

**HAINES JUNCTION PUMPING STATION DUMP SITE
CHARACTERIZATION AND STAGING OF NON - EMPTY
CONTAINERS**

FOR

**DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN
DEVELOPMENT
WASTE MANAGEMENT, YUKON REGION**

BY

**LABERGE ENVIRONMENTAL SERVICES
NOVEMBER, 1998**

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1.0 EXECUTIVE SUMMARY

In 1995 during site investigations of the Haines Fairbanks Pipeline, a buried dumpsite near the Haines Junction Pumping Station was delineated through geophysical surveys and test pitting. Full drums of hydrocarbon product were discovered buried in this dump site. Due to the risk that there may be a significant quantity of buried non - empty drums at the site, it was recommended that the site be excavated and these drums recovered to surface for proper disposal before they released contaminants into the surrounding environment.

An excavation of the dump site at the Haines Junction Pumping Station took place on September 1 to 4, 1998.

Approximately 600 m³ of material was turned over and returned to the dump site. A total of sixty nine 45 US gallon drums were encountered. Six drums were full or partly full, containing a total of 750 litres of various hydrocarbon products. Five drums and a sludge/liquid mixture were placed into 90 Imperial gallon over pack units and staged at the site.

An additional 14 empty drums were placed into a metal waste container which was left on site for the duration of the work.

A sampling plan was carried out to characterize the products and waste recovered, and to confirm the overall quality of the soil covering the backfilled waste dump. Results of these samples showed that there were no persistent or highly toxic contaminants found at the dump. A composite of four samples of backfill material from the area where the containers were recovered had 797 mg/Kg Heavy Extractable Petroleum Products (HEPH), while all other parameters analysed were below the limit of detection.

The liquid waste recovered was characterized by gas chromatography and was confirmed as various discarded hydrocarbon products.

When results of the characterization were received it was recommended that all of the recovered waste be disposed of at an approved special waste handling facility. General Waste Management of Whitehorse collected, transported, and disposed of all waste on October 20, 1998. The over pack units were returned to D.I.A.N.D. for use in future projects.

The site should be provided with a soil cap and reclaimed through natural revegetation.

No further excavation or remediation of this site is recommended.

2.0 INTRODUCTION AND BACKGROUND

The Haines Junction Pumping Station on the decommissioned Haines - Fairbanks pipeline was one of five sites subjected to a preliminary Environmental Assessment in 1995 by UMA Engineering in association with Ambio Research Associates Inc. An EM survey and test pitting revealed a significant buried dump near the pumping station. Full drums containing hydrocarbon product were raised to the surface during the test pitting, and numerous other drums were suspected to be contained in the dump.

The Haines Junction Pumping Station is located approximately 17km. north of Haines Junction on the Alaska Highway at 60° 50'N, 137° 45'W. This is mile 158 of the decommissioned Haines-Fairbanks pipeline. The subject of this report is an old dump, situated 450 m WNW of the pumping station. The site is approximately 0.25ha. in size. **See Figure One - Location Plan.**

Significant anecdotal and other evidence exists regarding use and disposal into common garbage dumps of full and partially full containers of hydrocarbon products during the decommissioning of the pipeline and other military projects.

Because of the similarities among the pipeline pumping stations, it was thought that the dump at the Haines Junction Station contained full and partially full drums and other containers. Release of contaminants into the soil as a result of decay of the containers would pose a significant environmental risk. Careful excavation and removal of these containers for proper disposal eliminates this risk.

3.0 METHODOLOGY

The work consisted of a careful excavation of the metal anomalies footprint within the dump site identified as "Grid #1" in the report *Preliminary Environmental Assessment Haines - Fairbanks Pipeline*, August 1995, by UMA Engineering Ltd. The figure *A.1.f Haines Junction Pumping Station Interpretation Map: Grid 1 & 3* from the above report was used as the basis for the site maps in this report. The grid established for the geophysical survey in 1995 is the reference used throughout this project. The original figure is included in this report as Appendix C.

The objective of this work was to expose, sample, characterize, and stage contaminants found in non - empty containers buried within the old dump.

An experienced operator using a conventional rubber tired excavator (580 CASE backhoe) in combination with field testing equipment was used to carefully and completely expose containers in the dump site.

Some laboratory analysis was conducted to characterize waste products and to assess the degree of soil contamination.

Because of the nature of this assignment, a planning component was included to cover preparation of a comprehensive site safety plan. A draft Health and Safety Plan including materials handling and sampling plans was submitted to the Waste Management Branch, modified, and approved before proceeding with the work. A class A Land Use Permit No. YA7X352, site HJ030 was in effect, and the Resource Management Officer and Head of Land Use were advised of the work in advance of the excavation.

3.1 Site Information Review and Identification of Contaminants of Concern

All relevant available studies and archival material were reviewed in preparation for the field work. Contaminants of concern appeared to be limited to hydrocarbon products and related parameters. However, in situations where buried military dumps sites are excavated, the possibility of uncovering other contaminants could not be ruled out. For this reason, extra care and attention was paid to the health and personal safety of site workers.

3.2 Site Health and Safety Plan

A draft comprehensive health and safety plan was developed and submitted for review on August 27. The plan was revised on the advice of the Waste Management Branch, and the final version was submitted and approved on August 31. The document "Haines Junction Pumping Station Dump Site Characterization and Staging of Non - Empty Containers Health and Safety Plan Including Materials Handling and Sampling Plans", August 31, 1998 is attached to this report as Appendix A.

The Health and Safety Plan (HASP) detailed all procedures, equipment, and protocols that were to be used to eliminate any risks to site personnel.

2.3 Material Handling and Excavation Method

A site reconnaissance was made on August 13. The original geophysical survey grid benchmarks and some of the grid markers were still visible from the 1995 survey. These were used to re establish the grid and to mark out the footprint of the metal anomalies.

When the excavation started on September 2, 1998, the working area was stripped of regrowth, which was stockpiled at the edge of the clearing. Flagging tape and fluorescent paint were used to again mark out the footprint of the buried dump. The locations of seven test pits dug during the 1995 work were also marked. **See Figure Two - 1995 Test Pit Locations.** It was concluded from the test pit logs and EM survey that the majority of containers were likely to be found in the south central portion of the dump site.

The excavation started at the south end of the footprint. Buried waste was quickly encountered just beneath the surface, composed of metal waste, jeep tires, and a few olive green crushed drums. The original plan was to advance a continuous excavation by casting backfill and waste onto the down hill face of the pit, but this was abandoned in favour of individual pits because it was easier to control the backhoe in the outstretched reach of each set up. Each pit was dug down to the grey till floor of the dump, which ranged in depth from 1.1 to 2.3 meters.

We used a system of excavating where the operator would scratch away the first few cm of soil and uncover the waste, while the sampler kept an eye out for drums. When a drum was encountered, it would be approached by the sampler with the CGI to check for combustible vapour and oxygen level. The CGI used was a Gastech 1314 Hydrocarbon Surveyor. Then the drum would be exposed with a shovel and checked to see if there was anything in it. Empty drums were pulled out of the pit and cast to the side. In most cases the empties were crushed and returned to the pit when backfilling, but some were left on surface later in the work and placed into the waste container.

Full and part full drums were dealt with as follows: First, the drum was examined for leaks and markings. Most of the drums were clearly labelled. When enough soil was removed, a nylon strap was wrapped around the drum and it was lifted out of the pit and placed into an over pack unit with the backhoe.

When a given pit was finished, dry metal waste and empty drums were cast back into the pit and covered with soil to make a pad for the next move. In this way, a total of 30 pits were dug and backfilled at the site. The area excavated roughly matched the metal anomalies footprint. See **Figure Three - Dump Site Excavation Area.**

4.0 RESULTS

Individual test pit soil description logs have not been prepared. The following is a description of the materials encountered. See **Figure 4 - Dump Site Materials.**

Soil Profile:

The soil profile within the excavations was very consistent and was typically as follows -

- | | |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0 - 0.2m | ORGANIC MAT, granular backfill, brown to grey, fine sand and silts, damp |
| 0.2 - 2.3m | SANDY SILT, granular backfill, garbage. Typical depth of waste and backfill was 2.3m from 10N to 13S. Waste and backfill depth was only 1.2m deep from 10N to 26N. |

1.5 - 2.2m GREY TILL, average depth of original ground. Grey till, dense, fine grained, low moisture content throughout.

All of the full and part full drums were found in the area around the 1995 test pits TP-4 and TP - 3.

All of the area from 10N to 26N was found to contain a shallow layer of burnt domestic garbage. It appeared as though the dump was segregated into metal waste and burnable garbage areas.

A total of about 600 cubic meters of materials were excavated and returned to the dump site. A total of 69 containers were encountered during the work. Of this total, nineteen remain on surface, with five of these contained within over pack units and representing 750 litres of hydrocarbon products. The rest were empty. Fourteen of the empties were placed into the waste container because there was no room to put them back into the dump (it was difficult to compact the empty drums efficiently with the backhoe). Some of these drums were oily and some contained small quantities of oily waste and sludge (a total of less than 20 litres). For this reason, the container was lined with 6 mil poly and two bags of absorbent were spread onto the floor around the drums to soak up any oil that may spill out of the drums when the container is lifted onto the tilt bed truck.

The over pack units were placed onto pallets and left beside the large container for transport and disposal.

Six samples were collected for product identification through gas chromatography. Twelve soil samples were collected of which four were composited and analysed for a complete suite of parameters while the rest were retained as archive samples in case the results of the composite sample required further analysis. The CGI was run continuously within the pits along the surface of exposed soil and within voids. No specific jar head space tests were considered necessary.

5.0 INTERPRETATIONS

5.1 Location of Waste

It should be noted for future reference that the geophysical survey and interpretations of metal anomalies conducted in 1995 by Hyd-Eng Geophysics Inc. was accurate as to the type and aerial distribution of buried metallic objects. The Figure *A.1.f Haines Junction Pumping Station Interpretation Map: Grid 1 & 3* was used throughout this exercise and was very reliable.

5.2 Composition of Recovered Waste

The recovered containers were sampled using glass Thiessen tubes and submitted for gas chromatography analysis to confirm the type of hydrocarbon product. A composite sample of all of the liquids recovered was checked for the presence of PCB as Arochlor. No PCB was detected in any of the recovered liquids.

The following table summarizes the amount and type of hydrocarbon products recovered based on interpretation of the chromatography. The original chemical analysis report and interpretations of chromatographs are included in Appendix B - ASL Chemical Analysis Reports: H.J.P.S. Dump Site Oil Analysis and Soil Analysis.

Table one - Containers and Contents

Sample Identification and Description	Type of Product, Container	Volume
D-1 tan coloured oil	combined motor oil and solvent (likely kerosene). Found in olive green 45USG drum, good cond.	45 USG (1 USG=3.785litres)
D-2 black oily sludge/liquid in split 45 USG drum. Sludge collected and placed in D-4 over pack	used oil mixed with solvent (kerosene) and recovered sludge. Found in split 45 USG drum. Recovered sludge with drum.	45 L liquid plus 20 Kg liquid/sludge
D-3 light tan coloured oil in unopened olive green drum	uncontaminated hydraulic oil found in undamaged unopened 45 USG drum.	45 USG
D-4 sludge nearly liquid black, recovered from around split D-2 drum	oily sludge recovered from around a broken drum.	100 Kg EPH >120,000 ppm
D-5 bright red coloured oil in civilian 45 USG drum, sealed.	transmission fluid red in colour, some crankcase oil mixed in, found in undamaged 45 USG drum, not military type.	130 L
D-6 very strong smelling light brown low viscosity liquid in split 20 USG drum	unknown. Does not match any standard hydrocarbon combination. Strong alcohol odour, soluble in methanol, water, and acetone but insoluble in hexane and dichloromethane. Found in broken 20 USG drum.	40 L
C- Comp (sample taken from the contents of the dumpster)	composite sample taken from small quantities of fluid in drums that are located in the waste container (dumpster), composition matches diesel fuel.	total in all drums < 20 L

5.3 Soil Quality Within Dump Backfill Materials

Soil Samples:

Representative samples of backfill soil were collected from the pits where the containers were found. These samples were composited and analysed for a full suite of parameters. The reason for compositing samples of the backfill was to conserve analysis costs. If any parameter was detected indicating a concern, the individual samples or archived samples could be analysed to further delineate the problem. Also, the backfill composite sample would reflect the degree to which any contaminants had leaked into the soil from broken containers. The composite sample was analysed for the following parameters:

- Non - halogenated Volatiles (BTEX and Light Hydrocarbons)
- Polycyclic Aromatic Hydrocarbons
- Polychlorinated Biphenyls
- Organochlorine Pesticides
- Herbicides
- Extractable Petroleum Hydrocarbons

Of the above suite of parameters, all were below the limit of detection except for Heavy Extractable Petroleum Hydrocarbons (HEPH). The composite sample had 797 mg/Kg HEPH (mg/Kg are equivalent to $\mu\text{g/g}$).

A relevant criteria for this parameter is found in the Yukon Environment Act *Contaminated Sites Regulations*, Schedule 1 Generic Numerical Soil Standards. The criteria for Residential land is 1,000 $\mu\text{g/g}$ HEPH, and for Commercial or Industrial lands 5,000 $\mu\text{g/g}$ HEPH is acceptable. Because the result of 797 mg/Kg came from a composite of four backfill samples, it is possible that one of the samples contained up to 3,188 ppm HEPH. This not likely because the material was well mixed and very consistent. It is suggested that no further action is required with regard to HEPHs. It should be noted that a high concentration of Extractable Petroleum Hydrocarbons (EPH) was found in a soil sample from one of the 1995 test pits. This may have been due to the burst drum of waste oil which was recovered in this work as drum D-2 and D-4 sludge / liquid.

