HYDROCARBON SPILL ASSESSMENT AND REMEDIATION
BOSTON CAMP, NUNAVUT

67° 39.41' NORTH, 106° 23.04' WEST

SUBMITTED TO:

MIRAMAR MINING CORPORATION

FEBRUARY, 2004

PROJECT NUMBER 1740065

EBA Engineering Consultants Ltd.

HYDROCARBON SPILL INVESTIGATION
AND
INITIAL REMEDIAL MEASURES
BOSTON CAMP, NUNAVUT
67° 39.41' North, 106° 23.04' West

Submitted to:

Miramar Mining Corporation

February 2004

Project No. 1740065

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1.0 INTRODUCTION

1.1 General

EBA Engineering Consultants Ltd. (EBA) was retained by Miramar Mining Corporation (Miramar), to undertake an environmental site assessment and implement initial remedial measures to mitigate the effects of a series of diesel fuel spills. The diesel spills occurred at Miramar's advanced exploration mining camp, Boston location (Boston Camp or "the site") during the 2003 field season. The three spills occurred on;

- August 21, 2003;
- June 28, 2003; and,
- March 3, 2003.

A proposal was submitted to Mr. J. Stard, Manager, Miramar Con Mine, on August 3, 2003 outlining the planned work, as well as budget expectations, to address the effects of the June 28 and March 3 spills. Confirmation to proceed with the work plan was granted by Mr. Stard by telephone on August 3, 2003. Authorization for EBA to proceed with investigative and remedial work was granted via phone from Mr. John Stard on August 21, 2003. This work was conducted in conjunction with the already ongoing fieldwork occurring at the camp.

The following report provides a detailed description of the site conditions, background information detailing the spill incidents, environmental investigative and mitigation techniques. Site photographs depicting the activities completed on the site during the investigation and remedial phases of the project are appended to this report in Appendix A.

Laboratory soil analytical results for petroleum hydrocarbon fractions F1 to F4 were compared the residential/parkland criteria as outlined in the Canadian Council of Ministers of the Environment's (CCME) Canada Wide Standards for Petroleum Hydrocarbons (PHC) in Soil, May 1, 2001. Laboratory results for benzene, toluene, ethyl benzene and xylenes were compared to CCME Environmental Quality Guidelines, May 2001 for Residential/Parkland, coarse grained soils.

In addition, due to the proximity of Spyder Lake, laboratory analytical results for benzene, toluene, ethyl benzene, and xylene (BTEX) concentrations in water were compared to the Canadian Council of Ministers of the Environment (CCME) Guidelines for the protection of freshwater aquatic life (FAL), May 1, 2001. Although no guidelines currently exist for hydrocarbon concentrations in water for reference purposes, the concentrations of total extractable hydrocarbons (TEH) and total volatile hydrocarbons (TVH) were analyzed to confirm the absence or presence of hydrocarbons.

1.2 Site Location and Description

Boston Camp is situated in northern Nunavut, east of the Bathhurst Inlet within the Hope Bay Greenstone Belt and is situated within the zone of continuous permafrost. A site location diagram is provided as Figure 1.

The site consists of an approximate 50 person camp constructed for support services directed towards underground mining operations and exploration activities. The camp is situated on a ridge, which comprises a peninsula extending northwards into Spyder Lake. The lakeshore is approximately 100m distant toward the west, 185 meters toward the north and 115 meters toward the east. The regional gradient surrounding the camp ranges from 2% to the north to approximately 20% in the west. The camp is approximately 325 meters from north to south and 150 meters east to west, covering an area of 48,750 square meters. The camp structures are constructed on a very fine to cobble sized crushed rock pad that ranges in thickness from 0.6 metres to 3.0 meters. The pad slopes toward the north at a topographical gradient of approximately 1%.

The camp consists of a series of trailers that comprise the sleeping and eating quarters. They are large enough to house approximately 50 people and are located on the northwest portion of the pad. Situated immediately southeast of the sleeping quarters are a series of six tents, which act as offices and a core logging area. A crusher enclosure and a maintenance shop are located 100 meters southeast and 120 south of the tents, respectively. The maintenance shop house the sites main generator. Two aboveground storage tanks (AST), containing diesel fuel, are located directly northwest of the maintenance shop. The tanks have a capacity of 4,000 liters and 35,000 liters.

The underground mining portal is located approximately 25 meters east of the maintenance building and a gravel airstrip is located approximately 500 meters south of the camp.

The camp contains a tank farm which is lined with a hydrocarbon resistant membrane, located on the southeast portion of the gravel pad. The tank farm consists of six large sized tanks with two smaller sized tanks. In addition, there are two bermed settling ponds located on the eastern portion of the pad which are not currently in use. A wastewater discharge pond is also present on site, situated east of the crusher shed. This pond is lined with a Bentomax liner and is currently in use.

Figure 1

Site Location

1740065-FIG1.cdr

The camp is serviced by a (RBC) rotating biological contactor sewage treatment facility which is located northwest of the camp. The discharge from this unit is directed to an area situated north of the camp. Waste products are separated with food waste and paper wastes incinerated in the camp incinerator. Metal and wood products are disposed of in the southern most of the two unused settling ponds. Potable water is obtained from Spyder Lake with the freshwater intake located directly west of the maintenance building.

A site plan depicting the layout of the camp is presented as Figure 2.

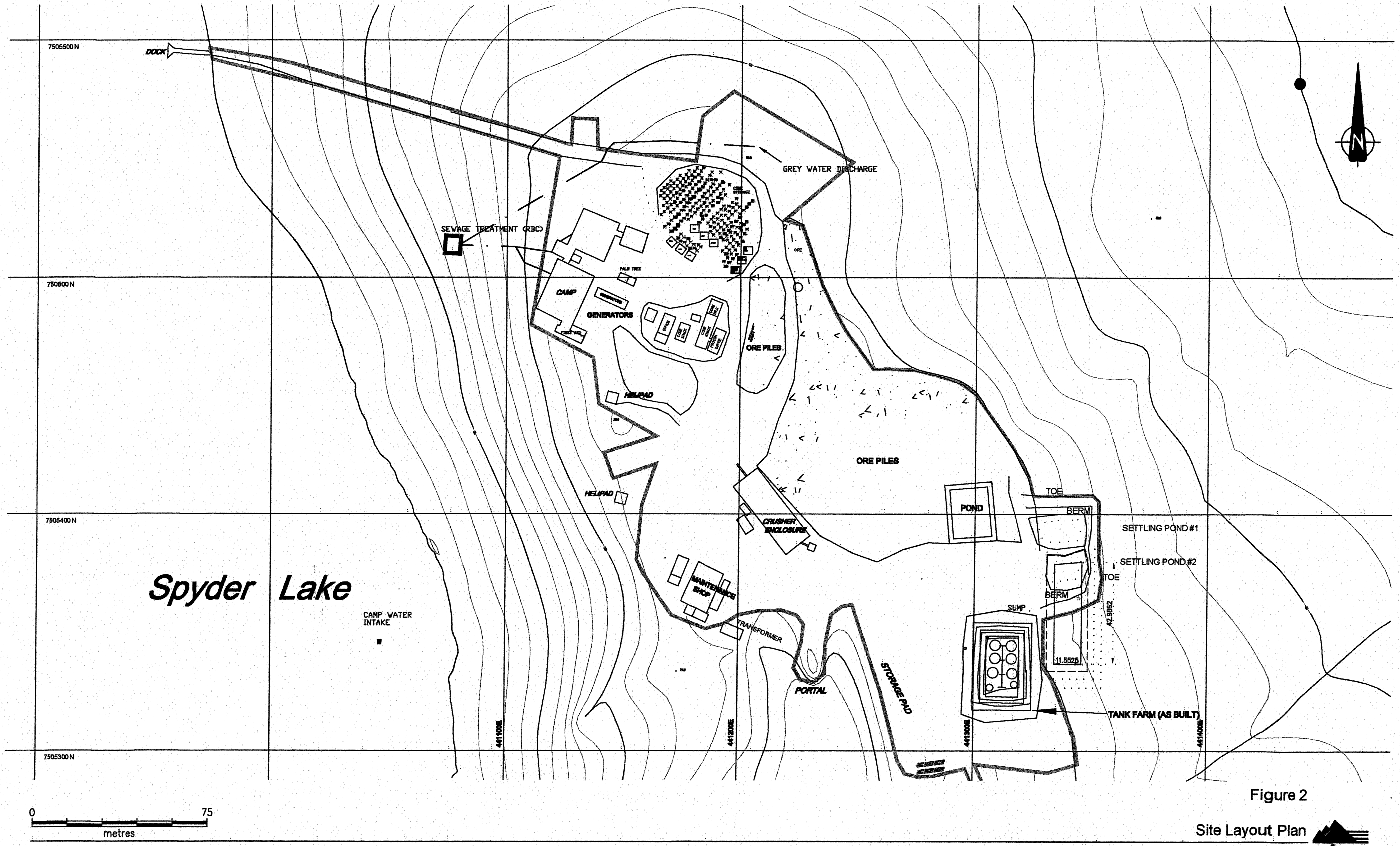

Figure 2

Site Layout Plan

1740065–FIG2.dwg

2.0 BACKGROUND INFORMATION- HYDROCARBON SPILL INCIDENTS

2.1 June 28 and March 3, 2003 Spill Incidents

According to internal records of Miramar, approximately 4,000 liters of diesel fuel were spilled during the early morning hours of June 28, 2003. The spill occurred in the southwest corner of the maintenance shop from a partially opened valve connecting fuel lines to the site generator. The spill was reported to the required authorities and was recorded as Spill Number 03-452.

At the time of the spill, no visible pooling of hydrocarbons was noted under the valve. Several hours following the spill discovery, camp personnel discovered that the diesel fuel had migrated west through the gravel pad and surface onto the tundra between the site and Spyder Lake. A series of trenches were hand excavated in areas containing the highest amounts of noticeable diesel. All excavated soil was placed in 205 liter drums and stored on site for future treatment and disposal in accordance with applicable guidelines. Miramar staff hand excavated two trenches and numerous test pits.

On June 30, 2003, two days after the spill occurred, free phase hydrocarbons were identified to be pooling in a small depression located adjacent to the camp helipad at a distance of approximately 75 meters from the spill occurrence. The emulsified liquid from within the depression was pumped into 205 liter barrels and stored on site for future treatment and disposal.

On July 23, 2003, an EBA representative inspected the site with emphasis placed on the assessment of the diesel fuel spill. It was reported, in a letter report to Miramar (EBA File No: 1740065.001) that:

- Little visible evidence of the hydrocarbon spill was present within the maintenance building in the vicinity of the generator. The valve at the point of the spill had been replaced with a series of locking valves;
- The trenches were inspected and, based on visual identifiers, it was determined that hydrocarbon migration west of the site had not exceeded 10 meters. Hydrocarbon absorbent pads were located within the trenches. The trenches did not contain any free standing water;

- Based on the estimated hydraulic conductivity of the gravel pad material, it was considered unlikely that the hydrocarbons leaching into the helipad depression were a result of the June 28, 2003 spill;
- At the time of the site inspection there was approximately 90 (205 litre) barrels of hydrocarbon impacted water stored on the site; and,
- In discussions with camp personnel, it was noted that a similar spill of diesel occurred on March 3, 2003. Based on the assumed hydraulic conductivity of the pad material and the timing of the March 3, 2003 spill, it was concluded that the residual hydrocarbons surfacing near the helipad originated from this spill incident.

A copy of the letter report summarizing the site inspection is provided in Appendix B.

2.2 August 21, 2003 Spill Incident

According to internal records of Miramar, approximately 150 litres of diesel fuel were spilled during the daytime hours of August 21, 2003. The spill occurred in the southwest corner of the generator building (Figure 2). The spill was reported to the required authorities and was recorded as Spill Number 03-541. A copy of the spill report is provided in Appendix C.

Directly after the incident occurred, Miramar personnel excavated the area impacted by the spill removing all soils with noticeable hydrocarbon odours. Hydrocarbon impacted soil was placed in 205 litre drums and stored on site for future treatment.

3.0 RECCOMENDED REMEDIAL APPROACH

The proposed remedial approach consisted of a strategy combining water treatment, source containment, soil removal and treatment associated with a site assessment program. The program was designed so as not to disturb the areas of natural landscape (i.e.: tundra), as it is a condition of the existing Water License for the Boston Camp. All work was therefore confined within the area of the site pad. The approach consisted of the following:

- Completed an environmental assessment of the site;
- A granular activated carbon unit to treat the existing stored water, as well as any future water produced by remedial measures was mobilized to the site. This unit was designed to remove the existing dissolved phase hydrocarbon from the water thereby allowing the treated water to be discharged to environment;

- A collection system was installed southwest of the maintenance building between the spill location and the tundra. The system was composed of a non-permeable barrier with the installation of a collection point allowing for the removal and subsequent treatment and discharge of hydrocarbon impacted groundwater soured from the active layer; and,
- A land treatment area was constructed. The hydrocarbon impacted soil excavated from the tundra near the spill location, from the collection system, and from the August 23, 2003 spill site and stored in 205 liter barrels was placed within this facility for treatment via natural degradation process.

4.0 SITE ASSESSMENT

4.1 June 28 and March 3, 2003 Spill Incidents

Environmental Site Assessment

An environmental site assessment of the area impacted by the March 3 and June 28 2003 spill incidents was conducted by an EBA representative from August 4 to August 17, 2003.

From August 5 to August 8, 2003, a total of 27 test pits (TP-01 to TP-27) were constructed on the pad of the site using a Komatsu™ PC15R track mounted excavator to delineate the sub-surface hydrocarbon plume. The excavator had been mobilized to the site by Miramar, specifically for the purposes of assessing and mitigating the effects of the hydrocarbon spill incidents. At each location, the thickness of the pad was measured and the presence of hydrocarbons, if any, was noted. Polyvinyl chloride (PVC) pipes (50.8 mm diameter) with 0.25 cm holes drilled for approximately 60 cm at one end were installed within selected test pits to be used for soil vapor and groundwater monitoring. The test pits were back filled with excavated material. Test pit stratigraphy, along with field observations, is provided as Table 1. The locations of all test pits and monitoring well locations within the pad area are depicted on Figure 3.

