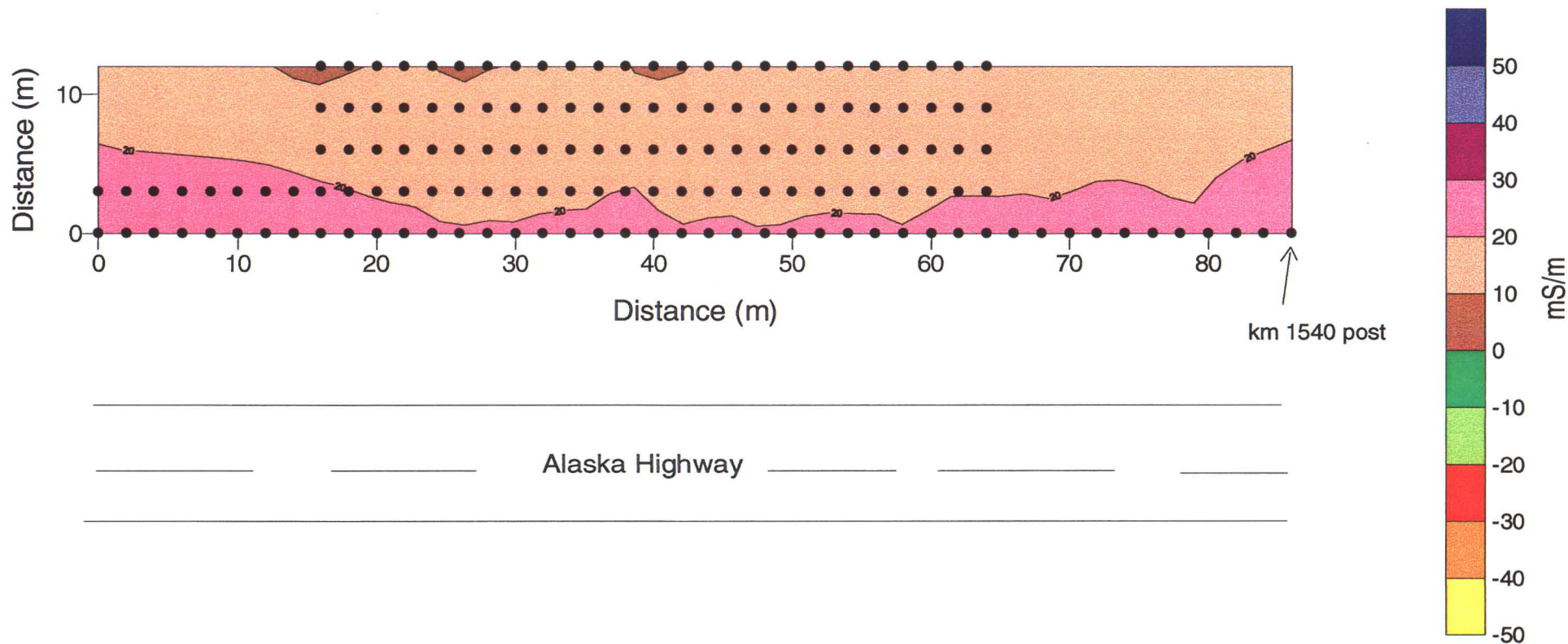
Preliminary Environmental Assessment,
 DIAND Yukon
 Site 16 - Takhini River Dump Site
 EM31 Survey Grid
 Figure A.1



Preliminary Environmental Assessment,
 DIAND Yukon
 Site 17M - Stony Creek - Site Area
 EM31 Survey Grid No. 1
 Figure A.2



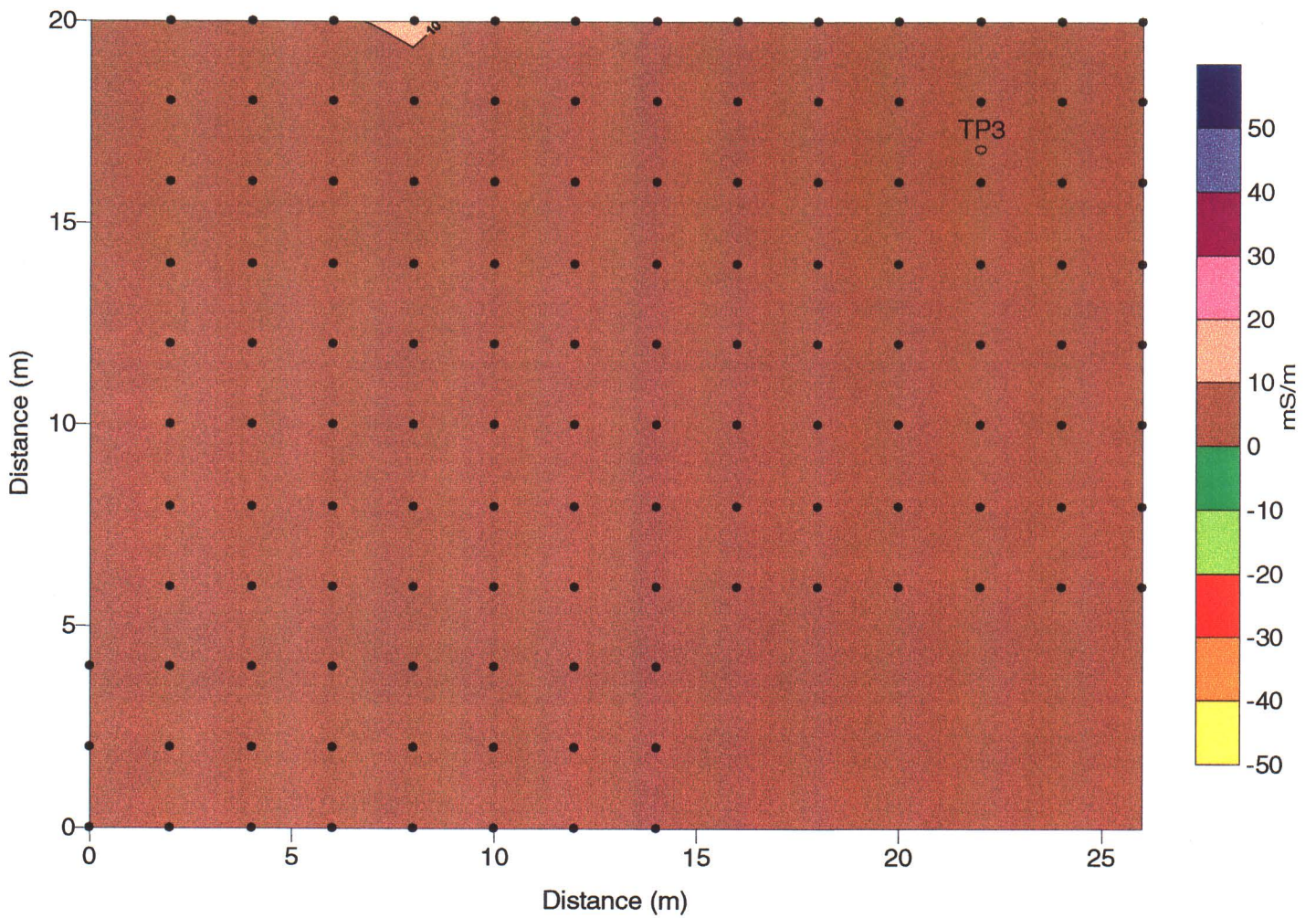
Preliminary Environmental Assessment,
DIAND Yukon
Site 17M - Stony Creek - Top of Ridge
EM31 Survey Grid No. 2
Figure A.3



Preliminary Environmental Assessment,
DIAND Yukon
Site 17C - Canol Pump Station
EM31 Survey Grid No. 1
Figure A.4



Canol Pumphouse Foundation

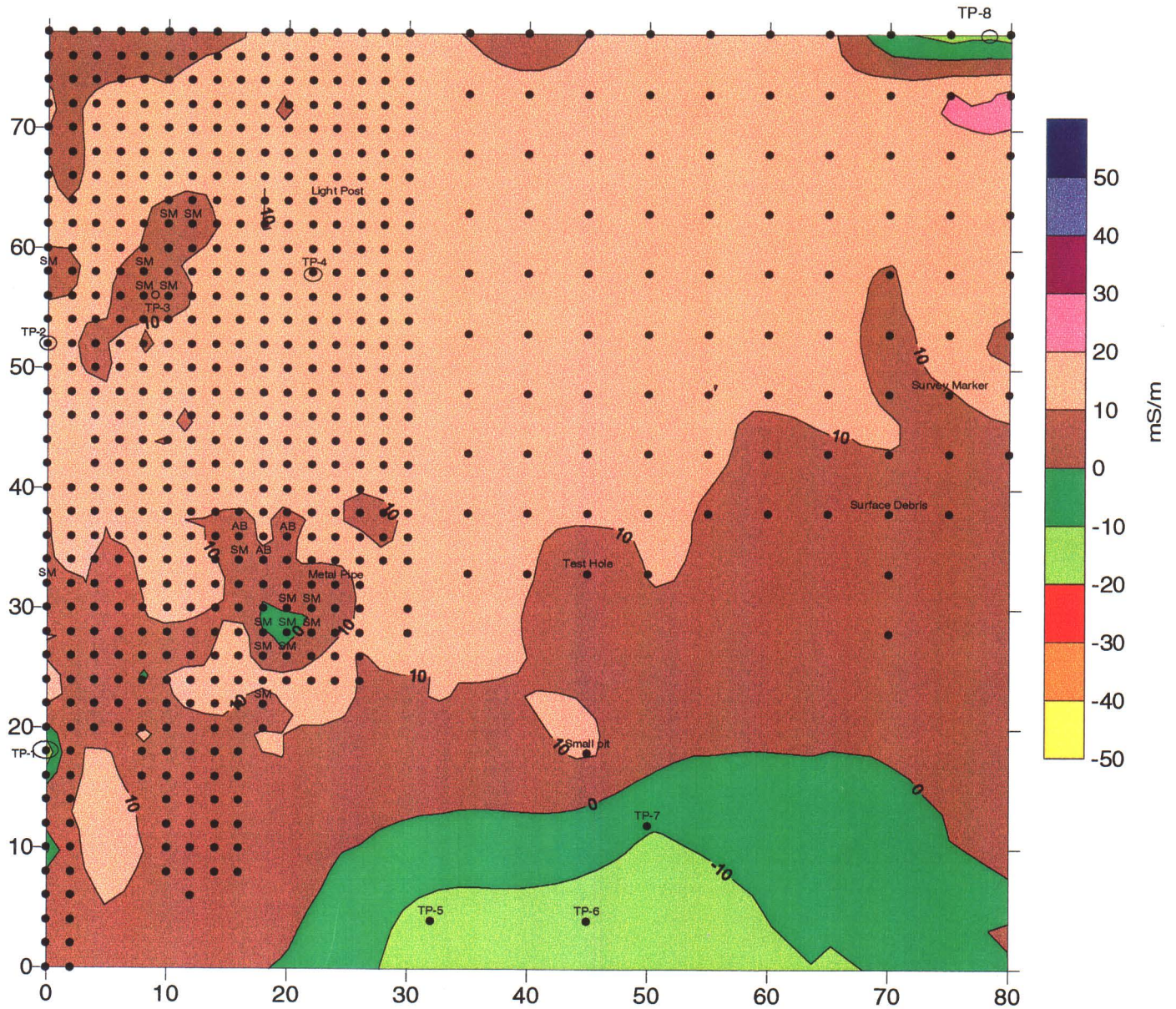


TP - Test Pit

Preliminary Environmental Assessment,
DIAND Yukon
Site 17C - Canol Pump Station
EM31 Survey Grid No.2
Figure A.5



Alaska Highway



SM - Surface Metal
AB - Abandoned Building
TP - Test Pit

Preliminary Environmental Assessment,
DIAND Yukon
Site 18 - Mendenhall River
EM31 Survey Grid No. 1
Figure A.6



APPENDIX B
TEST PIT LOGS AND SOIL SAMPLE DESCRIPTIONS

Site 15 - Takhini Mile - Mile 936

Sample #	Depth (m)	Sample Description	Comments
15-SS1	Surface	Sand, fine, dry, brown	Taken between earth mounds of former Camp 1W - area has been disturbed by the present landowner
15-BH-1	0.3	Sand, fine, dry, medium dense	Metal cans in area

Site 16 - Takhini River - Mile 946

Sample #	Depth (m)	Sample Description	Comments
TR16-SS1	Surface	sediment at riverbank	In centre of 31 m wide debris zone
TRD16-BH-1	0.1	Silt, fine sand, dry, brown	Centre of dump area
TRD16-SS1	Surface	Silt, fine sand, dry, brown	

Site 17 - Stony Creek - Mile 956

Sample #	Depth (m)	Sample Description	Comments
17M-BH-1	0.3	Silty sand, brown, moist to wet	Near trail to creek
17M-BH-2	0.3	Silt, some sand, brown	Near creek, north of site
17M-BH-3	0.3	Silt, brown, dry to damp	Uphill from slough near crossing road
17M-BH-4	0.2	Clayey silt, damp, brown	In pit, upper access road where it hits the upper plateau

Site 17 - Stony Creek - Mile 956.8

Sample #	Depth (m)	Sample Description	Comments
17C-BH-1	0.3	Sand, fine, dense, dry, light brown	
	0.6	Sand, fine, dense, dry, light brown	
17C-BH-2	0.3	Sand, some silt, dense, dry, grey	
	0.6	Sand, some silt, dense, dry, grey	
	1.0	Sand, some silt, dense, dry, grey	
17C-BH-3	0.3	Sand, very fine, dense, dry, light brown	

Site 18 - Mendenhall River - Mile 968

Sample #	Depth (m)	Sample Description	Comments
18-BH-1	0.3	Fine-grained sand, trace silt, loose, light brown, dry	Located at base of debris at south end of site
	0.6	Coarse-grained sand, trace silt, dry	
18-BH-2	0.2	Fine-grained sand, trace silt	Possible seepage pit
	0.3	Fine-grained sand, trace silt	
18-BH-3	0.5	Fine-grained sand, some silt	
18-BH-4	0.1	Silty, some clay, wet	Beside square box alongside river
	0.6	Silty, some clay, wet	
18-BH-5	0.1	Fine-grained sand, reddish colour, dry, small amount of grey ash	Wood debris and broken glass around borehole
18-BH-6	0.5	Silt, some sand, grey, compact, grey	Inside concrete foundation
18-BH-7	0.3	Fine-grained sand, dry, some scrap metal, brown, uniform	Debris covered area
18-BH-8	0.6	Fine-grained sand, uniform, grey, medium compact	Pit area
18-BH-9	0.1	Sand, grey, dry, loose	On west side in front of plywood planks
18-BH-10	0.2	Sand, dry, fine, brown	83 m north of Highway centreline

Client: AES - DIAND, YUKON Project: PRELIMINARY ENV. ASSESSMENT TEST PIT NO: TP-1

Location: STONY CREEK MAIN - SITE 17M PROJECT NO: 4440-035-00-02

Location: MILE 954 Drilling Method: BACKHOE ELEVATION:

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON A-CASING NO RECOVERY CORE

DEPTH(m)	PLASTIC 20 40 60 80	M.C.	LQUID	SOIL SYMBOL	SAMPLE TYPE	SOIL DESCRIPTION	COMMENTS	DEPTH(m)
----------	------------------------	------	-------	-------------	-------------	------------------	----------	----------

0.0						SAND, some silt, gravel and rocks, dry	Sample 17M-TP1-0.6 Tested For: Metals P.I.D. = 0.3 ppm	0.0
1.0								1.0

1.0						SILTY CLAY END OF TEST PIT AT 1.2 m		1.0
-----	--	--	--	--	--	--	--	-----

2.0								2.0
3.0								3.0
4.0								4.0
5.0								5.0

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REVIEWED BY: TMS

Fig. No: 1

COMPLETION DEPTH: 1.2 m

COMPLETE: 96/09/22

Page 1 of 1

Client: AES - DIAND, YUKON	Project: PRELIMINARY ENV. ASSESSMENT	TEST PIT NO: TP-2
Location: STONY CREEK MAIN - SITE 17M		PROJECT NO: 4440-035-00-02
Location: MILE 954	Drilling Method: BACKHOE	ELEVATION:

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON A-CASING NO RECOVERY CORE

DEPTH(m)	SOIL SYMBOL	SAMPLE TYPE	SOIL DESCRIPTION	COMMENTS	DEPTH(m)
0.0			ORGANICS		0.0
			CLAY, silty grey-brown - dry to damp		
1.0					1.0
2.0					2.0
3.0			END OF TEST PIT AT 2.7 m DRY, HARD DIGGING		3.0
4.0					4.0
5.0					5.0

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Fig. No: 2

COMPLETION DEPTH: 2.7 m

COMPLETE: 96/09/22

Page 1 of 1

Client: AES- DIAND, YUKON Project: PRELIMINARY ENV. ASSESSMENT TEST PIT NO: TP-3

Location: STONY CREEK CANOL - SITE 17C PROJECT NO: 4440-035-00-02

Location: MILE 954 Drilling Method: BACKHOE ELEVATION:

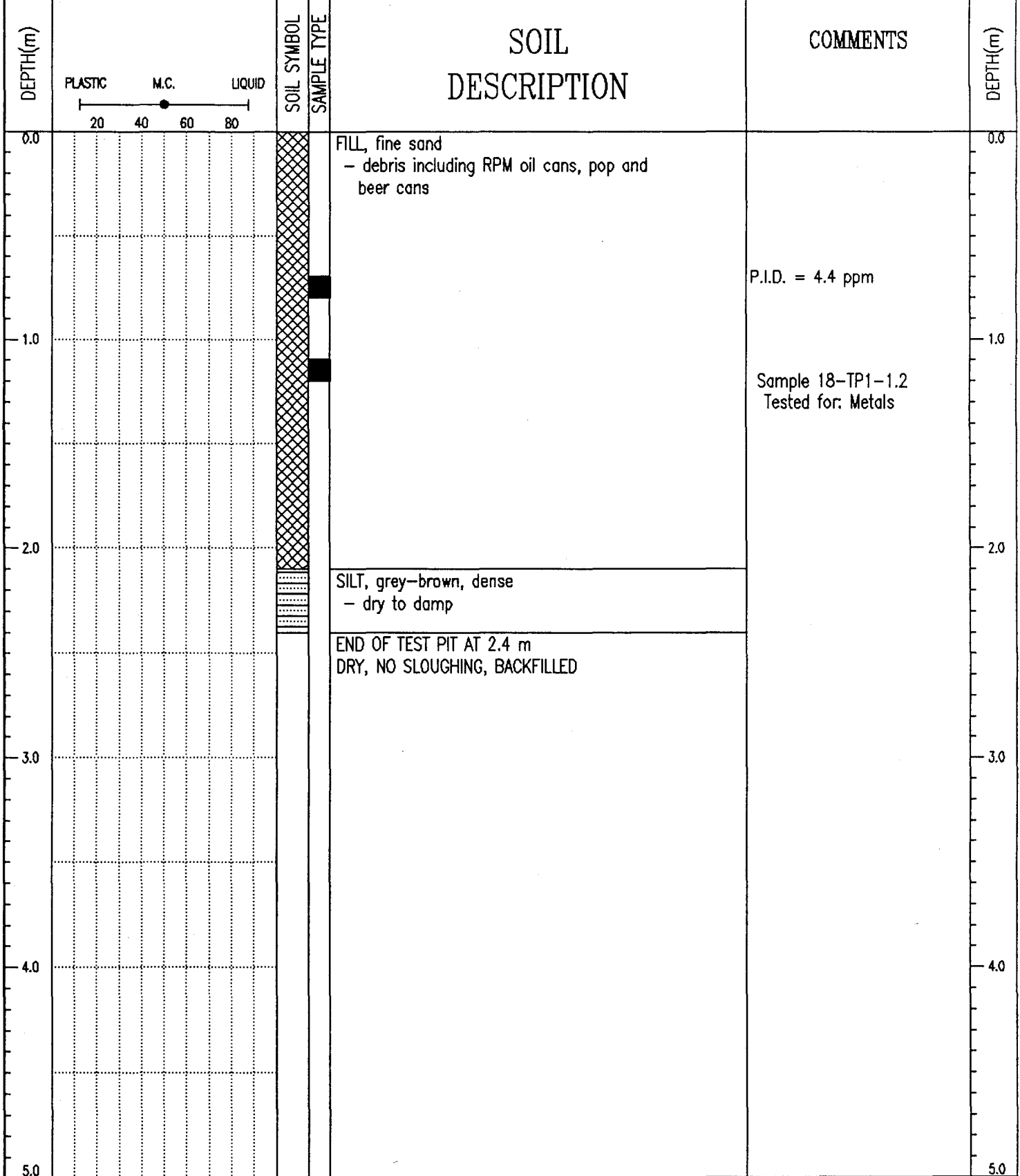
SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON A-CASING NO RECOVERY CORE

DEPTH(m)	PLASTIC	M.C.	LIQUID	SOIL SYMBOL	SAMPLE TYPE	SOIL DESCRIPTION	COMMENTS	DEPTH(m)
0.0	20	40	60	80		SAND AND GRAVEL		0.0
						SAND, silty, fine - damp, dense, light brown		1.0
1.0								1.0
						END OF TEST PIT AT 1.5 m DRY, NO SLOUGHING		2.0
2.0								2.0
								3.0
3.0								3.0
								4.0
4.0								4.0
								5.0
5.0								5.0

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LOGGED BY: EMS	COMPLETION DEPTH: 1.5 m
REVIEWED BY: TMS	COMPLETE: 96/09/22
Fig. No: 3	Page 1 of 1

Client: AES - DIAND, YUKON	Project: PRELIMINARY ENV. ASSESSMENT	TEST PIT NO: TP-1
Location: MENDENHALL RIVER - SITE 18		PROJECT NO: 4440-035-00-02
Location: MILE 968	Drilling Method: BACKHOE	ELEVATION:
SAMPLE TYPE <input checked="" type="checkbox"/> GRAB	<input checked="" type="checkbox"/> SHELBY TUBE	<input checked="" type="checkbox"/> SPLIT SPOON
	<input type="checkbox"/> A-CASING	<input type="checkbox"/> NO RECOVERY
		<input type="checkbox"/> CORE



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REVIEWED BY: TMS	COMPLETE: 96/09/22
Fig. No: 1	Page 1 of 1

Client: AES - DIAND, YUKON	Project: PRELIMINARY ENV. ASSESSMENT	TEST PIT NO: TP-2
Location: MENDENHALL RIVER - SITE 18		PROJECT NO: 4440-035-00-02
Location: MILE 968	Drilling Method: BACKHOE	ELEVATION:
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB	<input checked="" type="checkbox"/> SHELBY TUBE
	<input checked="" type="checkbox"/> SPLIT SPOON	<input type="checkbox"/> A-CASING
	<input type="checkbox"/> NO RECOVERY	<input type="checkbox"/> CORE

DEPTH(m)	PLASTIC	M.C.	LIQUID	SOIL SYMBOL	SAMPLE TYPE	SOIL DESCRIPTION	COMMENTS	DEPTH(m)
0.0						ORGANIC		0.0
						SILT, grey-brown, trace sand and clay - dry to damp		
1.0								1.0
						END OF TEST PIT AT 1.2 m DRY, NO SLOUGHING, BACKFILLED		
2.0								2.0
3.0								3.0
4.0								4.0
5.0								5.0

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LOGGED BY: EMS
REVIEWED BY: TMS
Fig. No: 2

COMPLETION DEPTH: 1.2 m
COMPLETE: 96/09/22

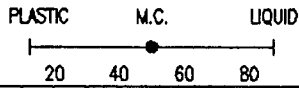
Client: AES - DIAND, YUKON Project: PRELIMINARY ENV. ASSESSMENT TEST PIT NO: TP-3

Location: MENDENHALL RIVER - SITE 18 PROJECT NO: 4440-035-00-02

Location: MILE 968 Drilling Method: BACKHOE ELEVATION:

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON A-CASING NO RECOVERY CORE

DEPTH(m)	PLASTIC	M.C.	LIQUID	SOIL SYMBOL	SAMPLE TYPE	SOIL DESCRIPTION	COMMENTS	DEPTH(m)
----------	---------	------	--------	-------------	-------------	------------------	----------	----------



0.0						ORGANICS, sandy		0.0
						SILT, grey-brown, trace sand and clay - damp, sand pockets		
1.0								1.0
2.0								2.0
3.0								3.0
4.0								4.0
5.0								5.0

END OF TEST PIT AT 1.35 m
DRY, NO SLOUGHING, BACKFILLED

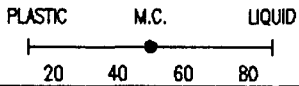
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LOGGED BY: EMS
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Fig. No: 3

COMPLETION DEPTH: 1.4 m
COMPLETE: 96/09/22

Client: AES - DIAND, YUKON	Project: PRELIMINARY ENV. ASSESSMENT	TEST PIT NO: TP-4
Location: MENDENHALL RIVER - SITE 18		PROJECT NO: 4440-035-00-02
Location: MILE 968	Drilling Method: BACKHOE	ELEVATION:
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB	<input type="checkbox"/> SHELBY TUBE
	<input checked="" type="checkbox"/> SPLIT SPOON	<input type="checkbox"/> A-CASING
	<input type="checkbox"/> NO RECOVERY	<input type="checkbox"/> CORE

DEPTH(m)	SOIL SYMBOL	SAMPLE TYPE	SOIL DESCRIPTION	COMMENTS	DEPTH(m)
0.0			ORGANICS, silty, fibrous, brown SILT FILL, some sand, brown - damp, slight hydrocarbon odour		0.0
1.0				P.I.D. = 9 ppm	1.0
2.0			SILT, light grey, chalky texture - strong hydrocarbon odour, damp	Sample 18-TP4-2.0 Tested for: BTEX, TPH, TEH, Pb, PAH P.I.D. = 403 ppm P.I.D. = 385 ppm	2.0
3.0			END OF TEST PIT AT 2.3 m DRY, NO SLOUGHING, BACKFILLED		3.0
4.0					4.0
5.0					5.0



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LOGGED BY: EMS	COMPLETION DEPTH: 2.3 m
REVIEWED BY: TMS	COMPLETE: 96/09/22
Fig. No: 4	Page 1 of 1

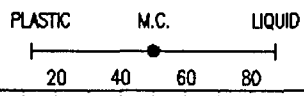
Client: AES - DIAND, YUKON Project: PRELIMINARY ENV. ASSESSMENT TEST PIT NO: TP-5

Location: MENDENHALL RIVER - SITE 18 PROJECT NO: 4440-035-00-02

Location: MILE 968 Drilling Method: BACKHOE ELEVATION:

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON A-CASING NO RECOVERY CORE

DEPTH(m)	SOIL SYMBOL	SAMPLE TYPE	SOIL DESCRIPTION	COMMENTS	DEPTH(m)
0.0			SILT, some sand, dry - Debris encountered including vehicle hulk, tires, vehicle parts, pipes	P.I.D. = nil	0.0
1.0			SILT, grey, moist, trace clay	Sample 18-TP5-1.1 Tested For: Metals P.I.D. = 3.4 ppm	1.0
2.0			END OF TEST PIT AT 1.5 m DRY, NO SLOUGHING, BACKFILLED		2.0
3.0					3.0
4.0					4.0
5.0					5.0



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Fig. No: 5

COMPLETION DEPTH: 1.5 m
COMPLETE: 96/09/22

Client: AES - DIAND, YUKON	Project: PRELIMINARY ENV. ASSESSMENT	TEST PIT NO: TP-6
Location: MENDENHALL RIVER - SITE 18		PROJECT NO: 4440-035-00-02
Location: MILE 968	Drilling Method: BACKHOE	ELEVATION:

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON A-CASING NO RECOVERY CORE

DEPTH(m)		SOIL SYMBOL	SAMPLE TYPE	SOIL DESCRIPTION	COMMENTS	DEPTH(m)
0.0				ORGANIC SILT, clayey fill, brown - Debris encountered including metal wood, two barrels		0.0
1.0				SAND, fine, silty - light grey, damp		1.0
2.0				END OF TEST PIT AT 1.9 m DRY, NO SLOUGHING, BACKFILLED		2.0
3.0						3.0
4.0						4.0
5.0						5.0

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REVIEWED BY: TMS
Fig. No: 6

COMPLETION DEPTH: 1.9 m
COMPLETE: 96/09/22

Client: AES - DIAND, YUKON Project: PRELIMINARY ENV. ASSESSMENT TEST PIT NO: TP-7

Location: MENDENHALL RIVER - SITE 18 PROJECT NO: 4440-035-00-02

Location: MILE 968 Drilling Method: BACKHOE ELEVATION:

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON A-CASING NO RECOVERY CORE

DEPTH(m)	PLASTIC	M.C.	LIQUID	SOIL SYMBOL	SAMPLE TYPE	SOIL DESCRIPTION	COMMENTS	DEPTH(m)
0.0	20	40	60	80		ORGANIC FILL, silty, trace clay - dry, brown - Debris encountered including steel wood, small cans, scrap iron		0.0
1.0						SAND, some silt - grey colour - dense, damp to moist		1.0
2.0						END OF TEST PIT AT 1.5 m DRY, NO SLOUGHING, BACKFILLED		2.0
3.0								3.0
4.0								4.0
5.0								5.0

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Fig. No: 7

COMPLETION DEPTH: 1.5 m

COMPLETE:

Page 1 of 1

Client: AES - DIAND, YUKON Project: PRELIMINARY ENV. ASSESSMENT TEST PIT NO: TP-8

Location: MENDENHALL RIVER - SITE 18 PROJECT NO: 4440-035-00-02

Location: MILE 968 Drilling Method: BACKHOE ELEVATION:

SAMPLE TYPE GRAB SHELBY TUBE SPLIT SPOON A-CASING NO RECOVERY CORE

DEPTH(m)	PLASTIC	M.C.	LIQUID	SOIL SYMBOL	SAMPLE TYPE	SOIL DESCRIPTION	COMMENTS	DEPTH(m)
0.0						SILT, sandy, brown		0.0
						- culvert at 0.7 m		
1.0						END OF TEST PIT AT 0.8 m DRY, NO SLOUGHING, BACKFILLED		1.0
2.0								2.0
3.0								3.0
4.0								4.0
5.0								5.0

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Fig. No: 8

COMPLETION DEPTH: 0.8 m

COMPLETE: 96/09/22

Page 1 of 1

**APPENDIX C
ANALYTICAL DATA**

List of Tables

- 15.1: Site 15 - Takhini Mile - Mile 936 Soil Sample Inorganic Element and PCB Analyses
- 15.2: Site 15 - Takhini Mile - Mile 936 Soil Sample Pesticide Analyses
- 16.1: Site 16 - Takhini River - Mile 946 Soil Samples Inorganic Element, PCB and Hydrocarbon Analyses
- 16.2: Site 16 - Takhini River - Mile 946 Soil Sample Pesticide Analyses
- 16.3: Site 16 - Takhini River - Mile 946 Soil Sample PAH Analyses
- 16.4: Site 16 - Takhini River - Mile 946 Water Sample Inorganic Element, PCB and Hydrocarbon Analyses
- 17.1: Site 17 - Stony Creek - Mile 956 & Mile 956.8 Soil Samples Inorganic Element, PCB and Hydrocarbon Analyses
- 17.2: Site 17 - Stony Creek - Mile 956 & 956.8 Soil Samples Pesticide Analyses
- 17.3: Site 17 - Stony Creek - Mile 956 & 956.8 Soil Samples PAH Analyses
- 17.4: Site 17 - Stony Creek - Mile 956 & 956.8 Water Samples Inorganic Element, PCB and Hydrocarbon Analyses
- 17.5: Site 17 - Stony Creek - Mile 956 & 956.8 - Water Sample Pesticide Analyses
- 17.6: Site 17 - Stony Creek - Mile 956 & 956.8 Water Sample PAH Analyses
- 18.1: Site 18 - Mendenhall River - Mile 968 Soil Samples Inorganic Element, PCB and Hydrocarbon Analyses
- 18.2: Site 18 - Mendenhall River - Mile 968 Soil Samples Pesticide Analyses
- 18.3: Site 18 - Mendenhall River - Mile 968 Soil Sample PAH Analyses
- 18.4: Site 18 - Mendenhall River - Mile 968 Water Sample Inorganic Element, PCB and Hydrocarbon Analyses
- 18.5: Site 18 - Mendenhall River - Mile 968 Water Sample Pesticide Analyses
- 18.6: Site 18 - Mendenhall River - Mile 968 Water Sample PAH Analyses

Table 15.1 - Preliminary Environmental Assessment DIAND Yukon

SITE 15 - TAKHINI MILE - MILE 936 SOIL SAMPLE				
INORGANIC ELEMENT & PCB ANALYSES				
Inorganic Elements	CCME R/P Criteria	Sample Identification		
		TM15-BH1-0.3	TM15-SS1	TM15-SS2 (Dup)
Silver	20	<1	<1	<1
Barium	500	190	421	391
Beryllium	4	<1	<1	<1
Cadmium	5	<0.5	<0.5	<0.5
Cobalt	50	13	18	18
Chromium	250	42.1	63.6	58.9
Copper	100	18	46	42
Molybdenum	10	<1	<1	<1
Nickel	100	31	66	64
Lead	500	10	20	16
Tin	50	<5	<5	<5
Strontium	--	50	133	134
Thallium	--	<1	<1	<1
Vanadium	200	46	64	62
Zinc	500	75.6	92.9	93.6
PCBs	5	--	N.D.	--

All concentrations in mg/kg

Table 15.2 - Preliminary Environmental Assessment DIAND Yukon

SITE 15 - TAKHINI MILE - MILE 936 SOIL SAMPLE			
PESTICIDE ANALYSES			
Organo-Chlorine Pesticides	BC Ministry of Environment Criteria	Alberta Tier I	Sample I.D. TM15-SS1
Total	2		
HCB	0.46		<0.005
Gamma-BHC		0.01	<0.005
Beta-BHC		0.01	<0.005
Alpha-BHC		0.01	<0.005
Ronnel			<0.005
Heptachlor	0.084	0.01	<0.005
Heptachlor Epoxide	0.06	0.01	<0.005
Aldrin	0.05		<0.005
pp-DDE	1.6		<0.005
Dieldrin	0.05		<0.005
pp-DDD	2.2		<0.005
pp-DDT	1.6		<0.005
Methoxychlor	4		<0.005
Mirex			<0.005

All concentrations in mg/kg

Table 16.1 - Preliminary Environmental Assessment DIAND Yukon

SITE 16 - TAKHINI RIVER - MILE 946 - SOIL SAMPLES				
INORGANIC ELEMENT, PCB AND HYDROCARBON ANALYSES				
Inorganic Elements	CCME R/P Criteria	Sample Identification		
		TR16-SS1	TRD16-BH1-0.1	TR16-PAINT
Silver	20	<1	<1	<1
Barium	500	185	234	1610
Beryllium	4	<1	<1	<1
Cadmium	5	<0.5	<0.5	9
Cobalt	50	12	12	148
Chromium	250	28.1	42.7	4290
Copper	100	59	27	90
Molybdenum	10	<1	<1	259
Nickel	100	29	36	233
Lead	500	59	15	66000
Tin	50	<5	<5	<5
Strontium	—	42	79	67
Thallium	—	<1	<1	<1
Vanadium	200	40	50	<1
Zinc	500	137	64.9	19700
PCBs	5	N.D.		5.8
TEH	1000*	<5		
BTEX				
Benzene	0.5	<0.005		
Toluene	3	<0.005		
Ethylbenzene	5	<0.005		
Xylenes	5	<0.005		
Total Volatiles	200*	<0.1		

* Yukon Territory Guidelines

All concentrations in mg/kg

Table 16.2 - Preliminary Environmental Assessment DIAND Yukon

SITE 16 - TAKHINI RIVER - MILE 946 SOIL SAMPLE			
PESTICIDE ANALYSES			
Organo-Chlorine Pesticides	BC Ministry of Environment Criteria	Alberta Tier I	Sample I.D. TR16-SS1
Total	2		
HCB	0.46		<0.005
Gamma-BHC		0.01	<0.005
Beta-BHC		0.01	<0.005
Alpha-BHC		0.01	<0.005
Ronnel			<0.005
Heptachlor	0.084	0.01	<0.005
Heptachlor Epoxide	0.06	0.01	<0.005
Aldrin	0.05		<0.005
pp-DDE	1.6		<0.005
Dieldrin	0.05		<0.005
pp-DDD	2.2		<0.005
pp-DDT	1.6		<0.005
Methoxychlor	4		<0.005
Mirex			<0.005

All concentrations in mg/kg

Table 16.3 - Preliminary Environmental Assessment DIAND Yukon

SITE 16 - TAKHINI RIVER - MILE 946 SOIL SAMPLE			
PAH ANALYSES			
PAHs	CCME R/P Criteria	BC Ministry of Environment Criteria	Sample I.D. TR16-SS1
Napthalene	5		0.02
Acenaphthene		10	N.D.
Acenaphthylene		10	N.D.
Fluorene		10	N.D.
Phenanthrene	5		N.D.
Anthracene	5		N.D.
Fluoranthene		10	N.D.
Pyrene	10		N.D.
B(a)A/Chrysene/B(c)P			N.D.
7,12-Dimethylbenz(a)anthracene			N.D.
Benzo(b,j,k)fluoranthene	1		N.D.
Benzo(a)pyrene	1		N.D.
3-Methylcholanthrene		1	N.D.
Indeno(1,2,3-cd)pyrene	1		N.D.
Dibenzo(a,h)anthracene	1		N.D.
Benzo(ghi)perylene		1	N.D.
Dibenz(ah,al,a)pyrene		1	N.D.