6.0 RECOMMENDATIONS

6.1 Soil Cap

Because of the limitations of the backhoe, it was not possible to completely reclaim the surface of the work area. The backfilled excavations still have some exposed metal waste showing and the site is rough. Trees that were cleared for the work were cut into small lengths and scattered.

It is recommended that a loosely compacted and graded soil cap be placed over the excavated area to a depth of 15mm. A source of fill material suitable for this is located in the borrow pit near the Macintosh Lodge. The soil used for the cap should be fine grained and evenly graded over the excavated area. The site can be left to revegetate naturally. If so, micro sites for seed trap should be created normal to the slope by running a tracked vehicle up and down the slope, or by using the teeth of a front end loader to scarify the surface at right angles to the slope.

6.2 Waste Removal

All of the hydrocarbon products in the over pack units should be collected and disposed of in an approved special waste handling facility. The over pack units should be washed and returned to D.I.A.N.D. Waste Management for future use.

The empty drums in the waste container should be washed and crushed before disposal into an ordinary landfill site.

Further excavation and or remediation of this site beyond what is described above is not recommended.

7.0 REFERENCES

Guide for Assessing and Remediating Petroleum Hydrocarbons in Soils, October, 1993, American Petroleum Institute, API publication 1629.

Preliminary Environmental Assessment Haines - Fairbanks Pipeline, August 1995, by UMA Engineering Ltd..

Research of Former Military Sites and Activities in the Yukon, April, 1995, by K. Bisset and Associates.

Subsurface Assessment Handbook for Contaminated Sites, March, 1994, Canadian Council of Ministers of the Environment (CCME), National Contaminated Sites Remediation Program.

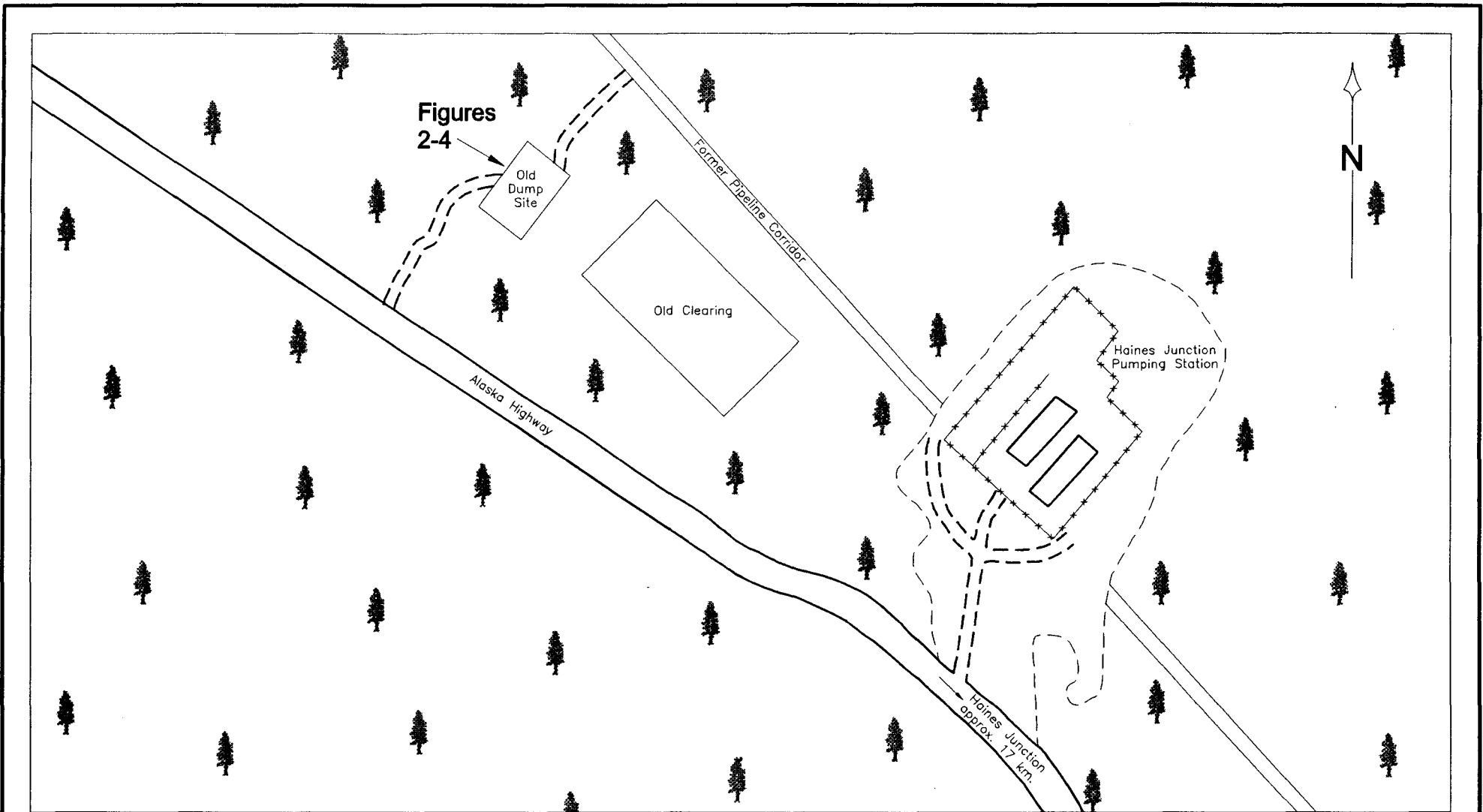
Yukon Environment Act, Contaminated Sites Regulations

National Contaminated Sites Training Program , 40 Hour Contaminated Site Health and Safety Training Course. Reference Manual. 1994, Environment Canada and EPA

FIGURES

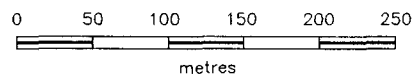
Haines Junction Pumping Station Dump Site

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| Figure One | Site Excavation Location Plan |
| Figure Two | 1995 Test Pit Locations |
| Figure Three | Excavation Area |
| Figure Four | Materials |

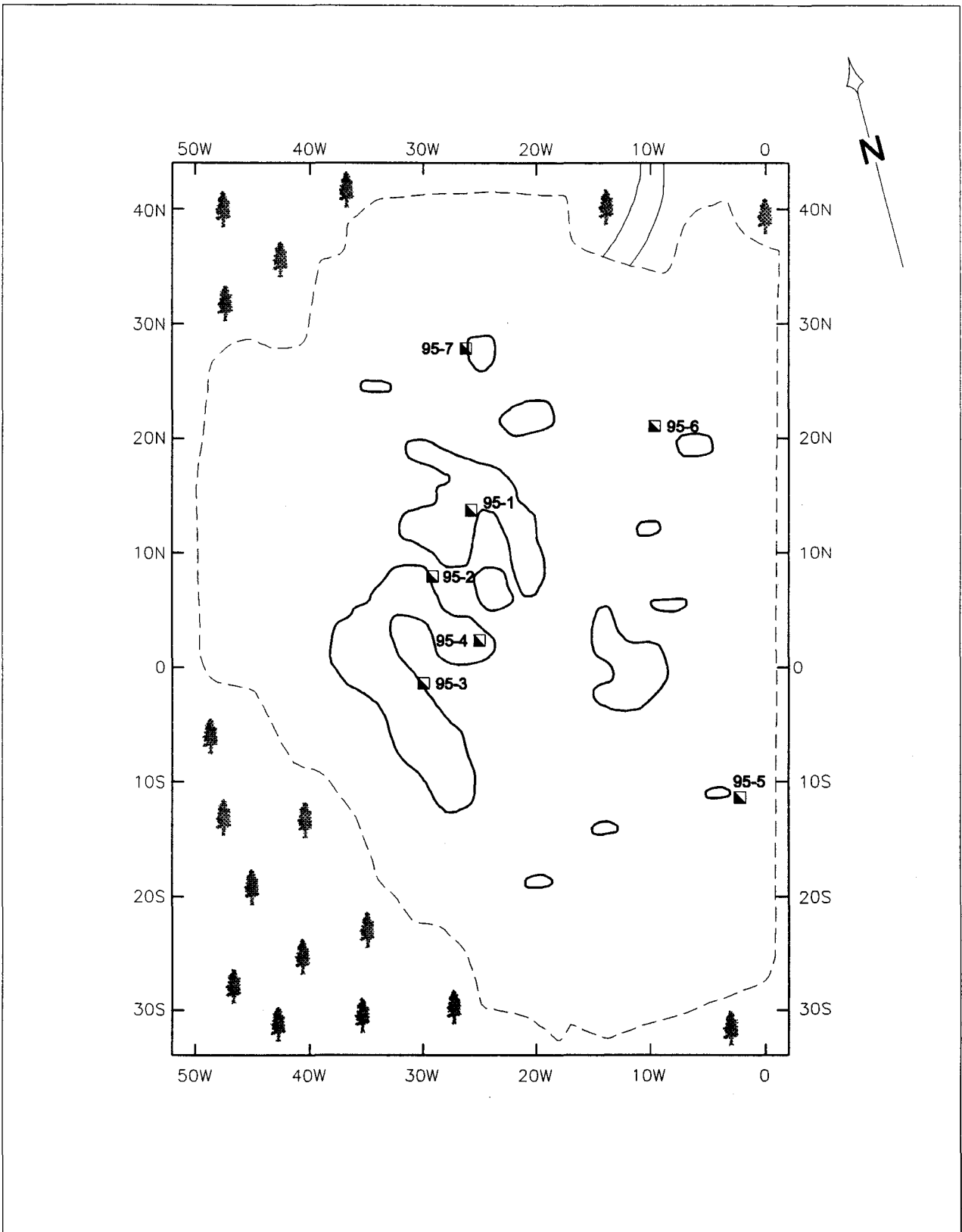


**HAINES JUNCTION PUMPING STATION
DUMP SITE EXCAVATION
Location Plan**

Laberge Environmental Services



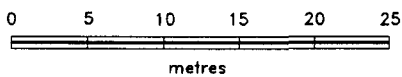
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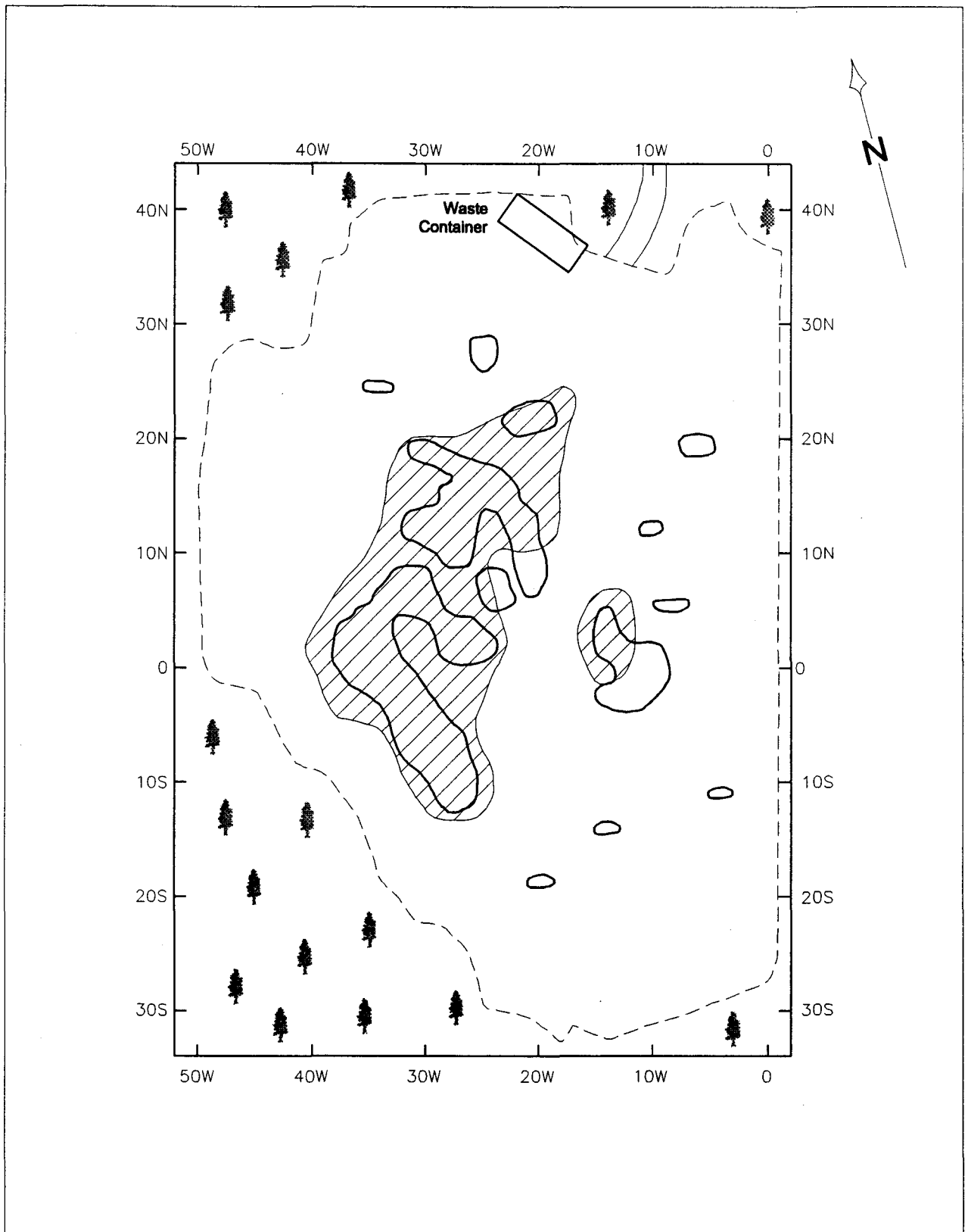