Table 1: Test Pit Observations

Test Pit ID	Hydrocarbon Odour Present	Pad-Sand Thickness (m)	Well Installed	Depth to Bottom of Pipe (m)	Screen Length
TP01	No	1.1	Yes	1.3	0.75
TP02	No	1.1	Yes	1.2	0.75
TP03	Weak	1.2	Yes	1.3	0.75
TP04	Strong	1	Yes	1.3	0.75
TP05	Weak	1.1	Yes	1.3	0.75
TP06	No	0.9	Yes	1.2	0.75
TP07	No	0.75	Yes	1	0.75
TP08	No	1	Yes	1.5	0.85
TP09	No	1.1	Yes	1.3	0.58
TP10	No	1	Yes	1.3	0.61
TP11	No	0.7	Yes	1.2	0.55
TP12	Weak	1	Yes	1.4	0.58
TP13	Weak	1.1	Yes	1.3	0.5
TP14	Strong	1.1	Yes	1.3	0.6
TP15	Weak	NA	No	NA	NA
TP16	No	1.3	Yes	1.5	0.6
TP17	No	1.1	No	NA	NA
TP18	Weak	0.9	Yes	1.4	0.5
TP19	No	1.1	No	NA	NA
TP20	Strong	1.2	Yes	NA	0.5
TP21	Strong	1.2	No	NA	0.5
TP22	No	1.4	No	NA	NA
TP23	Strong	1.4	Yes	1.6	0.6
TP24	Strong	1.4	Yes	1.6	0.6
TP25	Strong	1.3	Yes	1.5	0.65
TP26	Strong	0.5	Yes	1.4	0.65
TP27	No	0.5	Yes	NA	NA

Tundra Topsoil Monitoring

On August 07, 2003 the area of the identified fuel spill within the tundra was transected into lines A to F. Approximately 10 cubic centimeter (cm^3) samples of topsoil were taken from locations along the lines within depressions or where hydrocarbon impacts were noticeable (Figure 4). The samples were placed in plastic bags, tied and stored at ambient temperature for 20 minutes. VOC and CO_2 headspace concentrations were then measures using a MultiRae™ IR PGM-54 multi gas monitor. Table 2 summarizes the results of the topsoil headspace analyses.

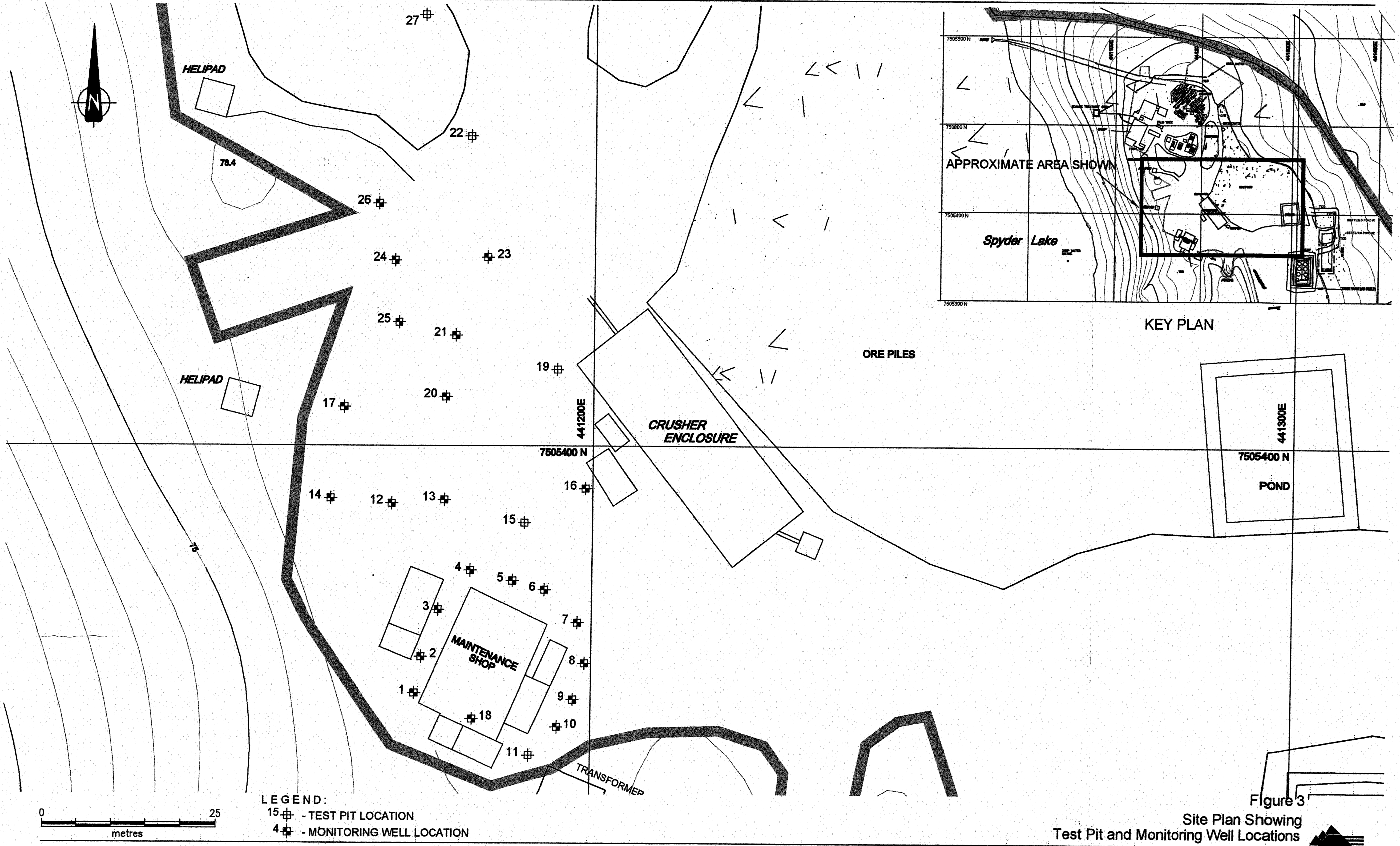

Figure 3
Site Plan Showing
Test Pit and Monitoring Well Locations

1740065–FIG3.dwg

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In the tundra, within the trenches and test pits excavated by Miramar following the release of the fuel, 11 test pit locations were hand excavated to groundwater or shovel refusal. Pipes, identical to the ones described previously, were installed in the new excavations within the tundra trenches (MW 1 to MW-11). The location of monitoring well locations within the tundra (i.e. outside of the site pad) were contained within the area of the transect lines A to F which are depicted on Figure 4.

Table 2: Tundra Soil Transect Data

Transect											
A		**B**		**C**		**D**		**E**		**F**	
Length (m)	**VOC ppm**	**Length (m)**	**VOC ppm**	**Length (m)**	**VOC ppm**	**Length (m)**	**VOC ppm**	**Length (m)**	**VOC ppm**	**Length (m)**	**VOC ppm**
0.0	21	0.0	0	0.0	8	0.0	2	0.0	50	0.0	8
2.2	20	3.7	8	2.0	0	1.5	12	2.2	7	2.2	0
4.0	60	6.7	12	5.2	10	3.3	2	3.8	7	5.8	2
5.5	32	8.6	13	8.0	85	5.2	70	5.7	29	6.2	120
7.7	20	13.6	2	10.5	10	7.5	55	6.5	4	8.7	11
11.5	10	16.0	12	16.1	16	10.0	13	8.3	25	11.9	25
15.3	12	19.8	10	20.0	40	12.9	12	10.0	0	15.0	14
19.0	11	30.0	1	23.5	11	16.1	18	12.4	0	18.5	22
23.0	178			28.0	11	19.0	0	14.6	0	21.9	17
30.0	1					20.2	9	18.3	50	26.8	20
						20.7	0	21.0	0	29.5	6
						23.5	14	23.4	11		
						25.2	20	26.9	12		
						28.3	18	30.9	20		

Soil and Water Monitoring

On August 15, 2003, monitoring wells were monitored for the presence of water within the local active layer and free phase hydrocarbons using a Solinst™ Model 122 interphase meter. Volatile organic carbon (VOC) and carbon dioxide (CO_2) concentrations within each of the wells were measured with a MultiRae™ IR PGM-54 multi gas monitor water levels, product thickness, VOC concentrations and CO_2 concentrations are provided as Table 3

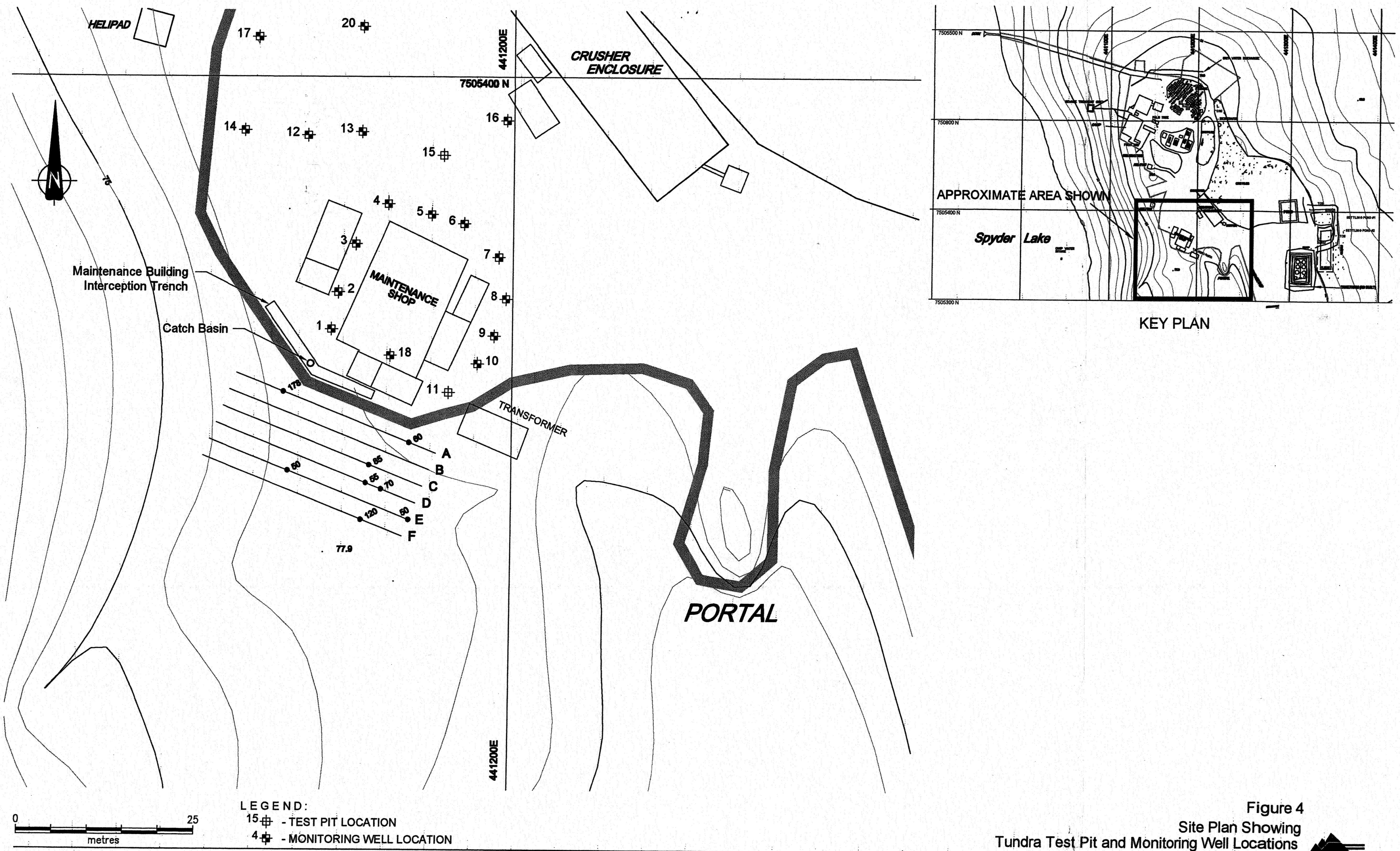


Figure 4
Site Plan Showing
Tundra Test Pit and Monitoring Well Locations

1740065–FIG4.dwg

Table 3: Monitoring Well Information

MW ID		VOC ppm	CO_2 ppm	Free Phase Hydrocarbons Thickness (m)	Water Depth Metres Below Surface
Tundra Monitoring Well Locations	**MW1**	101	>20000		1.42
	MW2	0	2600		1.76
	MW3	0	10,000		Dry
	MW4	0	1700		Dry
	MW5	0	3000		Dry
	MW6	0	2000		Dry
	MW7	0	3200		Dry
	MW8	20	2500		Dry
	MW9	0	3000		Dry
	MW10	32	14000		Dry
	MW11	82	16000		Dry
Site Pad Monitoring Well Locations	**TP01**	0	2500		Dry
	TP02	0	3200		2.16
	TP03	5	3300		1.62
	TP04	110	16000	0.01	1.55
	TP05	100	9000	Trace	1.87
	TP06	77	4000		1.86
	TP07	0	3500		1.98
	TP08	0	4200		1.49
	TP09	0	7000		1.87
	TP10	0	3200		1.52
	TP11	0	3500		1.75
	TP12	13	5500	Trace	1.6
	TP13	25	6500	Trace	1.5
	TP14	12	4300		1.7
	TP16	0	2700		2.41
	TP17	0	3500		1.75
	TP18	15	10000		1.29
	TP20	50	9000	0.02	1.63
	TP21	150	8500	Trace	1.55
	TP23	28	5200		1.8
	TP24	85	4000	Trace	1.33
	TP25	25	3800	Trace	1.8
	TP26	16	>20000		1.1
	TP27	Not measured			

Free-phase liquid hydrocarbons were detected in eight monitoring wells located on the pad area (TP4, TP5, TP12, TP13, TP20, TP21, TP24, and TP25).

CO_2 levels were greater than 10,000 ppm in three pad wells (TP4, TP18 and TP26) and four tundra wells (MW1, MW3, MW10 and MW11). All wells with elevated levels of CO_2 also had VOC concentrations greater than the background readings of 0 ppm. The presence of elevated CO_2 levels along with elevated VOC readings is an indication of hydrocarbon impacts as a by product of natural degradation of hydrocarbons is CO_2 .