All concentrations in mg/kg

Table 16.4 - Preliminary Environmental Assessment DIAND Yukon

SITE 16 - TAKHINI RIVER - MILE 946 - WATER SAMPLE			
INORGANIC ELEMENT, PCB AND HYDROCARBON ANALYSES			
Inorganic Elements	CCME Freshwater Criteria	CCME Drinking Water Criteria	Sample I.D. 16-SW1
Silver	0.1	n/a	<5
Aluminum	5 to 100	n/a	40
Barium		1	35
Beryllium		n/a	<2
Boron		5000	<50
Calcium			19 800
Cadmium	0.2 to 1.8	5	<1
Cobalt		n/a	4
Chromium	2 to 20	50	<5
Copper	2 to 4	1000	2
Iron	300	300*	60
Potassium		n/a	1200
Magnesium		n/a	5700
Manganese		50*	3
Molybdenum		n/a	<5
Sodium		n/a	4000
Nickel	25 to 150	n/a	<2
Lead	1 to 7	10	<5
Phosphorus		n/a	<50
Silicon		n/a	100
Tin		n/a	<50
Strontium		n/a	92
Titanium		n/a	<1
Thallium		n/a	<50
Vanadium		n/a	2
Zinc	30	5000	17
PCBs	1 ng/L		N.D.
TEH			—
BTEX			—
Benzene	300	5	
Toluene	300	24	
Ethylbenzene	700	2.4	
Xylenes	—	300	—
Total Volatiles			

All concentrations in ug/L

Table 17.1 - Preliminary Environmental Assessment DIAND Yukon

SITE 17 - STONY CREEK - MILE 956 & MILE 956.8 - SOIL SAMPLES						
INORGANIC ELEMENT, PCB AND HYDROCARBON ANALYSES						
Inorganic Elements	CCME R/P Criteria	Sample Identification				
		17-SS1	17M-BH4-0.2	17C-BH2-0.3	17C-BH3-0.3	17M-TP1-0.6
Silver	20	<1	<1	<1	<1	<1
Barium	500	119	375	494	311	426
Beryllium	4	<1	<1	<1	<1	<1
Cadmium	5	<0.5	<0.5	<0.5	<0.5	<0.5
Cobalt	50	13	21	24	22	15
Chromium	250	55.5	61.8	76.2	61.1	43.7
Copper	100	35	56	61	53	115
Molybdenum	10	<1	<1	<1	<1	<1
Nickel	100	41	71	89	65	43
Lead	500	267	44	22	21	66
Tin	50	<5	<5	<5	<5	<5
Strontium	—	53	83	174	53	75
Thallium	—	<1	<1	<1	<1	<1
Vanadium	200	53	70	80	67	55
Zinc	500	259	135	129	95	605
PCBs	5	N.D.	N.D.	N.D.	N.D.	—
TEH	1000*	900	<5	<5	<5	—
BTEX						—
Benzene	0.5	<0.005	<0.005	<0.005	<0.005	
Toluene	3	<0.005	<0.005	<0.005	<0.005	
Ethylbenzene	5	<0.005	<0.005	<0.005	<0.005	
Xylenes	5	<0.005	<0.005	<0.005	<0.005	
Total Volatiles	200*	<0.1	<0.1	<0.1	0.2	---

* Yukon Territory Guidelines

All concentrations in mg/kg

Table 17.2 - Preliminary Environmental Assessment DIAND Yukon

SITE 17 - STONY CREEK - MILE 956 & 956.8 SOIL SAMPLES					
PESTICIDE ANALYSES					
Organo-Chlorine Pesticides	BC Ministry of Environment Criteria	Alberta Tier I	Sample Identification		
			17-SS1	17M-BH4-0.2	17C-BH3-0.3
Total	2				
HCB	0.46		<0.005	<0.005	<0.005
Gamma-BHC		0.01	<0.005	<0.005	<0.005
Beta-BHC		0.01	<0.005	<0.005	<0.005
Alpha-BHC		0.01	<0.005	<0.005	<0.005
Ronnel			<0.005	<0.005	<0.005
Heptachlor	0.084	0.01	<0.005	<0.005	<0.005
Heptachlor Epoxid	0.06	0.01	<0.005	<0.005	<0.005
Aldrin	0.05		<0.005	<0.005	<0.005
pp-DDE	1.6		<0.005	0.009	<0.005
Dieldrin	0.05		<0.005	<0.005	<0.005
pp-DDD	2.2		<0.005	trace	<0.005
pp-DDT	1.6		<0.005	trace	<0.005
Methoxychlor	4		<0.005	<0.005	<0.005
Mirex			<0.005	<0.005	<0.005

All concentrations in mg/kg

Table 17.3 - Preliminary Environmental Assessment DIAND Yukon

SITE 17 - STONY CREEK - MILE 956 & 956.8 SOIL SAMPLES					
PAH ANALYSES					
PAHs	CCME R/P Criteria	BC Ministry of Environment Criteria	Sample Identification		
			17-SS1	17M-BH4-0.2	17C-BH2-0.3
Napthalene	5		0.75	0.01	N.D.
Acenaphthene		10	0.11	N.D.	N.D.
Acenaphthylene		10	0.07	N.D.	N.D.
Fluorene		10	0.11	N.D.	0.01
Phenanthrene/Anthracene	5		0.22	0.02	0.13
Fluoranthene		10	0.03	0.02	0.94
Pyrene	10		0.16	0.01	0.44
B(a)A/Chrysene/B(c)P			0.05	0.01	0.46
7,12-Dimethylbenz(a)anthracene			N.D.	N.D.	N.D.
Benzo(b,j,k)fluoranthene	1		N.D.	0.02	0.36
Benzo(a)pyrene	1		N.D.	N.D.	0.21
3-Methylcholanthrene		1	N.D.	N.D.	N.D.
Indeno(1,2,3-cd)pyrene	1		N.D.	N.D.	0.08
Dibenzo(a,h)anthracene	1		N.D.	N.D.	0.03
Benzo(ghi)perylene		1	N.D.	N.D.	0.05
Dibenz(ah,ai,aj)pyrene		1	N.D.	N.D.	N.D.

All concentrations in mg/kg

Table 17.4 - Preliminary Environmental Assessment DIAND Yukon

SITE 17 - STONY CREEK - MILE 956 & 956.8 - WATER SAMPLES					
INORGANIC ELEMENT, PCB AND HYDROCARBON ANALYSES					
Inorganic Elements	CCME Freshwater Criteria	CCME Drinking Water Criteria	Sample Identification		
			17M-SW2	17M-SW	17M-SW1
Silver	0.1	n/a	<5	<5	<5
Aluminum	5 to 100	n/a	50	370	10
Barium		1	26	152	53
Beryllium		n/a	<2	<2	<2
Boron		5000	<5	<50	<50
Calcium			17 500	61 800	55 300
Cadmium	0.2 to 1.8	5	<1	<1	<1
Cobalt		n/a	<2	<2	4
Chromium	2 to 20	50	<5	<5	<5
Copper	2 to 4	1000	<1	<1	<1
Iron	300	300*	153	7110	400
Potassium		n/a	90	3300	3600
Magnesium		n/a	2400	15 100	16 700
Manganese		50*	8	1560	29
Molybdenum		n/a	<5	<5	<5
Sodium		n/a	2000	8000	9000
Nickel	25 to 150	n/a	<2	<2	<2
Lead	1 to 7	10	<5	<5	<5
Phosphorus		n/a	<50	670	<50
Silicon		n/a	6100	6400	4800
Tin		n/a	<50	<50	<50
Strontium		n/a	73	369	368
Titanium		n/a	3	10	<1
Thallium		n/a	<50	<50	<50
Vanadium		n/a	3	2	2
Zinc	30	5000	14	39	30
PCBs	1 ng/L		N.D.	N.D.	--
TEH			<50	<50	--
BTEX			--		--
Benzene	300	5		<0.5	
Toluene	300	24		<0.5	
Ethylbenzene	700	2.4		<0.5	
Xylenes		300		<0.5	
Total Volatiles				<100	

All concentrations in ug/L

Table 17.5 - Preliminary Environmental Assessment DIAND Yukon

SITE 17 - STONY CREEK - MILE 956 & 956.8 - WATER SAMPLE			
PESTICIDE ANALYSES			
Organo-Chlorine Pesticides	CCME Freshwater Criteria	Ontario R/P Potable Water	Sample I.D. 17-SW
Total			
HCB		0.62	<0.1
Gamma-BHC			<0.1
Beta-BHC			<0.1
Alpha-BHC			<0.1
Ronnel			<0.1
Heptachlor	0.01	0.04	<0.1
Heptachlor Epoxide		3	<0.1
Aldrin	4 ng/L	0.01	<0.1
pp-DDE		20	<0.1
Dieldrin	4 ng/L	0.02	<0.1
pp-DDD		6	<0.1
pp-DDT	1 ng/L	0.05	<0.1
Methoxychlor			<0.1
Mirex			<0.1

All concentrations in ug/L

Table 17.6 - Preliminary Environmental Assessment DIAND Yukon

SITE 17 - STONY CREEK - MILE 956 & 956.8 WATER SAMPLE		
PAH ANALYSES		
PAHS	B.C. Ministry of Environment Criteria	Sample I.D.
		SW-17
Napthalene	1	<0.05
Acenaphthene	6	<0.05
Acenaphthylene	---	<0.05
Fluorene	12	<0.05
Phenanthrene/Anthracene	0.3/12	<0.05
Fluoranthene	---	<0.05
Pyrene	0.02	<0.05
B(a)A/Chrysene/B(c)P	---	<0.05
7,12-Dimethylbenz(a)anthracene	---	<0.05
Benzo(b,j,k)fluoranthene	---	<0.05
Benzo(a)pyrene	0.01	<0.05
3-Methylcholanthrene	---	<0.05
Indeno(1,2,3-cd)pyrene	---	<0.05
Dibenzo(a,h)anthracene	---	<0.05
Benzo(ghi)perylene	---	<0.05
Dibenz(ah,ai)pyrene	---	<0.05

All concentrations in ug/L

Table 18.1 - Preliminary Environmental Assessment DIAND Yukon

SITE 18 - MENDENHALL RIVER - MILE 968 - SOIL SAMPLES										
INORGANIC ELEMENT, PCB AND HYDROCARBON ANALYSES										
Inorganic Elements	CCME R/P Criteria	Sample Identification								
		18-BH1-0.2	18-BH2-0.3	18-BH2-0.2	18-BH4-0.1	18-BH5-0.1	18-BH7-0.3	18-TP4-2.0	18-TP1-1.2	18-TP5-1.1
Silver	20	<1	<1	---	---	<1	<1	-	<1	<1
Barium	500	78	105	---	---	105	186	-	95.3	145
Beryllium	4	<1	<1	---	---	<1	<1	-	<1	<1
Cadmium	5	<0.5	<0.5	---	---	<0.5	<0.5	-	<0.5	<0.5
Cobalt	50	9	6	---	---	5	7	-	11	12
Chromium	250	19.2	21	---	---	19.8	25.4	-	23.4	26
Copper	100	20	17	---	---	9	21	-	15	19
Molybdenum	10	<1	<1	---	---	<1	<1	-	<1	<1
Nickel	100	15	14	---	---	11	17	-	19	28
Lead	500	15	7	---	---	11	30	16	14	13
Tin	50	<5	<5	---	---	<5	<5	-	<5	<5
Strontium	---	40	51	---	---	29	39	-	43	59
Thallium	---	<1	<1	---	---	<1	<1	-	<1	<1
Vanadium	200	40	36	---	---	34	38	-	49	47
Zinc	500	32.9	35.7	---	---	29.5	111	-	47	65.5
PCBs	5	---	---	N.D.	N.D.				---	
TEH	1000*	---	---	25	9.6			2500		
BTEX										
Benzene	0.5			<0.005	<0.005			<0.005		
Toluene	3			<0.005	<0.005			<0.005		
Ethylbenzene	5			<0.005	<0.005			0.019		
Xylenes	5			0.11	0.005			0.077		
Total Volatiles	200*	---	---	0.6	<0.1			2.6		

* Yukon Territory Guidelines

All concentrations in mg/kg

Table 18.2 - Preliminary Environmental Assessment DIAND Yukon

SITE 18 - MENDENHALL RIVER - MILE 968 SOIL SAMPLES				
PESTICIDE ANALYSES				
Organo-Chlorine Pesticides	BC Ministry of Environment Criteria	Alberta Tier I	Sample Identification	
			18-BH2-0.2	18-BH5-0.1
Total	2			
HCB	0.46		<0.005	<0.005
Gamma-BHC		0.01	<0.005	<0.005
Beta-BHC		0.01	<0.005	<0.005
Alpha-BHC		0.01	<0.005	<0.005
Ronnel			<0.005	<0.005
Heptachlor	0.084	0.01	<0.005	<0.005
Heptachlor Epoxide	0.06	0.01	<0.005	<0.005
Aldrin	0.05		<0.005	<0.005
pp-DDE	1.6		<0.005	<0.005
Dieldrin	0.05		<0.005	<0.005
pp-DDD	2.2		<0.005	<0.005
pp-DDT	1.6		<0.005	<0.005
Methoxychlor	4		<0.005	<0.005
Mirex			<0.005	<0.005

All concentrations in mg/kg

Table 18.3 - Preliminary Environmental Assessment DIAND Yukon

SITE 18 - MENDENHALL RIVER - MILE 968 SOIL SAMPLES					
PAH ANALYSES					
PAHs	CCME R/P Criteria	BC Ministry of Environment Criteria	Sample identification		
			18-BH2-0.2	18-BH4-0.1	18-TP4-2.0
Napthalene	5		N.D.	N.D.	1.7
Acenaphthene		10	N.D.	N.D.	N.D.
Acenaphthylene		10	N.D.	N.D.	0.59
Fluorene		10	N.D.	N.D.	1.4
Phenanthrene/Anthracene	5		N.D.	N.D.	3.4
Fluoranthene		10	N.D.	N.D.	0.07
Pyrene	10		N.D.	N.D.	0.23
B(a)A/Chrysene/B(c)P			N.D.	N.D.	0.05
7,12-Dimethylbenz(a)anthracene			N.D.	N.D.	N.D.
Benzo(b,j,k)fluoranthene	1		N.D.	N.D.	N.D.
Benzo(a)pyrene	1		N.D.	N.D.	N.D.
3-Methylcholanthrene		1	N.D.	N.D.	N.D.
Indeno(1,2,3-cd)pyrene	1		N.D.	N.D.	N.D.
Dibenzo(a,h)anthracene	1		N.D.	N.D.	N.D.
Benzo(ghi)perylene		1	N.D.	N.D.	N.D.
Dibenz(ah,al,aj)pyrene		1	N.D.	N.D.	N.D.