**HAINES JUNCTION PUMPING STATION
DUMP SITE EXCAVATION
1995 Test Pit Locations**

Laberge Environmental Services

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**HAINES JUNCTION PUMPING STATION
Dump Site Excavation Area**

Laberge Environmental Services

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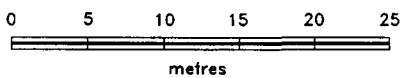
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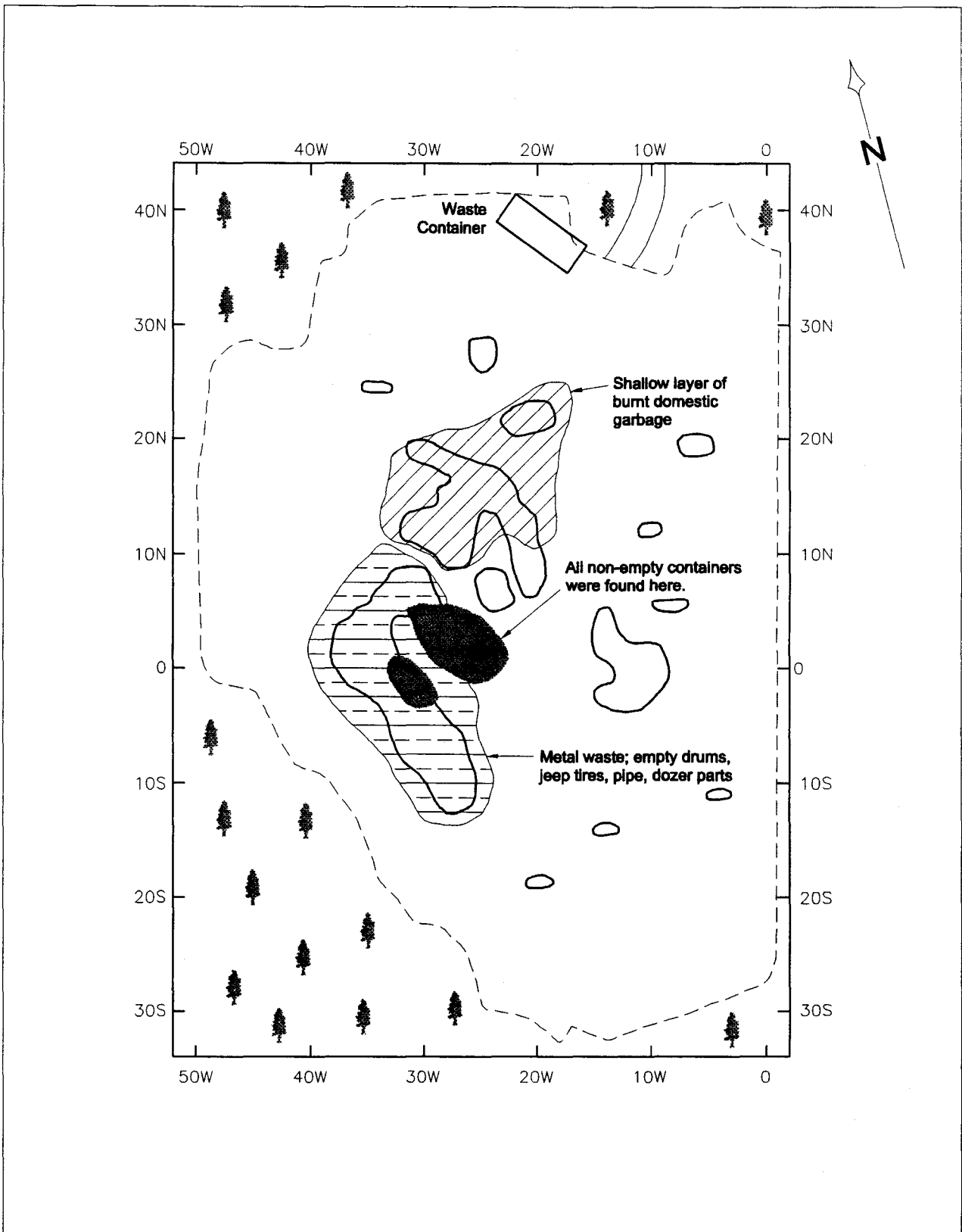
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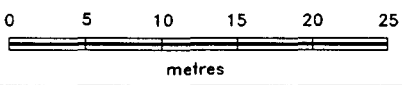
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FIGURE: 3





HAINES JUNCTION PUMPING STATION		
Dump Site Materials		
<i>Laberge Environmental Services</i>		
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APPENDIX A

**HAINES JUNCTION PUMPING STATION DUMP SITE CHARACTERIZATION AND STAGING
OF NON - EMPTY CONTAINERS**

**HEALTH AND SAFETY PLAN INCLUDING MATERIALS HANDLING AND SAMPLING
PLANS**

AUGUST 31, 1998

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HAINES JUNCTION PUMPING STATION DUMP SITE
CHARACTERIZATION AND STAGING OF NON - EMPTY CONTAINERS

HEALTH AND SAFETY PLAN

INCLUDING MATERIALS HANDLING AND SAMPLING PLANS

FOR

DEPARTMENT OF INDIAN AFFAIRS AND NORTHERN DEVELOPMENT
WASTE MANAGEMENT, YUKON REGION

BY

LABERGE ENVIRONMENTAL SERVICES
AUGUST 31, 1998

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HEALTH AND SAFETY PLAN - HAINES JUNCTION PUMPING STATION DUMP SITE

1.0 SITE DESCRIPTION

Date: August 31, 1998

Location: The Haines Junction Pumping Station is located 17km. north of Haines Junction (60° 50'N, 137° 45'W) at mile 158 of the decommissioned Haines-Fairbanks pipeline. The contaminated site is an old dump, situated to the west of this station. The site is approximately 0.25ha. in size.

Hazards: Physical safety hazards associated with excavation of buried materials, Explosion/Fire, Oxygen Deficiency, sampling and handling of petroleum hydrocarbon products and other containers. Previous assessment revealed no significant human health risks associated with ingestion of soil, dermal uptake, or inhalation of particulate or vapour phase contaminants.

Area Affected: Limited to a small cleared area, approximately .25 ha

Surrounding Population: Haines Junction has a population of 830 people.

Topography/Soils/Vegetation:

Soils are variable and consist of mixtures of clay, silt, sand and gravel in disturbed and worked areas. In wooded regions, organic-detrital soil covers reddish sandy clays. The site is situated within an area of mid-successional forest with a mix of white spruce, balsam poplar and grey/hoary alder trees. Drainage from the site follows a slope into the surrounding forest to the south and west.

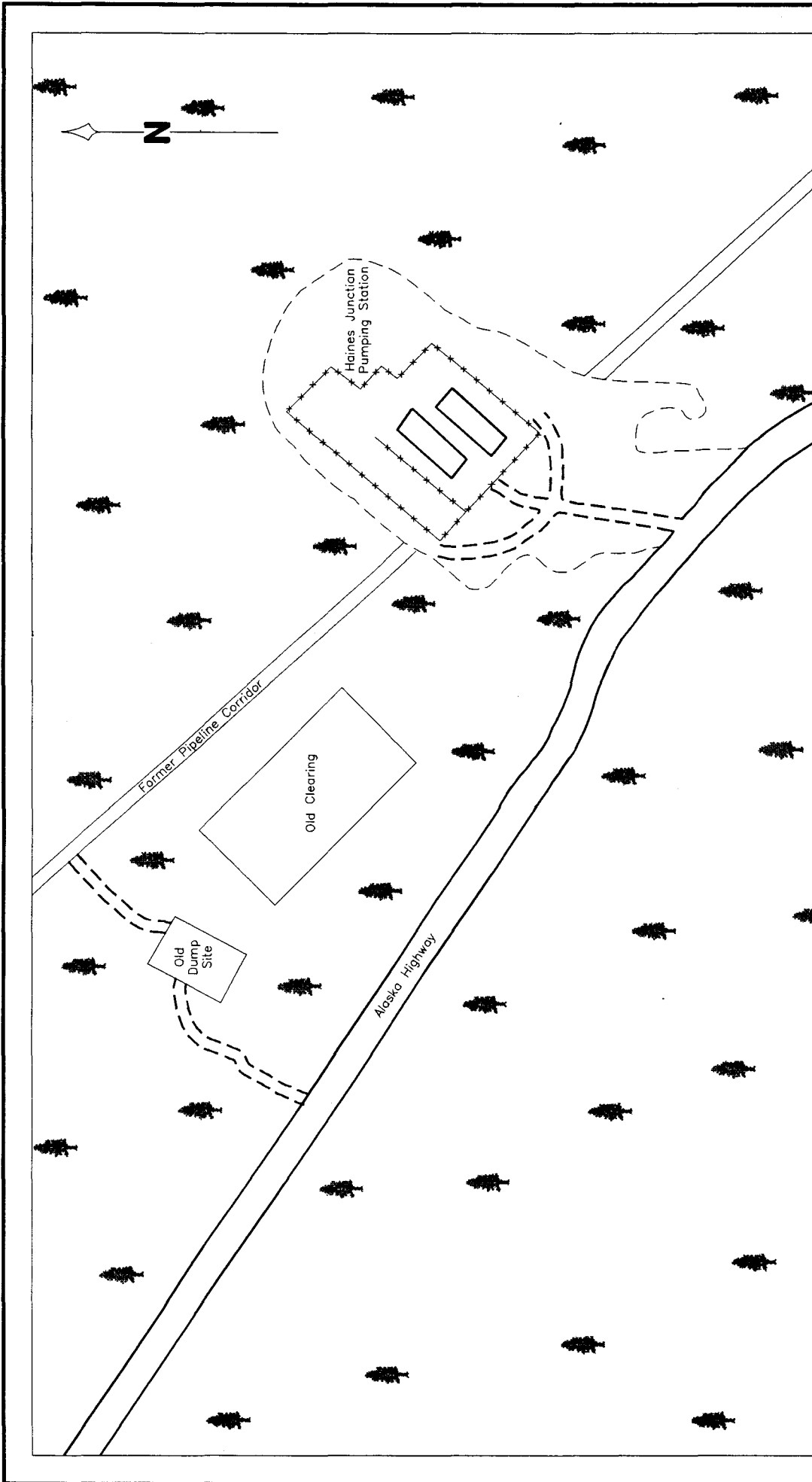
Weather Conditions:

Weather expected during excavation is daytime highs of about 10 to 15 degrees, overnight lows about -2 to +5 degrees C. Winds prevail out of the south frequently up to 30 kph. Precipitation in the form of snow may be expected at higher elevations.

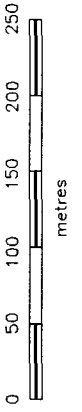
Additional Information:

The pumping station was one of five sites subjected to a preliminary Environmental Assessment in 1995 by UMA Engineering in association with Ambio Research Associates Inc. An EM survey and test pitting revealed a significant buried dump near the pumping station. Full and partially full drums containing hydrocarbon product were raised to the surface during the test pitting. Significant evidence exists regarding use and disposal into common garbage dumps of full and partially full containers of hydrocarbon products during the decommissioning of the pipeline in 1972.

Because of the similarities among the pipeline pumping stations, it is likely that the dump at the Haines Junction Station contains more non-empty containers. Release of contents into the soil as a result of decay of the containers would pose a significant environmental risk as defined by exceeding remediation standards.



**HAINES JUNCTION PUMPING STATION
DUMP SITE EXCAVATION
LOCATION PLAN**



Laberge Environmental Services

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HEALTH AND SAFETY PLAN - HAINES JUNCTION PUMPING STATION DUMP SITE

2.0 ENTRY OBJECTIVES

The objective of the entry into the contaminated area is to expose, sample, characterize and stage buried contaminants found in non-empty containers within the old dump, or within underlying soil. We will work with an experienced operator using a conventional rubber-tired excavator in combination with field-testing equipment to carefully and completely expose, characterize, and stage contaminants from the dump site. Full or partially full containers will be stored in over pack units in a staging area. A covered portable metal waste container will be kept on site for the purpose of holding empty containers or other waste encountered which would not be appropriate to put back into the excavation.

This is not a comprehensive clean up operation. Our objectives are to recover non empty containers and return non hazardous waste to the excavation as it is advanced through the old dump.

3.0 ON-SITE ORGANIZATION AND CO-ORDINATION

The following personnel are designated to carry out the stated job functions on the site:
Project Manager, sampler, : Ken Nordin
Backhoe Operator: Mike Crawshay, Kluane Machine

4.0 ON-SITE CONTROL

Laberge Environmental Services will co-ordinate access control and security on-site. The area is rarely visited by the public, and few if any people not working on the project are expected to be near the site during the work. If for any reason the pit has to be shut down, suitable barrierettes and signage will be set up. A safe perimeter is considered to be at the edge of the old clearing containing the dump site. This perimeter will be marked with nylon rope and no admittance signs. No unauthorized person should be within this area during the work.

The prevailing wind conditions are out of the south.

The site staging area will be established at the south east corner of the clearing. This location is upwind from the buried dump.