Extent of Hydrocarbon Impacts

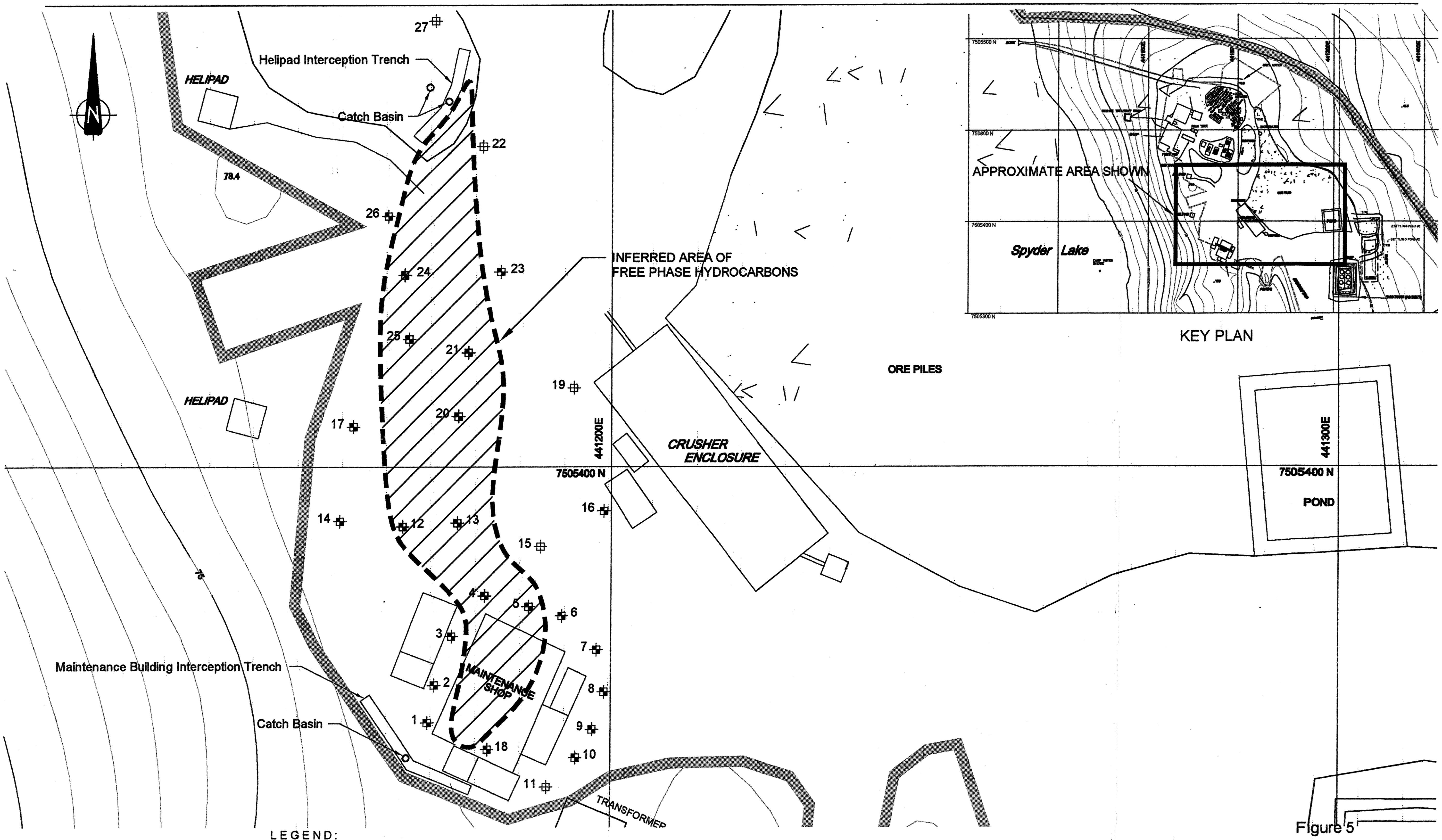
An area, of approximately 1,035 m^2, where free phase hydrocarbons is present was inferred based on the results of initial assessment work (Figure 5). The volume of free phase hydrocarbon liquid present on-site could not be calculated due to the minor amounts (trace) detected within the wells which did not provide sufficient information to calculate volumes.

All test pits whereby soil hydrocarbon impacts were noted during excavation, free phase hydrocarbons were also noted during monitoring activity. Hydrocarbon impacts were observed from 0.75 metres to a maximum depth of 1.50 metres below surface grade, the depth at which permafrost was encountered. Based on the area where free-product was noted, the volume of the hydrocarbon impacted material within the site gravel pad resulting from the March 3 and June 28,2003 was determined to be approximately 8000 m^3.

4.2 August 21, 2003 Spill Incident

Test Pit Excavation

The excavation examination resulting from the August 21, 2003 spill incident was completed on August 28, 2003. The excavation was approximately 5 meters long by 5 meters wide and had a depth of 1.5 meters and had been constructed by Miramar personnel as an immediate measure to mitigate the impacts of the spill after discovery. Several large boulders remained within the excavation resulting in a removal of 30 cubic meters of soil. On the north wall, directly beneath the generator building, black hydrocarbon staining was visible. Further excavation was not possible towards the north due to the building presence. No hydrocarbon staining was noted along the south, east and west wall.



0 25
metres

LEGEND:
15 ⊕ - TEST PIT LOCATION
4 ⊕ - MONITORING WELL LOCATION

Figure 5
Site Plan Showing Area of
Inferred Free Phase Hydrocarbons

1740065–FIG5.dwg

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A small amount of water was collected on the excavation bottom upon which no hydrocarbon sheen was detected. Upon removal the water, hydrocarbon staining was not observed.

During excavation assessment, the site pad composed of very fine to cobble sized drilling debris extended from surface to approximately 0.5 meters below surface grade (bsg). Below the site pad, a 10 centimetre poorly developed organic soil overlays a medium to coarse-grained sand to a maximum depth of approximately 1.5 meters whereby permafrost was encounter.

A site plan depicting the location of the spill and the extent of the excavation is presented as Figure 6.

5.0 SOIL AND WATER REMEDIAL MEASURES

5.1 March 3 and June 28 Spill Incidents

Following the site assessment, remedial techniques as discussed in Section 3.0 were implemented to assist in preventing further migration of the hydrocarbon impacts from its existing source areas and to mitigate the hydrocarbon impacts currently observed on site.

Interception Trenches

Two interception trenches were constructed on site as situated on Figure 5. Similar construction techniques were used for the two interception trenches. The first trench situated east of the heli-pad, was installed to contain the existing hydrocarbon plume from further northward migration. The trench was excavated to a depth of approximately 1.0 metres depth below surface grade, lined on the north wall and base with hydrocarbon resistant high density polyethylene (HDPE) liner and backfilled with clean crushed rock fill. A catch basin was installed at the approximate center of the trench. The basin, a 205 liter drum with holes drilled along the sides, will allow for the placement of a pump to remove the water. A second basin, similar to the first, was placed north of the trench on the opposite side of the HDPE liner.

Pumping water from the two catch basin locations during periods of melt and wet weather during the summer months will deter further migration of hydrocarbons by creating a flow gradient towards the basins. The result of the pumping will be the creation of a net flow towards the basin and efficient removal of the hydrocarbon impacted water.

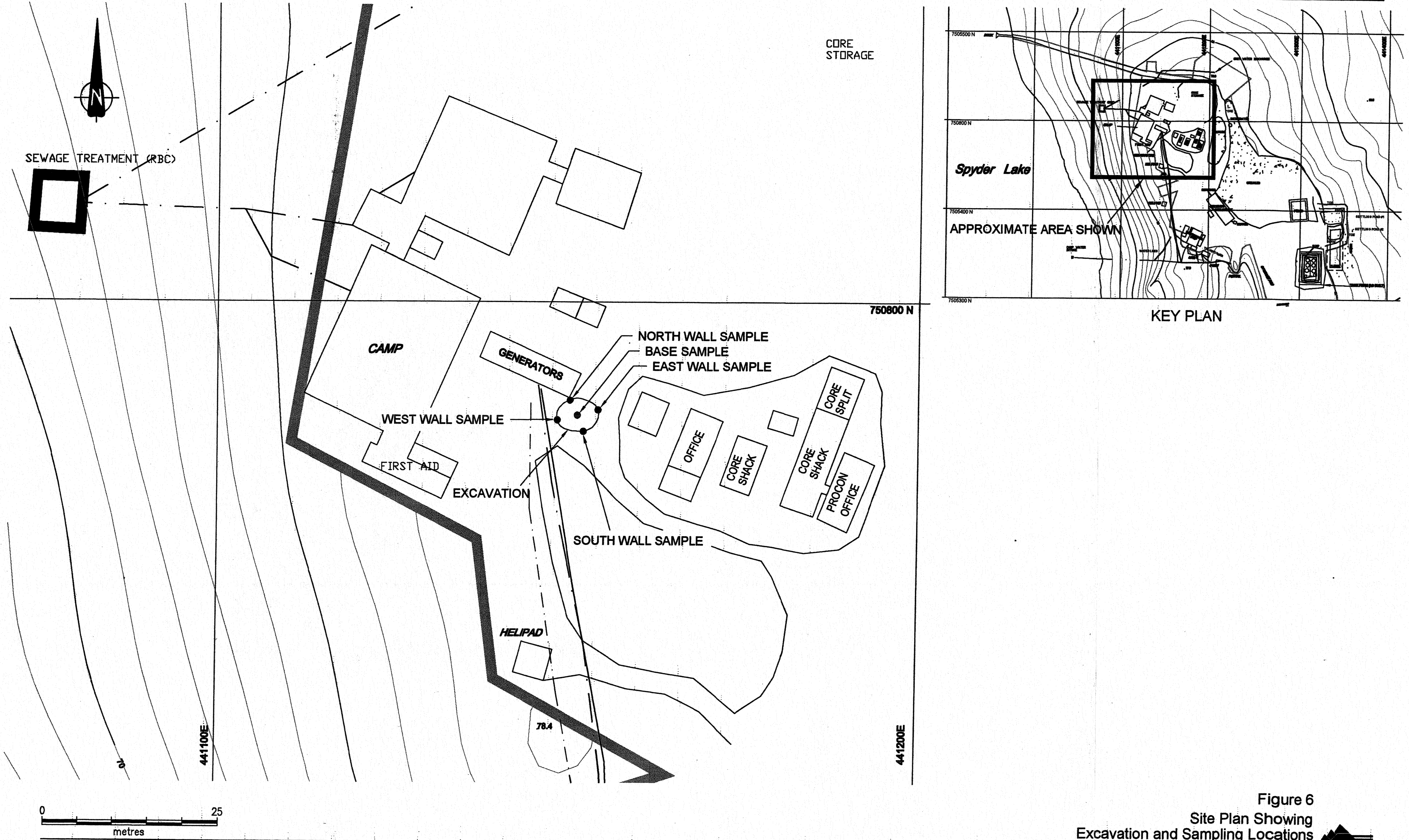


Figure 6
Site Plan Showing
Excavation and Sampling Locations

1740065–FIG6.dwg

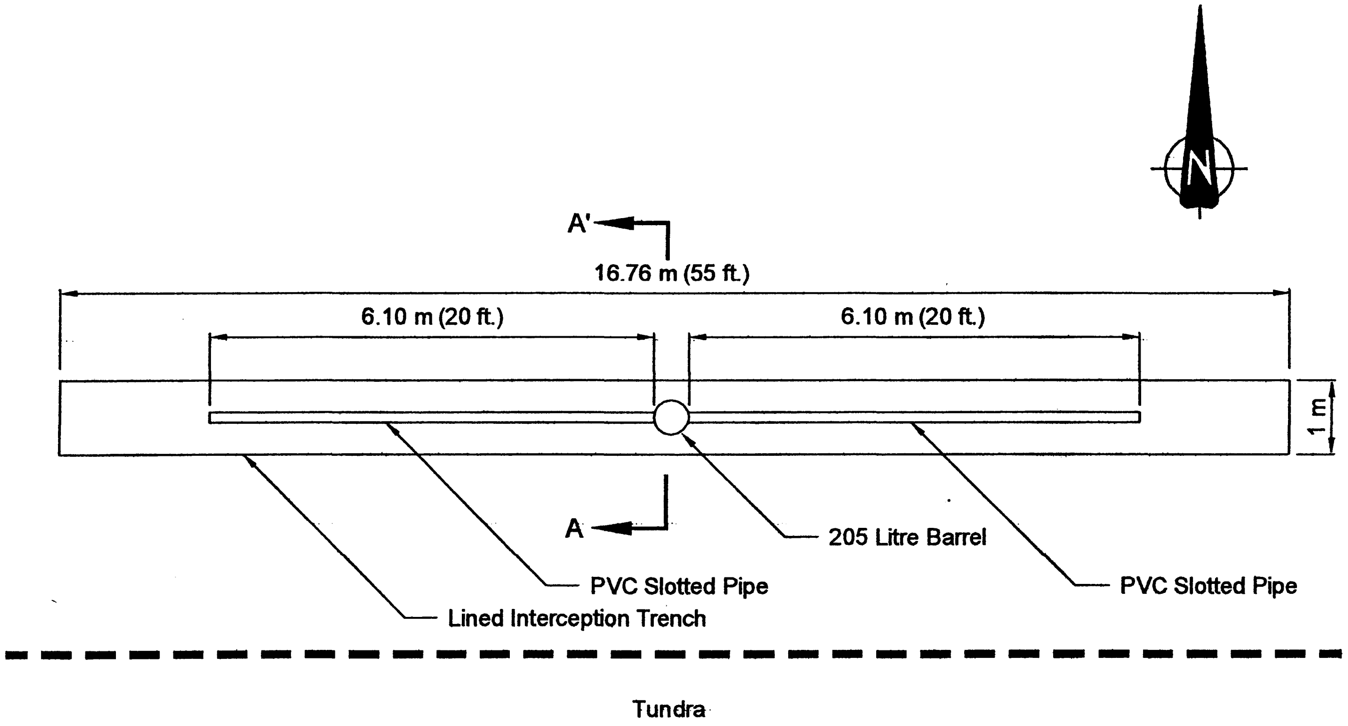
The second interception trench was placed along the south and west edge of the maintenance shop to prevent further hydrocarbon migration onto the tundra and ultimately into Spyder Lake. The trench was excavated to a depth of approximately 1.5 meters below surface grade, the depth at which permafrost was encountered. The trench bottom and west wall were lined with a HDPE liner surrounded by Bentomax™ matting (as protection for the HDPE liner) as shown in Figure 7. A 205 liter catch basin was installed in the trench with an approximate length of 14 meters of 55 mm schedule 40 slotted PVC pipe extending along the trench bottom. The liner will prevent hydrocarbon migration from the source area (i.e.: beneath the generator) onto the tundra while the basin will allow for the removal for treatment purposes of hydrocarbon impacted water migrating from the source area (i.e. underneath the generator) during periods of flow.

Land Treatment Area Construction

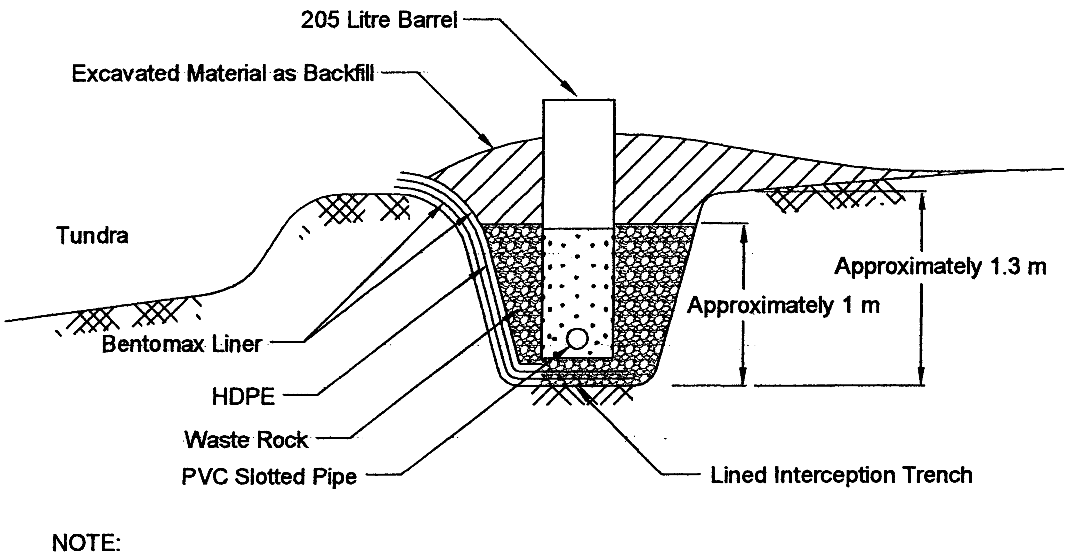
A land treatment area (LTA) was constructed using HDPE liner underlain by Bentomax™ matting for protection at the south end of the pad as depicted on Figure 8. An as-built diagram is provided as Figure 9. The dimensions of the LTA are approximately 30 meters by 20 meters wide with a minimum wall height of 0.75 meters. Approximately 50 barrels of soil excavated by Miramar following the two hydrocarbon spills were placed within the LTA for remediation.