All concentrations in mg/kg

Table 18.4 - Preliminary Environmental Assessment DIAND Yukon

SITE 18 - MENDENHALL RIVER - MILE 968 - WATER SAMPLE			
INORGANIC ELEMENT, PCB AND HYDROCARBON ANALYSES			
Inorganic Elements	CCME Freshwater Criteria	CCME Drinking Water Criteria	Sample I.D. 18-SW
Silver	0.1	n/a	5
Aluminum	5 to 100	n/a	40
Barium		1	33
Beryllium		n/a	<2
Boron		5000	<50
Calcium			54400
Cadmium	0.2 to 1.8	5	<1
Cobalt		n/a	<2
Chromium	2 to 20	50	<5
Copper	2 to 4	1000	1
Iron	300	300*	2210
Potassium		n/a	2700
Magnesium		n/a	16800
Manganese		50*	73
Molybdenum		n/a	11
Sodium		n/a	22000
Nickel	25 to 150	n/a	<2
Lead	1 to 7	10	<5
Phosphorus		n/a	<50
Silicon		n/a	4600
Tin		n/a	<50
Strontium		n/a	442
Titanium		n/a	<1
Thallium		n/a	<50
Vanadium		n/a	3
Zinc	30	5000	33
PCBs	1 ng/L		N.D.
TEH			<50
BTEX			
Benzene	300	5	<0.5
Toluene	300	24*	<0.5
Ethylbenzene	700	2.4*	<0.5
Xylenes	---	300*	<0.5
Total Volatiles			<100

All concentrations in ug/L

Table 18.5 - Preliminary Environmental Assessment DIAND Yukon

SITE 18 - MENDENHALL RIVER - MILE 968 WATER SAMPLE			
PESTICIDE ANALYSES			
Organo-Chlorine Pesticides	CCME Freshwater Criteria	Ontario R/P Potable Water	Sample I.D. 18-SW
Total			
HCB		0.62	<0.1
Gamma-BHC			<0.1
Beta-BHC			<0.1
Alpha-BHC			<0.1
Ronnel			<0.1
Heptachlor	0.01	0.04	<0.1
Heptachlor Epoxide		3	<0.1
Aldrin	4 ng/L	0.01	<0.1
pp-DDE		20	<0.1
Dieldrin	4 ng/L	0.02	<0.1
pp-DDD		6	<0.1
pp-DDT	1 ng/L	0.05	<0.1
Methoxychlor			<0.1
Mirex			<0.1

All concentrations in ug/L

Table 18.6 - Preliminary Environmental Assessment DIAND Yukon

SITE 18 - MENDENHALL RIVER - MILE 968 WATER SAMPLE		
PAH ANALYSES		
PAHs	B.C. Ministry of Environment Criteria	Sample I.D. SW-18
Napthalene	21	N.D.
Acenaphthene	20	N.D.
Acenaphthylene	310	N.D.
Fluorene	280	N.D.
Phenanthrene/Anthracene	12	N.D.
Fluoranthene	130	N.D.
Pyrene	0.2	N.D.
B(a)A/Chrysene/B(c)P		N.D.
7,12-Dimethylbenz(a)anthracene		N.D.
Benzo(b,j,k)fluoranthene	0.2	N.D.
Benzo(a)pyrene	0.01	N.D.
3-Methylcholanthrene		N.D.
Indeno(1,2,3-cd)pyrene	0.2	N.D.
Dibenzo(a,h)anthracene	0.2	N.D.
Benzo(ghi)perylene	0.2	N.D.
Dibenz(ah,al,aj)pyrene		N.D.

All concentrations in ug/L

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
E609701-01 17-SS1 Sample Type:SOIL Collected:09/19/96								
OC Screen in Soil (GC/ECD)								
		HCB	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Gamma-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Beta-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Alpha-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Ronnel	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Heptachlor	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Heptachlor Epoxide	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Aldrin	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDE	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Dieldrin	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDD	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDT	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Methoxychlor	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Mirex	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
Tier1-PAHs in Soil								
		Naphthalene	0.75	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Acenaphthylene	0.11	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Acenaphthene	0.07	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Fluorene	0.11	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Phenanthrene/Anthracene	0.22	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Fluoranthene	0.03	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Pyrene	0.16	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		B(a)A/Chrysene/B(c)P	0.05	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		7,12-Dimethylbenz(a)anthracene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(b/j/k)fluoranthene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(a)pyrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		3-Methylcholanthrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Indeno(1,2,3-cd)pyrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Dibenzo(ah)anthracene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(ghi)perylene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Dibenz(ah,ai)pyrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
PCB'S in Soil								
		All Aroclors	N.D.	0.10	ug/g (ppm)	10/01/96	10/03/96	SRJ
BTEX, TVH and TEH in Soil								
BTEX and TVH in Soil								
		Benzene	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Toluene	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Ethylbenzene	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Xylenes	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Total Volatiles	< 0.1	0.1	ug/g (ppm)	09/26/96	09/27/96	QVP
		% Moisture	3.3		%	09/26/96	09/28/96	ESB
		Total Extractables (Soil)	900	5.0	ug/g (ppm)	09/26/96	09/29/96	QVP
Metals (SW3051)								
		Silver (Ag)	<1	1	mg/kg		09/27/96	RH
		Barium (Ba)	119	0.5	mg/kg		09/27/96	RH
		Beryllium (Be)	<1	1	mg/kg		09/27/96	RH
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	RH
		Cobalt (Co)	13	1	mg/kg		09/27/96	RH
		Chromium (Cr)	55.5	0.5	mg/kg		09/27/96	RH
		Copper (Cu)	35	1	mg/kg		09/27/96	RH
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	RH
		Nickel (Ni)	41	2	mg/kg		09/27/96	RH
		Lead (Pb)	267	5	mg/kg		09/27/96	RH
		Tin (Sn)	<5	5	mg/kg		09/27/96	RH
		Strontium (Sr)	53	1	mg/kg		09/27/96	RH
		Thallium (Tl)	<1	1	mg/kg		09/27/96	RH
		Vanadium (V)	53	1	mg/kg		09/27/96	RH
		Zinc (Zn)	259	0.5	mg/kg		09/27/96	RH
E609701-02 17M-BH-4-0.2m Sample Type:SOIL Collected:09/19/96								
OC Screen in Soil (GC/ECD)								
		HCB	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Gamma-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Beta-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Alpha-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Ronnel	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Heptachlor	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Heptachlor Epoxide	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Aldrin	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDE	0.009	0.005	ug/g (ppm)		10/08/96	MTD

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
E609701-02 17M-BH-4-0.2m								
Sample Type:SOIL								
Collected:09/19/96								
		Dieldrin	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDD	Trace	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDT	Trace	0.005	ug/g (ppm)		10/08/96	MTD
		Methoxychlor	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Mirex	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Tier1-PAHs in Soil						
		Naphthalene	0.01	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Acenaphthylene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Acenaphthene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Fluorene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Phenanthrene/Anthracene	0.02	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Fluoranthene	0.02	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Pyrene	0.01	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		B(a)A/Chrysene/B(c)P	0.01	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		7,12-Dimethylbenz(a)anthracene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(b/j/k)fluoranthene	0.02	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(a)pyrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		3-Methylcholanthrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Indeno(1,2,3-cd)pyrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Dibenzo(ah)anthracene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(ghi)perylene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Dibenz(ah,ai,aj)pyrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		PCB'S in Soil						
		All Aroclors	N.D.	0.10	ug/g (ppm)	10/01/96	10/03/96	SRJ
		BTEX, TVH and TEH in Soil						
		BTEX and TVH in Soil						
		Benzene	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Toluene	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Ethylbenzene	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Xylenes	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Total Volatiles	< 0.1	0.1	ug/g (ppm)	09/26/96	09/27/96	QVP
		% Moisture	12.9		%	09/26/96	09/28/96	ESB
		Total Extractables (Soil)	<5.0	5.0	ug/g (ppm)	09/26/96	09/30/96	QVP
		Metals (SW3051)						
		Silver (Ag)	<1	1	mg/kg		09/27/96	RH
		Barium (Ba)	375	0.5	mg/kg		09/27/96	RH
		Beryllium (Be)	<1	1	mg/kg		09/27/96	RH
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	RH
		Cobalt (Co)	21	1	mg/kg		09/27/96	RH
		Chromium (Cr)	61.8	0.5	mg/kg		09/27/96	RH
		Copper (Cu)	56	1	mg/kg		09/27/96	RH
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	RH
		Nickel (Ni)	71	2	mg/kg		09/27/96	RH
		Lead (Pb)	44	5	mg/kg		09/27/96	RH
		Tin (Sn)	<5	5	mg/kg		09/27/96	RH
		Strontium (Sr)	83	1	mg/kg		09/27/96	RH
		Thallium (Tl)	<1	1	mg/kg		09/27/96	RH
		Vanadium (V)	70	1	mg/kg		09/27/96	RH
		Zinc (Zn)	135	0.5	mg/kg		09/27/96	RH
E609701-03 17C-BH2-0.3m								
Sample Type:SOIL								
Collected:09/19/96								
		Tier1-PAHs in Soil						
		Naphthalene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Acenaphthylene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Acenaphthene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Fluorene	0.01	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Phenanthrene/Anthracene	0.13	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Fluoranthene	0.94	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Pyrene	0.44	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		B(a)A/Chrysene/B(c)P	0.46	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		7,12-Dimethylbenz(a)anthracene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(b/j/k)fluoranthene	0.36	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(a)pyrene	0.21	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		3-Methylcholanthrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Indeno(1,2,3-cd)pyrene	0.08	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Dibenzo(ah)anthracene	0.03	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(ghi)perylene	0.05	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Dibenz(ah,ai,aj)pyrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		PCB'S in Soil						
		All Aroclors	N.D.	0.10	ug/g (ppm)	10/01/96	10/03/96	SRJ

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
E609701-03	17C-BH2-0.3m							
	Sample Type:SOIL							
	Collected:09/19/96							
		BTEX, TVH and TEH in Soil						
		BTEX and TVH in Soil						
		Benzene	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Toluene	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Ethylbenzene	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Xylenes	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Total Volatiles	< 0.1	0.1	ug/g (ppm)	09/26/96	09/27/96	QVP
		% Moisture	19.6		%	09/26/96	09/28/96	ESB
		Total Extractables (Soil)	<5.0	5.0	ug/g (ppm)	09/26/96	09/29/96	QVP
		Metals (SW3051)						
		Silver (Ag)	<1	1	mg/kg		09/27/96	RH
		Barium (Ba)	494	0.5	mg/kg		09/27/96	RH
		Beryllium (Be)	<1	1	mg/kg		09/27/96	RH
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	RH
		Cobalt (Co)	24	1	mg/kg		09/27/96	RH
		Chromium (Cr)	76.2	0.5	mg/kg		09/27/96	RH
		Copper (Cu)	61	1	mg/kg		09/27/96	RH
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	RH
		Nickel (Ni)	89	2	mg/kg		09/27/96	RH
		Lead (Pb)	22	5	mg/kg		09/27/96	RH
		Tin (Sn)	<5	5	mg/kg		09/27/96	RH
		Strontium (Sr)	174	1	mg/kg		10/02/96	RH
		Thallium (Tl)	<1	1	mg/kg		09/27/96	RH
		Vanadium (V)	80	1	mg/kg		09/27/96	RH
		Zinc (Zn)	129	0.5	mg/kg		09/27/96	RH
E609701-04	17C-BH3-0.3m							
	Sample Type:SOIL							
	Collected:09/19/96							
		OC Screen in Soil (GC/ECD)						
		HCB	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Gamma-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Beta-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Alpha-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Ronnel	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Heptachlor	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Heptachlor Epoxide	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Aldrin	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDE	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Dieldrin	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDD	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDT	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Methoxychlor	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Mirex	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		PCB'S in Soil						
		All Aroclors	N.D.	0.10	ug/g (ppm)	10/01/96	10/03/96	SRJ
		BTEX, TVH and TEH in Soil						
		BTEX and TVH in Soil						
		Benzene	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Toluene	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Ethylbenzene	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Xylenes	< 0.005	0.005	ug/g (ppm)	09/26/96	09/27/96	QVP
		Total Volatiles	0.2	0.1	ug/g (ppm)	09/26/96	09/27/96	QVP
		% Moisture	14.7		%	09/26/96	09/28/96	ESB
		Total Extractables (Soil)	<5.0	5.0	ug/g (ppm)	09/26/96	09/27/96	QVP
		Metals (SW3051)						
		Silver (Ag)	<1	1	mg/kg		09/27/96	RH
		Barium (Ba)	311	0.5	mg/kg		09/27/96	RH
		Beryllium (Be)	<1	1	mg/kg		09/27/96	RH
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	RH
		Cobalt (Co)	22	1	mg/kg		09/27/96	RH
		Chromium (Cr)	61.1	0.5	mg/kg		09/27/96	RH
		Copper (Cu)	53	1	mg/kg		09/27/96	RH
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	RH
		Nickel (Ni)	65	2	mg/kg		09/27/96	RH
		Lead (Pb)	21	5	mg/kg		09/27/96	RH
		Tin (Sn)	<5	5	mg/kg		09/27/96	RH
		Strontium (Sr)	53	1	mg/kg		09/27/96	RH
		Thallium (Tl)	<1	1	mg/kg		09/27/96	RH
		Vanadium (V)	67	1	mg/kg		09/27/96	RH
		Zinc (Zn)	95.0	0.5	mg/kg		09/27/96	RH

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
E609701-04	17C-BH3-0.3m							
	Sample Type:SOIL							
	Collected:09/19/96							
		Metals (SW3051)						
E609701-05	17M-SW2							
	Sample Type:WATER							
	Collected:09/20/96							
		PCB's in Water						
		All Aroclors	N.D.	0.10	ug/L (ppb)	10/01/96	10/03/96	SRJ
		Metals, Total						
		Silver (Ag)	<0.005	0.005	mg/L		09/25/96	RH
		Aluminum (Al)	0.05	0.01	mg/L		09/25/96	RH
		Barium (Ba)	0.026	0.003	mg/L		09/25/96	RH
		Beryllium (Be)	<0.002	0.002	mg/L		09/25/96	RH
		Boron (B)	<0.05	0.05	mg/L		09/25/96	RH
		Calcium (Ca)	17.5	0.5	mg/L		09/25/96	RH
		Cadmium (Cd)	<0.001	0.001	mg/L		09/25/96	RH
		Cobalt (Co)	<0.002	0.002	mg/L		09/25/96	RH
		Chromium (Cr)	<0.005	0.005	mg/L		09/25/96	RH
		Copper (Cu)	<0.001	0.001	mg/L		09/25/96	RH
		Iron (Fe)	0.153	0.005	mg/L		09/25/96	RH
		Potassium (K)	0.9	0.1	mg/L		09/25/96	RH
		Magnesium (Mg)	2.4	0.1	mg/L		09/25/96	RH
		Manganese (Mn)	0.008	0.001	mg/L		09/25/96	RH
		Molybdenum (Mo)	<0.005	0.005	mg/L		09/25/96	RH
		Sodium (Na)	2	1	mg/L		09/25/96	RH
		Nickel (Ni)	<0.002	0.002	mg/L		09/25/96	RH
		Lead (Pb)	<0.005	0.005	mg/L		09/25/96	RH
		Phosphorus (P)	<0.05	0.05	mg/L		09/25/96	RH
		Silicon (Si)	6.1	0.1	mg/L		09/25/96	RH
		Tin (Sn)	<0.05	0.05	mg/L		09/25/96	RH
		Strontium (Sr)	0.073	0.002	mg/L		09/25/96	RH
		Titanium (Ti)	0.003	0.001	mg/L		09/25/96	RH
		Thallium (Tl)	<0.05	0.05	mg/L		09/25/96	RH
		Vanadium (V)	0.003	0.001	mg/L		09/25/96	RH
		Zinc (Zn)	0.014	0.001	mg/L		09/25/96	RH
		TEH in Water						
		Total Extractables (Water)	<50	50	ug/L (ppb)	09/25/96	09/27/96	CAS
E609701-06	17m-SW							
	Sample Type:WATER							
	Collected:09/21/96							
		OC Screen in Water GC/ECD						
		HCB	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Gamma-BHC	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Beta-BHC	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Alpha-BHC	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Ronnel	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Heptachlor	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Heptachlor Epoxide	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Aldrin	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		pp-DDE	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Dieldrin	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		pp-DDD	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		pp-DDT	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Methoxychlor	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Mirex	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Tier1-PAHs in Water						
		Naphthalene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Acenaphthylene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Acenaphthene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Fluorene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Phenanthrene/Anthracene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Fluoranthene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Pyrene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		B(a)A/Chrysene/B(c)P	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		7,12-Dimethylbenz(a)anthracene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Benzo(b/j/k)fluoranthene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Benzo(a)pyrene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		3-Methylcholanthrene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Indeno(1,2,3-cd)pyrene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Dibenzo(ah)anthracene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Benzo(ghi)perylene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY		
E609701-06	17m-SW Sample Type:WATER Collected:09/21/96	Dibenz(ah,ai,aj)pyrene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR		
		PCB's in Water								
		All Aroclors	N.D.	0.10	ug/L (ppb)	10/01/96	10/03/96	SRJ		
		BTEX, TVH and TEH in Water								
		BTEX and TVH in Water								
		Benzene	< 0.5	0.5	ug/L (ppb)	09/25/96	09/26/96	CAS		
		Toluene	< 0.5	0.5	ug/L (ppb)	09/25/96	09/26/96	CAS		
		Ethylbenzene	< 0.5	0.5	ug/L (ppb)	09/25/96	09/26/96	CAS		
		Xylenes	< 0.5	0.5	ug/L (ppb)	09/25/96	09/26/96	CAS		
		Total Volatiles	< 100	100	ug/L (ppb)	09/25/96	09/26/96	CAS		
		Total Extractables (Water)	< 50	50	ug/L (ppb)	09/25/96	09/27/96	CAS		
		Metals, Total								
		Silver (Ag)	< 0.005	0.005	mg/L		09/25/96	RH		
		Aluminum (Al)	0.37	0.01	mg/L		09/25/96	RH		
		Barium (Ba)	0.152	0.003	mg/L		09/25/96	RH		
		Beryllium (Be)	< 0.002	0.002	mg/L		09/25/96	RH		
		Boron (B)	< 0.05	0.05	mg/L		09/25/96	RH		
		Calcium (Ca)	61.8	0.5	mg/L		09/25/96	RH		
		Cadmium (Cd)	< 0.001	0.001	mg/L		09/25/96	RH		
		Cobalt (Co)	< 0.002	0.002	mg/L		09/25/96	RH		
		Chromium (Cr)	< 0.005	0.005	mg/L		09/25/96	RH		
		Copper (Cu)	< 0.001	0.001	mg/L		09/25/96	RH		
		Iron (Fe)	7.11	0.005	mg/L		09/25/96	RH		
		Potassium (K)	3.3	0.1	mg/L		09/25/96	RH		
		Magnesium (Mg)	15.1	0.1	mg/L		09/25/96	RH		
		Manganese (Mn)	1.56	0.001	mg/L		09/25/96	RH		
		Molybdenum (Mo)	< 0.005	0.005	mg/L		09/25/96	RH		
		Sodium (Na)	8	1	mg/L		09/25/96	RH		
		Nickel (Ni)	< 0.002	0.002	mg/L		09/25/96	RH		
		Lead (Pb)	< 0.005	0.005	mg/L		09/25/96	RH		
		Phosphorus (P)	0.67	0.05	mg/L		09/25/96	RH		
		Silicon (Si)	6.4	0.1	mg/L		09/25/96	RH		
		Tin (Sn)	< 0.05	0.05	mg/L		09/25/96	RH		
Strontium (Sr)	0.369	0.002	mg/L		09/25/96	RH				
Titanium (Ti)	0.010	0.001	mg/L		09/25/96	RH				
Thallium (Tl)	< 0.05	0.05	mg/L		09/25/96	RH				
Vanadium (V)	0.002	0.001	mg/L		09/25/96	RH				
Zinc (Zn)	0.039	0.001	mg/L		09/25/96	RH				
E609701-07	17M-SW1 Sample Type:WATER Collected:09/21/96	Metals, Total								
		Silver (Ag)	< 0.005	0.005	mg/L		09/25/96	RH		
		Aluminum (Al)	0.01	0.01	mg/L		09/25/96	RH		
		Barium (Ba)	0.053	0.003	mg/L		09/25/96	RH		
		Beryllium (Be)	< 0.002	0.002	mg/L		09/25/96	RH		
		Boron (B)	< 0.05	0.05	mg/L		09/25/96	RH		
		Calcium (Ca)	55.3	0.5	mg/L		09/25/96	RH		
		Cadmium (Cd)	< 0.001	0.001	mg/L		09/25/96	RH		
		Cobalt (Co)	0.004	0.002	mg/L		09/25/96	RH		
		Chromium (Cr)	< 0.005	0.005	mg/L		09/25/96	RH		
		Copper (Cu)	< 0.001	0.001	mg/L		09/25/96	RH		
		Iron (Fe)	0.4	0.005	mg/L		09/25/96	RH		
		Potassium (K)	3.6	0.1	mg/L		09/25/96	RH		
		Magnesium (Mg)	16.7	0.1	mg/L		09/25/96	RH		
		Manganese (Mn)	0.029	0.001	mg/L		09/25/96	RH		
		Molybdenum (Mo)	< 0.005	0.005	mg/L		09/25/96	RH		
		Sodium (Na)	9	1	mg/L		09/25/96	RH		
		Nickel (Ni)	< 0.002	0.002	mg/L		09/25/96	RH		
		Lead (Pb)	< 0.005	0.005	mg/L		09/25/96	RH		
		Phosphorus (P)	< 0.05	0.05	mg/L		09/25/96	RH		
		Silicon (Si)	4.8	0.1	mg/L		09/25/96	RH		
		Tin (Sn)	< 0.05	0.05	mg/L		09/25/96	RH		
		Strontium (Sr)	0.368	0.002	mg/L		09/25/96	RH		
Titanium (Ti)	< 0.001	0.001	mg/L		09/25/96	RH				
Thallium (Tl)	< 0.05	0.05	mg/L		09/25/96	RH				
Vanadium (V)	0.002	0.001	mg/L		09/25/96	RH				
Zinc (Zn)	0.030	0.001	mg/L		09/25/96	RH				