A decontamination area will be established at the extreme south-east corner of the site. An escape route towards the south east will be clearly marked. This route leads to an adjacent clearing and will follow an existing path.

HEALTH AND SAFETY PLAN - HAINES JUNCTION PUMPING STATION DUMP SITE

5.0 HAZARD EVALUATION

Chemical Hazards:

In the 1995 work, soil samples and one product sample were collected and analysed for various potential contaminants. These included inorganic elements, total extractable hydrocarbons, (TEHs), volatile organic compounds (VOCs), organochlorine pesticides (OCs), phenoxyacid herbicides, polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs). Of this suite of analytes, only those associated with petroleum hydrocarbon products pose any human health risk.

The hazards posed by chemical substances are known to be low, and adequate personal protection will be provided with the use of Level D and Level C Personal Protective Equipment (PPE). Risks posed by splash from leaking or burst petroleum product containers, dermal contact with soil contaminated with petroleum hydrocarbons, and inhalation of PAHs will be adequately reduced with the PPE.

Other Hazards:

Type of Hazard	Source
Explosion or Fire	-Ignition of explosive or flammable liquids -Agitation of shock or friction sensitive compounds, or sudden release of pressurized materials such as pressurized tanks
Physical Safety Hazards	-Sharp objects, mechanical equipment, physical obstacles expected in excavation -Use of protective clothing or equipment can impair the agility, stamina, hearing or vision of the worker, which may increase risk of injury.
Oxygen Deficiency	-may result from the displacement of oxygen by another gas, or the consumption of oxygen by unexpected chemical reactions.
Biological Hazards	- None expected

HEALTH AND SAFETY PLAN - HAINES JUNCTION PUMPING STATION DUMP SITE

6.0 PERSONAL PROTECTIVE EQUIPMENT

The National Institute for Occupational Health and Safety (NIOSH) guidelines were used to assess the level of worker protection required when working in excavation and container recovery. We also reviewed the existing assessment data and examined the human health risks associated with contaminants found within the dump and underlying soils.

We have tentatively identified chemical and physical hazard levels, and have selected PPE for routine work. As part of our contingency plan, work will be stopped and this safety plan upgraded whenever conditions require a higher level of PPE.

Based on evaluation of potential hazards, it appears that physical hazards will dominate, therefore all workers will wear at minimum, level D PPE, and will don Level C suits if and when this appears necessary due to the nature of exposed materials. Level C suits and equipment will be worn by anyone who is handling or sampling containers. The level of worker protection may have to be upgraded if we encounter a container which does not obviously contain petroleum hydrocarbon products and is not readily identifiable, or if we encounter other unknown hazardous materials. At this point we will cease the excavation and proceed to the higher level PPE as advised by DIAND.

Personal Protective Equipment Supplied:

Level D: (worn as a minimum throughout)

- work coveralls
- safety glasses and/or goggles
- safety boots or rubber boots with steel toe and shank
- work gloves
- hard hat
- hearing protection

Level C: (on hand to be donned as required)

- chemically resistant disposable suits, booties, and hood
- chemically resistant inner and outer gloves
- air purifying respirators MSHA/NIOSH approved, with organic vapour/acid gas/HEPA cartridges
- splash goggles
- rubber boots with steel toe and shank

In addition, the following contingency equipment will be on hand:

- tear-resistant tape to repair small rips in coveralls
- protective outer gloves will be worn for handling sharp objects
- absorbent materials in pads and in bulk for spill responses
- plastic drop cloths
- hand tools: polaski, shovel, pick, pails, garbage bags and containers

HEALTH AND SAFETY PLAN - HAINES JUNCTION PUMPING STATION DUMP SITE

7.0 ON-SITE WORK PLANS - MATERIALS HANDLING AND SAMPLING

The footprint of the buried dump will be traced on the ground using reference to the original EM survey controls.

The area will be stripped of vegetation and topsoil, which will be stockpiled at the extreme south west corner of the work area.

The excavation of the dump site will proceed as follows:

Beginning in the uncontaminated area down grade and upwind, we will advance pits with acceptable slopes based on soil conditions, to a maximum depth of 2.5 m.

When the buried waste is encountered, it will be exposed by removing backfill and buried materials and casting these into the pit behind the working face of the excavation. We expect to encounter the following materials, based on test pit results conducted previously: metal waste, dozer parts, pipe, tires, plastic, glass, empty 45 gallon drums, paper waste, woody debris, and common domestic garbage. All of this type of material will be cast to the opposite pit face on the down hill, upwind side.

Using visual cues and constant monitoring with a CGI/O₂ instrument, we will identify any containers or materials suspected to contain contaminants.

When a container of any kind is exposed, we will proceed with extreme care using hand tools to identify the type and amount of product and condition of the container. Only when we are satisfied that it is safe to do so, we will raise the container using chain, drum grapplers, or nylon straps, and place the container into an over pack unit in the staging area. The staging area will consist of graded local till covered by plastic sheeting, on which 95 gallon over pack containers will be placed on pallets. A 30 m³ covered metal waste container will be kept on site for use as storage for any non hazardous waste that we decide not to return to the excavation.

If it is safe to do so, we will open the container and collect a sample using a sampling device. All sampling will follow standard protocols for collection, storage, and shipping of contaminated soil or hazardous materials. The sampling kit and shipping containers for product samples will conform to TDG regulation. To maintain QA/QC a local control sample will be collected, as well as one blind duplicate. Samples may be examined with an immunoassay kit, or split and archived for future further analysis if required.

If underlying soil appears to be contaminated, we will collect samples and advance the pit to determine the extent of contamination as far as this is practical and within the limits of the equipment. At a minimum, we will collect representative samples of the backfill materials and have these analysed for a suite of parameters so that the backfilled dump site can be compared with appropriate criteria.

Should a container be encountered which is suspected to contain a substance *other than hydrocarbon product*, we will attempt to identify the contents by observation of the type of container and any markings present. Whenever there is doubt as to the integrity of the

HEALTH AND SAFETY PLAN - HAINES JUNCTION PUMPING STATION DUMP SITE

container, and its contents are not known, we will cease the excavation and advise DIAND that a higher level of PPE is required for further characterization or staging of such containers.

When the excavation is complete, and all non empty containers have been staged, the dump site will be covered with a minimum of 0.2 m of local till. Stripped vegetation and topsoil will either be buried or scattered onto the surface as appropriate.

8.0 COMMUNICATION PROCEDURES

The following hand signals will be used in order for the sampler and backhoe operator to communicate when conversation is impossible due to noise or PPE restrictions:

Both arms raised	--	Leave area immediately, follow escape route
Hand on top of head	--	Need assistance
Hand gripping throat	--	Out of air, can't breathe
Thumbs up	--	OK, I'm all right, I understand
Thumbs down	--	No, negative

9.0 DECONTAMINATION PROCEDURES

Minimum Level C decontamination procedures will be followed. This plan may need to be upgraded if the work moves to a higher level of protection.

All items and personnel leaving the excavation area will be decontaminated. We will maintain a 1000 L water tank, generator, and pressure washer on site to clean up the backhoe if necessary. This will be done at the end of the excavation and before final backfilling.

A clean area, or "decontamination station" will be set up. We will deposit small equipment used in the excavation onto plastic drop cloths at the edge of the pit.

Outer boots and gloves will be scrubbed with detergent and rinsed beside the staging area. These will be removed and placed into a plastic garbage bag in a garbage can there.

If someone needs to change a respirator canister, this will be done at the edge of the clearing, where new outer gloves and boot covers will be put on, and joints taped before the person returns to the pit.

Boots, splash suit, and inner gloves will be removed and placed into separate garbage bags.

HEALTH AND SAFETY PLAN - HAINES JUNCTION PUMPING STATION DUMP SITE

The half mask and goggles will be removed with care not to touch the face with fingers. We will then thoroughly wash hands and face and shower as soon as possible after leaving the job site.

10.0 EMERGENCY RESPONSE PLAN

10.1 EMERGENCY MEDICAL CARE

The Haines Junction Nursing Station is 10 minutes from the site. Ambulance is also 10 minutes away. A first aid kit will be on site including wool and aluminium blankets.

10.2 ENVIRONMENTAL MONITORING

A Gastec 1314 Hydrocarbon Surveyor will be used constantly within the excavation to detect presence of combustible gasses and to monitor oxygen levels. This instrument will also be used for headspsace tests on soil samples as required.

Common sense observation will provide most of the required environmental monitoring. All materials handled with the backhoe will be examined carefully for the presence of leakage of liquids of any kind, the presence of pressurized containers, or containers which may contain unexpected substances. We will be careful to note any unusual or chemical odours that may signal the presence of unexpected contaminants.

We will keep an eye on the wind direction by using bright flagging on a pole as a wind sock.

10.3 EMERGENCY PROCEDURES

The following are **standard emergency procedures** to be used by all persons authorized to work at the site. (These two pages to be laminated and kept handy at site):

Physical Injury in the Excavation:

The backhoe operator will stabilize the machine and enter the pit to evaluate the nature of the injury and to remove the injured person to decontamination area where PPE will be doffed and first aid initiated. The injured person will then either be transported to the nursing station or an ambulance called, depending on the nature of the injury.

HEALTH AND SAFETY PLAN - HAINES JUNCTION PUMPING STATION DUMP SITE

Fire or Explosion:

Fire extinguishers and hand tools will be deployed if the fire can be extinguished promptly.

In the case of a serious event, all personnel will move to the decontamination area and the Haines Junction Fire Department, Northern Affairs Regional Office, and the R.C.M.P. will be notified immediately.

Personnel should proceed to an area a safe distance away from the dangerous site (the pumping station, or exit road)

Chemical Exposure:

The unaffected person will don a respirator and assess the nature of the injury.

The affected person will be removed from the exclusion zone immediately.

Personnel should move to the decontamination area where decontamination will be done.

If necessary, contact will be made for an ambulance, or, the injured worker will be taken to the nearest medical facility.

Personal Protective Equipment Failure:

If an equipment failure occurs, the worker will go to the clean area and repair or replace PPE.

Re-entry will not be permitted until the equipment has been repaired or replaced

In all situations, when an on-site emergency results in evacuation of the excavation site, no one will re-enter until:

- The conditions resulting in the emergency have been corrected
- The hazards have been reassessed
- The site safety plan has been reviewed
- Site personnel have been briefed on any changes to the safety plan

Spill Response:

- Shut down sources of ignition
- Use the hand tools, absorbent pads, or absorbent material to contain the spill
- Cover or contain heavily contaminated soils for later disposal
- Call and report spill if greater than 200 litres

HEALTH AND SAFETY PLAN - HAINES JUNCTION PUMPING STATION DUMP SITE

EMERGENCY PHONE NUMBERS:

POLICE: 634-5555 (HAINES JUNCTION) OR 1-867-667-5555 (WHITEHORSE)

HOSPITAL: 393-8700 (WH)

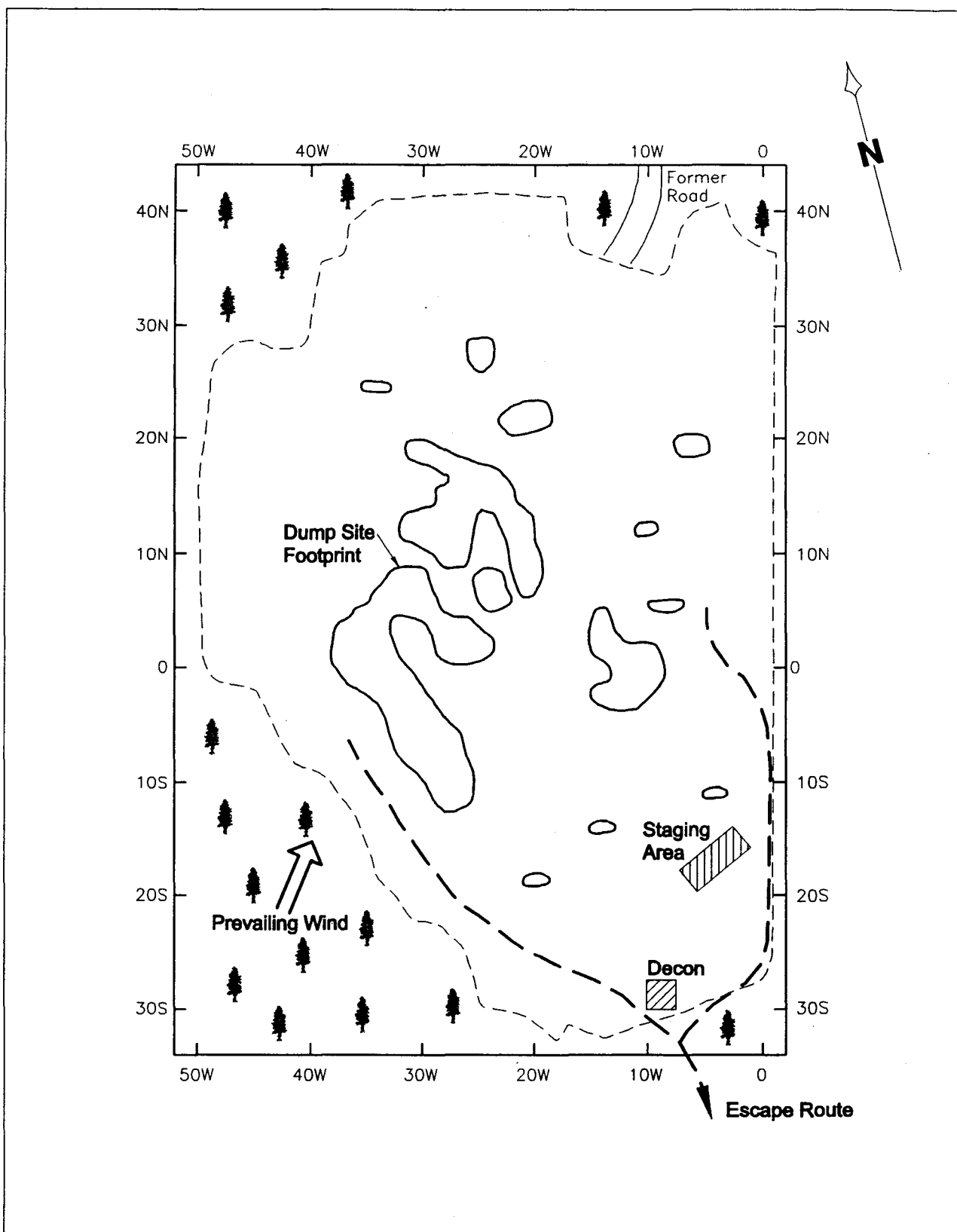
NURSE: 634-4444

AMBULANCE: 634-4444

PUBLIC HEALTH OFFICE: 667-6371 (WH)

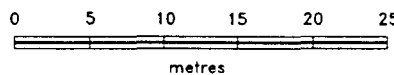
FIRE DEPARTMENT: 634-2222

SPILL LINE: 667-7244



**Haines Junction Pumping
Station Dump Site
HASP**

Laberge Environmental Services



SCALE: 1 : 500	FILE: 159A_1	DATE: 98/08/26
NTS:	DRAWN:	FIGURE: 1

APPENDIX B

ASL CHEMICAL ANALYSIS REPORTS:
H.J.P.S. DUMP SITE OIL ANALYSIS AND SOIL ANALYSIS.