Water Treatment

Approximately 82,000 liters (400 barrels) of water that were stored on site and identified by Miramar staff as material collected from the heli-pad depression were processed using an FII Oil Absorption System provided by Terry Ruddy Sales of Edmonton, Alberta. The barrels containing the water were first emptied into 1400 liter capacity basins constructed on site for de-emulsification and coarse sediment removal. The free-phase product and sludge was skimmed from the surface and large particles removed from the processing by means of screening and filtration through a burlap net. A schematic of the treatment system is provided as Figure 10 and an operation manual of this system is provided as Appendix D.



Plan View



NOTE:
Bentomax Liners and HDPE Material shown separated for clarity.

Cross-Section A-A'

Figure 7
As Built of Maintenance Building Interception Trench

Not To Scale

1740065–FIG7.dwg

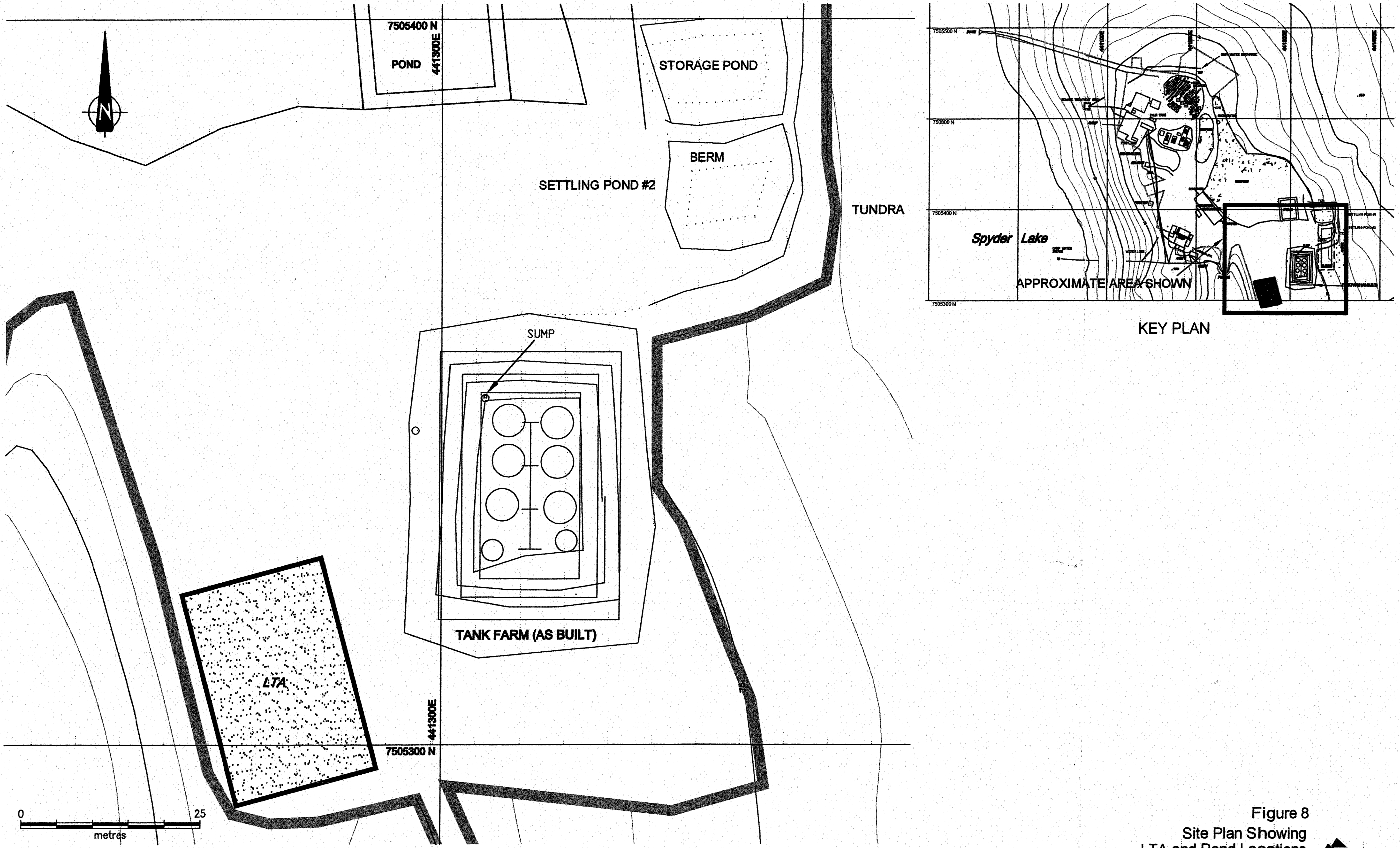
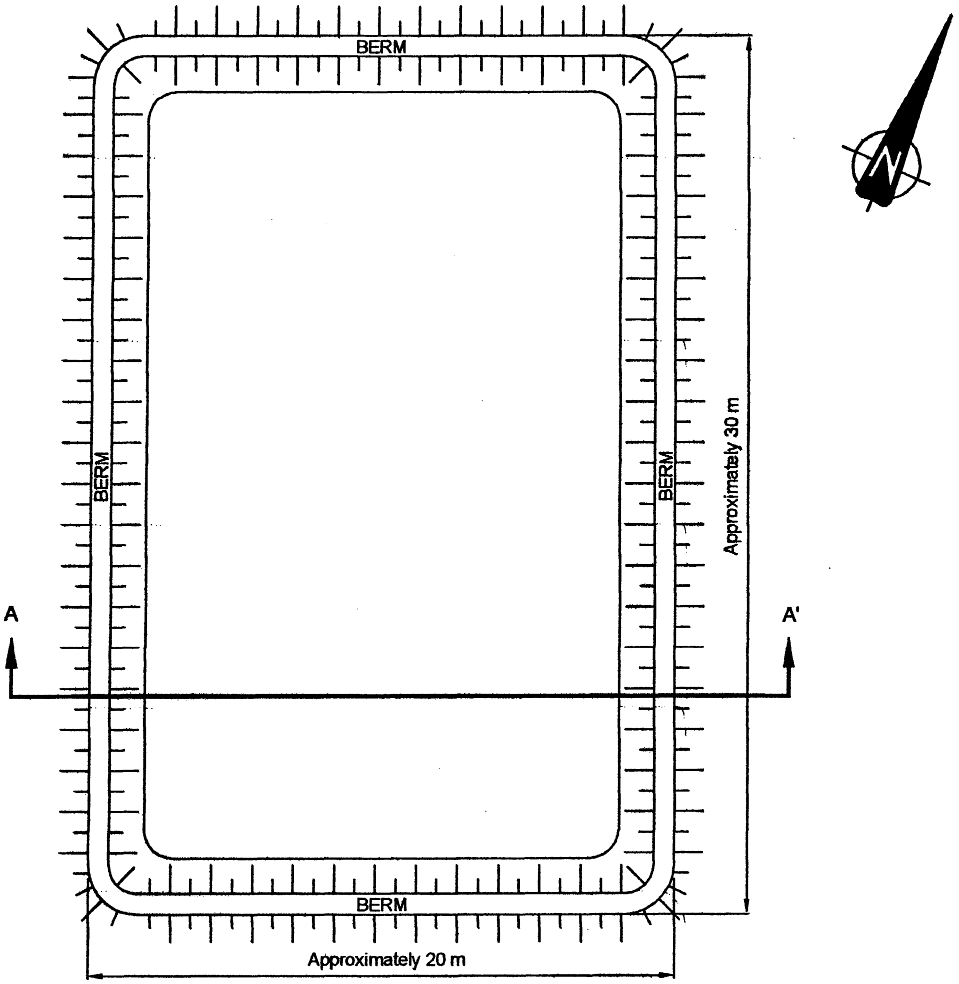
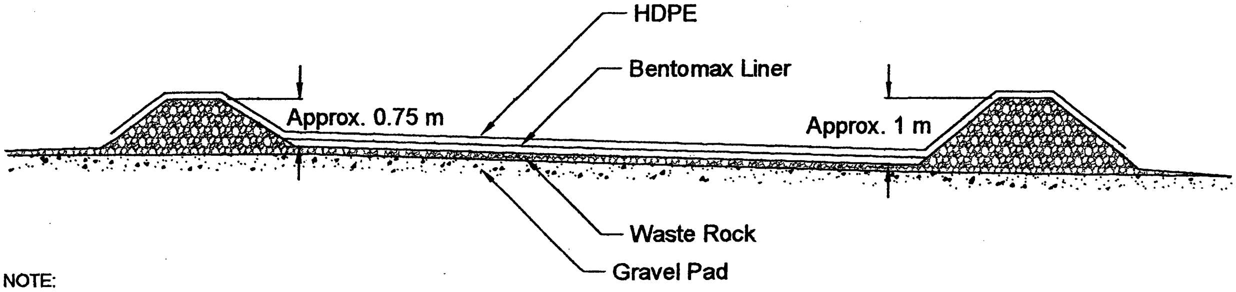


Figure 8
Site Plan Showing
LTA and Pond Locations



Plan View



NOTE:
Bentomax Liners and HDPE Material shown separated for clarity.

Cross-Section A-A'

Figure 9
As Built of
Land Treatment Area

Not To Scale

1740065-FIG9.dwg

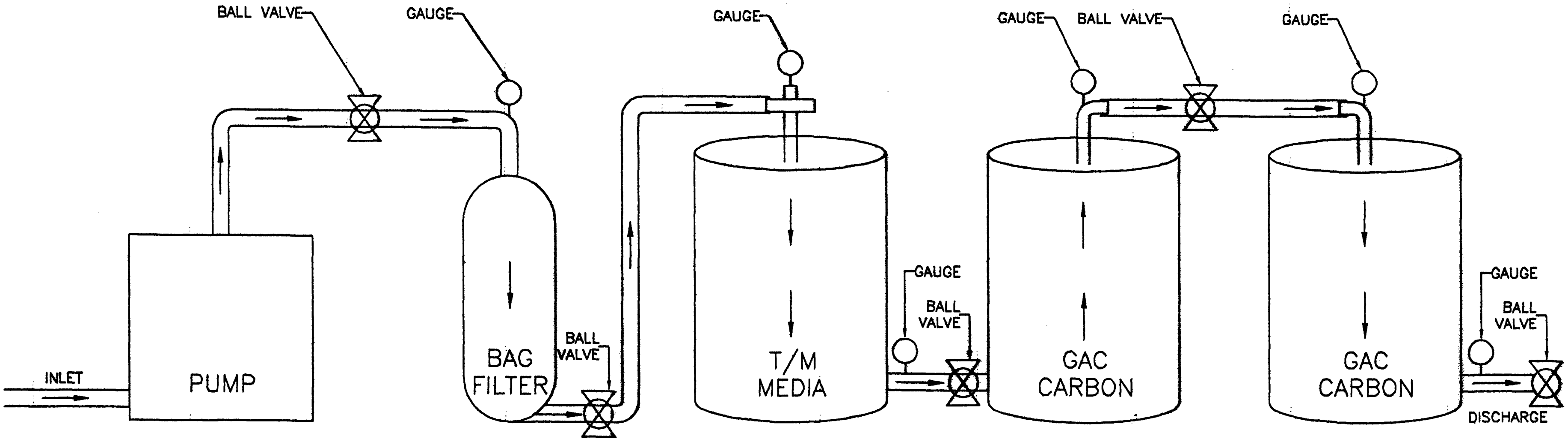


Figure 10
General Schematic
Granular Activated Carbon (GAC) Unit

1740065–FIG10.dwg

In order to verify the removal of hydrocarbons from system operation, water samples were collected after 1 and 3.5 hours of system operation on August 13, 2003. The system operation was then suspended until analytical results were returned. The samples were collected from pre and post treatment liquid. All samples were placed in laboratory provided containers, stored in coolers at 4 °C and transported by courier to Enviro-Test Laboratories of Edmonton, Alberta for analysis. The requested analytical suite included benzene, toluene, ethyl benzene and xylene (BTEX), total volatile hydrocarbons (TVH) and total extractable hydrocarbons (TEH) concentrations (Table 4).

Table 4: Process Water Analytical Results (mg/l))

Sample Identification		**Parameters**					
Date	**Location**	**Benzene**	**Toluene**	**Ethyl Benzene**	**Xylenes**	**TVH**	**TEH**
August 13	Before 3:30 PM	0.94	21	4.0	15	90	2400
	After 3:30 PM	0.0006	0.0006	<0.0005	<0.0005	<0.1	<0.5
August 13	Before 5:00 PM	0.37	5.4	1.3	6.9	44	3000
	After 5:00PM	0.0010	0.0009	<0.0005	<0.0005	<0.1	<0.5
August 28	Before 11:00AM	0.64	3.1	0.50	2.9	44	270
	After 11:00AM	0.0015	0.017	0.0014	0.012	0.1	1.7
August 28	After 4:00 PM	0.0013	0.012	0.0009	0.0090	<0.1	2.3
August 28	After 9:00 PM	<0.0005	<0.0005	<0.0005	<0.0005	0.2	16
August 29	After 11:00 AM	<0.0005	<0.0005	<0.0005	<0.005	0.4	1.7
Sept 4	After 3:00 PM	<0.0005	<0.0005	<0.0005	<0.0005	1.2	3.7
Sept 5	After 3:00 PM	<0.0005	<0.0005	<0.0005	0.0018	0.8	19
Sept 6	After 3:00 PM	<0.0005	0.0013	<0.0005	0.0008	0.9	12
Sept 7	After 3:00 PM	<0.0005	0.0006	<0.0005	0.0033	<0.1	3.2
Sept 8	After 3:00 PM	<0.0005	0.0005	<0.0005	0.00.33	0.1	3.9
Sept 9	After 3:00 Pm	<0.0005	<0.0005	<0.0005	<0.0005	0.2	13
Guidelines		**0.37**	**0.002**	**0.09**	**0.18**	**NG**	**NG**

Notes
Analytical Results are compared to Canadian Aquatic Guidelines for Protection of Freshwater Aquatic Life
Canadian Council of Ministers of the Environment

Both samples collected on August 13 from pre-treatment water contained BTEX concentrations exceeding CCME guidelines. Following processing, BTEX concentrations were below CCME guidelines and detectable limits.

Once confirmation was received that hydrocarbon removal was being achieved, the remaining water was processed and stored in a HDPE lined pond. Water processing continued until the capacity of the pond was exhausted. Samples were collected at regular intervals throughout, and up to end of August 29 during the first complete use of media to demonstrate that even though the GAC media becomes spent (i.e. saturated with hydrocarbons), the end product water discharge did not contain elevated levels of BTEX, TEH or TVH.