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
E609701-08	17M-TP1-0.6							
	Sample Type:SOIL							
	Collected:09/22/96							
		Metals (SW3051)						
		Silver (Ag)	<1	1	mg/kg		09/27/96	RH
		Barium (Ba)	426	0.5	mg/kg		09/27/96	RH
		Beryllium (Be)	<1	1	mg/kg		09/27/96	RH
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	RH
		Cobalt (Co)	15	1	mg/kg		09/27/96	RH
		Chromium (Cr)	43.7	0.5	mg/kg		09/27/96	RH
		Copper (Cu)	115	1	mg/kg		09/27/96	RH
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	RH
		Nickel (Ni)	43	2	mg/kg		09/27/96	RH
		Lead (Pb)	66	5	mg/kg		09/27/96	RH
		Tin (Sn)	<5	5	mg/kg		09/27/96	RH
		Strontium (Sr)	75	1	mg/kg		09/27/96	RH
		Thallium (Tl)	<1	1	mg/kg		09/27/96	RH
		Vanadium (V)	55	1	mg/kg		09/27/96	RH
		Zinc (Zn)	605	0.5	mg/kg		09/27/96	RH
E609701-09	TM15-BH1-0.3							
	Sample Type:SOIL							
	Collected:09/20/96							
		Metals (SW3051)						
		Silver (Ag)	<1	1	mg/kg		09/27/96	RH
		Barium (Ba)	190	0.5	mg/kg		09/27/96	RH
		Beryllium (Be)	<1	1	mg/kg		09/27/96	RH
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	RH
		Cobalt (Co)	13	1	mg/kg		09/27/96	RH
		Chromium (Cr)	42.1	0.5	mg/kg		09/27/96	RH
		Copper (Cu)	18	1	mg/kg		09/27/96	RH
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	RH
		Nickel (Ni)	31	2	mg/kg		09/27/96	RH
		Lead (Pb)	10	5	mg/kg		09/27/96	RH
		Tin (Sn)	<5	5	mg/kg		09/27/96	RH
		Strontium (Sr)	50	1	mg/kg		09/27/96	RH
		Thallium (Tl)	<1	1	mg/kg		09/27/96	RH
		Vanadium (V)	46	1	mg/kg		09/27/96	RH
		Zinc (Zn)	75.6	0.5	mg/kg		09/27/96	RH
E609701-10	15-SS1							
	Sample Type:SOIL							
	Collected:09/21/96							
		OC Screen in Soil (GC/ECD)						
		HCB	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Gamma-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Beta-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Alpha-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Ronnel	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Heptachlor	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Heptachlor Epoxide	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Aldrin	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDE	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Dieldrin	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDD	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDT	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Methoxychlor	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Mirex	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		PCB'S in Soil						
		All Aroclors	N.D.	0.10	ug/g (ppm)	10/01/96	10/03/96	SRJ
		Metals (SW3051)						
		Silver (Ag)	<1	1	mg/kg		09/27/96	RH
		Barium (Ba)	421	0.5	mg/kg		09/27/96	RH
		Beryllium (Be)	<1	1	mg/kg		09/27/96	RH
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	RH
		Cobalt (Co)	18	1	mg/kg		09/27/96	RH
		Chromium (Cr)	63.6	0.5	mg/kg		09/27/96	RH
		Copper (Cu)	46	1	mg/kg		09/27/96	RH
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	RH
		Nickel (Ni)	66	2	mg/kg		09/27/96	RH
		Lead (Pb)	20	5	mg/kg		09/27/96	RH
		Tin (Sn)	<5	5	mg/kg		09/27/96	RH
		Strontium (Sr)	133	1	mg/kg		09/27/96	RH
		Thallium (Tl)	<1	1	mg/kg		09/27/96	RH
		Vanadium (V)	64	1	mg/kg		09/27/96	RH

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
E609701-10	15-SS1	Sample Type:SOIL Collected:09/21/96						
		Metals (SW3051) Zinc (Zn)	92.9	0.5	mg/kg		09/27/96	RH
E609701-11	15-SS2	Sample Type:SOIL Collected:09/21/96						
		Metals (SW3051)						
		Silver (Ag)	<1	1	mg/kg		09/27/96	RH
		Barium (Ba)	391	0.5	mg/kg		09/27/96	RH
		Beryllium (Be)	<1	1	mg/kg		09/27/96	RH
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	RH
		Cobalt (Co)	18	1	mg/kg		09/27/96	RH
		Chromium (Cr)	58.9	0.5	mg/kg		09/27/96	RH
		Copper (Cu)	42	1	mg/kg		09/27/96	RH
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	RH
		Nickel (Ni)	64	2	mg/kg		09/27/96	RH
		Lead (Pb)	16	5	mg/kg		09/27/96	RH
		Tin (Sn)	<5	5	mg/kg		09/27/96	RH
		Strontium (Sr)	134	1	mg/kg		09/27/96	RH
		Thallium (Tl)	<1	1	mg/kg		09/27/96	RH
		Vanadium (V)	62	1	mg/kg		09/27/96	RH
Zinc (Zn)	93.5	0.5	mg/kg		09/27/96	RH		
N.D. - NOT DETECTED, LESS THAN THE DETECTION LIMIT								
THIS IS THE FINAL PAGE OF THE REPORT								

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY		
E609700-01	18-BH1-0.2	Sample Type:SOIL Collected:09/18/96								
		Metals (SW3051)								
		Silver (Ag)	<1	1	mg/kg		09/27/96	RH		
		Barium (Ba)	78.0	0.5	mg/kg		09/27/96	RH		
		Beryllium (Be)	<1	1	mg/kg		09/27/96	RH		
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	RH		
		Cobalt (Co)	9	1	mg/kg		09/27/96	RH		
		Chromium (Cr)	19.2	0.5	mg/kg		09/27/96	RH		
		Copper (Cu)	20	1	mg/kg		09/27/96	RH		
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	RH		
		Nickel (Ni)	15	2	mg/kg		09/27/96	RH		
		Lead (Pb)	15	5	mg/kg		09/27/96	RH		
		Tin (Sn)	<5	5	mg/kg		09/27/96	RH		
		Strontium (Sr)	40	1	mg/kg		09/27/96	RH		
		Thallium (Tl)	<1	1	mg/kg		09/27/96	RH		
		Vanadium (V)	40	1	mg/kg		09/27/96	RH		
		Zinc (Zn)	32.9	0.5	mg/kg		09/27/96	RH		
E609700-02	18-BH2-0.3	Sample Type:SOIL Collected:09/18/96								
		Metals (SW3051)								
		Silver (Ag)	<1	1	mg/kg		09/27/96	TW		
		Barium (Ba)	105	0.5	mg/kg		09/27/96	TW		
		Beryllium (Be)	<1	1	mg/kg		09/27/96	TW		
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	TW		
		Cobalt (Co)	6	1	mg/kg		09/27/96	TW		
		Chromium (Cr)	21.0	0.5	mg/kg		09/27/96	TW		
		Copper (Cu)	17	1	mg/kg		09/27/96	TW		
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	TW		
		Nickel (Ni)	14	2	mg/kg		09/27/96	TW		
		Lead (Pb)	7	5	mg/kg		09/27/96	TW		
		Tin (Sn)	<5	5	mg/kg		09/27/96	TW		
		Strontium (Sr)	51	1	mg/kg		09/27/96	TW		
		Thallium (Tl)	<1	1	mg/kg		09/27/96	TW		
		Vanadium (V)	36	1	mg/kg		09/27/96	TW		
		Zinc (Zn)	35.7	0.5	mg/kg		09/27/96	TW		
E609700-03	18-BH2-0.2	Sample Type:SOIL Collected:09/18/96								
		OC Screen in Soil (GC/ECD)								
		HCB	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Gamma-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Beta-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Alpha-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Ronnel	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Heptachlor	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Heptachlor Epoxide	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Aldrin	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		pp-DDE	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Dieldrin	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		pp-DDD	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		pp-DDT	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Methoxychlor	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Mirex	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Tier1-PAHs in Soil								
		Naphthalene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		Acenaphthylene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		Acenaphthene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		Fluorene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		Phenanthrene/Anthracene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		Fluoranthene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		Pyrene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		B(a)A/Chrysene/B(c)P	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		7,12-Dimethylbenz(a)anthracene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		Benzo(b/j/k)fluoranthene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		Benzo(a)pyrene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		3-Methylcholanthrene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		Indeno(1,2,3-cd)pyrene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		Dibenzo(ah)anthracene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		Benzo(ghi)perylene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	
		Dibenz(ah,ai,aj)pyrene	N.D.	0.01	ug/g (ppm)		10/03/96	10/07/96	RRR	

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY		
E609700-03	18-BH2-0.2 Sample Type:SOIL Collected:09/18/96	PCB'S in Soil All Aroclors	N.D.	0.10	ug/g (ppm)	10/01/96	10/03/96	SRJ		
		BTEX, TVH and TEH in Soil BTEX and TVH in Soil								
		Benzene	< 0.005	0.005	ug/g (ppm)	09/25/96	09/25/96	QVP		
		Toluene	< 0.005	0.005	ug/g (ppm)	09/25/96	09/25/96	QVP		
		Ethylbenzene	< 0.005	0.005	ug/g (ppm)	09/25/96	09/25/96	QVP		
		Xylenes	0.11	0.005	ug/g (ppm)	09/25/96	09/25/96	QVP		
		Total Volatiles	0.6	0.1	ug/g (ppm)	09/25/96	09/25/96	QVP		
		% Moisture	14.5		%	09/25/96	09/26/96	CEH		
		Total Extractables (Soil)	25	5.0	ug/g (ppm)	09/25/96	09/26/96	QVP		
		E609700-04	18-BH4-0.1 Sample Type:SOIL Collected:09/18/96	Tier1-PAHs in Soil						
				Naphthalene	N.D.	0.02	ug/g (ppm)	10/03/96	10/07/96	RRR
				Acenaphthylene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
				Acenaphthene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
Fluorene	N.D.			0.01	ug/g (ppm)	10/03/96	10/07/96	RRR		
Phenanthrene/Anthracene	N.D.			0.01	ug/g (ppm)	10/03/96	10/07/96	RRR		
Fluoranthene	N.D.			0.01	ug/g (ppm)	10/03/96	10/07/96	RRR		
Pyrene	N.D.			0.01	ug/g (ppm)	10/03/96	10/07/96	RRR		
B(a)A/Chrysene/B(c)P	N.D.			0.01	ug/g (ppm)	10/03/96	10/07/96	RRR		
7,12-Dimethylbenz(a)anthracene	N.D.			0.01	ug/g (ppm)	10/03/96	10/07/96	RRR		
Benzo(b/j/k)fluoranthene	N.D.			0.01	ug/g (ppm)	10/03/96	10/07/96	RRR		
Benzo(a)pyrene	N.D.			0.01	ug/g (ppm)	10/03/96	10/07/96	RRR		
3-Methylcholanthrene	N.D.			0.01	ug/g (ppm)	10/03/96	10/07/96	RRR		
Indeno(1,2,3-cd)pyrene	N.D.			0.01	ug/g (ppm)	10/03/96	10/07/96	RRR		
Dibenzo(ah)anthracene	N.D.			0.01	ug/g (ppm)	10/03/96	10/07/96	RRR		
Benzo(ghi)perylene	N.D.			0.01	ug/g (ppm)	10/03/96	10/07/96	RRR		
Dibenz(ah,ai,aj)pyrene	N.D.			0.01	ug/g (ppm)	10/03/96	10/07/96	RRR		
PCB'S in Soil All Aroclors	N.D.			0.10	ug/g (ppm)	10/01/96	10/03/96	SRJ		
BTEX, TVH and TEH in Soil BTEX and TVH in Soil										
Benzene	< 0.005			0.005	ug/g (ppm)	09/25/96	09/25/96	QVP		
Toluene	< 0.005			0.005	ug/g (ppm)	09/25/96	09/25/96	QVP		
Ethylbenzene	< 0.005			0.005	ug/g (ppm)	09/25/96	09/25/96	QVP		
Xylenes	0.005			0.005	ug/g (ppm)	09/25/96	09/25/96	QVP		
Total Volatiles	< 0.1			0.1	ug/g (ppm)	09/25/96	09/25/96	QVP		
% Moisture	37.2				%	09/25/96	09/26/96	CEH		
Total Extractables (Soil)	9.6			5.0	ug/g (ppm)	09/25/96	09/26/96	QVP		
E609700-05	18-BH5-0.1 Sample Type:SOIL Collected:09/18/96			OC Screen in Soil (GC/ECD)						
				HCB	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Gamma-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Beta-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Alpha-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Ronnel	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Heptachlor	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Heptachlor Epoxide	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Aldrin	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		pp-DDE	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Dieldrin	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		pp-DDD	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		pp-DDT	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Methoxychlor	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Mirex	<0.005	0.005	ug/g (ppm)		10/08/96	MTD		
		Metals (SW3051)								
		Silver (Ag)	<1	1	mg/kg		09/27/96	TW		
		Barium (Ba)	105	0.5	mg/kg		09/27/96	TW		
		Beryllium (Be)	<1	1	mg/kg		09/27/96	TW		
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	TW		
		Cobalt (Co)	5	1	mg/kg		09/27/96	TW		
		Chromium (Cr)	19.8	0.5	mg/kg		09/27/96	TW		
		Copper (Cu)	9	1	mg/kg		09/27/96	TW		