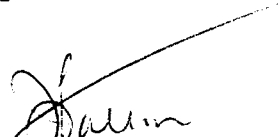


CHEMICAL ANALYSIS REPORT

Date: October 8, 1998
ASL File No. J8564
Report On: H.J.P.S. Dump Site Soil Analysis
Report To: **Laberge Environmental Services**
PO Box 5111
Whitehorse, YT
T1A 4S3
Attention: **Mr. Ken Nordin**
Received: September 14, 1998

ASL ANALYTICAL SERVICE LABORATORIES LTD.

per:


Gan Dang, B.Sc. - Project Chemist
Joanne Patrick, B.Sc. - Project Chemist





RESULTS OF ANALYSIS - Sediment/Soil

File No. J8564

Comp.
S-1,2,3,
&5
98 09 04

D-4

98 09 04

Physical Tests

Moisture % 7.5 7.0

Non-halogenated Volatiles

Benzene <0.04 -
Ethylbenzene <0.05 -
Toluene <0.05 -
meta- & para-Xylene <0.05 -
ortho-Xylene <0.05 -
Light Hydrocarbons (C5-9) <5 -
VPH (C5-11) <10 -

Polycyclic Aromatic Hydrocarbons

Acenaphthene <0.01 -
Acenaphthylene <0.01 -
Anthracene <0.01 -
Benz(a)anthracene <0.01 -
Benzo(a)pyrene <0.01 -
Benzo(b)fluoranthene <0.01 -
Benzo(g,h,i)perylene <0.01 -
Benzo(k)fluoranthene <0.01 -
Chrysene <0.01 -
Dibenz(a,h)anthracene <0.01 -
Fluoranthene <0.01 -
Fluorene <0.01 -
Indeno(1,2,3-c,d)pyrene <0.01 -
Naphthalene <0.01 -
Phenanthrene <0.01 -
Pyrene <0.01 -

Polychlorinated Biphenyls

PCB 1242 <0.05 -
PCB 1248 <0.05 -
PCB 1254 <0.05 -
PCB 1260 <0.05 -
Total Polychlorinated Biphenyls <0.05 -

Results are expressed as milligrams per dry kilogram except where noted.
< = Less than the detection limit indicated.
VPH = Volatile Petroleum Hydrocarbons.
EPH = Extractable Petroleum Hydrocarbons.
LEPH & HEPH = Light and Heavy Extractable Petroleum Hydrocarbons.
Comp. = Composite.



RESULTS OF ANALYSIS - Sediment/Soil

File No. J8564

Comp.
S-1,2,3,
&5
98 09 04

D-4

98 09 04

Organochloride Pesticides

Aldrin	<0.001	-
alpha-BHC	<0.001	-
beta-BHC	<0.002	-
delta-BHC	<0.001	-
cis-Chlordane (alpha)	<0.001	-
4,4'-DDD	<0.001	-
4,4'-DDE	<0.001	-
4,4'-DDT	<0.001	-
Dieldrin	<0.001	-
Endosulfan I	<0.001	-
Endosulfan II	<0.001	-
Endosulfan Sulfate	<0.005	-
Endrin	<0.005	-
Heptachlor	<0.002	-
Heptachlor Epoxide	<0.001	-
Lindane (gamma - BHC)	<0.001	-
Methoxychlor	<0.005	-

Herbicides

2,4,5-T	<0.05	-
2,4-Dichlorophenoxy Acetic Acid	<0.05	-
Dicamba	<0.05	-
2,4-DB	<0.05	-
Dichlorprop	<0.05	-
Dinoseb	<0.05	-
MCPA	<0.05	-
Picloram	<0.05	-
Silvex (2,4,5-TP)	<0.05	-

Extractables

EPH (C10-18)	<200	1990
EPH (C19-31)	797	109000
LEPH	<200	-
HEPH	797	-

Results are expressed as milligrams per dry kilogram except where noted.
 < = Less than the detection limit indicated.
 VPH = Volatile Petroleum Hydrocarbons.
 EPH = Extractable Petroleum Hydrocarbons.
 LEPH & HEPH = Light and Heavy Extractable Petroleum Hydrocarbons.
 Comp. = Composite.



METHODOLOGY

File No. J8564

Outlines of the methodologies utilized for the analysis of the samples submitted are as follows:

Moisture

This analysis is carried out gravimetrically by drying the sample at 103 C for a minimum of three hours.

Volatile Organic Compounds in Sediment/Soil - Headspace Method

This analysis is based on U.S. EPA Methods 3500, 3810, 8015 and 8020 (Publ. #SW-846, 3rd ed., Washington, DC 20460) and British Columbia Ministry of Environment, Lands and Parks Method "Volatile Petroleum Hydrocarbons in Soil". The procedure involves a 1:1 extraction of the sediment/soil sample with methanol. An aliquot of this methanol extract is then added to a vial containing a constant volume of water. This vial is sealed and heated, causing the volatile compounds to partition into the headspace above the sample. A portion of this gaseous headspace is then analysed by capillary column gas chromatography with photo-ionization and flame-ionization detection.

Volatile Petroleum Hydrocarbons (VPH) is a calculation defined by British Columbia Contaminated Sites Regulations (April 1, 1997). The concentrations of Benzene, Toluene, Ethylbenzene and Xylenes are subtracted from the sum of all purgeable compounds that elute between n-Pentane (nC5) and n-Undecane (nC11) which has been quantitated by FID against n-Hexane.

Polycyclic Aromatic Hydrocarbons in Sediment/Soil

This analysis is carried out using a procedure adapted by ASL from U.S. EPA Methods 3500, 3630, and 8270 (Publ. #SW-846 3rd ed., Washington, DC 20460). The procedure involves a microwave assisted extraction with dichloromethane followed by a clean-up using silica gel column chromatography. This clean-up procedure has been found to effectively remove aliphatic and heterocyclic hydrocarbons which could potentially interfere with the analysis. The final extract is analysed by capillary column gas chromatography with mass spectrometric detection.



Organochloride Pesticides and Polychlorinated Biphenyls in Sediment/Soil

This analysis is carried out in accordance with U.S. EPA Methods 3500/3610, 3630 and 8080 (Publ. # SW-846 3rd ed., Washington, DC 20460). The procedure involves a solvent extraction using acetonitrile. The extract is then solvent exchanged to hexane followed by alumina and silica gel column clean-ups. The final extract is analysed by dual capillary column gas chromatography with electron capture detection.

Extractable Hydrocarbons in Sediment/Soil

This analysis is carried out using procedures adapted from U.S. EPA Methods 3500/8015 (Publ. # SW-846 3rd ed., Washington, DC 20460) and British Columbia Ministry of Environment, Lands and Parks Method for "Extractable Petroleum Hydrocarbons in Soil by GC/FID" (January 1996). The procedure involves a hexane/acetone solvent extraction followed by analysis of the extract by capillary column gas chromatography with flame ionization detection. Results are not corrected for Polycyclic Aromatic Hydrocarbons (PAHs) for Extractable Petroleum Hydrocarbon (LEPH/HEPH) purposes.

Light and Heavy Extractable Petroleum Hydrocarbons in Soil

This analysis is carried out as outlined in the method descriptions for Extractable Petroleum Hydrocarbons and Polycyclic Aromatic Hydrocarbons. The concentration of naphthalene is subtracted from EPH (C10-18) to obtain the LEPH result. Concentrations of benzo[a]anthracene, benzo[b]fluoranthene, benzo[k]fluoranthene, dibenz[a,h]anthracene, indeno[1,2,3-c,d]pyrene, phenanthrene, pyrene and benzo[a]pyrene are subtracted from EPH (C19-31) to obtain the HEPH result.

End of Report



APPENDIX

**HYDROCARBON
DISTRIBUTION
REPORTS**

HYDROCARBON DISTRIBUTION REPORT

SAMPLE NAME: J8564-T--1

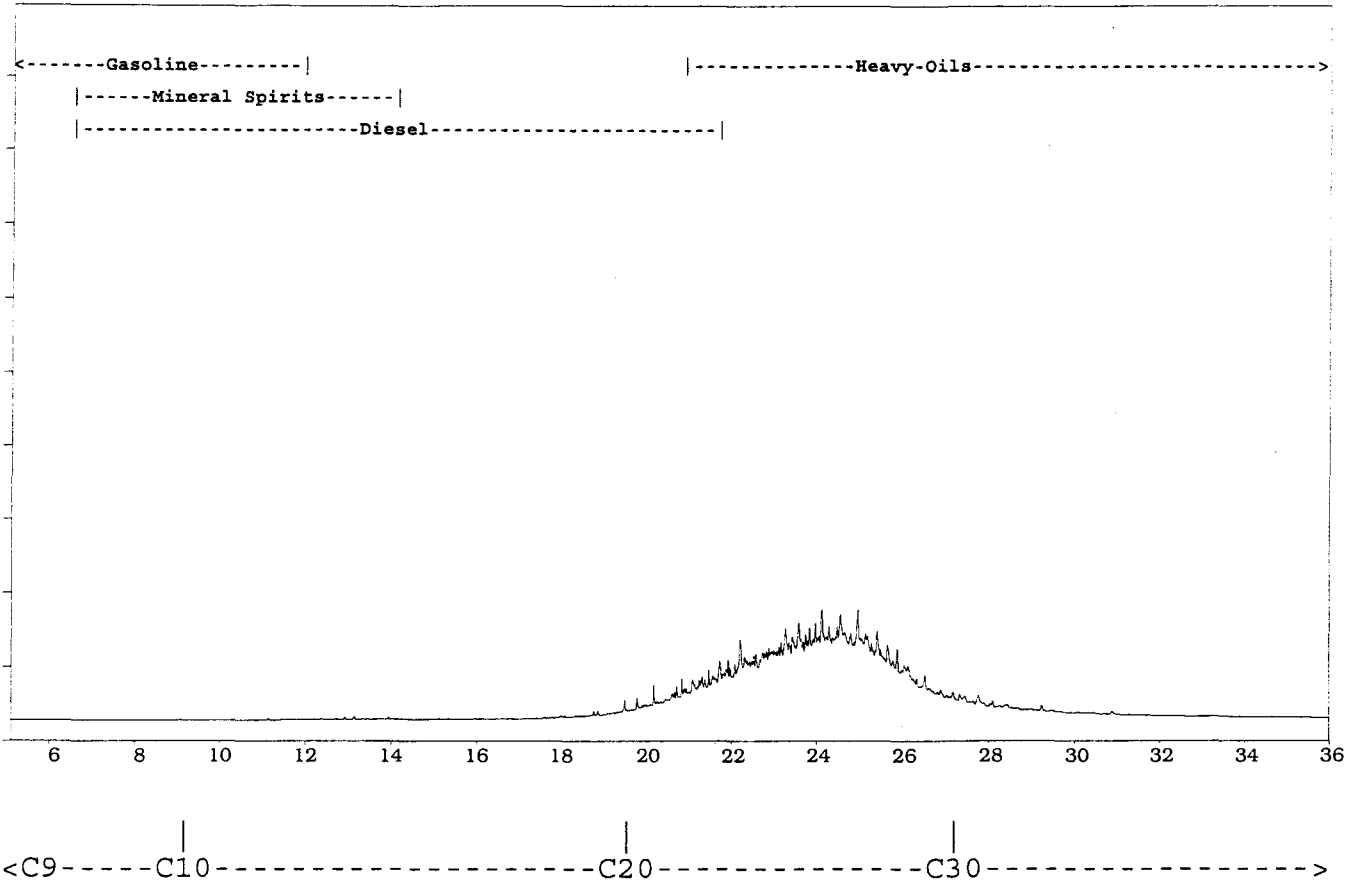
Comp.
S-1,2,3,
&5

Sample acquired: SEP 17, 1998 23:09:40

Sequence File: TEH17SEP

File Name: C:\TEH2\17SEP\TEH17SEP.28R , Sample Name: J8564-T--1

Chromatogram Scale: 50.0 millivolts



ASL Sample ID: J8564-T--1* 8.0Dilution

HYDROCARBON RANGE (by Carbon#)	RELATIVE AMOUNT (%)
C9 (beg-nC9 to beg-nC10)	0.0
C10-C19 (beg-nC10 to beg-nC20)	4.3
C20-C30 (beg-nC20 to beg-nC31)	76.7
C31-C40 (beg-nC31 to beg-nC41)	19.0

The Hydrocarbon Distribution Report is intended to assist you in characterizing the hydrocarbon product present in a given sample. The scale at the top of the chromatographic trace represents the hydrocarbon range of common petroleum products. Comparison of this report with those of reference standards may also assist you in the identification of the hydrocarbon product detected in your sample. The second part of the report is a table that expresses the relative amounts of hydrocarbon product present in the ranges specified. Percent values are relative to the sum of all chromatographic peaks between the retention times of the alkanes n-C9 and n-C40, and are based solely on the areas of those peaks.