For samples collected on August 28 and 29, 2003 three of the four "before" water samples were cancelled due to the large percentage of free phase hydrocarbons contained within the sample. The samples indicated that the treatment system was effectively removing the hydrocarbons with only the toluene levels in two of the four samples slightly exceeding the guidelines level. Laboratory analytical results for all other parameters were below applicable guidelines.

Additional water sampling continued on the water discharge from the water treatment until all of the hydrocarbon-impacted water stored on site had been treated on September 9, 2003. These analyses indicated that he BTEX parameters were within the applicable guidelines. Complete laboratory analytical reports are provided as Appendix E

The treated water was discharged to a storage pond constructed with an impermeable HDPE liner. Pond location is shown on Figure 8. A notice of discharge prepared by Miramar was issued to the Nunavut Water Board on August 27, 2003 indicating that the pond water would be discharged to environment on September 6, 2003 (Appendix F). Following a review of the analytical results of the first media test, it was shown that BTEX, TEH and TVH concentrations were below applicable guidelines, therefore on September 6, 2003 the stored water was released to environment at a location on the tundra immediately to the east of storage ponds as depicted on Figure 8. Water discharge was completed on September 15, 2003 with approximately 82,000 liters being released.

Spent carbon media removed from the treatment unit was disposed of within the LTA in accordance with the manufacturer specifications.

5.2 August 21, 2003 Spill Incident

Soil samples were collected from the excavation base and along each wall at a depth of 1.0 meter base or where obvious hydrocarbon staining existed. All soil samples were placed in laboratory provided containers, stored at 4 degrees Celsius and shipped to Enviro-Test Laboratories of Edmonton, Alberta for analysis. Requested analysis included benzene, toluene, ethyl benzene, xylene (BTEX) and PHC F1 to F4 concentrations. Sampling locations are shown on Figure 6. One soil sample was collected from the excavated impacted material, for contaminant characterization purposes, and submitted to ETL for similar analysis. Analytical results are presented in Table 5 and the Laboratory Sheets are provided in Appendix E.

Table 5: Soil Analytical Results (mg/kg)

Parameter	**Guideline**	**Soil removed for Treatment (W/C)**	**N.Wall**	**S.Wall**	**E.Wall**	**W.Wall**	**Base**
Benzene	0.5	0.14	0.39	<0.01	<0.01	<0.01	0.02
Toluene	0.8	3.4	14	<0.01	0.03	0.31	3.4
Ethyl benzene	1.2	1.2	2.8	<0.01	<0.01	0.27	0.72
Xylene	1	13	31	0.02	0.17	1.4	3.6
PHC F1	30	310	650	17	<5	10	61
PHC F2	150	96000	11000	86	25	62	810
PHC F3	400	22000	4300	26	46	39	820
PHC F4	2800	6600	700	130	<100	140	400

The analytical results indicated that remnant hydrocarbon levels in excess of applicable guidelines remain on the north face and on the base of the excavation. Further excavation to the north is prevented by the presence of the generator building and the permafrost layer at depth.

Excavated Soil Treatment

Approximately 30 cubic meters of hydrocarbon impacted soil excavated by Miramar staff. The soil was transported in 205 litre drums and placed in a land treatment area (LTA) constructed under EBA supervision in August 2003 (EBA Job# 0701-1740065.001) for remedial purposes. The LTA location is shown on Figure 8.

Excavation Water Treatment and Discharge

Approximately 350 liters of water was removed from the excavation and stored in 205 liter barrels. The water was then treated using a FII Oil Absorption System supplied by Terry Ruddy sales of Edmonton, Alberta consisting of a granular activated carbon used for hydrocarbon removal. Once treated, the water was then discharged to the environment.

6.0 SUMMARY AND CONCLUSIONS

6.1 March 3 and June 28 Spill Incidents

A hydrocarbon plume of approximately 1,350 m^2 exists within the site pad matrix. It originates at the maintenance building and appears to terminate at a small depression near the heli-pad. An estimated 800 m^3 of hydrocarbon impacted soil is contained within the inferred area of the plume.

Isolated areas of hydrocarbon impacts exist within the tundra that has elevated CO_2 and VOC concentrations relative to background levels. The high CO_2 concentrations indicate that microbial activity is occurring in the soil whereby the microorganisms are consuming a nutrient source (the diesel) and producing CO_2 as a by product of metabolism. Since the main source of the hydrocarbons spill was excavated by Miramar shortly after the spill, it can be assumed that only residual amounts of the fuel remain within the tundra. It is likely that, given time, the microbial activity will be sufficient to remove the remnant hydrocarbons from the soil. Because of the cold climate of the north, the time that will be required to consume the hydrocarbon will be greater than in warmer climates, likely spanning several years.

Two interception trenches were constructed to inhibit further migration of the hydrocarbon plume. The first was constructed within a small depression adjacent to the heli-pad; the second was built between the spill location and the tundra. Both had catch basins installed to allow for contaminant removal during high flow periods.

A land treatment area was constructed for hydrocarbon impacted soil remediation. The LTA, with a surface area of approximately 600 m^2, was lined with a high-density polyethylene, hydrocarbon resistant liner. An estimated 50 barrels of soil excavated from the tundra following the fuel release, was placed within the LTA.

Approximately 82,000 litres of hydrocarbon contaminated water were subsequently treated and released to the environment. Prior to release, the water was analysed so that BTEX, TEH and

TVH concentration were below applicable guidelines and that hydrocarbon removal was being achieved.

6.2 August 21, 2003 Spill Incident

The immediate impacted area of the hydrocarbon spill, approximately 30 cubic meters of soil, was excavated and placed into a land treatment area constructed with an impermeable hydrocarbon resistant liner, for the purpose of remediation.

Hydrocarbon impacts exist along the north wall, beneath the generator structure. Further excavation of stained soil was not possible towards the north due to the presence of the generator structure.

Black staining and hydrocarbon odour were noted along the north wall during the excavation inspection. The staining is likely a result of microbial activity within the soil utilizing the diesel as a nutrient source. The microbial degradation process is generally slow; taking years in colder, less active climates to produce the amount of observed staining indicating that the spill is likely a result of a historic event.

Soil collected along the base of the excavation contained toluene, xylene, PHC F2 and PHC F3 concentrations above residential guidelines. The excavation was advanced to a maximum depth where permafrost was encountered and the concentrations from the sample are tow orders of magnitude lower than the worst case sample. It is likely some residual hydrocarbons exist at the base of the excavation and are immobilised within the permafrost posing little concern to the environment.

Xylene concentration in the west wall was 1.4 mg/kg, exceeding the CCME guideline of 1.0 mg/kg. The worst case sample had a xylene concentration of 13 mg/kg indicating that the majority of the contaminant has been removed.

Soil concentrations of BTEX and PHC F1 to F4 along the east and south walls of the excavation were all below CCME guidelines.

Water that collected within the excavation was treated by granular activated carbon filtration for hydrocarbon removal and discharged to environment.

7.0 RECOMMENDATIONS

A remediation action plan should be developed in order to address the following issues:

- Removal, treatment and discharge of all water from the catch basins installed near the heli-pad and maintenance building. This plan should include regular operation, maintenance, and monitoring of the water treatment system once the onset of the spring freshet is experienced;

- Soil within the LTA should be cleared of all large objects, segregated based on the date the material was placed with, and aerated on a regular basis to aid in the bio-remediation process. If required, soil amendments such fertilizer could be added to speed the process. Prior to the removal of any soil from the LTA, soil samples should be taken and analyzed to confirm that hydrocarbon levels have been reduced to within acceptable levels; and

- Monitor all wells within the tundra at least twice through the upcoming summer season to ensure that further migration towards Spyder Lake is not occurring.

8.0 LIMITATIONS OF LIABILITY

This report has been prepared for the exclusive use of Miramar Mining Corporation for the specific application described in Section 1.0 of this report. It has been prepared in accordance with generally accepted geo-environmental engineering practices. No other warranty is made, either expressed or implied. Engineering judgement has been applied in developing this report.

For further limitations, reference should be made to the General Conditions contained in Appendix G.

9.0 CLOSURE

We trust this report meets your present requirements. Should you have any questions or comments, please do not hesitate to contact the undersigned directly.

Yours truly,
EBA ENGINEERING CONSULTANTS LTD.

Prepared by:	Reviewed by:
Steve Taylor, B.Sc., Environmental Scientist	Brent Murphy, M.Sc., P. Geol, Project Director, NWT/Nunavut

APPENDIX A
SITE PHOTOGRAPHS

Photo 1
Photograph of test pit/monitoring well locations west of the maintenance shop.

Photo 2
Photograph of test pits/monitoring wells in pad area. Looking south.

Photo 3
Photograph of test pit/monitoring well locations south and east of the maintenance shop. Looking north.

Photo 4
Photograph of hand excavated trench completed by Miramar staff following the discovery of the fuel spill. Looking east.

Photo 5
Photograph of hand excavated trench completed by Miramar staff following the discovery of the fuel spill. Looking east.

Photo 6
Photograph of helipad interception trench pre-construction. Looking south.

Photo 7
Photograph of helipad interception trench post-construction. Looking south.

Photo 8
Photograph of maintenance shop interception trench post construction. Looking south.

Photo 9
Photograph of backfill material used in maintenance shop interception trench. Looking north.

Photo 10
Photograph of catch barrel and piping used in maintenance shop interception trench. Looking south.

Photo 11
Photograph of HDPE liner used in maintenance shop interception trench. Looking south.

Photo 12
Photograph of crush material used as bedding for landfarm area.
Looking south.

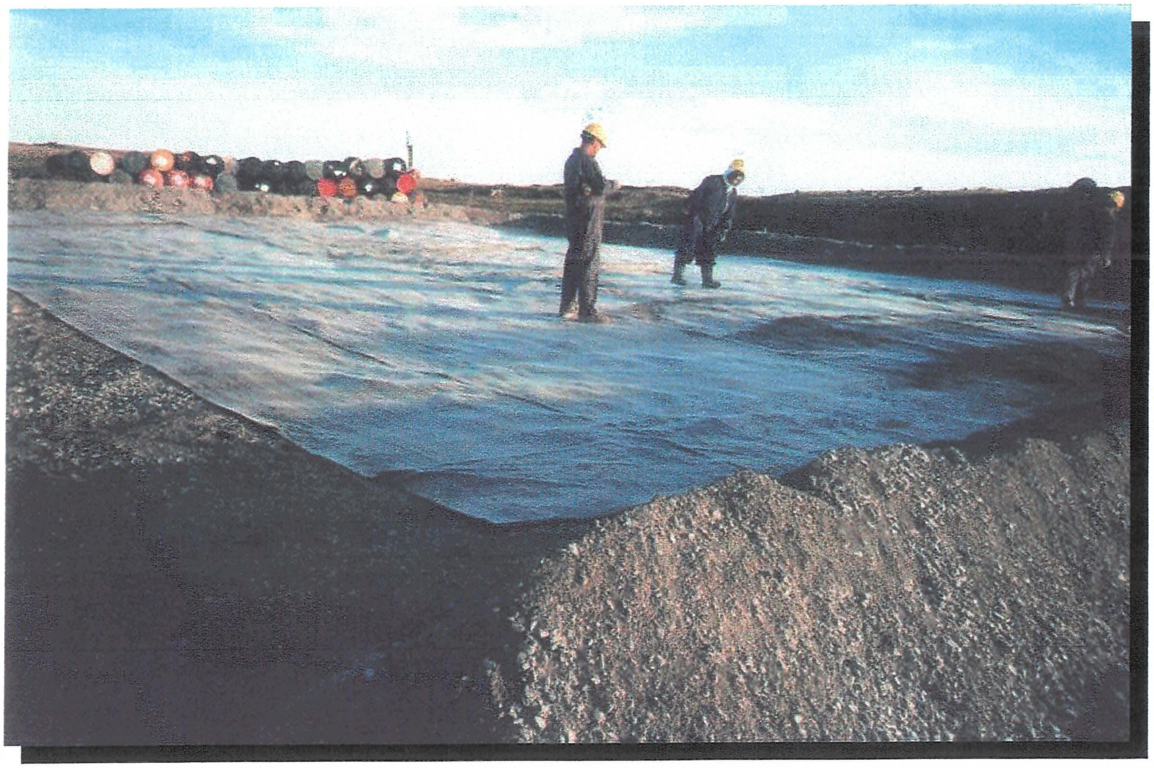


Photo 13
Photograph of Bentomax™ liner used as a protective barrier for
landfarm. Looking south.

Photo 14
Photograph of landfarm area. Looking west.

Photo 15
Photograph of water treatment system.

Photo 16
Construction of helipad interception trench.

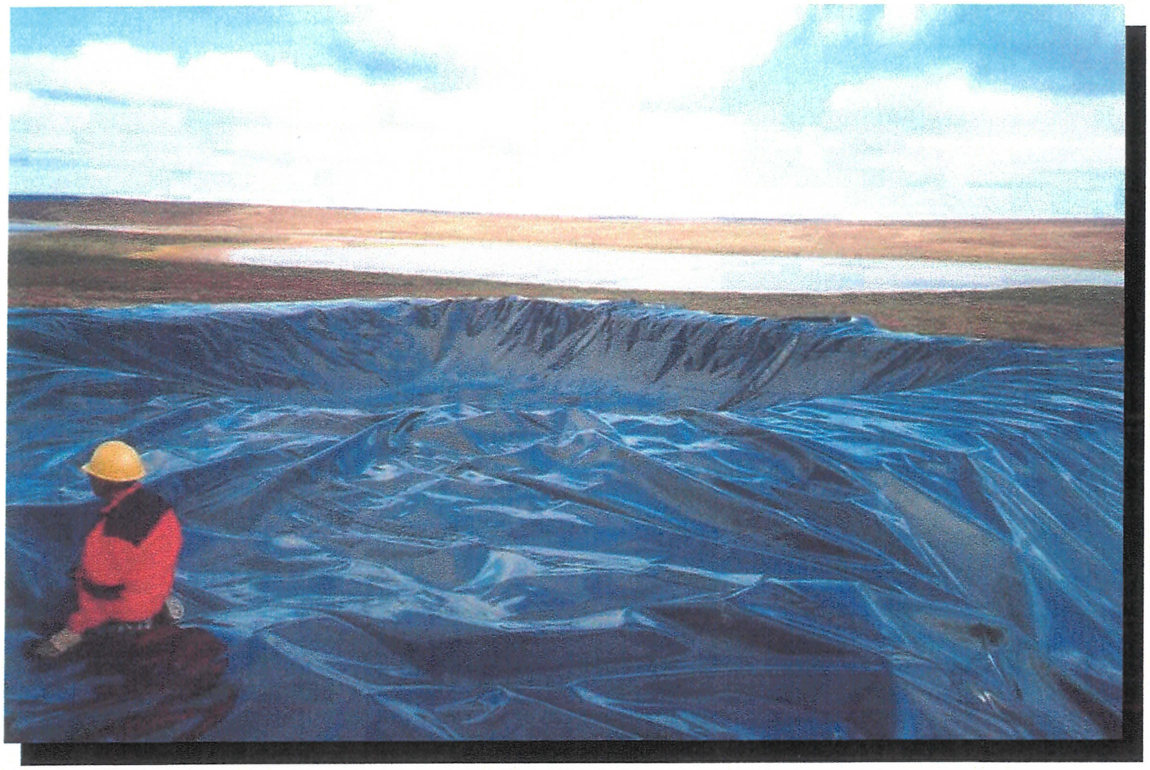


Photo 17
Lined pond.