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY		
E609700-05	18-BH5-0.1 Sample Type:SOIL Collected:09/18/96	Metals (SW3051)								
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	TW		
		Nickel (Ni)	11	2	mg/kg		09/27/96	TW		
		Lead (Pb)	11	5	mg/kg		09/27/96	TW		
		Tin (Sn)	<5	5	mg/kg		09/27/96	TW		
		Strontium (Sr)	29	1	mg/kg		09/27/96	TW		
		Thallium (Tl)	<1	1	mg/kg		09/27/96	TW		
		Vanadium (V)	34	1	mg/kg		09/27/96	TW		
		Zinc (Zn)	29.5	0.5	mg/kg		09/27/96	TW		
		E609700-06	18-BH7-0.3 Sample Type:SOIL Collected:09/18/96	Metals (SW3051)						
				Silver (Ag)	<1	1	mg/kg		09/27/96	TW
Barium (Ba)	186			0.5	mg/kg		09/27/96	TW		
Beryllium (Be)	<1			1	mg/kg		09/27/96	TW		
Cadmium (Cd)	<0.5			0.5	mg/kg		09/27/96	TW		
Cobalt (Co)	7			1	mg/kg		09/27/96	TW		
Chromium (Cr)	25.4			0.5	mg/kg		09/27/96	TW		
Copper (Cu)	21			1	mg/kg		09/27/96	TW		
Molybdenum (Mo)	<1			1	mg/kg		09/27/96	TW		
Nickel (Ni)	17			2	mg/kg		09/27/96	TW		
Lead (Pb)	30			5	mg/kg		09/27/96	TW		
Tin (Sn)	<5			5	mg/kg		09/27/96	TW		
Strontium (Sr)	39			1	mg/kg		09/27/96	TW		
Thallium (Tl)	<1			1	mg/kg		09/27/96	TW		
Vanadium (V)	38			1	mg/kg		09/27/96	TW		
Zinc (Zn)	111			0.5	mg/kg		09/27/96	TW		
E609700-07	18-BH10-0.2 Sample Type:SOIL Collected:09/18/96			Metals (SW3051)						
		Silver (Ag)	<1	1	mg/kg		09/27/96	TW		
		Barium (Ba)	555	0.5	mg/kg		09/27/96	TW		
		Beryllium (Be)	<1	1	mg/kg		09/27/96	TW		
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	TW		
		Cobalt (Co)	15	1	mg/kg		09/27/96	TW		
		Chromium (Cr)	54.8	0.5	mg/kg		09/27/96	TW		
		Copper (Cu)	42	1	mg/kg		09/27/96	TW		
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	TW		
		Nickel (Ni)	39	2	mg/kg		09/27/96	TW		
		Lead (Pb)	15	5	mg/kg		09/27/96	TW		
		Tin (Sn)	<5	5	mg/kg		09/27/96	TW		
		Strontium (Sr)	89	1	mg/kg		09/27/96	TW		
		Thallium (Tl)	<1	1	mg/kg		09/27/96	TW		
		Vanadium (V)	60	1	mg/kg		09/27/96	TW		
		Zinc (Zn)	95.9	0.5	mg/kg		09/27/96	TW		
		E609700-08	18-SW Sample Type:WATER Collected:09/21/96	OC Screen in Water GC/ECD						
HCB	<0.1			0.1	ug/L (ppb)		10/16/96	MTD		
Gamma-BHC	<0.1			0.1	ug/L (ppb)		10/16/96	MTD		
Beta-BHC	<0.1			0.1	ug/L (ppb)		10/16/96	MTD		
Alpha-BHC	<0.1			0.1	ug/L (ppb)		10/16/96	MTD		
Ronnel	<0.1			0.1	ug/L (ppb)		10/16/96	MTD		
Heptachlor	<0.1			0.1	ug/L (ppb)		10/16/96	MTD		
Heptachlor Epoxide	<0.1			0.1	ug/L (ppb)		10/16/96	MTD		
Aldrin	<0.1			0.1	ug/L (ppb)		10/16/96	MTD		
pp-DDE	<0.1			0.1	ug/L (ppb)		10/16/96	MTD		
Dieldrin	<0.1			0.1	ug/L (ppb)		10/16/96	MTD		
pp-DDD	<0.1			0.1	ug/L (ppb)		10/16/96	MTD		
pp-DDT	<0.1			0.1	ug/L (ppb)		10/16/96	MTD		
Methoxychlor	<0.1			0.1	ug/L (ppb)		10/16/96	MTD		
Mirex	<0.1			0.1	ug/L (ppb)		10/16/96	MTD		
Tier1-PAHs in Water										
Naphthalene	N.D.			0.05	ug/L (ppb)		10/03/96	10/07/96	RRR	
Acenaphthylene	N.D.			0.05	ug/L (ppb)		10/03/96	10/07/96	RRR	

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
E609700-08 18-SW								
Sample Type:WATER								
Collected:09/21/96								
		Acenaphthene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Fluorene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Phenanthrene/Anthracene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Fluoranthene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Pyrene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		B(a)A/Chrysene/B(c)P	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		7,12-Dimethylbenz(a)anthracene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Benzo(b/j/k)fluoranthene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Benzo(a)pyrene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		3-Methylcholanthrene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Indeno(1,2,3-cd)pyrene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Dibenzo(ah)anthracene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Benzo(ghi)perylene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		Dibenz(ah,ai,aj)pyrene	N.D.	0.05	ug/L (ppb)	10/03/96	10/07/96	RRR
		PCB's in Water						
		All Aroclors	N.D.	0.10	ug/L (ppb)	10/01/96	10/03/96	SRJ
		BTEX, TVH and TEH in Water						
		BTEX and TVH in Water						
		Benzene	< 0.5	0.5	ug/L (ppb)	09/25/96	09/26/96	CAS
		Toluene	< 0.5	0.5	ug/L (ppb)	09/25/96	09/26/96	CAS
		Ethylbenzene	< 0.5	0.5	ug/L (ppb)	09/25/96	09/26/96	CAS
		Xylenes	< 0.5	0.5	ug/L (ppb)	09/25/96	09/26/96	CAS
		Total Volatiles	< 100	100	ug/L (ppb)	09/25/96	09/26/96	CAS
		Total Extractables (Water)	< 50	50	ug/L (ppb)	09/26/96	09/27/96	CAS
		Metals, Total						
		Silver (Ag)	<0.005	0.005	mg/L		09/25/96	RH
		Aluminum (Al)	0.04	0.01	mg/L		09/25/96	RH
		Barium (Ba)	0.033	0.003	mg/L		09/25/96	RH
		Beryllium (Be)	<0.002	0.002	mg/L		09/25/96	RH
		Boron (B)	<0.05	0.05	mg/L		09/25/96	RH
		Calcium (Ca)	54.4	0.5	mg/L		09/25/96	RH
		Cadmium (Cd)	<0.001	0.001	mg/L		09/25/96	RH
		Cobalt (Co)	<0.002	0.002	mg/L		09/25/96	RH
		Chromium (Cr)	<0.005	0.005	mg/L		09/25/96	RH
		Copper (Cu)	0.001	0.001	mg/L		09/25/96	RH
		Iron (Fe)	0.221	0.005	mg/L		09/25/96	RH
		Potassium (K)	2.7	0.1	mg/L		09/25/96	RH
		Magnesium (Mg)	16.8	0.1	mg/L		09/25/96	RH
		Manganese (Mn)	0.073	0.001	mg/L		09/25/96	RH
		Molybdenum (Mo)	0.011	0.005	mg/L		09/25/96	RH
		Sodium (Na)	22	1	mg/L		09/25/96	RH
		Nickel (Ni)	<0.002	0.002	mg/L		09/25/96	RH
		Lead (Pb)	<0.005	0.005	mg/L		09/25/96	RH
		Phosphorus (P)	<0.05	0.05	mg/L		09/25/96	RH
		Silicon (Si)	4.6	0.1	mg/L		09/25/96	RH
		Tin (Sn)	<0.05	0.05	mg/L		09/25/96	RH
		Strontium (Sr)	0.442	0.002	mg/L		09/25/96	RH
		Titanium (Ti)	<0.001	0.001	mg/L		09/25/96	RH
		Thallium (Tl)	<0.05	0.05	mg/L		09/25/96	RH
		Vanadium (V)	0.003	0.001	mg/L		09/25/96	RH
		Zinc (Zn)	0.033	0.001	mg/L		09/25/96	RH
E609700-09 18-TP4-2.0								
Sample Type:SOIL								
Collected:09/22/96								
		Tier1-PAHs in Soil						
		Naphthalene	1.7	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Acenaphthylene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Acenaphthene	0.59	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Fluorene	1.4	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Phenanthrene/Anthracene	3.4	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Fluoranthene	0.07	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Pyrene	0.23	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		B(a)A/Chrysene/B(c)P	0.05	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		7,12-Dimethylbenz(a)anthracene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(b/j/k)fluoranthene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(a)pyrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		3-Methylcholanthrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Indeno(1,2,3-cd)pyrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Dibenzo(ah)anthracene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(ghi)perylene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Dibenz(ah,ai,aj)pyrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
E609700-09	18-TP4-2.0							
	Sample Type:SOIL							
	Collected:09/22/96							
		BTEX, TVH and TEH in Soil						
		BTEX and TVH in Soil						
		Benzene	< 0.005	0.005	ug/g (ppm)	09/25/96	09/25/96	QVP
		Toluene	< 0.005	0.005	ug/g (ppm)	09/25/96	09/25/96	QVP
		Ethylbenzene	0.019	0.005	ug/g (ppm)	09/25/96	09/25/96	QVP
		Xylenes	0.077	0.005	ug/g (ppm)	09/25/96	09/25/96	QVP
		Total Volatiles	2.6	0.1	ug/g (ppm)	09/25/96	09/25/96	QVP
		% Moisture	11.5		%	09/25/96	09/26/96	CEH
		Total Extractables (Soil)	2500	5.0	ug/g (ppm)	09/25/96	09/26/96	QVP
		Lead in Soil						
		Lead, (Total)	16	5	mg/kg		09/27/96	KH
E609700-10	18-TP1-1.2							
	Sample Type:SOIL							
	Collected:09/22/96							
		Metals (SW3051)						
		Silver (Ag)	<1	1	mg/kg		09/27/96	RH
		Barium (Ba)	95.3	0.5	mg/kg		09/27/96	RH
		Beryllium (Be)	<1	1	mg/kg		09/27/96	RH
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	RH
		Cobalt (Co)	11	1	mg/kg		09/27/96	RH
		Chromium (Cr)	23.4	0.5	mg/kg		09/27/96	RH
		Copper (Cu)	15	1	mg/kg		09/27/96	RH
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	RH
		Nickel (Ni)	19	2	mg/kg		09/27/96	RH
		Lead (Pb)	14	5	mg/kg		09/27/96	RH
		Tin (Sn)	<5	5	mg/kg		09/27/96	RH
		Strontium (Sr)	43	1	mg/kg		09/27/96	RH
		Thallium (Tl)	<1	1	mg/kg		09/27/96	RH
		Vanadium (V)	49	1	mg/kg		09/27/96	RH
		Zinc (Zn)	47.0	0.5	mg/kg		09/27/96	RH
E609700-11	18-TP5-1.1							
	Sample Type:SOIL							
	Collected:09/22/96							
		Metals (SW3051)						
		Silver (Ag)	<1	1	mg/kg		09/27/96	RH
		Barium (Ba)	145	0.5	mg/kg		09/27/96	RH
		Beryllium (Be)	<1	1	mg/kg		09/27/96	RH
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	RH
		Cobalt (Co)	12	1	mg/kg		09/27/96	RH
		Chromium (Cr)	26.0	0.5	mg/kg		09/27/96	RH
		Copper (Cu)	19	1	mg/kg		09/27/96	RH
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	RH
		Nickel (Ni)	28	2	mg/kg		09/27/96	RH
		Lead (Pb)	13	5	mg/kg		09/27/96	RH
		Tin (Sn)	<5	5	mg/kg		09/27/96	RH
		Strontium (Sr)	59	1	mg/kg		09/27/96	RH
		Thallium (Tl)	<1	1	mg/kg		09/27/96	RH
		Vanadium (V)	47	1	mg/kg		09/27/96	RH
		Zinc (Zn)	65.5	0.5	mg/kg		09/27/96	RH
E609700-12	TR16-SS1							
	Sample Type:SOIL							
	Collected:09/20/96							
		OC Screen in Soil (GC/ECD)						
		HCB	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Gamma-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Beta-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Alpha-BHC	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Ronnel	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Heptachlor	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Heptachlor Epoxide	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Aldrin	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDE	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Dieldrin	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDD	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDT	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Methoxychlor	<0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Mirex	<0.005	0.005	ug/g (ppm)		10/08/96	MTD

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
E609700-12	TR16-SS1							
		Sample Type:SOIL Collected:09/20/96						
		Tier1-PAHs in Soil						
		Naphthalene	0.02	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Acenaphthylene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Acenaphthene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Fluorene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Phenanthrene/Anthracene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Fluoranthene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Pyrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		B(a)A/Chrysene/B(c)P	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		7,12-Dimethylbenz(a)anthracene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(b/j/k)fluoranthene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(a)pyrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		3-Methylcholanthrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Indeno(1,2,3-cd)pyrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Dibenzo(ah)anthracene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Benzo(ghi)perylene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		Dibenz(ah,ai,aj)pyrene	N.D.	0.01	ug/g (ppm)	10/03/96	10/07/96	RRR
		PCB'S in Soil						
		All Aroclors	N.D.	0.10	ug/g (ppm)	10/01/96	10/04/96	SRJ
		BTEX, TVH and TEH in Soil						
		BTEX and TVH in Soil						
		Benzene	< 0.005	0.005	ug/g (ppm)	09/25/96	09/25/96	QVP
		Toluene	< 0.005	0.005	ug/g (ppm)	09/25/96	09/25/96	QVP
		Ethylbenzene	< 0.005	0.005	ug/g (ppm)	09/25/96	09/25/96	QVP
		Xylenes	< 0.005	0.005	ug/g (ppm)	09/25/96	09/25/96	QVP
		Total Volatiles	< 0.1	0.1	ug/g (ppm)	09/25/96	09/25/96	QVP
		% Moisture	29.3		%	09/25/96	09/26/96	CEH
		Total Extractables (Soil)	< 5.0	5.0	ug/g (ppm)	09/25/96	09/26/96	QVP
		Metals (SW3051)						
		Silver (Ag)	< 1	1	mg/kg		09/27/96	RH
		Barium (Ba)	185	0.5	mg/kg		09/27/96	RH
		Beryllium (Be)	< 1	1	mg/kg		09/27/96	RH
		Cadmium (Cd)	< 0.5	0.5	mg/kg		09/27/96	RH
		Cobalt (Co)	12	1	mg/kg		09/27/96	RH
		Chromium (Cr)	28.1	0.5	mg/kg		09/27/96	RH
		Copper (Cu)	59	1	mg/kg		09/27/96	RH
		Molybdenum (Mo)	< 1	1	mg/kg		09/27/96	RH
		Nickel (Ni)	29	2	mg/kg		09/27/96	RH
		Lead (Pb)	59	5	mg/kg		09/27/96	RH
		Tin (Sn)	< 5	5	mg/kg		09/27/96	RH
		Strontium (Sr)	42	1	mg/kg		09/27/96	RH
		Thallium (Tl)	< 1	1	mg/kg		09/27/96	RH
		Vanadium (V)	40	1	mg/kg		09/27/96	RH
		Zinc (Zn)	137	0.5	mg/kg		09/27/96	RH
E609700-13	TRD 16-SS1							
		Sample Type:SOIL Collected:09/20/96						
		OC Screen in Soil (GC/ECD)						
		HCB	< 0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Gamma-BHC	< 0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Beta-BHC	< 0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Alpha-BHC	< 0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Ronnel	< 0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Heptachlor	< 0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Heptachlor Epoxide	< 0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Aldrin	< 0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDE	< 0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Dieldrin	< 0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDD	< 0.005	0.005	ug/g (ppm)		10/08/96	MTD
		pp-DDT	< 0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Methoxychlor	< 0.005	0.005	ug/g (ppm)		10/08/96	MTD
		Mirex	< 0.005	0.005	ug/g (ppm)		10/08/96	MTD
E609700-14	TRD 16-BH1-0.1m							
		Sample Type:SOIL Collected:09/20/96						
		Metals (SW3051)						
		Silver (Ag)	< 1	1	mg/kg		09/27/96	RH
		Barium (Ba)	234	0.5	mg/kg		09/27/96	RH
		Beryllium (Be)	< 1	1	mg/kg		09/27/96	RH

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
E609700-14	TRD 16-BH1-0.1m							
	Sample Type:SOIL							
	Collected:09/20/96							
		Metals (SW3051)						
		Cadmium (Cd)	<0.5	0.5	mg/kg		09/27/96	RH
		Cobalt (Co)	12	1	mg/kg		09/27/96	RH
		Chromium (Cr)	42.7	0.5	mg/kg		09/27/96	RH
		Copper (Cu)	27	1	mg/kg		09/27/96	RH
		Molybdenum (Mo)	<1	1	mg/kg		09/27/96	RH
		Nickel (Ni)	36	2	mg/kg		09/27/96	RH
		Lead (Pb)	15	5	mg/kg		09/27/96	RH
		Tin (Sn)	<5	5	mg/kg		09/27/96	RH
		Strontium (Sr)	79	1	mg/kg		09/27/96	RH
		Thallium (Tl)	<1	1	mg/kg		09/27/96	RH
		Vanadium (V)	50	1	mg/kg		09/27/96	RH
		Zinc (Zn)	64.9	0.5	mg/kg		09/27/96	RH
E609700-15	TR16 -PA1							
	Sample Type:PAINT							
	Collected:09/20/96							
		PCBs in Paint						
		Aroclor 1254	5.6	1.0	ug/g (ppm)	10/02/96	10/08/96	CSI
		Metals (SW3051)						
		Silver (Ag)	<1	1	mg/kg		09/27/96	RH
		Barium (Ba)	1610	0.5	mg/kg		09/27/96	RH
		Beryllium (Be)	<1	1	mg/kg		09/27/96	RH
		Cadmium (Cd)	9	0.5	mg/kg		09/27/96	RH
		Cobalt (Co)	148	1	mg/kg		09/27/96	RH
		Chromium (Cr)	4290	0.5	mg/kg		09/27/96	RH
		Copper (Cu)	90	1	mg/kg		09/27/96	RH
		Molybdenum (Mo)	259	1	mg/kg		09/27/96	RH
		Nickel (Ni)	233	2	mg/kg		09/27/96	RH
		Lead (Pb)	66000	5	mg/kg		09/27/96	RH
		Tin (Sn)	<5	5	mg/kg		09/27/96	RH
		Strontium (Sr)	67	1	mg/kg		09/27/96	RH
		Thallium (Tl)	<1	1	mg/kg		09/27/96	RH
		Vanadium (V)	<1	1	mg/kg		09/27/96	RH
		Zinc (Zn)	19700	0.5	mg/kg		09/27/96	RH
E609700-16	TR16-SW1							
	Sample Type:WATER							
	Collected:09/20/96							
		OC Screen in Water GC/ECD						
		HCB	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Gamma-BHC	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Beta-BHC	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Alpha-BHC	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Ronnel	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Heptachlor	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Heptachlor Epoxide	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Aldrin	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		pp-DDE	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Dieldrin	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		pp-DDD	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		pp-DDT	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Methoxychlor	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		Mirex	<0.1	0.1	ug/L (ppb)		10/16/96	MTD
		PCB's in Water						
		All Aroclors	N.D.	0.10	ug/L (ppb)	10/01/96	10/03/96	SRJ
		Metals, Total						
		Silver (Ag)	<0.005	0.005	mg/L		09/25/96	RH
		Aluminum (Al)	0.04	0.01	mg/L		09/25/96	RH
		Barium (Ba)	0.035	0.003	mg/L		09/25/96	RH
		Beryllium (Be)	<0.002	0.002	mg/L		09/25/96	RH
		Boron (B)	<0.05	0.05	mg/L		09/25/96	RH
		Calcium (Ca)	19.8	0.5	mg/L		09/25/96	RH
		Cadmium (Cd)	<0.001	0.001	mg/L		09/25/96	RH
		Cobalt (Co)	0.004	0.002	mg/L		09/25/96	RH
		Chromium (Cr)	<0.005	0.005	mg/L		09/25/96	RH
		Copper (Cu)	0.002	0.001	mg/L		09/25/96	RH
		Iron (Fe)	0.060	0.005	mg/L		09/25/96	RH
		Potassium (K)	1.2	0.1	mg/L		09/25/96	RH
		Magnesium (Mg)	5.7	0.1	mg/L		09/25/96	RH
		Manganese (Mn)	0.003	0.001	mg/L		09/25/96	RH

ENVIRO-TEST CHEMICAL ANALYSIS REPORT

LAB ID	SAMPLE ID	TEST DESCRIPTION	RESULT	D.L.	UNITS	EXTRACTED	ANALYZED	BY
E609700-16	TR16-SW1							
		Sample Type:WATER						
		Collected:09/20/96						
		Metals, Total						
		Molybdenum (Mo)	<0.005	0.005	mg/L		09/25/96	RH
		Sodium (Na)	4	1	mg/L		09/25/96	RH
		Nickel (Ni)	<0.002	0.002	mg/L		09/25/96	RH
		Lead (Pb)	<0.005	0.005	mg/L		09/25/96	RH
		Phosphorus (P)	<0.05	0.05	mg/L		09/25/96	RH
		Silicon (Si)	0.1	0.1	mg/L		09/25/96	RH
		Tin (Sn)	<0.05	0.05	mg/L		09/25/96	RH
		Strontium (Sr)	0.092	0.002	mg/L		09/25/96	RH
		Titanium (Ti)	<0.001	0.001	mg/L		09/25/96	RH
		Thallium (Tl)	<0.05	0.05	mg/L		09/25/96	RH
		Vanadium (V)	0.002	0.001	mg/L		09/25/96	RH
		Zinc (Zn)	0.017	0.001	mg/L		09/25/96	RH
<p>N.D. - NOT DETECTED, LESS THAN THE DETECTION LIMIT</p> <p>THIS IS THE FINAL PAGE OF THE REPORT</p>								

ENGINEERING LTD.