HYDROCARBON DISTRIBUTION REPORT

SAMPLE NAME: J8564-T--2#RX5

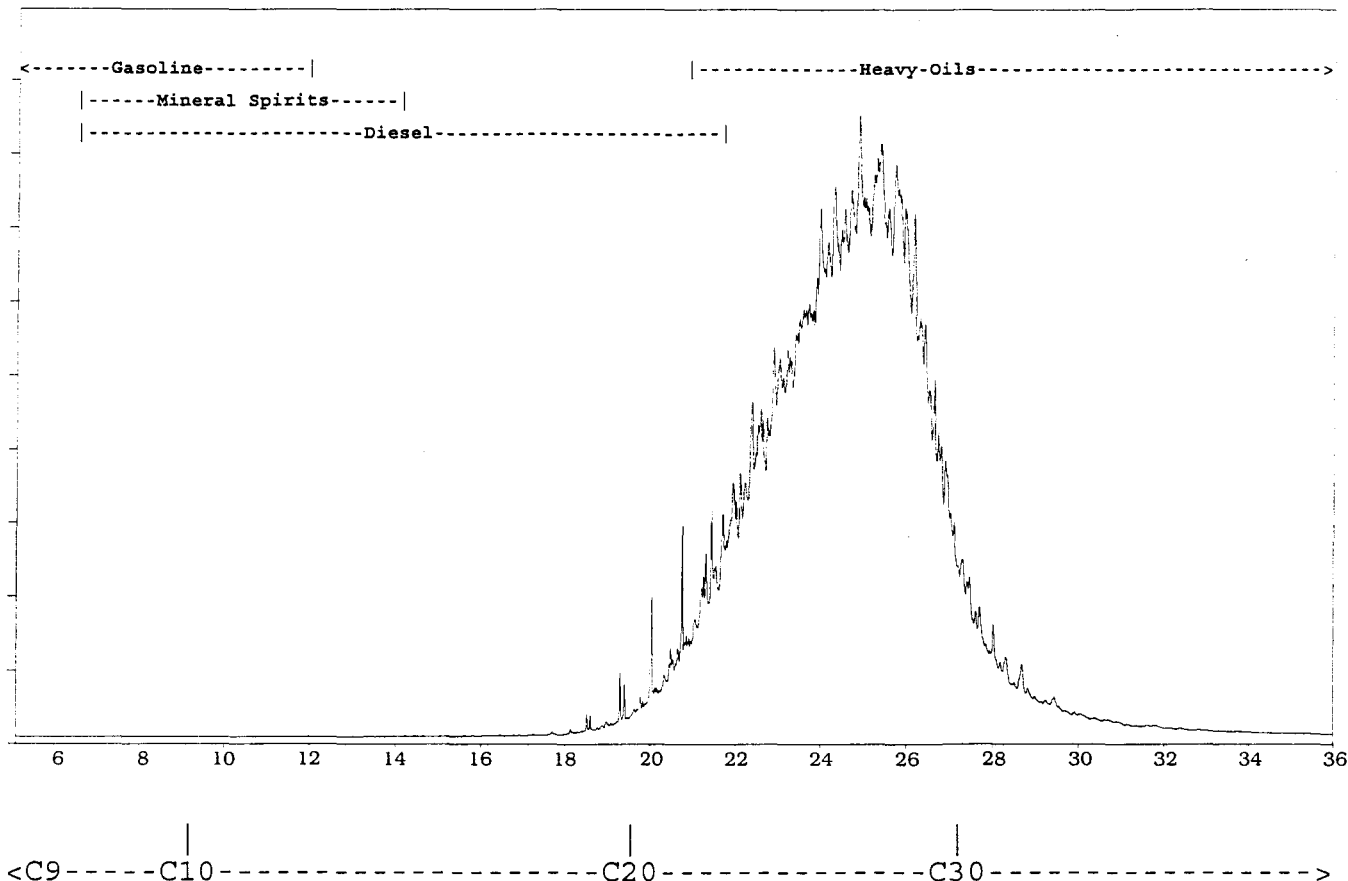
D-4

Sample acquired: SEP 18, 1998 16:41:24

Sequence File: TEHSEP18

File Name: C:\TEH\SEP18\TEHSEP18.09R , Sample Name: J8564-T--2#RX5

Chromatogram Scale: 150.0 millivolts



ASL Sample ID: J8564-T--2#RX5* 40.0Dilution

HYDROCARBON RANGE (by Carbon#)	RELATIVE AMOUNT (%)
C9 (beg-nC9 to beg-nC10)	0.0
C10-C19 (beg-nC10 to beg-nC20)	1.1
C20-C30 (beg-nC20 to beg-nC31)	73.4
C31-C40 (beg-nC31 to beg-nC41)	25.4

The Hydrocarbon Distribution Report is intended to assist you in characterizing the hydrocarbon product present in a given sample. The scale at the top of the chromatographic trace represents the hydrocarbon range of common petroleum products. Comparison of this report with those of reference standards may also assist you in the identification of the hydrocarbon product detected in your sample. The second part of the report is a table that expresses the relative amounts of hydrocarbon product present in the ranges specified. Percent values are relative to the sum of all chromatographic peaks between the retention times of the alkanes n-C9 and n-C40, and are based solely on the areas of those peaks.

ltd.

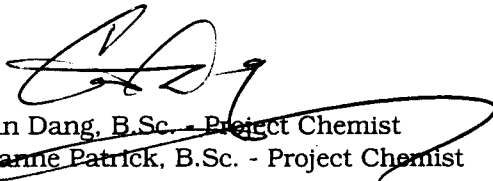


CHEMICAL ANALYSIS REPORT

Date: October 13, 1998
ASL File No. J8583
Report On: H.J.P.S. Dump Site Oil Analysis
Report To: **Laberge Environmental Services**
PO Box 5111
Whitehorse, YT
T1A 4S3
Attention: **Mr. Ken Nordin**
Received: September 15, 1998

ASL ANALYTICAL SERVICE LABORATORIES LTD.

per:



Can Dang, B.Sc. - Project Chemist
Joanne Patrick, B.Sc. - Project Chemist





REMARKS

File No. J8583

The six product samples identified as "D-1", "D-2", "D-3", "D-5", "D-6" and "C-comp" have been composited using 0.5g of each to produce the sample "Comp."

The liquid samples identified as "D1", "D2", "D3", "D5", "D6" and "C-Comp" were submitted for characterisation by gas chromatography with flame ionisation detection (GC/FID). The Hydrocarbon Distribution Report for these samples and reference standards have been appended to this report to assist you in your investigation. The scale at the top of the chromatographic traces represents the hydrocarbon range of common petroleum products. The scale at the bottom represents retention time in minutes.

The samples, "D1" and "D2", both have a hydrocarbon distribution similar to a combination of motor oil and solvent (possibly Kerosene).

The sample, "D3" has a hydrocarbon distribution similar to hydraulic oil.

The sample, "D5", has a hydrocarbon distribution similar to a combination of motor oil and transmission fluid. Since the sample has a reddish colour, along with its hydrocarbon distribution, the main component of this sample is suspected to be transmission fluid.

Since the sample, "D6", has a hydrocarbon distribution which does not resemble any of the standard hydrocarbon distribution reports from our library, this sample can be classified as unknown. Some of the physical properties observed for this sample are as follows: This sample has a strong alcohol odour; It is soluble in methanol, water and acetone; and it is insoluble in hexane and dichloromethane. The chromatogram is generated from a mixture of the sample and acetone rather than our routine solvent which is hexane. Further analyses would be necessary if this sample is to be identified.

The sample, "C-Comp", has a hydrocarbon distribution similar to a diesel. Since The hydrocarbon range of this sample is slightly more volatile than our general diesel. This sample is suspected to be arctic diesel.



RESULTS OF ANALYSIS - Oil

File No. J8583

D-1	D-2	D-3	D-5	D-6
98 09 03	98 09 03	98 09 04	98 09 04	98 09 04

Extractables
GC Scan

Appendix Appendix Appendix Appendix Appendix

Remarks regarding the analyses appear at the beginning of this report.



RESULTS OF ANALYSIS - Oil

File No. J8583

C-Comp

Comp.^{1,2,3}

98 09 05

Polychlorinated Biphenyls

Total Polychlorinated Biphenyls

-

<1

Extractables

GC Scan

Appendix

-

Remarks regarding the analyses appear at the beginning of this report.

¹Results are expressed as milligrams per kilogram.

²< = Less than the detection limit indicated.

³Comp. = Composite of the samples D-(1-6) and D-Comp.



METHODOLOGY

File No. J8583

Outlines of the methodologies utilized for the analysis of the samples submitted are as follows:

Product Characterization by Gas Chromatography

This analysis is carried out using a procedure adapted from U.S. EPA Method 8015 (Publ. #SW-846 3rd ed., Washington, DC 20460). A portion of the product is diluted with methylene chloride followed by analysis using capillary column gas chromatography with flame ionization detection. The chromatogram is then compared to known petroleum blends for identification.

Polychlorinated Biphenyls in Oil

This analysis is carried out in accordance with procedures that are consistent with the requirements of the appropriate regulatory agencies and adapted from the American Society for Testing Materials (ASTM), Method D4059-86. Specifically, a subsample is diluted with hexane, partitioned with florasil and analysed for PCB using a gas chromatograph equipped with an electron capture detector.

End of Report



APPENDIX

**HYDROCARBON
DISTRIBUTION
REPORTS**

HYDROCARBON DISTRIBUTION REPORT

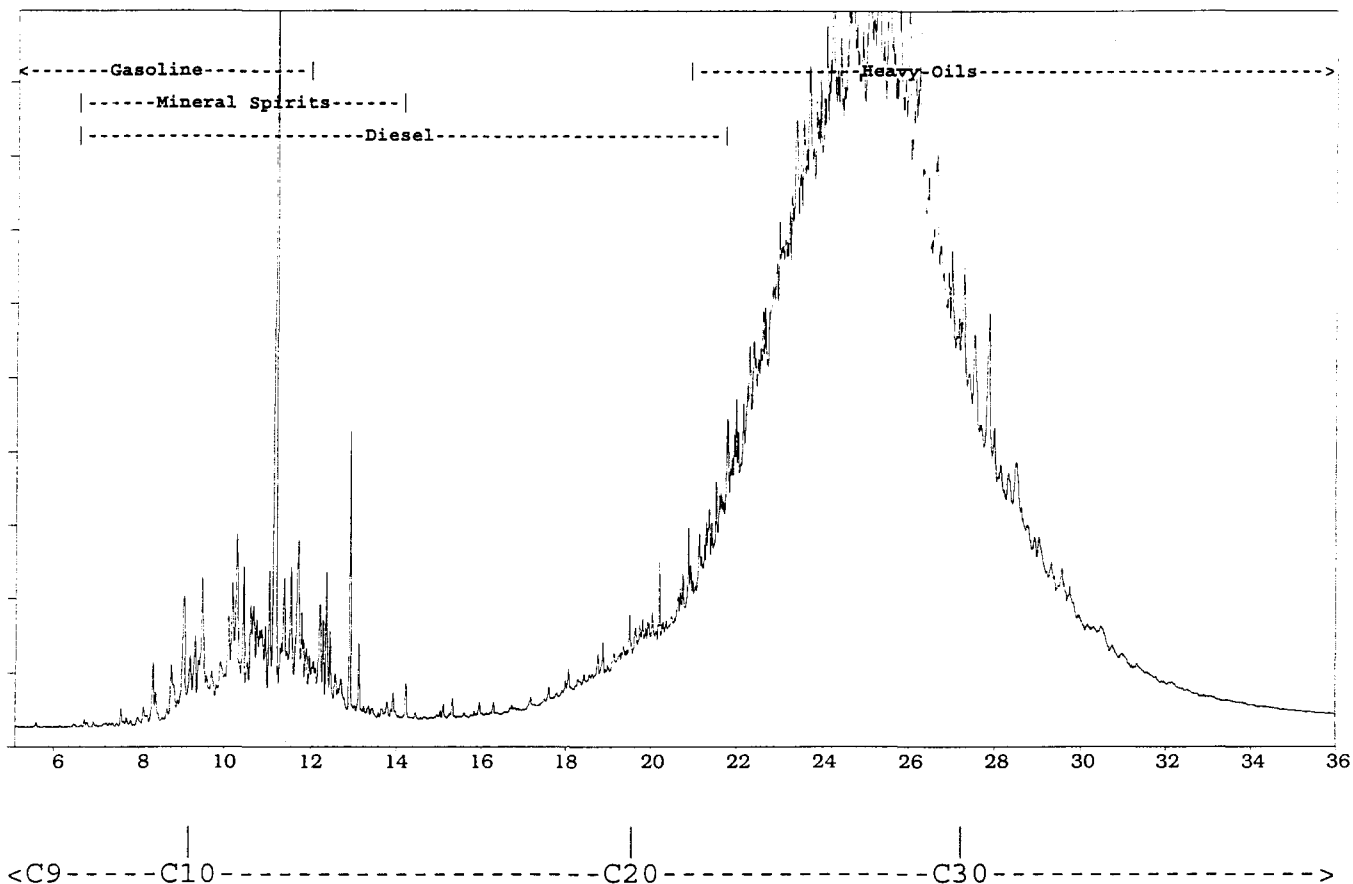
SAMPLE NAME: J8583-T--1 D-1

Sample acquired: SEP 24, 1998 13:00:48

Sequence File: TEH24SEP

File Name: C:\TEH2\24SEP\TEH24SEP.10R , Sample Name: J8583-T--1

Chromatogram Scale: 50.0 millivolts



ASL Sample ID: J8583-T--1* 1.0Dilution

HYDROCARBON RANGE (by Carbon#)	RELATIVE AMOUNT (%)
C9 (beg-nC9 to beg-nC10)	0.3
C10-C19 (beg-nC10 to beg-nC20)	11.9
C20-C30 (beg-nC20 to beg-nC31)	55.5
C31-C40 (beg-nC31 to beg-nC41)	32.4