Photo 18
Land Treatment Area.

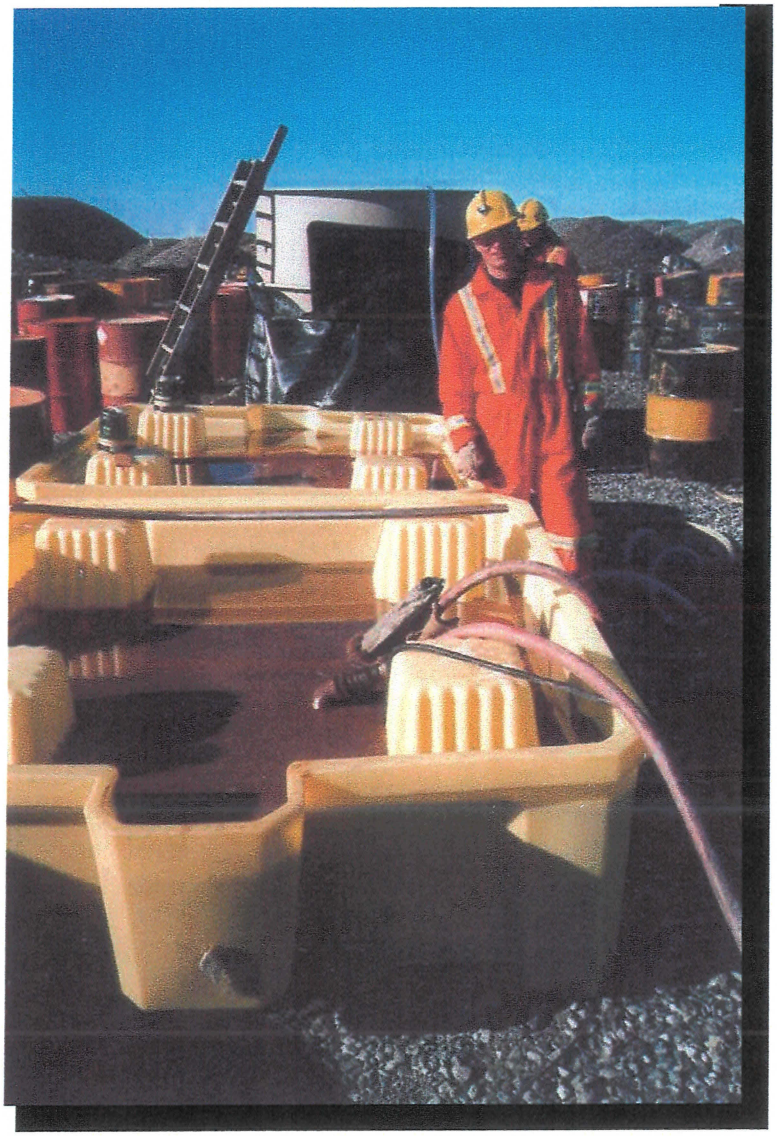


Photo 19
Storage basins for de-emulsification of pre-treatment liquid.

Photo 20
South wall of excavation.

Photo 21
North wall of excavation.

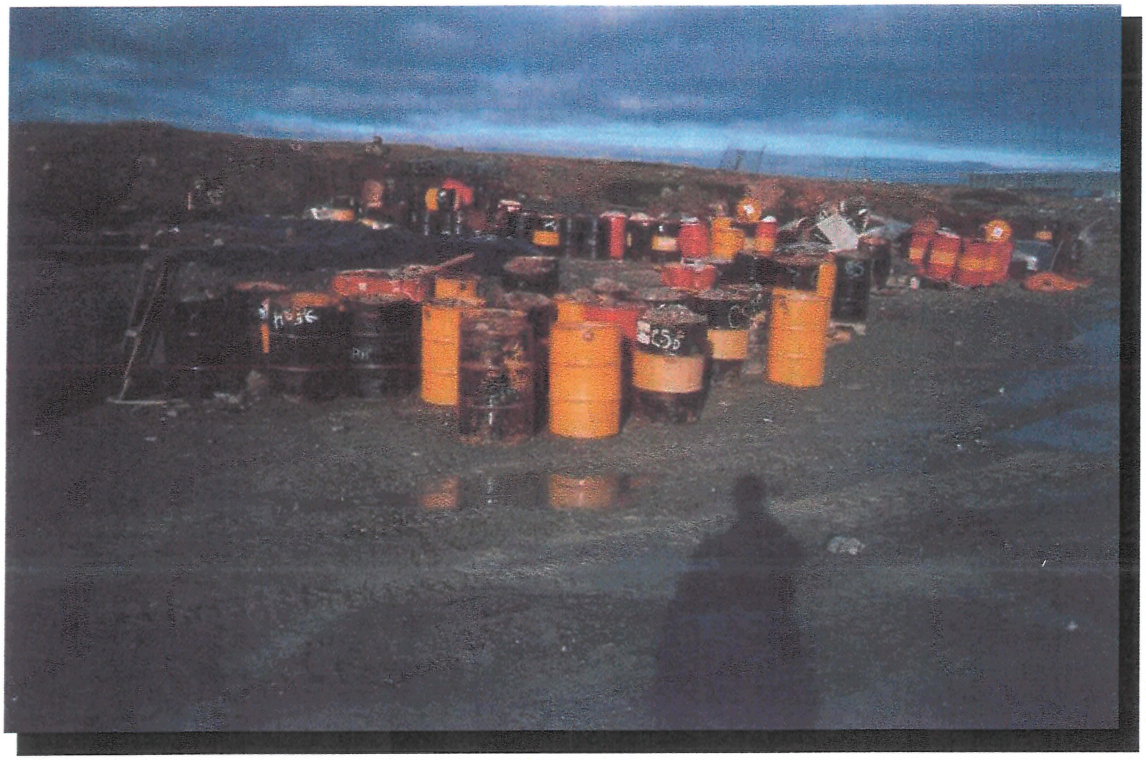


Photo 22
Excavated soil placed in LTA for remediation.

Photo 23
Removal of floating material with screen filter.

Photo 24
Coarse sediment filter.

APPENDIX B
EBA SITE INSPECTION REPORT

EBA Engineering Consultants Ltd.

Creating and Delivering Better Solutions

August 3, 2003

EBA File No: 1740065

Miramar Mining Corporation
Box 2000
Yellowknife, Northwest Territories
X1A 2M1

Attention: Mr. John Stard
Manager, Miramar Conn Mine

Dear Mr. Stard:

Re: Site Inspection Report, Hydrocarbon Spill Incident, Boston Camp, Nunavut

INTRODUCTION

A site inspection was completed at the above location by a representative of EBA Engineering Consultants Ltd., Mr. Brent Murphy, P.Geol. This visit was conducted at the request of Miramar Mining Corporation as per email authorization received from Mr. Ted Mahoney of Miramar Mining Corporation located in Vancouver, B.C. The purpose of the site visit was to investigate the extent of actual and potential environmental impacts resulting from a recent hydrocarbon fuel spill and to recommend mitigation measures designed to minimize future impacts. Mr. Murphy is an environmental professional with over 18 years experience in applied environmental science, of which 12 years have been directly related to the assessment and remediation of sites impacted by hydrocarbon fuel releases. The following letter presents a summary of the observations noted during the site inspection and presents a proposed remedial plan for discussion purposes with associated costs.

The Boston Camp is situated in northern Nunavut, east of Bathurst Inlet, and south of Melville Sound, within the Hope Bay Greenstone Belt, composed of interlayered mafic volcanic and sedimentary rocks of Archean Age on the geological time scale. The camp is also located in the zone of continuous permafrost. The camp is currently one of three camps being used by Miramar Mining Corporation for grassroots and advanced exploration activities directed toward the discovery of economical gold deposits in the Hope Bay region of Nunavut. The other two camps are the Windy and Doris sites respectively.

The site visit was undertaken on July 23 and 24, 2003. Mr Murphy was accompanied to the site by Messrs. Brian Labadie, John Stard and Scott Stringer, of Miramar Mining Corporation. Upon arrival at the Boston camp, Mr. Murphy was met by Ms. Stevii Greschuk, Environmental Co-odinator for the Boston and Windy Camps, who subsequently accompanied Mr. Murphy during his two day field visit and provided first hand knowledge of the spill incident.

SITE DESCRIPTION
The Boston Camp consists of an approximately 50 person camp constructed for support services directed towards underground mining operations and exploration activities. The camp is situated on a ridge which comprises a peninsula extending northwards into Spyder Lake (Figure 1). The lake shore is approximately 100 metres distant toward the west, 185 metres toward the north and 115 metres toward the east. The regional topographical gradient surrounding the camp ranges from 2% to the north to approximately 20% in the west. The camp covers an approximate area of 325 by 150 metres, covering an area of 48,750 square metres. The camp structures are constructed on a fine to coarse crushed rock pad ranging in thickness from 0.6 metres to 3.0 metres, with the surface of the gravel pad sloping toward the north at a topographical gradient of 1 percent.

The camp consists of a series of trailers which comprise the sleeping and eating quarters, large enough to house approximately 50 persons, situated on the northwest portion of thegavel pad (Figure 1). Situated immediately to the southeast of the sleeping quarters are a series of six tent structures, which act as offices and a core logging area. A crusher enclosure is located 100 metres southeast of the office tents, with a maintenance shop located approximately 120 metres south of the main camp structures along the eastern edge of gravel pad. The maintenance shop houses the camp generator and it is at this location that fuel for the generator is stored in a large volume horizontal tank situated adjacent to the northwest wall of the maintenance shed, approximately 10 metres from the generator.

The underground portal is located approximately 25 metres east of the maintenance building. A gravel covered airstrip is located approximately 500 metres south of the camp site, which allows access to the site. A site map depicting the layout of the camp is presented as Figure 1.

The camp contains a tank farm which is lined with a hydrocarbon resistant membrane, located on the southeast portion of the gravel pad. The tank farm consists of six large sized tanks with two smaller sized tanks. In addition, there are two bermed settling ponds located on the eastern portion of the pad which are not currently in use. A waste water discharge pond is also present on site, situated east of the crusher shed. This pond is lined with a Bentomax liner and is currently in use.

The camp is serviced by a RBC sewage treatment facility which is located northwest of the camp. The discharge from this unit is directed to an area situated north of the north of the camp (Figure 1). Waste products are separated with food waste and paper wastes incinerated in the camp incinerator. Metal and wood products are disposed of in the southern most of the two unused settling ponds. Potable water is obtained from Spyder Lake with the fresh water intake located immediately west of the maintenance shop.

SPILL INCIDENT

According to internal records of Miramar Mining Corporation, approximately 4000 litres of diesel fuel were spilled during the early morning hours of June 28, 2003. The spill occurred in the maintenance shop, at the southwest corner where the camp generator is located. The fuel leaked from a partially open three way value that serviced lines running from a fuel storage tank to the generator. Major visual evidence of the spill such as the surface pooling of hydrocarbons was not noted at the time of the incidence. However minor or incidental evidence of a spill occurrence consisting of the following observations were noted; the generator had stopped running; the fuel storage tank was empty; and fresh hydrocarbon staining was present under the fuel value next to the generator.

Immediately after the spill occurrence, it was determined by camp personnel that the diesel fuel had migrated through the crushed rock pad and flowed westerly through an installed drain, onto the tundra and the slope that extends to the shores of Spyder Lake (Figure 1). A series of cut off trenches were hand constructed and the topographically down gradient extent of hydrocarbon impacts was determined to be approximately 10 to 15 metres toward Spyder Lake.

The spill was subsequently reported to the applicable regulatory authorities including the NWT Spill line (Spill number 03-452). A representative of the Kitikmeot Inuit Association visited the site on July 2, 2003 to inspect the extent of the impacts.

Subsequent to the spill incident on June 30, 2003, free phase hydrocarbons were identified to be pooling in a small depression located adjacent to the camp helipad, approximately 75 to 90 metres north of the spill site. Due to the limited storage capacity of this depression and the requirement to prevent additional impacts to the environment, pumping operations were initiated to remove the emulsified fuel and water mixture on a daily basis. The mixture was transferred to empty 205 litre fuel barrels (45 imperial gallons capacity) for storage on site. As of July 23 there were approximately 90 barrels containing the water/ fuel oil mixture, (an approximate volume of 18,000 litres) stored at the site.

OBSERVATIONS

The camp site was inspected on July 23, 2003, with emphasis placed on inspecting the spill site and the depression adjacent to helipad in which free phase hydrocarbons were accumulating.

Little visible evidence was noted at the spill site within the generator shed. It was observed that the valve system from which the leak had occurred had been replaced with a series of locking valves. Minor amounts of localized hydrocarbon staining were noted on the fill surface underlying the generator, but free phase hydrocarbons were not noted in this area.

The hand constructed trenches were inspected and it was confirmed on the basis of visual that the overall extent of the hydrocarbons in a westerly direction had not extended past 10 metres surface distance topographically downgradient from the spill site. The trenches contained hydrocarbon absorbent pads and there was no visible standing water nor free phase hydrocarbons present.

The shores of Spyder Lake topographically downgradient of the spill site were also inspected. Evidence of hydrocarbon impacts was not observed in this area.

The depression located adjacent to the helipad was inspected and water was observed to be flowing into the depression at an approximate rate of 0.04 litres/second (0.5 igpm). The water contained gobules of free phase hydrocarbons and emanated a strong odour of diesel fuel. The water was flowing into the depression from the east and south sides of the depression. The water flow consisted of subsurface flow, discharging at the base of the overlying gravel/crushed rock pad in contact with the underlying native soil. The water was assumed to be derived from minor groundwater flow contained within the active layer, resulting from the removal of the seasonal ground frost associated with the onset of the summer thaw period.

The depression in which the water was discharging appeared to be self containing as it was lined with naturally occurring clayey silts to silty clays and the water and fuel oil mixture was accumulating in this area. A gasoline powered pump was located in the depression with the discharge hose extending to an empty barrel. Hydrocarbon impacted soil was also present along the bottom of the depression.

The barrels containing the water/fuel oil mixture were also inspected. These barrels were situated on the south side of the ore stockpile in close proximity to the existing waste water pond. The barrels were sealed and there was no evidence of leakage from the barrels.

Alternative hydrocarbon sources located topographically upgradient of the depression were not identified during the camp inspection. The tank which supplies the fuel for the generator was also closely inspected and there was no evidence of a leak or tank breach. Barrels containing Jet "B' fuel located north of the maintenance shed were also inspected and all barrels were observed to be sealed with no visible surface evidence of a large volume hydrocarbon release (i.e. in excess of 4000 litres).