SEP 30 1996			
TO	OK	TO	OK
ES			

September 26, 1996

UMA Engineering Ltd.
17007-107 Avenue
Edmonton, Alberta
T5S 1G3

Attention: MS. EVA SCHULZ

Dear Ms. Schulz,

Re: Bulk Material Identification Report

Please find attached our laboratory's results for the two (2) bulk samples that were received at our laboratory for identification on September 26, 1996.

Examination of these samples for asbestos content was conducted in accordance with the current U.S. 40 Code of Federal Regulations Chapter I (1-1-87 edition) Part 763, Subpart F, Appendix A analytical methodology for the analysis of asbestos in building materials using polarized light microscopy (PLM) and dispersion staining techniques. The detection limit of this method is listed as < 1 %. Multiple phases within samples are analyzed separately. Quantitation by visual estimate is subjective and may result in a higher degree of error for samples containing low percentages of asbestos.

This test report relates only to the items tested and any extrapolation by the client of these results is the responsibility of the client.

PHH Environmental Limited will store this sample for 90 days after analysis. After this time, the sample will be disposed of unless the client has requested that the sample be returned.

If further clarification of these results is required please call our office. Thank you for having PHH Environmental Limited of Edmonton carry out this work for you.

Sincerely,

PHH Environmental Limited

Per: *Karen Orlando*

Karen Orlando, B.Sc.
Laboratory Analyst

File: 6081B11

LOG NUMBER	SAMPLE NUMBER	DATE ANALYZED	SAMPLE INFORMATION	SAMPLE DESCRIPTION	TYPE OF ASBESTOS	%	OTHER COMPONENTS (%)	ANALYST
552	1	96/09/26	17 Main Site debris fibreboard	75% Brown fibrous mat 25% Grey fibrous mat	None Detected Chrysotile	0.00 70.00	Cellulose (100) Cellulose (20), NF (10)	KO
553	2	96/09/26	Diand Yukon Location 18 BH6 block	100% Grey cementitious mass	None Detected	0.00	Cellulose (15), NF (85)	KO

APPENDIX D
QA/QC

D. QUALITY ASSURANCE/QUALITY CONTROL QA/QC PROGRAM

A quality assurance/quality control program was used to monitor data quality and reliability. The program included:

- internal spikes (using a known concentration of an analyte) and surrogate standards to monitor analytical accuracy.
- analytical or procedural duplicates of samples to monitor internally the precision or repeatability of the results.
- submission of blind field duplicates obtained during the sampling program.

The results of the QA/QC program are summarized below.

D.1 Inorganic Element (Metal Analyses)

Analytical precision for inorganic elements was performed internally at EnviroTest using Standard Reference Material and a spiked matrix sample as shown in Table D.1. Generally, determined values which fall within 30% of the expected values (for spikes) are considered to indicate reasonable to good analytical accuracy. Good analytical accuracy was found for the majority of the inorganic analytes in the spiked soil sample. Determined concentrations in the standard reference material were typically underestimated, but were still within the range of acceptable limits. Recovery values for the spiked water sample, as shown in Table D.2, were within the acceptable limits (+/- 30%) indicating good precision.

One pair of duplicate samples of soil and water were submitted for analyses as external monitors of analytical precision. Agreement between duplicates can be measured either by direct comparison or by calculating the relative standard deviation (RSD), the standard deviation of the duplicates divided by the mean (expressed as a percentage). Values of RSD less than 30% indicate reasonable to good precision. Tables D.3 and D.4 provide a comparison of the soil and water duplicate samples respectively. For the field duplicate of the soil sample, all RSD values were within the 30% limit indicating good precision for the analytes. Poor repeatability was indicated for the majority of analytes in the water analyses. The poor repeatability is thought to be a result of sampling problems as opposed to analytical error. This observation is consistent with the

TABLE D.1 - INORGANIC ELEMENT SOIL ANALYSES QA/QC REPORT

Parameter	SPIKES		STANDARD REFERENCE MATERIAL			
	Concentration (ppm)	% Rec	Concentration (ppm)	Determined (ppm)	95% Confidence Limit (ppm)	Recovery %
Metals (SW3051)						
Barium	0.50	91.7	83	72	21	87%
Beryllium	0.50	99.2	n/a			
Cadmium	0.25	107.3	3.0	3.0	0.8	100%
Chromium	0.50	96.0	80.0	72.2	21.3	90%
Cobalt	0.50	93.1	11.0	8.2	1.3	75%
Copper	0.50	99.4	80.0	80.9	10.1	101%
Lead	0.50	96.3	145.0	130.7	20.4	90%
Molybdenum	0.50	96.4	n/a			
Nickel	0.50	96.8	37.0	33.4	8.1	90%
Silver	0.50	98.2	n/a			
Strontium	0.25	92.5	32.0	35.4	7.2	111%
Thallium	0.50	100.3	n/a			
Tin	0.50	97.9	n/a			
Vanadium	0.50	97.3	23.0	16.8	10.6	73%
Zinc	0.50	97.2	500.0	352.8	41.6	71%

**TABLE D.2- INORGANIC ELEMENT WATER ANALYSES
QA/QC REPORT**

Parameter	SPIKE	
	Expected (ppm)	% Rec
Metals (SW3051)		
Aluminum	0.5	106.4
Barium	0.1	94.8
Beryllium	0.1	95.7
Boron	0.1	108.5
Cadmium	0.5	93.4
Calcium	40.0	99.7
Chromium	0.1	95.3
Cobalt	0.1	94.4
Copper	0.1	104.7
Iron (total)	0.5	90.3
Lead	0.1	97.3
Magnesium	40.0	97.8
Manganese	0.2	94.5
Molybdenum	0.1	89.9
Nickel	0.1	98.1
Phosphorus	2.0	99.2
Potassium	10.0	102.9
Silicon	0.2	115.8
Silver	0.1	85.2
Sodium	40.0	101.0
Strontium	0.5	94.8
Thallium	0.1	80.0
Tin	0.1	79.2
Titanium	0.2	96.6
Vanadium	0.1	95.5
Zinc	0.1	118.0

**TABLE D.3 - INORGANIC ELEMENT SOIL ANALYSIS
DUPLICATE COMPARISON**

Parameter	SAMPLE		RSD (%)
	15-SS1 (ppm)	15-SS2 (ppm)	
Metals (SW3051)			
Barium	421	391	5%
Beryllium	<1	<1	n/a
Cadmium	<0.5	<0.5	n/a
Chromium	63.6	58.9	5%
Cobalt	18	18	0%
Copper	46	42	6%
Lead	20	16	16%
Molybdenum	<1	<1	n/a
Nickel	66	64	2%
Silver	<1	<1	n/a
Strontium	133	134	1%
Thallium	<1	<1	n/a
Tin	<5	<5	n/a
Vanadium	64	62	2%
Zinc	93	93.5	0%

**TABLE D.4- INORGANIC ELEMENT WATER
DUPLICATE COMPARISON**

Parameter	SAMPLE		
	17-SW (ppm)	17-SW1 (ppm)	% RSD
Metals (SW3051)			
Aluminum	0.37	0.01	134%
Barium	0.152	0.053	68%
Beryllium	<0.002	<0.002	---
Boron	<0.05	<0.05	---
Cadmium	<0.001	<0.001	---
Calcium	61.8	55.3	8%
Chromium	<0.005	<0.005	---
Cobalt	<0.002	0.004	---
Copper	<0.001	<0.001	---
Iron (total)	7.1	0.4	126%
Lead	<0.005	<0.005	---
Magnesium	15.1	16.7	7%
Manganese	1.560	0.029	---
Molybdenum	<0.005	<0.005	---
Nickel	<0.002	<0.002	---
Phosphorus	0.7	<0.05	---
Potassium	3.3	3.6	6%
Silicon	6.4	4.8	20%
Silver	<0.005	<0.005	---
Sodium	8	9	8%
Strontium	0.369	0.368	0%
Thallium	<0.05	<0.05	---
Tin	<0.05	<0.05	---
Titanium	0.010	<0.001	---
Vanadium	0.002	0.002	0%
Zinc	0.039	0.030	18%

difficulties encountered during sampling as the water was very turbid. As indicated in the main body of the report, repeat sampling of this area is required to verify the results.

D.2 Hydrocarbon Analyses

Total Extractable Hydrocarbons (TEH)

Table D.5 provides a summary of the QA/QC for TEH. Good recovery percentages were recorded for both soil and water spiked samples, with TEH concentrations in soil being slightly overestimated and TEH concentrations in water slightly underestimated.

TABLE D.5 SUMMARY OF QA/QC FOR TEH		
Media	% Recovery	% RSD
Soil	115%	+/- 18%
Water	84%	+/- 22%

BTEX and Total Volatile (Purgeable) Hydrocarbons

Table D.6 provides a summary of the QA/QC for BTEX and TPH. Good recovery percentages were recorded for both soil and water spiked samples.

TABLE D.6 SUMMARY OF QA/QC FOR BTEX and TPH		
Media	% Recovery	% RSD
Soil	98%	+/- 15%
Water	95%	+/- 8%

Polycyclic Aromatic Hydrocarbons (PAHs)

Two surrogate samples for each of soil and water were run to evaluate the QA/QC of the PAH analyses. The percent surrogate recovery is provided in Table D.7.

TABLE D.7 SUMMARY OF PAH QA/QC ANALYSES				
	Soil - % Surrogate Recovery		Water - % Surrogate Recovery	
	E609700	E609701	E60970008D	E6097016D
Nitrobenzene d5	72	86	89	93
2-Fluorobiphenyl	100	111	103	108
p-Terphenyl d14	107	121	109	123

Organo-Chlorine Pesticides OC

Representative historical spike recoveries for the Organo-Chlorine Pesticide analyses are provided in Table D.8.

TABLE D.8 SUMMARY OF ORGANO-CHLORINE PESTICIDE QA/QC ANALYSES	
	% Spike Recovery
Alpha BHC	88
Gamma BHC (Lindane)	79
Dieldrin	99
p,p-DDT	97
Methoxychlor	93

PCBs

Table D.9 summarizes the percent recovery for PCB surrogate and spiked samples for soil and water analyses.

TABLE D.9 SUMMARY OF PCB QA/QC ANALYSES				
	Soil - % Recovery		Water - % Surrogate Recovery	
	E609700	E609701	E60970008D	E6097016D
Surrogate Recovery	91	91	117	117
Spike Recovery	99	99	107	107

Appendix A Test Methodologies

Acid Digestion

Preparation: Microwave digestion of sample in a closed vessel with concentrated nitric acid on a wet or dry soil/solids

Reference: E.P.A. SW 846 Method 3051

Acid Digestion

Preparation: Microwave digestion of sample in a closed vessel with concentrated nitric acid on water samples.

Reference: E.P.A. SW 846 Method 3015

BTEX and TVH in Soil

NOTE: All results reported on dry weight basis.

Total Volatiles: This semi-quantitative result is a summation from the C3 to C10 carbon range (including benzene, toluene, ethylbenzene, and xylenes) and is calculated against a gasoline standard.

BTEX METHOD REFERENCE: Modified EPA SW-846 Method-5021/8015 and 8020.

QA/QC SUMMARY FOR BTEX:

TEST	ACCURACY	PRECISION
BTEX (Soil)	98%	± 15%

NOTE: Accuracy is expressed as the average % recovery and Precision as the relative standard deviation (RSD) of fortifications made using certified standards (BTEX).

BTEX and TVH in Water

Total Volatiles: This semi-quantitative result is a summation from the C3 to C10 carbon range (including benzene, toluene, ethylbenzene, and xylenes) and is calculated against a calibrated gasoline standard.

BTEX METHOD REFERENCE: Modified EPA SW-846 Method-5030/8015 and 8020.

QA/QC FOR BTEX:

TEST	ACCURACY	PRECISION
BTEX (Water)	95%	± 8%

NOTE: Accuracy is expressed as the average % recovery and Precision as the relative standard deviation (RSD) of fortifications made using certified standards (BTEX).

ICP Metals

PREPARATION METHOD:

Dissolved: Filter through 0.45u and preserve with nitric acid
Extractable: Preserve with nitric acid
Total: Preserve with nitric acid; digest with nitric/hydrochloric acid

INSTRUMENTAL METHOD: ICP Spectrophotometry

METHOD REFERENCE: APHA 3120B/3030F, Standard Methods; 18th ed.

Appendix A Test Methodologies

METALS	ENVIRODAT CODE	WAVELENGTH
Aluminum (Al)	327	308.2
Barium (Ba)	330	455.4
Beryllium (Be)	331	313.0
Boron (B)	329	249.8
Cadmium (Cd)	334	226.5
Calcium (Ca)	333	317.9
Chromium (Cr)	336	267.7
Cobalt (Co)	335	228.6
Copper (Cu)	337	324.7
Iron (Fe)	338	259.9
Lead (Pb)	82360	220.3
Magnesium (Mg)	341	279.1
Manganese (Mn)	342	257.6
Molybdenum (Mo)	343	202.0
Nickel (Ni)	28350	231.6
Phosphorus (P)	N/A	178.3
Potassium (K)	339	766.5
Silicon (Si)	N/A	212.4
Silver (Ag)	326	328.1
Sodium (Na)	11005	589.0
Strontium (Sr)	347	407.8
Thallium (Tl)	349	190.9
Tin (Sn)	346	189.9
Titanium (Ti)	N/A	334.9
Vanadium (V)	N/A	367.0
Zinc (Zn)	N/A	213.8

ICP Method Descriptions

Metals by Inductively Coupled Plasma in digests of soils/solids

METHOD REFERENCE: E.P.A. SW846 Method 6010

NOTE: Wavelengths selected for analysis are the determination of the laboratory

METAL	WAVELENGTH	*DETECTION LIMIT mg/Kg
Barium (Ba)	455.403	0.5
Beryllium (Be)	313.042	1
Cadmium (Cd)	228.802	0.5
Calcium (Ca)	317.933	5
Chromium (Cr)	283.563	0.5
Cobalt (Co)	238.892	1
Copper (Cu)	324.754	1
Iron (Fe)	259.940	1
Lead (Pb)	220.353	5
Lithium (Li)	670.781	20
Magnesium (Mg)	285.213	5
Manganese (Mn)	257.610	1
Molybdenum (Mo)	281.615	1
Nickel (Ni)	231.604	1
Sodium (Na)	588.995	5
Potassium (K)	769.896	5
Tin (Sn)	189.926	5
Thallium (Tl)	351.924	1
Vanadium (V)	290.882	1
Zinc (Zn)	213.856	0.5
Silver (Ag)	328.068	1
Strontium (Sr)	421.552	1

Appendix A Test Methodologies

*The actual detection limits reported will vary with the digestion extraction ratio.

NOTE: Wavelengths and detection limits may vary with matrix and sample composition.

% Moisture

Preparation Method: Sample is oven dried at 105 degrees C
Instrumental Method: Gravimetric analysis

OC Screen in Soil (GC/ECD)

Method Overview: Samples were extracted into Acetone/Water which was diluted into water, partitioned into Dichloromethane, concentrated, and exchanged into Hexane. Florisil clean-up is done on all extracts should it be required. Samples were analyzed by GC/ECD. Positive results may be confirmed by GC/MSD if requested.

OC Screen in Water GC/ECD

Method Ref.: Samples for Organo-Chlorine Pesticide analysis were partitioned into Dichloromethane, concentrated, exchanged into Hexane and analyzed by Gas Chromatography/Electron Capture Detection.