The Hydrocarbon Distribution Report is intended to assist you in characterizing the hydrocarbon product present in a given sample. The scale at the top of the chromatographic trace represents the hydrocarbon range of common petroleum products. Comparison of this report with those of reference standards may also assist you in the identification of the hydrocarbon product detected in your sample. The second part of the report is a table that expresses the relative amounts of hydrocarbon product present in the ranges specified. Percent values are relative to the sum of all chromatographic peaks between the retention times of the alkanes n-C9 and n-C40, and are based solely on the areas of those peaks.

HYDROCARBON DISTRIBUTION REPORT

SAMPLE NAME: J8583-T--2

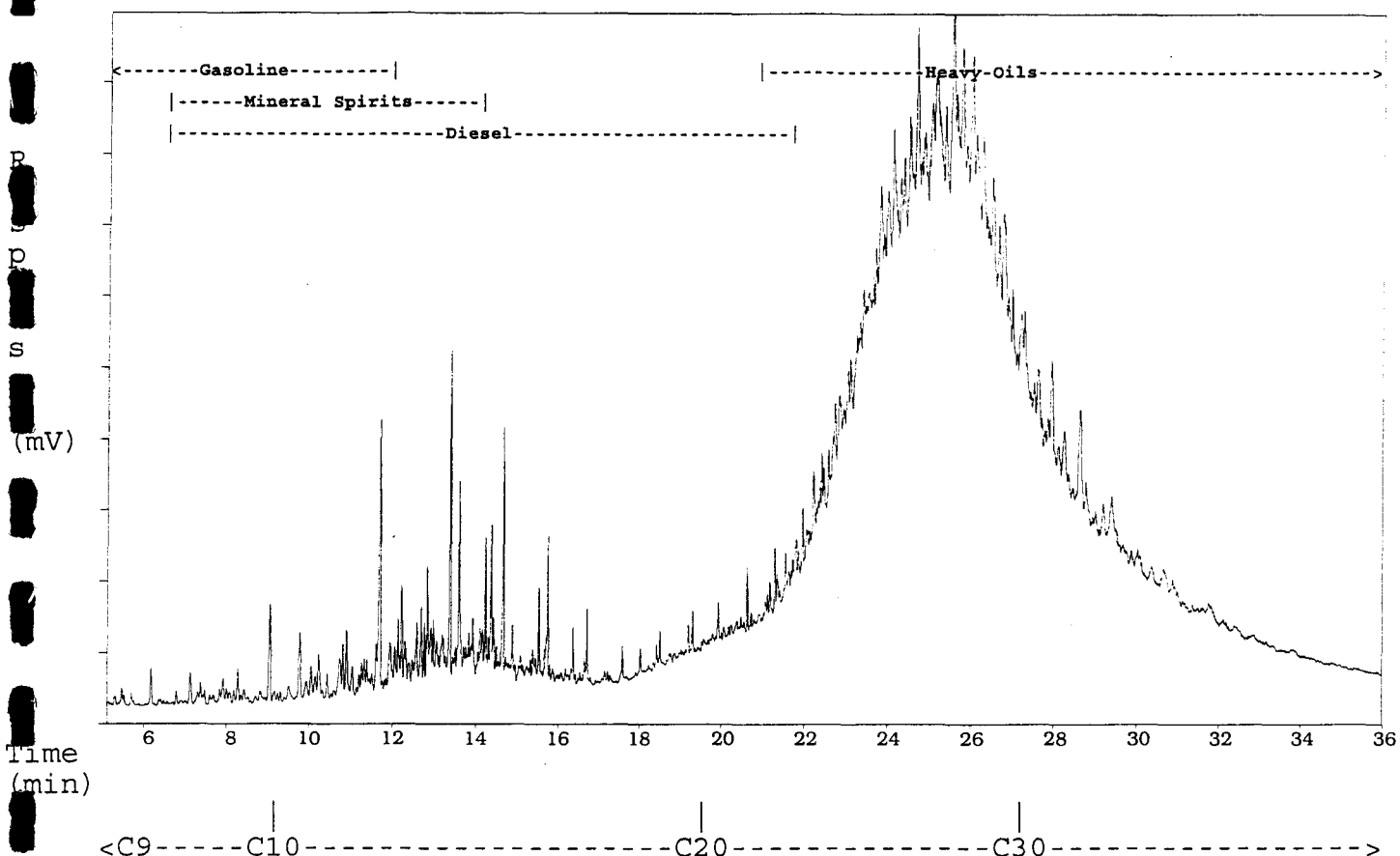
D-2

Sample acquired: SEP 24, 1998 13:54:25

Sequence File: TEH24SEP

File Name: C:\TEH2\24SEP\TEH24SEP.11R , Sample Name: J8583-T--2

Chromatogram Scale: 50.0 millivolts



ASL Sample ID: J8583-T--2* 1.0Dilution

HYDROCARBON RANGE (by Carbon#)	RELATIVE AMOUNT (%)
C9 (beg-nC9 to beg-nC10)	0.5
C10-C19 (beg-nC10 to beg-nC20)	11.0
C20-C30 (beg-nC20 to beg-nC31)	48.5
C31-C40 (beg-nC31 to beg-nC41)	40.0

The Hydrocarbon Distribution Report is intended to assist you in characterizing the hydrocarbon product present in a given sample. The scale at the top of the chromatographic trace represents the hydrocarbon range of common petroleum products. Comparison of this report with those of reference standards may also assist you in the identification of the hydrocarbon product detected in your sample. The second part of the report is a table that expresses the relative amounts of hydrocarbon product present in the ranges specified. Percent values are relative to the sum of all chromatographic peaks between the retention times of the alkanes n-C9 and n-C40, and are based solely on the areas of those peaks.

HYDROCARBON DISTRIBUTION REPORT

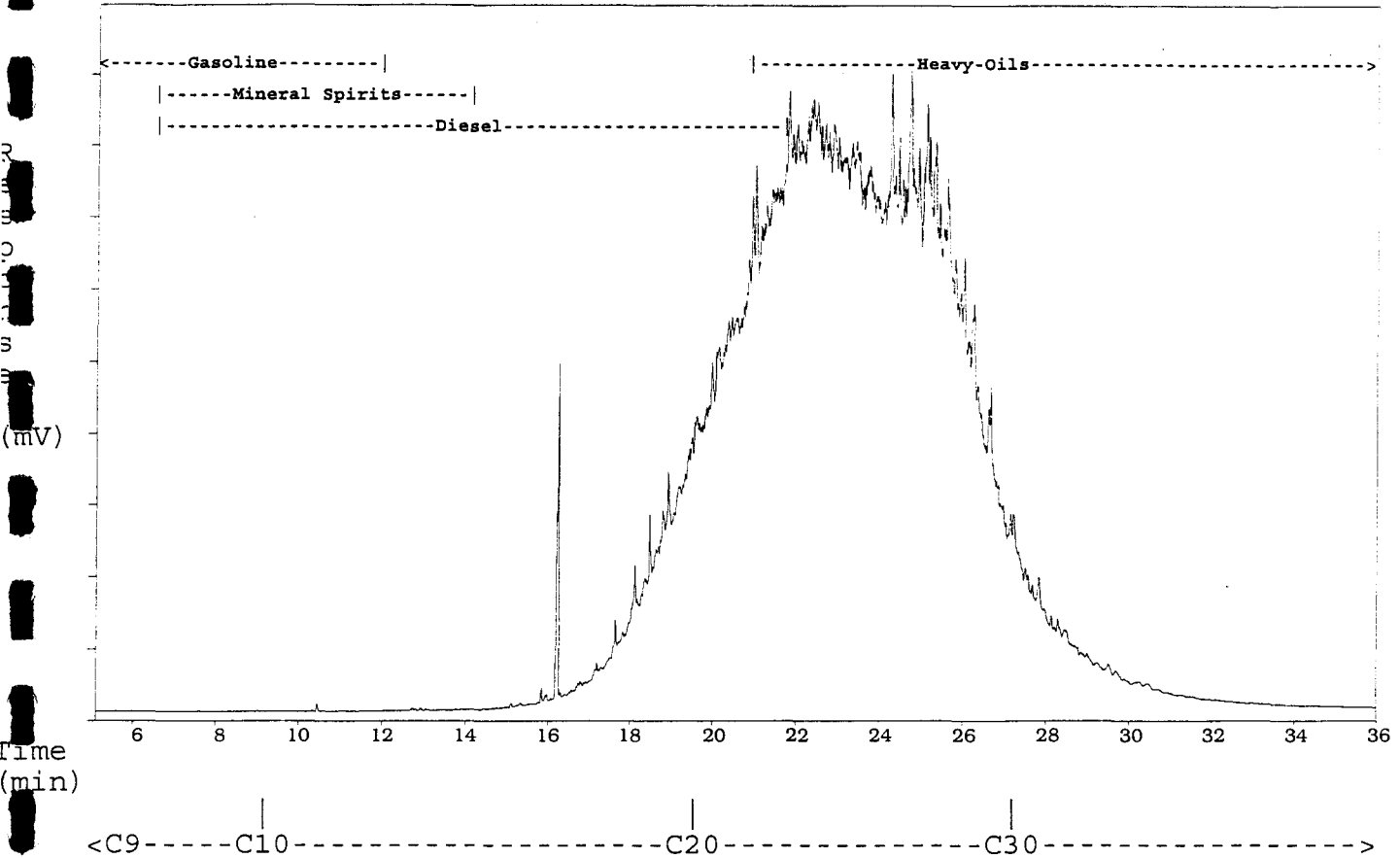
SAMPLE NAME: J8583-T--3 D-3

Sample acquired: SEP 24, 1998 13:54:25

Sequence File: TEH24SEP

File Name: C:\TEH2\24SEP\TEH24SEP.12R , Sample Name: J8583-T--3

Chromatogram Scale: 100.0 millivolts



ASL Sample ID: J8583-T--3* 1.0Dilution

HYDROCARBON RANGE (by Carbon#)	RELATIVE AMOUNT (%)
C9 (beg-nC9 to beg-nC10)	0.0
C10-C19 (beg-nC10 to beg-nC20)	12.4
C20-C30 (beg-nC20 to beg-nC31)	72.3
C31-C40 (beg-nC31 to beg-nC41)	15.3

The Hydrocarbon Distribution Report is intended to assist you in characterizing the hydrocarbon product present in a given sample. The scale at the top of the chromatographic trace represents the hydrocarbon range of common petroleum products. Comparison of this report with those of reference standards may also assist you in the identification of the hydrocarbon product detected in your sample. The second part of the report is a table that expresses the relative amounts of hydrocarbon product present in the ranges specified. Percent values are relative to the sum of all chromatographic peaks between the retention times of the alkanes n-C9 and n-C40, and are based solely on the areas of those peaks.