Subsequently it was determined that the only potential source of the observed hydrocarbon impacts was from the hydrocarbon release attributed to the leaky value associated with the generator. All other potential sources were discounted.

DISCUSSION

The spill occurred on the early morning of June 28 and free phase hydrocarbons were subsequently observed within the depression situated adjacent to the helipad approximately 75 to 90 metres north of the maintenance shed (i.e. spill location) on June 30. Assuming a steady state laminar flow system over a 2.5 day period, an assumed groundwater velocity of 30 metres per day was calculated for the subsurface water flow. Using the known topographical gradient of 1% and the assumed groundwater velocity inputted into Darcy's Law (v=Ki), a hydraulic conductivity in the range of 10^3 to10^4 would be required to account for the observed site conditions. The hydraulic conductivities predicted would encompass hydraulic conductivities values typical for fine to coarse unconsolidated sand and gravel deposits but not for a compacted gravel/rock pad stratigraphy which is present on the site.

The crushed rock fill present on the site can be compared with glacial till deposits which exhibit hydraulic conductivities values ranging from less than 10^{-5} metres/day to greater than 10^{2} metres per day. A hydraulic conductivity in the range of 10^{2} metres per day for the gravel pad and underlying native soils (which is the upper range of valves for the glacial tills) was therefore estimated. Combining the assumed hydraulic conductivity with the measured topographical gradient of 1%, free phase hydrocarbons would be expected to flow into the depression next to the helipad, anywhere from 70 to 100 days after a spill incident. This assumption is based on the elimination of surface flow as a flow mechanism.

However, this prediction was not substantiated by field observations as hydrocarbons were observed 75 to 90 metres distant from the spill site, 2.5 days after the occurrence (i.e. on June 30, 2003).

Additionally, the lack of substantive hydrocarbon impacts situated west of the spill site, also raised potential questions regarding the particulars of the spill incidence. The spill site was located approximately five metres from the western edge of the gravel/crushed rock pad, from which the topographically sloped steeply to the west at a gradient of 70% to Spyder Lake. Given the close proximity of the spill site to this steep topographical gradient and the volume of hydrocarbons released, it would be anticipated that major hydrocarbon impacts would occur in this area. However only minor impacts were observed in this area with only minor volumes (i.e. less than 100 litres) of free phase hydrocarbons recovered, leaving the bulk of the 4000 litres of fuel unaccounted for.

Based upon the previous discussion, the site observations associated with the hydrocarbon release did not substantiate the expected groundwater flow behavior and it was concluded that an alternate source of hydrocarbons such as a previous release or spill would correlate with the recorded site observations. This conclusion was based on the following information;

- Lack of any identifiable topographically upgradient hydrocarbon sources from the helipad depression which would more readily account for the occurrence of free phase hydrocarbons in this area so soon after the spill incidence;
- Distance (i.e. 75 to 90 metres) in which the hydrocarbons supposedly migrated in 2.5 days after the spill incident which occurred on June 28, 2003;
- The assumed groundwater velocity of 30 metres per day (based on the reported timing of the spill incident and the first observation of hydrocarbons within the depression), which would indicate an aquifer unit of extremely high hydraulic conductivity similar to an unconsolidated coarse gravel deposit. This assumption was not substantiated by observed site conditions where the stratigraphy is characterized by a compacted gravel/crusher rock pad with substantial fines present. This unit would be expected to have a lower hydraulic conductivity value and would thus have a lower groundwater velocity associated with it; and,

- The lack of significant impacts situated west of the maintenance shed.

The suspected occurrence of an earlier release of hydrocarbons was subsequently confirmed in conversations with various camp personnel on July 23, 2003. It was reported that a similar incident had occurred on March 3, 2003 at which time the generator had stopped operations due to a lack of fuel. At this time an empty fuel storage tank and an open value were noted at the same location as the spill on June 28, 2003. However at the time, the lack of visible free phase hydrocarbons pooled on the ground surface under the generator was highlighted as evidence that a spill had not occurred.

Based on the observed site conditions and information obtained from camp personnel, it was concluded with reasonable certainty that two hydrocarbon spills had occured at the Boston camp;

- A release on June 28, 2003 of approximately 4000 litres; and,
- An earlier release which occurred on March 3, which probably released a similar volume of hydrocarbons into the environment.

The lack of evidence of pooled hydrocarbons subsequent to the March 3, 2003 spill, cannot not be used as evidence that a spill did not occur. This observation can be explained by the lack of ground frost in this area during the winter months, which would allow the hydrocarbons to seep into the underlying ground. It is postulated that the continuous operation of the generator in its current location, which produces heat, resulted in the lack of ground frost in this area during the winter months. Also it is suspected that the heat produced by the generator operation has resulted in degradation of permafrost layer in this area, creating a thicker active layer. The net result of this effect, was to produce a localized depression or "bathtub" resulting from the recession of the permafrost –active layer contact to greater depths below the ground surface.

The March 3 hydrocarbon spill did not pool on the ground surface as there was a lack of ground frost within the underlying gravel pad. This feature allowed the hydrocarbon to seep underground and pool within a frost free area created by the release of heat from the generator. This area of pooled hydrocarbons was contained by the presence of ground frost outside of the maintenance shed.

Subsequently, as the ground frost in areas outside the maintenance shed slowly receded with the onset of warmer weather, the pooled hydrocarbons slowly intermixed with groundwater and migrated through the path of least resistance (i.e. contact between gravel pad and underlying natural sediments) toward the depression situated adjacent to the helipad. Local barriers such as the presence of a zone of lower permeability prevented the migration of a large volume of hydrocarbons westward out onto the tundra.

The mixture of hydrocarbons and water was subsequently released into the surface depression after the last of the ground frost was removed on June 30, 2003. It is coincidence that the free phase hydrocarbons were released so soon after the June 28, 2003 spill. The presence of hydrocarbons in the ground for a period of four months (i.e. March to the end of June) is consistent with the observed migration distance and with the assumed hydraulic conductivities for the crushed rock fill and the measured hydraulic gradient for this area..

This scenario also accounts for the lack of a far larger hydrocarbon impact than what was observed associated with the June 28 hydrocarbon release. Due to the "bathtub effect" and the depressed permafrost contact that is suspected to be present under the generator shed, it is assumed that the hydrocarbons resulting from the June 28 have pooled in this area. This feature would have minimized hydrocarbon flow to the west.

PROPOSED REMEDIAL MEASURES

Remedial measures designed to reduce additional impacts to the surrounding environment must be implemented at the Boston site immediately. These measures would be designed to preserve the existing natural integrity of the environment and to minimize any future impact on the waters of Spyder Lake and the surrounding landscape. Remedial measures proposed for implementation and mitigation measures undertaken will be conducted in accordance with the "Spill Contingency Plan" prepared for the Hope Bay Project, dated January 2002 This plan whas been approved and accepted by the applicable regulatory agencies in Nunavut.

A phased approach has been developed to address the existing environmental issues located on the site consisting of;

- Seeping free phase hydrocarbons which has impacted the local groundwater contained within the active layer;
- A suspected continual source area of hydrocarbons underneath the generator location; and,
- The presence of hydrocarbon impacted soils.

The proposed approach will consist of strategy combining a water treatment, source contaminant and soil treatment. The program was also designed so as not to disturb existing areas of natural landscape (i.e. tundra) as it is a condition of the existing Water License for the Boston Camp. Therefore all mitigation efforts will be confined to the limits of the existing gravel pad.

For remedial and assessment purpose, it is assumed the Canadian Council of Minister of the Environmental (CCME) Guidelines for the Protection of Freshwater Aquatic Life will be used as the remedial standard. Furthermore it is assumed that the recently adopted Canada Wide Standards for Petroleum Hydrocarbons in Soil will be utilized as the soil remedial standards.

A granular activated carbon (GAC) unit is proposed as a means to treat the existing stored hydrocarbon impacted water on the site. This system will remove the existing dissolved phase hydrocarbons from the water column to non-detectable levels allowing the water to be discharged to the environment.

It is proposed that the existing barrels of water currently stored on the site be emptied into the existing waste water pond. This will allow the de-emulsification of the fuel/water mixture, allowing the removal of free phase hydrocarbons, with the use of hydrocarbon adsorbent pads, prior to the water under going treatment thru the GAC unit. This pond is lined with a Bentomax liner and is considered an acceptable water retaining structure, which is currently approved for use. The presence of the liner will assist in minimising potential impacts associated with potential migration of hydrocarbon impacted water from this pond. Additionally the pond is underlain by the crushed rock pad, approximately three to four metres thick.

A series of collection trenches containing a 200 mm diameter collection well is proposed for construction at the spill site. This system will allow the collection of pooled residual free phase hydrocarbons in this area as will as minimizing additional groundwater movements topographically downgradient toward Spyder Lake. The trench will be excavated to permafrost and the topographically downgradient sides of the trench will be lined with a petroleum resistant HDPE liner, keyed into the permafrost. The trench would be located on the north-western and south-western walls of the maintenance building, with the collection well situated at the south-western corner of the building. The presence of the well will allow for the accumulation and removal of free phase hydrocarbons in this area for off site disposal as well as impacted groundwater.

A series of collection trenches and/or testpits is then recommended to assess the extent of environmental impacts resulting from the migration of hydrocarbons into the helipad depression. Based on the results of this investigation, additional remedial measures may be required.

A land farm area is also proposed for emergency construction at the site. The presence of this structure will allow for the treatment of hydrocarbon impacted soils, which will be derived from the construction of the collection trenches and the test pitting program. An area of approximately 20 by 40 metres situated south of the existing tank farm is proposed for this purpose. This area will be lined with a hydrocarbon resistant HDPE liner.

It is anticipated that the proposed landfarm will hold approximately 400 metres of hydrocarbon impacted soil and will have to operate for an approximate period of three to four years. Should the volume of hydrocarbon impacted soil be larger than expected, additional operating time may be required. Soil that is remediated will be stockpiled on site and can be used for backfilling purposes.

CONCLUSIONS

A site inspection was completed at the Boston Camp operated by Miramar Mining Corporation on July 23 and 24, 2003. The inspection was requested by Miramar to assist in an evaluation of the site following a hydrocarbon release. Mr. Murphy, a representative of EBA Engineering Consultants Ltd., completed the site inspection. The following conclusions have resulted from observations noted during the site inspection;

1) A hydrocarbon spill of 400O litres did occur at the site on June 28, 2003. This spill has resulted in impacts to the environment (i.e. soil and groundwater). The spill resulted from a opened valve situated between the fuel storage tank and the generator;
2) The spill was subsequently reported to the applicable regulatory authorities;
3) Spyder Lake was not impacted by the initial June 23 spill;

4) Free phase hydrocarbons were noted to be accumulating in the depression situated adjacent to the helipad, approximately 75 metres north of the spill site. The presence of hydrocarbons were initially observed in this depression on June 30, 2003, 2.5 days after the spill incidence;
5) Additional hydrocarbons sources located topographically upgradient of the depression, that could be contributing to the problem in the depression were not identified during the site inspection;
6) Due to observed site conditions, it was suspected that a second (i.e. earlier) hydrocarbon spill had occurred;
7) The occurrence of an earlier hydrocarbon release was confirmed in discussions with site personnel;
8) Long term storage of hydrocarbon impacted water will be a problem with the onset of colder weather;
9) Currently 18,000 litres of hydrocarbon impacted water stored on site;
10) The spill site at the generator remains as a suspected long term source of hydrocarbons;

RECOMMENDATIONS

The following recommendations are offered for your review and consideration;

1. Site remedial measures addressing both groundwater and soil issues be implemented as soon as practical to minimise the potential for additional impacts to the environment. The remedial measures would consist of water treatment, and the construction of a collection trench system at the spill, supplemented by a landfarm soil treatment facility to remediate hydrocarbon impacted soils;
2. The preferred water treatment system is granular activated carbon ;
3. A backhoe capable of being transported by a plane, be mobilized to the site to assist with the implementation of site remedial measures;
4. Communications be initiated as soon as possible with the Nunavut regulatory agencies to inform them of the proposed remedial approach;
5. Following implementation of the planned remedial approach, a site assessment be conducted to assist in the determination of the extent of hydrocarbon impacts on the site;
6. The feasibility of mobilizing a larger back hoe during the winter transport season, via the ice roads, for permanent use at the site must be investigated;
7. The feasibility of relocating the generator to a new location within the next year needs to be evaluated. Removal of the generator from the existing site will allow for a more complete remedial program to be undertaken in this area;
8. The existing hand dug trenches situated west of the maintenance shed be monitored on a regular basis to ensure no topographically downgradient migration of hydrocarbons toward Spyder Lake. The existing plastic barriers present in the trenches should be re-established to ensure maximum protection and the trenches should be filled with peat moss to act as an absorbent. This moss will require changing on a semi-regular basis.

A cost estimate to undertake the proposed remedial approach is attached to this letter for your review and comment. Additionally, technical specifications for the proposed water treatment unit are also attached.

We trust that the above information meets with your requirements at this time. Please contact the undersigned should there be questions or concerns regarding this letter.

Yours truly,
EBA ENGINEERING CONSULTANTS LTD.

R. Brent Murphy, M.Sc., P.Geol.
Project Director, NWT/Nunavut

R.B. MURPHY
03/08/03

RBM/...

c.c. Hugh Wilson
Environmental Manager
Miramar Mining Corporation

Attachments

THE ASSOCIATION OF
PROFESSIONAL ENGINEERS,
GEOLOGISTS and GEOPHYSICISTS
OF THE NORTHWEST TERRITORIES
PERMIT NUMBER
P 018 03/08/03
EBA ENGINEERING
CONSULTANTS LTD.

APPENDIX C
HYDROCARBON SPILL REPORT

Northwest Territories

NWT SPILL REPORT (Oil, Gas, Hazardous chemicals or other materials)

24 - Hour Report Line

Phone: (867) 920-8130
Fax: (867) 873-6924

➔ **NOTE: 2 PAGES FAXED NO COVER**

A Report Date and Time August 22/03 14:30	B Date and Time of Spill (if known) August 21/03 14:45	C ✱ Original Report ☐ Update No.	Spill Number 03-541

D Location and map coordinates (if known) and direction (if moving)
Miramar Hope Bay Ltd's (MHBL) Boston Camp, Nunavut.
Map coordinates 67° 39.41' North, 106° 23.04' West

E Party Responsible for Spill
Camp Maintenance Foreman

F Product(s) spilled and estimated quantities (provide metric volumes/weights if possible)
P-50 Diesel Fuel. Approximately 150 litres.

G Cause of spill
Transporting an unsecured tidy tank on forklift.
This fuel was moved from a stationary generator supply tank into portable enviro-tanks to allow construction of spill containment under the supply tank. It was spilled when transporting it back to refill the supply tank.

H Is spill terminated? ✱ yes ☐ no	I If spill is continuing give estimated rate n/a	J Is further spill possible? ☐ yes ✱ no	K extent of contaminated area in m² Approx 5m by 4m

L Factors affecting spill or recovery (weather conditions, terrain snow cover etc). None.	M Containment (natural depression, dykes etc) Flat ground. Approximately 20 litres contained and removed from plastic liner under nearby stationary fuel tank. Approximately 150 litres of heavily oil laden water pumped from excavation into 205 litre drum. Perforated steel drum installed in pit to act as catchment well. Pit to be backfilled around drum with clean crush fill. Containment well to be monitored and pumped periodically to test for fuel. Water to be stored in drums for treatment with charcoal filtration.