QA/QC: Representative Historical Spike Recoveries

Alpha BHC 88%

Gamma BHC (Lindane) 79%

Dieldrin 99%

p,p-DDT 97%

Methoxychlor 93%

Tier1-PAHs in Soil

Preparation Method: Soxhlet extraction with DCM or by accelerated solvent extraction with DCM/Acetone

Instrument Method: GC/MSD analysis

Method Reference: Extraction Method: EPA 3540 (modified) or EPA 3545 (modified)
Analytical Method: EPA 8270 (modified)

Tier1-PAHs in Water

Preparation Method: Liquid/liquid extraction with DCM

Instrument Method: GC/MSD analysis

Method Reference: Extraction Method: EPA 3510 or EPA 3520 (modified)
Analytical Method: EPA 8270 (modified)

PCB'S in Soil

Preparation Method: Extraction with acetone/hexane

Instrument Method: GC/ECD analysis

Method Reference: Extraction Method: EPA 3550 (modified)
Analytical Method: EPA 8080 (modified)

Appendix A Test Methodologies

Minimum Detection Limit (MDL) - 0.030 ppm for all Aroclors

QA/QC Statement:

Accuracy is 99% (expressed as the average recovery of PCB in soil at a 5 ppm level).

Precision is +/- 15% (expressed as the relative standard deviation or RSD).

PCB's in Water

Preparation Method: Extraction with dichloromethane

Instrument Method: GC/ECD analysis

Method Reference: Extraction Method: EPA 3510 (modified)
Analytical Method: EPA 8080 (modified)

Minimum Quantifiable Level (MQL) - 0.10 ppb for all Aroclors

Minimum Detection Limit (MDL) - 0.050 ppb for all Aroclors

Trace - denotes concentrations which are >MDL but <MQL

QA/QC Statement:

Accuracy is 93% (expressed as the average % recovery of PCB in water at a 5 ppb level).

Precision is +/- 16% (expressed as the relative standard deviation or RSD).

Total Extractables (Soil)

NOTE: All results reported on dry weight basis.

Total Extractables: This result is a summation of the hydrocarbon concentration from the C11 to C30 carbon range (excluding benzene, toluene, ethylbenzene, and xylenes) and is calculated against a calibrated diesel standard.

TOTAL EXTRACTABLES METHOD REFERENCE: Modified EPA SW-846 Method-3550 or 3580/8000

QA/QC FOR TEH:

TEST	ACCURACY	PRECISION
Total Extractables (Soil)	115%	± 18%

NOTE: Accuracy is expressed as the average % recovery and Precision as the relative standard deviation (RSD) of fortifications made using in house standards (total extractables).

Total Extractables (Water)

Total Extractables: This result is a summation of the hydrocarbon concentration from the C11 to C30 carbon range (excluding benzene, toluene, ethylbenzene, and xylenes) and is calculated against a calibrated diesel standard.

TOTAL EXTRACTABLES METHOD REFERENCE: Modified EPA SW-846 Method-3510/8000

QA/QC FOR TEH:

Appendix A Test Methodologies

TEST	ACCURACY	PRECISION
Total Extractables (Water)	84%	± 22%

NOTE: Accuracy is expressed as the average % recovery and Precision as the relative standard deviation (RSD) of fortifications made using in house standards (total extractables).

THIS IS THE LAST PAGE OF THE METHODOLOGY APPENDIX.

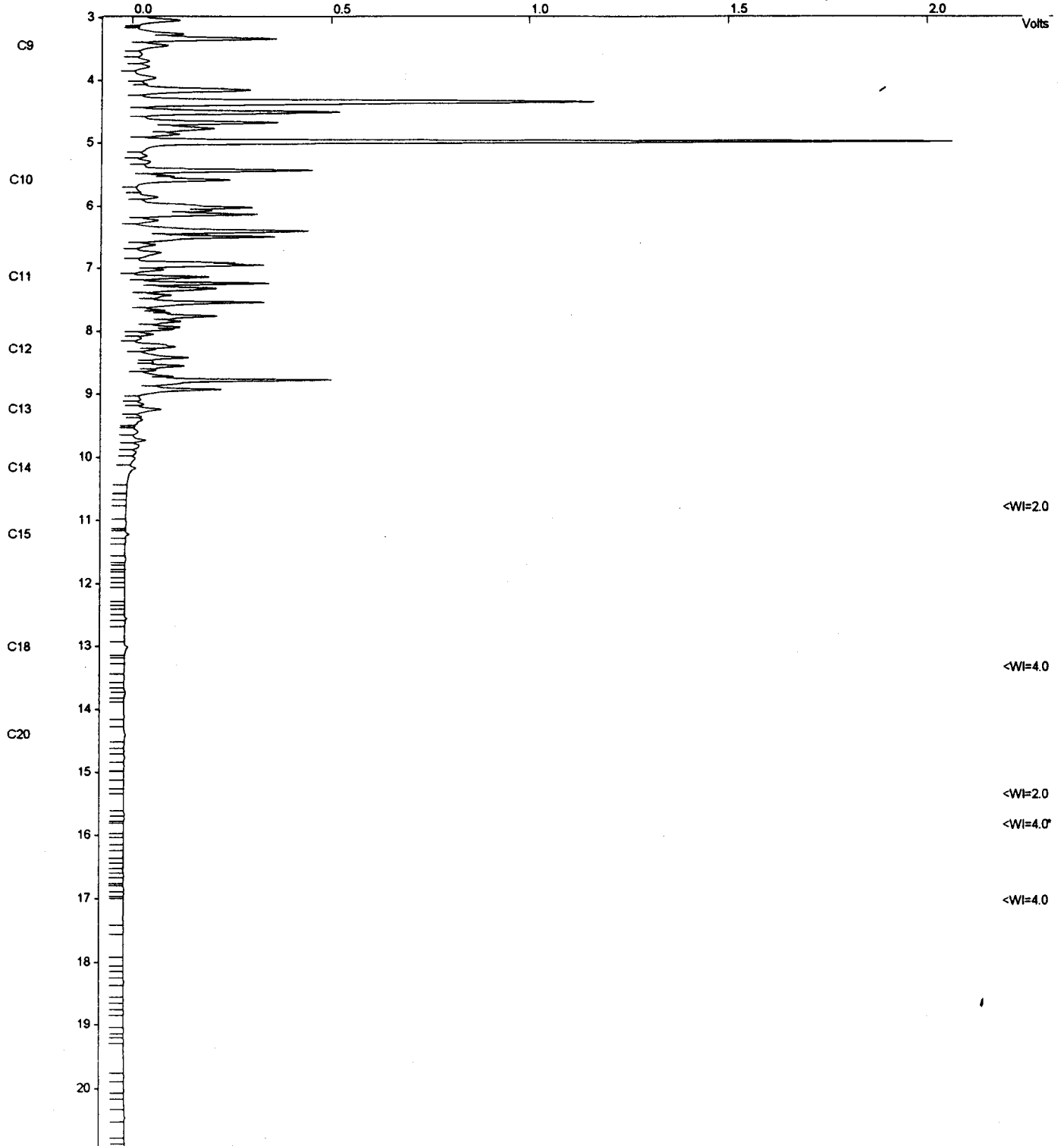
Title : Total extractable hydrocarbons
Run File : g:\star\module18\sepb072.run
Method File : G:\STAR\C-RANGE.B.MTH
Sample ID : Gas std 1100 ppm

Injection Date: 27-SEP-96 5:35 PM Calculation Date: 27-SEP-96 6:01 PM

Operator : UST group Detector Type: ADCB (10 Volts)
Workstation: SYS Bus Address : 18
Instrument : GC 3600 Channel B Sample Rate : 10.00 Hz
Channel : A = FID 10-12 Run Time : 26.002 min

***** Star Chromatography Workstation ***** Version 4.5 *****

Chart Speed = 1.09 cm/min Attenuation = 983 Zero Offset = 3%
Start Time = 3.000 min End Time = 21.000 min Min / Tick = 1.00



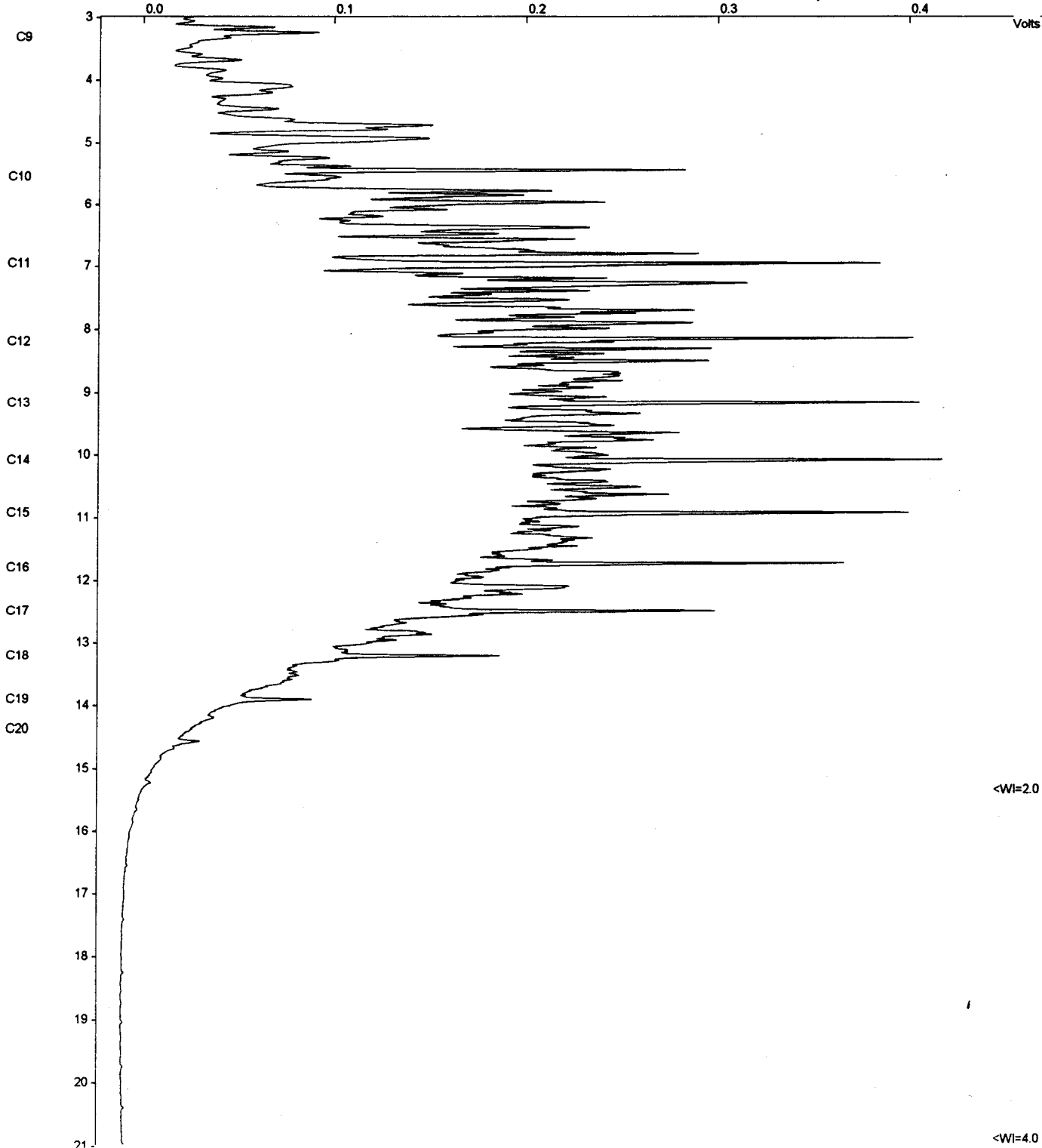
Title : Total extractable hydrocarbons
Run File : g:\star\module16\sepa315.run
Method File : G:\STAR\C-RANGEA.MTH
Sample ID : Diesel std 760 ppm

Injection Date: 27-SEP-96 7:02 PM Calculation Date: 27-SEP-96 7:29 PM

Operator : UST group Detector Type: ADCB (10 Volts)
Workstation: SYS Bus Address : 16
Instrument : GC 3600 Channel A Sample Rate : 10.00 Hz
Channel : A = A 10-12 Run Time : 26.002 min

***** Star Chromatography Workstation ***** Version 4.5 *****

Chart Speed = 1.09 cm/min Attenuation = 202 Zero Offset = 4%
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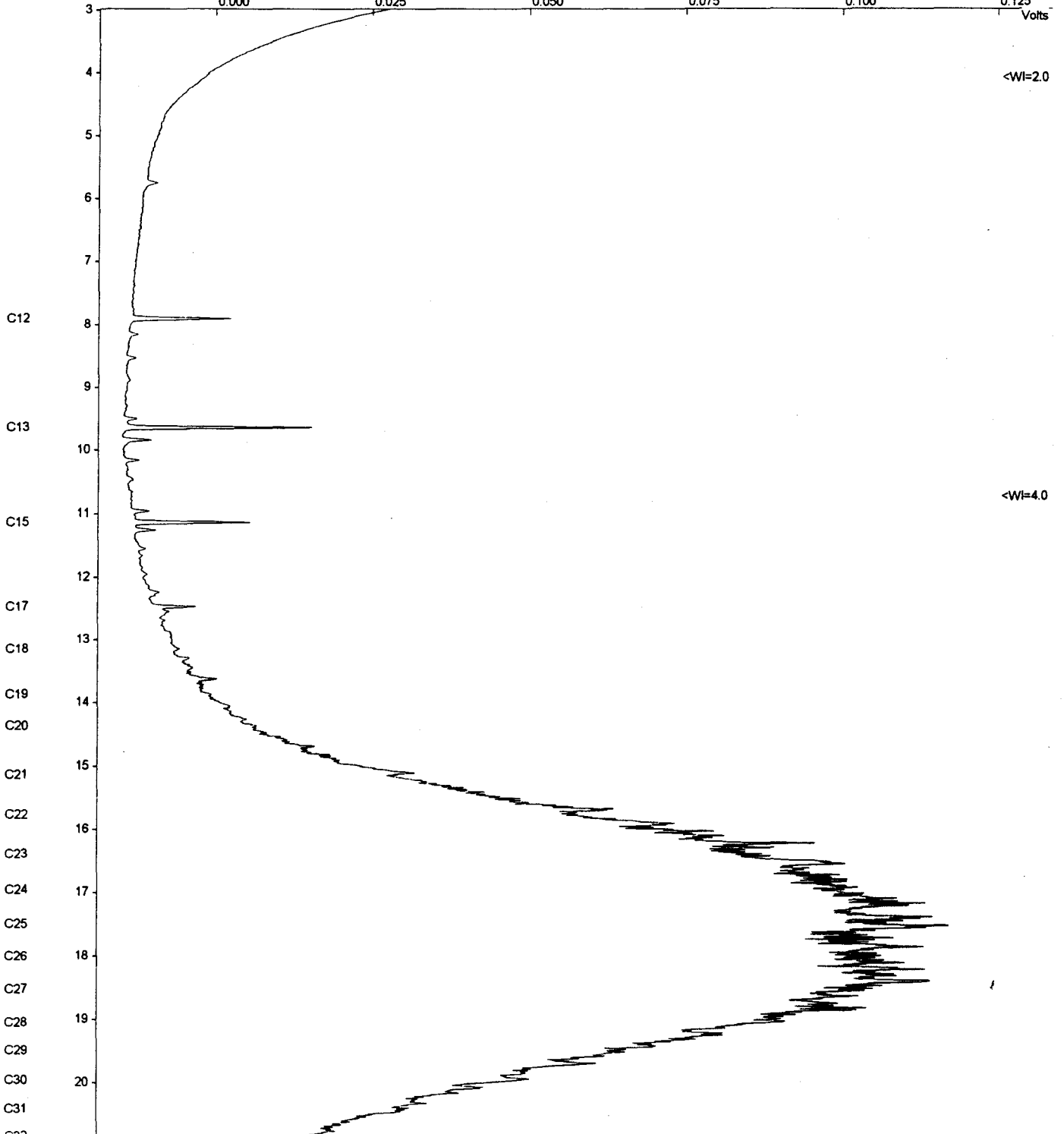
Title : Total extractable hydrocarbons
Run File : g:\star\module16\sepa341.run
Method File : G:\STAR\C-RANGEA.MTH
Sample ID : E609701-01-100

Injection Date: 28-SEP-96 4:20 PM Calculation Date: 28-SEP-96 4:47 PM

Operator : UST group Detector Type: ADCB (10 Volts)
Workstation: SYS Bus Address : 16
Instrument : GC 3600 Channel A Sample Rate : 10.00 Hz
Channel : A = A 10-12 Run Time : 26.002 min

***** Star Chromatography Workstation ***** Version 4.5 *****

Chart Speed = 1.09 cm/min Attenuation = 62 Zero Offset = 12%
Start Time = 3.000 min End Time = 21.000 min Min / Tick = 1.00
0.000 0.025 0.050 0.075 0.100 0.125 Volts



ENVIRO-TEST QA/QC REPORT

BTEX and TVH in Soil

BTEX and TVH in Water

OC Screen in Soil (GC/ECD)

OC Screen in Water GC/ECD

PCB'S in Soil

<u>Average Surrogate Recovery for E609700</u>	<u>%</u>
Decachlorobiphenyl	91

<u>Spike Recovery</u>	<u>%</u>
Aroclor 1260	99

PCB's in Water

<u>Average Surrogate Recovery for E609700</u>	<u>%</u>
Decachlorobiphenyl	117

<u>Spike Recovery</u>	<u>%</u>
Aroclor 1260	107

PCBs in Paint

<u>Surrogate Recovery for E60970015C</u>	<u>%</u>
Decachlorobiphenyl	87

Tier1-PAHs in Soil

<u>Average Surrogate Recovery for E609700</u>	<u>%</u>
Nitrobenzene d5	72
2-Fluorobiphenyl	100
p-Terphenyl d14	107

Tier1-PAHs in Water

<u>Surrogate Recovery for E60970008D</u>	<u>%</u>
Nitrobenzene d5	89
2-Fluorobiphenyl	103
p-Terphenyl d14	109

Relative percent difference is expressed as RPD.

Percent Recovery is expressed as %.

THIS IS THE LAST PAGE OF THE QA/QC REPORT