HYDROCARBON DISTRIBUTION REPORT

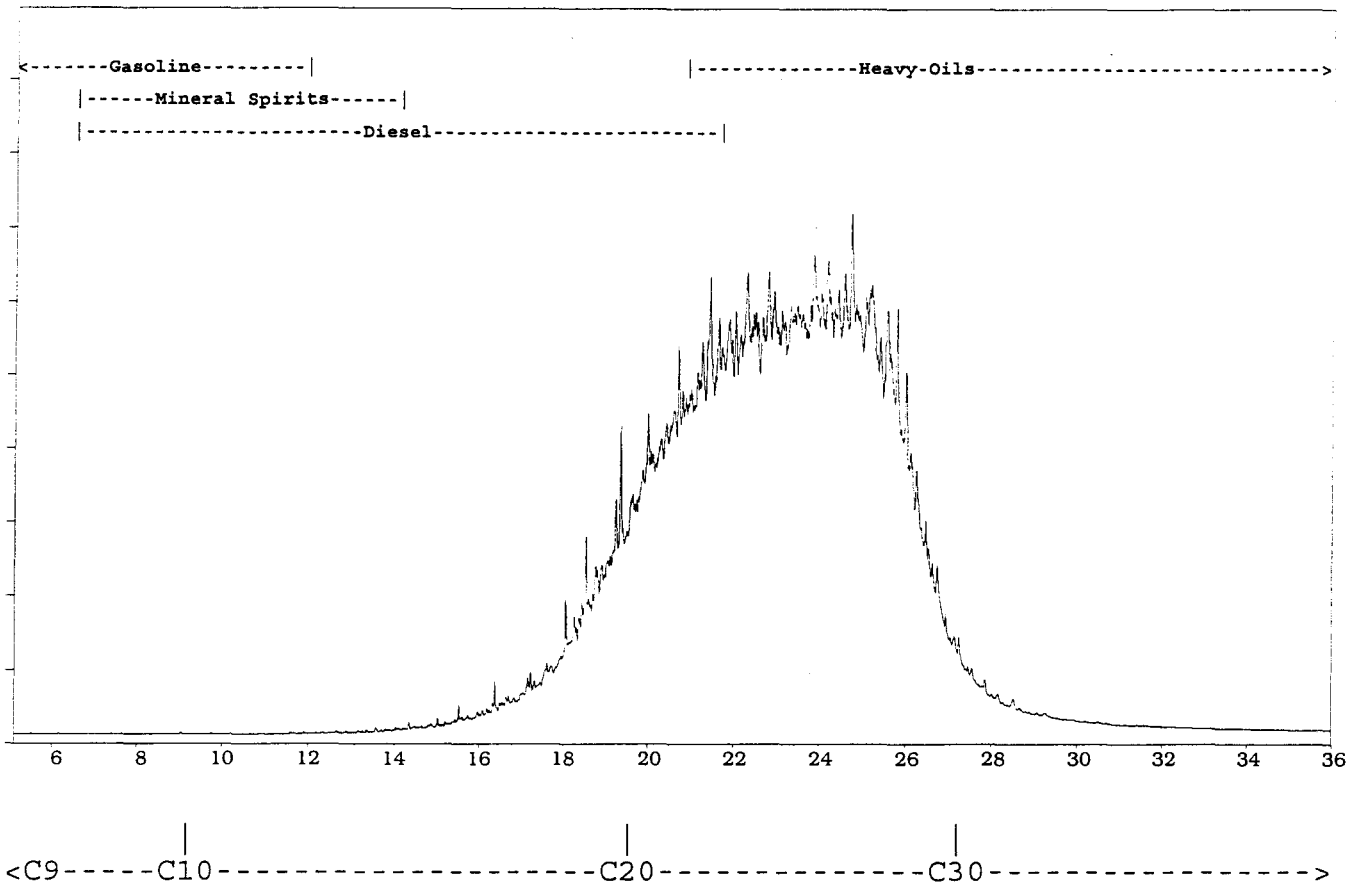
SAMPLE NAME: J8583-T--4 D-5

Sample acquired: SEP 24, 1998 14:47:51

Sequence File: TEH24SEP

File Name: C:\TEH2\24SEP\TEH24SEP.13R , Sample Name: J8583-T--4

Chromatogram Scale: 100.0 millivolts



ASL Sample ID: J8583-T--4* 1.0Dilution

HYDROCARBON RANGE (by Carbon#)	RELATIVE AMOUNT (%)
C9 (beg-nC9 to beg-nC10)	0.0
C10-C19 (beg-nC10 to beg-nC20)	15.2
C20-C30 (beg-nC20 to beg-nC31)	73.6
C31-C40 (beg-nC31 to beg-nC41)	11.2

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HYDROCARBON DISTRIBUTION REPORT

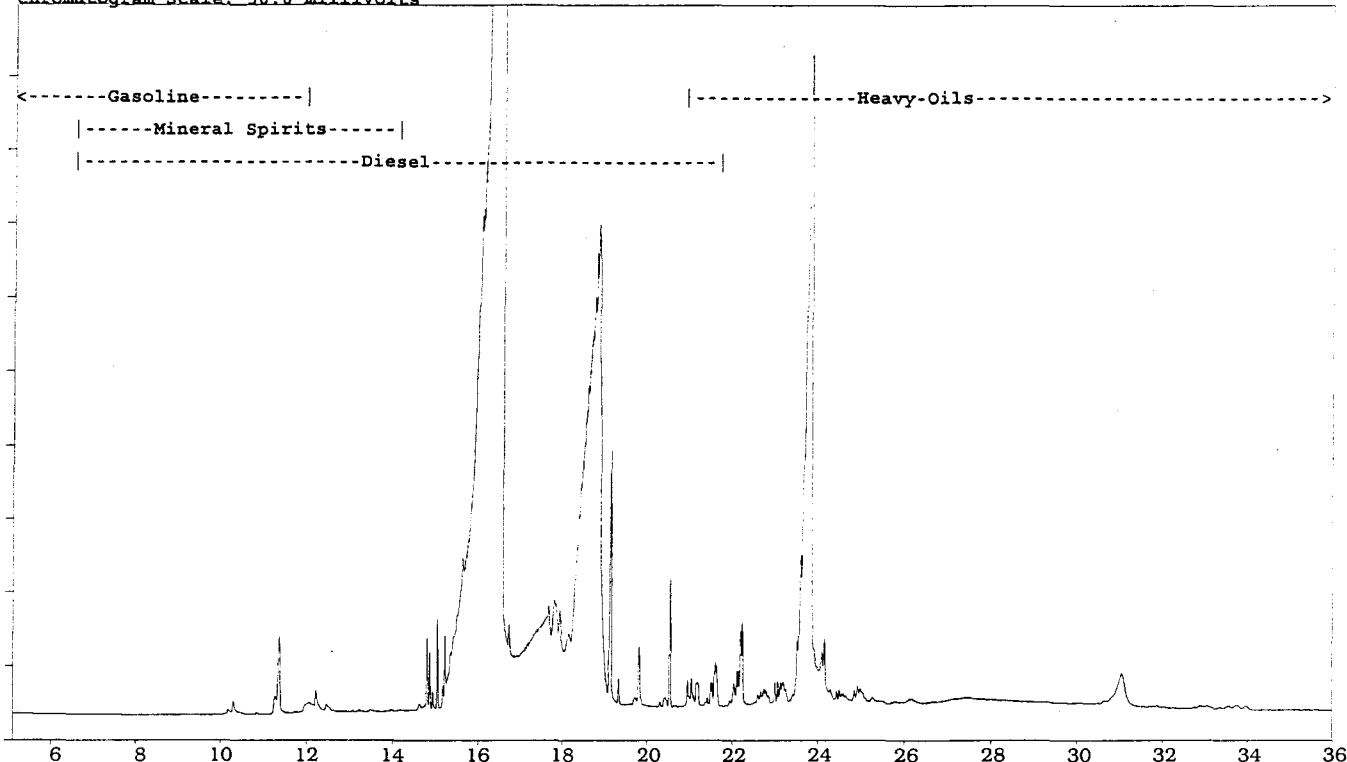
SAMPLE NAME: J8583 D-6

Sample acquired: OCT 2, 1998 07:44:22

Sequence File: TEHOCT1

File Name: C:\TEH\OCT1\TEHOCT1.49R , Sample Name: J8583

Chromatogram Scale: 50.0 millivolts



<C9-----C10-----C20-----C30----->
 ASL Sample ID: J8583 * 1.0Dilution

HYDROCARBON RANGE (by Carbon#)	RELATIVE AMOUNT (%)
C9 (beg-nC9 to beg-nC10)	0.0
C10-C19 (beg-nC10 to beg-nC20)	77.1
C20-C30 (beg-nC20 to beg-nC31)	16.6
C31-C40 (beg-nC31 to beg-nC41)	6.4

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HYDROCARBON DISTRIBUTION REPORT

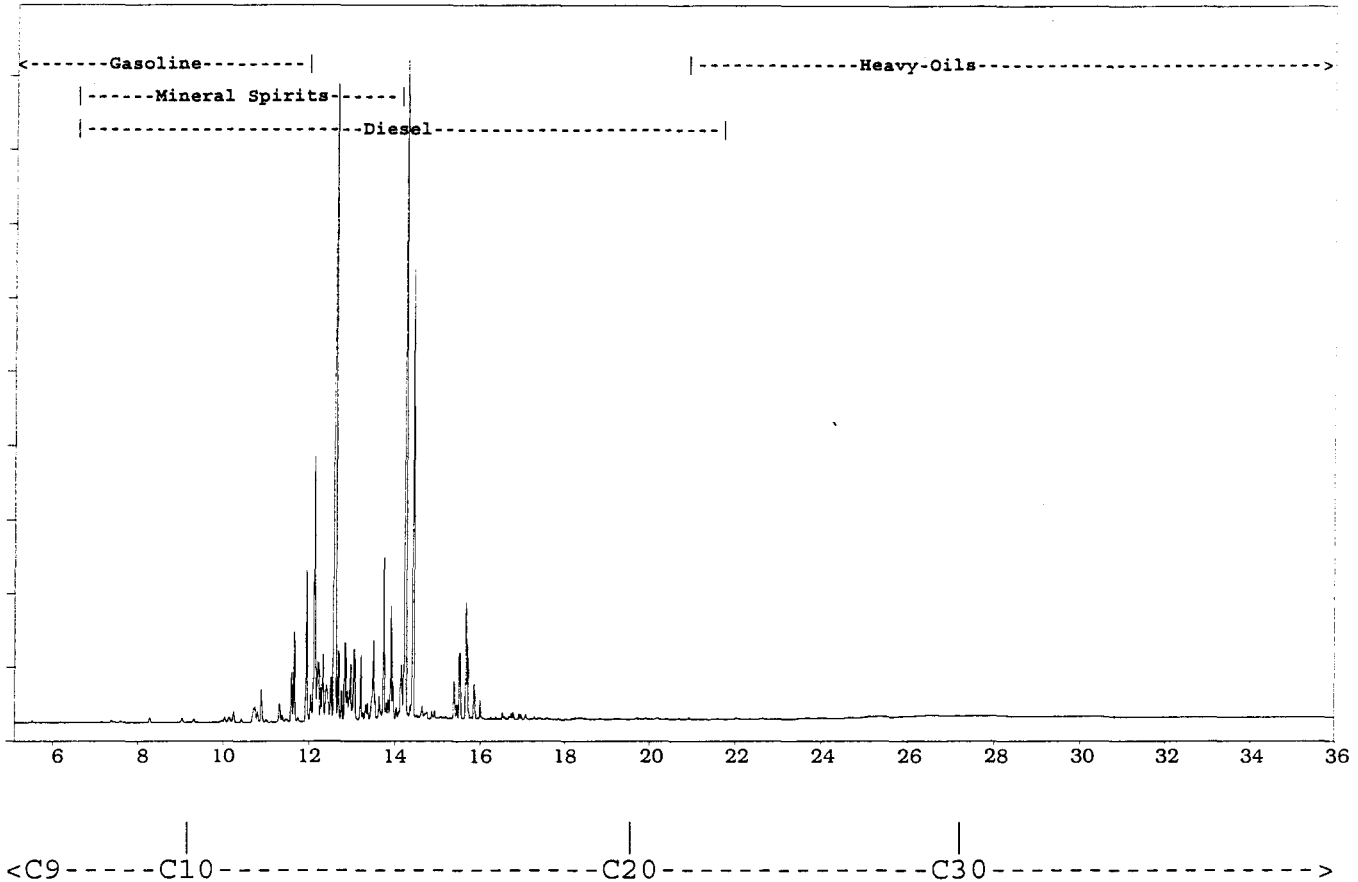
SAMPLE NAME: J8583-T--6 C-Comp

Sample acquired: SEP 24, 1998 15:41:01

Sequence File: TEH24SEP

File Name: C:\TEH2\24SEP\TEH24SEP.15R , Sample Name: J8583-T--6

Chromatogram Scale: 50.0 millivolts



ASL Sample ID: J8583-T--6* 1.0Dilution

HYDROCARBON RANGE (by Carbon#)	RELATIVE AMOUNT (%)
C9 (beg-nC9 to beg-nC10)	0.3
C10-C19 (beg-nC10 to beg-nC20)	94.3
C20-C30 (beg-nC20 to beg-nC31)	2.3
C31-C40 (beg-nC31 to beg-nC41)	3.0

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APPENDIX C

SITE PHOTOGRAPHS



Plate 1 **Sept. 1, 1998** **clearing site**



Plate 2 **Sept. 1, 1998** **decon station**



Plate 3 **Sept. 1, 1998** **waste container**



Plate 4 13S 30W pit # 3



Plate 5 Drum D-1 3S 30W pit # 6



Plate 6 2N 30W pit # 12



Plate 7 Typical waste. OS 31W pit # 14



Plate 8 Sept. 3. 5N 35W pit # 15



Plate 9 ON 25W. Found all remaining non empties around here



Plate 10 0N 28W Drums D2, D-3, sludge D-4 from this pit # 20



Plate 11 Perimeter was marked with nylon rope and sign



Plate 12 Looking south from 20W 30N. Conditions after backfilling.



Plate 13 Sept. 4. Waste container and over pack units



Plate 14 Sept.4. Container contents.



Plate 15 Sept. 4 Over pack units as they were left on site.

APPENDIX D

FIGURE: A.1.F HAINES JUNCTION PUMPING STATION INTERPRETATION MAP : GRID 1 & 3
FROM THE REPORT *Preliminary Environmental Assessment Haines - Fairbanks Pipeline*,
August 1995, by UMA Engineering Ltd