N Action, if any, taken or proposed to contain, recover, clean up or dispose of product(s) and contaminated materials
The tank was chained and pulled into an upright position to stop fuel flow. Absorbent pad and mini-booms from spill kit were immediately placed on and around the spill site. Started excavating soil with backhoe less than 20min after spill. Contaminated crushed fill placed in 205 liter drums for transportation to existing soil remediation land farm site. Total of 47 drums removed from spill site. Hole excavated down to permafrost at 1.3m.

O Do you require assistance?
☒ no ☐ yes

P Possible hazards to persons, property, or environment; eg: fire, drinking water, fish or wildlife
None

Q Comments and/or recommendations
The spill would not have happened if the tank had been properly secured. All persons handling fuel and other materials must be instructed in the proper method of securing a load before moving it. Review fuel handling procedures with camp maintenance personnel.

FOR SPILL LINE USE ONLY

Lead Agency

Spill Significance

Lead Agency contact and date

Is this file now closed? ☐ yes ☐ no

Reported by: P. Stapleton	Position, Employer, Location Maintenance Foreman, MHBL	Telephone No: 604-881-6790
Reported to: R. Mercer	Position, Employer, Location Project Manager, MHBL	Telephone No: 604-881-6792

APPENDIX D
OPERATIONS AND MAINTENCEN MANUAL

OPERATING & MAINTENANCE INSTRUCTIONS

for

Miramar Hope Bay Ltd.

“FLOW AND PLUG”
(OIL ABSORPTION EQUIPMENT)

Model No: FII-AP-C-180-TM-Cx2
Maximum Pressure: 10 PSI
Product: Oil Absorption Equipment

MANUAL NO. C5121

Terry Ruddy Sales
9329 62 Ave.
Edmonton, Alberta
Ph. 1-877-435-9690 Fax 780-413-0090
www.terryruddysales.com

TLI-CHO LOGISTICS

"FLOW AND PLUG"
(OIL ABSORPTION EQUIPMENT)

GENERAL DESCRIPTION

The FII "Flow and Plug" Oil Absorption System is the simplest, most efficient and versatile method for removing oil and grease in waste water streams to a level below 15 PPM as regulated by the Ministry of the Environment. (Not Recommended for chemical Oil Emulsions).

The FII "Flow and Plug" Oil Absorption Equipment consists of four basic systems: (1) the Coalescer, (2) the Particulate Filter, (3) the Oil Absorbing Media, and (4) the activated carbon media.

(1) The Coalescer

The basic concepts used in our Coalescing Systems are gravity and coalescence. First the contaminated solution is taken into and through the coalescer with a pump. Because oil and water do not mix (unless chemically emulsified), the larger droplets float to the top and are skimmed off. The smaller droplets are collected on the olephilic ("oil-loving") media to coalesce into larger units. These larger particles float to the surface and are skimmed off into a holding vessel. The "oil-free" water passes under a weir (wall) and out of the coalescer. Marlin units have achieved efficiencies of 90%-95% of the free oil removed.

(2) The Particulate Filter

The Particulate Filter is a pre-filter to effectively remove any dirt and dust particles which would prematurely plug the oil absorbing media. It is a bag filter system consisting of the pressure vessel, the micron rated disposable filter bag and restrainer basket (to support the filter bag).

The disposable filter bag is a triple layered bag having a filter rating of approximately 1 micron. It will hold from 1-2 pounds of dry solids before becoming plugged.

Rapid access to the filter bag ensures a quick and easy clean-up of the vessel, since filtered out contaminants are trapped within the bag. "Spaghetti" is added into the clean filter bag to enhance the dirt holding capacity by up to 5 times.

(3) The Oil Absorbing Media

The Oil Absorbing TM Media is contained in removable disposable drums. The drums are specially coated with epoxy making them both chemical and abrasive resistant. This TM media absorbs oil and grease through a partitioning phenomena. The unique characteristics of the media results in a slight swelling of the bed as it removes the hydrocarbon from the contaminated liquid. At a maximum pressure of 8 PSI stoppage of the pumping action through the system is required as media is saturated and needs to be replaced thus eliminating the flow of unfiltered liquid to the environment.

(4) Activated Carbon

GC 12 X 40 is a virgin activated carbon derived form bituminous coal. Granular in form, it is ideal for many liquid phase applications including the removal of organics from water streams. Its superior adsorptive capacity and surface area make it particularly attractive for use in waste water while its size makes it appealing where low pressure drop is needed.

The net result is oil/grease readings will be well below 15 ppm enabling the water to be sewerable.

WARNING

THIS FILTRATION SYSTEM IS DESIGNED WITH DISPOSABLE FII FILTER PRODUCTS OF THE TYPE AND MODEL SPECIFIED IN THE OPERATION INSTRUCTION MANUAL AND DRAWINGS. SAFE OPERATION AND PERFORMANCE IS GUARANTEED WITH THE SPECIFIED FII FILTERS. WE WILL NOT GUARANTEE THE PERFORMANCE AND FUNCTION OF THE SYSTEM WITH OTHER MAKES, MODELS OR TYPES. ANY ACCIDENTS OR DAMAGES CAUSED BY USING INCORRECT, NON-SPECIFIED FILTER AND MEDIA ARE THE FULL RESPONSIBILITY OF THE OPERATOR OR USER.

INSTALLATIONS

Remove the unit from the shipping crate, being careful not to damage any of the projecting connections.

CAUTION:

DO NOT ATTACH SLINGS TO ANY NOZZLES WELDED TO THE UNIT. BE SURE TO PLACE SLINGS ON THE FRAME OF THE UNIT.

IMPORTANT:

BE SURE TO CORRECTLY IDENTIFY THE INLET AND OUTLET CONNECTIONS OF THE UNIT TO AVOID PIPING THE UNIT BACKWARDS. THE FILTER WILL NOT PERFORM IF THE CONNECTIONS ARE REVERSED. INLET CONNECTION LEADS TO AIR DIAPHRAGM PUMP.

Proceed with the required piping. Tighten all bolts evenly and securely. Check to make sure that the bag filter has been installed in the filter vessel before tightening the end cover bolts.

Drain piping should be led well away from the unit. The water drain lines can be connected into a common drain system.

A container is required to be placed under the elbow of the tubular skimmer to catch free oil coalesced from the oil water separator. A threaded reducer is included with the elbow. **DO NOT GLUE UNTIL TUBULAR SKIMMER IS SET.**

After all connections have been made and all bolting tightened securely, the unit is ready to be placed in operation.

NOTE:

The FII "Flow and Plug" Treatment System should be level to 1/8" per foot to be conducive to proper operation.

OPERATION
(Refer to drawing 1, Pictorial 1-6)

The filter system requires a minimum amount of attention after the initial installation. Differential pressure readings should be made and recorded on initial start-up.

OPERATION CONDITIONS

(1) Pump (23) on skid mounted system, **this pump must be properly grounded.** Read fire or explosion hazard in Apendix 1 Manufacturers Literature.
(2) Pump Air Supply permits pumping of fluid until filter bag (2) or oil absorbing drum (3) become plugged.
(3) When the differential pressure across the bag filter vessel reaches 15 PSI shown on pressure gauge (8A) the pump needs to be stopped and filter bag changed.
(4) When the differential pressure across the oil absorbing drum (2) reaches 8 PSI as shown by the gauge (8B) the pump should be shut off. The absorbing drum is saturated and needs to be replaced.

Set Up of Coalescer (1)

This procedure is to be followed for the installation of the unit or the restart after cleaning of the unit.

Begin by filling the unit with clean water. Make sure it is high enough to slightly exceed the bottom portion of the separator weir. This procedure prevents the premature posts break out of oil on the clean water side of the weir.

Rotate the slot of the oil outlet tube (20) to a straight up position.

Continue to fill the coalescer with the oil/water mixture that is to be separated, until the solution begins to exit the coalescer.

Adjust the slot in the tubular rotating oil weir (20) to within 1/16 of an inch of the oil/water mix surface. When tubular skimmer is at desired level tighten set screw (22). This is a one time adjustment, tubular skimmer does not need to be adjusted again. Glue elbow and provided reducer to oil discharge pipe and connect appropriate hose to collect free oil into a waste oil container.

To make adjustments to the coalescer, set the rotating oil pipe slot 1/16" above the level of the solution on the side of the coalescing filter. Various periods will elapse before there is enough oil accumulated to begin flowing oil out of the oil pipe. Allow 3/8" to 3/4" of oil on the surface during operation. To prevent the aqueous solution from migrating with the oil an occasional check can be made on the post weir side for an oil break out. If this occurs check to see if the pump is exceeding the designed capacity of the coalescer by checking the flow meter. If meter is showing flows higher or lower than 19 LPM adjust with flow control valve (11 A).

Refer to Drawing 1

To place the unit in operation, the following procedures must be observed

1) Attach air hose to pump (23). Connect hose to suction side of pump from processing tank. Use clean water first for start up.
2) Connect drain hose on final carbon absorbing drum (4B).
3) Close all drain valves (10, 15, 16, 19) and sample effluent valve (18).
4) Open flow control valves (11, 11 A) slightly.
5) Pump will start up as air is applied to pump.

   NOTE: ½ pump designed to pump into coalescer. ½ pump designed to pump out of coalescer.

6) Check flow meter (13) and if flow is greater than 19 LPM immediately adjust with flow control valves.

   NOTE: If flow is greater than 19 LPM treated water quality will be come worse due to speed of flow through system. If excessive flow and or pressure (greater than 15 psi) is allowed than damage and leakage to drums will occur!

7) Allow water to fill system which will purge all air trapped in filters.
8) Allow water to flow approximately 15 minutes after system filled to ensure all trapped air is removed from filters, as well as TM-fines and carbon fines are removed.
9) To make adjustments to the coalescer, set the rotating oil pipe slot (20) 1/16" above the level of the solution on the side of the coalescing filter. Various periods will elapse before there is enough oil accumulated to begin flowing oil out of the oil pipe. Tighten set screw (22) then glue elbow and reducer to oil discharge pipe. Allow 3/8" to 3/4" of oil on the surface during operation. To prevent the aqueous solution from migrating with the oil. An occasional check can be made on the post weir side for an oil break out. If this occurs check to see if the pump is exceeding the designed capacity of the coalescer of 19 LPM. If meter is showing flows higher or lower than 19 LPM adjust with flow control valve (11A).
10) Observe the pressure gauge readings (8) and record pressures over bag filter and TM drum for future reference.
11) Samples of incoming water may be taken from sampling drain valve and samples of discharge water after filtration may be taken from sampling drain valves (15, 16, 19).
12) The system is now ready to treat your waste water transfer suction hose.

NOTE:

UNIT SHOULD ONLY BE DRAINED WHEN CHANGING FILTER ELEMENTS OR WHEN NO LONGER IN SERVICE. THE OIL ABSORBING MEDIA MUST BE IMMERSED IN WATER TO ELIMINATE AIR POCKETS WHICH WOULD EFFECT ITS OIL ABSORBING CAPABILITIES.

INSTRUCTIONS FOR CHANGING FILTER BAGS

THE MOST IMPORTANT STEP IN CHANGING FILTER BAGS IS TO MAKE SURE THAT THE PRESSURE IN THE FILTER VESSEL IS RELIEVED PRIOR TO OPENING THE UNIT. THIS IS ACCOMPLISHED BY OPENING THE DRAIN VALVE AT THE DISCHARGE OF THE FILTER.

To change filter bags

1) Pressure gauge (8A) on top of bag filter at 15 psi or greater filter bag is plugged and change is required.

2) Shut the system off (turn pump (23) off).

2A) Shut off valves before and after filter.

3) Open the bag filter drain valve (10). The product drained from the filter may contain oil and should be piped or collected accordingly. This will also relieve any internal pressure.

4) Wait five minutes to allow water in bag filter to drain. Check pressure gauge to make sure no pressure is in system.

5) Loosen bar knobs on the lid so that they are free and eye bolt assembly can be swung away from it.

7) Remove "Spaghetti" from bag filter. Remove and discard saturated filter bag.

8) Insert the clean filter bag into the restrainer basket (already installed) and form the bag to the contours of the basket by pressing against the restrainer basket.

9) Insert new "Spaghetti". Take small handfuls and push firmly to bottom of bag. Repeat until the filter bag is filled.

10) Check positioning of the "O" ring which should be properly seated in the filter. The ring of the filter bag must be seated in the edge provided by the restrainer basket.

11) Replace bag hold down device.

12) Close cover carefully. (Do not drop.) Tighten bar knobs evenly and securely. (Slight downward force is necessary to compress bag hold down device.)

13) Close drain valve (10). Partially open the flow control valve (11).

14) Reopen the main flow control valve slightly (11A).

15) Unit is ready to operate. On restart ensure flow meter (13) is reading at or under 19 LPM. If not adjust flow control valves (11, 11A) accordingly.

16) Record in the Logbook the **Time** and **Date** and **Cubic Meters** processed for the bag filter change.

INSTRUCTIONS FOR CHANGING OIL ABSORBING DRUM

THE MOST IMPORTANT STEP IN CHANGING THE OIL ABSORBING DRUM IS TO MAKE SURE THAT THE PRESSURE IN THE SYSTEM IS RELIEVED PRIOR TO REMOVING THE DRUM. THIS CAN BE ACCOMPLISHED BY OPENING THE DRAIN VALVE AT THE BOTTOM OF BAG FILTER.

1) Check pressure gauge (8B) to confirm oil absorbing drum (3) is plugged and requires change-out. (8 psi maximum)

NOTE: At 10 psi pressure relief valve will open to prevent over pressurizing of drum

2) Shut the pump off. Close the flow control valve (11A) prior to inlet on coalescer.

3) Open drain valve (10) at the bottom of the bag filter to relieve internal pressure and open sample valve (15) between TM-100 drum and carbon drum (4A) to remove any water which may remain in the drum. Wait 10 minutes to allow any drain-water to escape.

4) Undo union (9A) on inlet and (9B) on the outlet of the drum.

5) Release the drum hold down devices by unscrewing eye nut.

Note: **The saturated weight of drums and media is approximately 500 lbs. The drums need to be handled with proper equipment to remove them from the skid.**

6) Remove spent drum.

7) Replace with new drum.

8) Remove threaded inlet/outlet connections from spent drum. Remove 2 inch coupling with cap seal from new drum. Replace threaded outlet connection to bottom discharge on the new drum securing tightly against the O-ring for a good seal. Replace 2 inch coupling with the cap seal onto the spent drum and tighten securely against the O-ring for a good seal. The spent drum is now completely sealed for disposal.

9) The new drum having the newly placed inlet lid and outlet connection is ready for hook-up.

10) Replace and retighten unions (9A) on inlet of drum and (9B) on outlet of drum.

11) Close drain valve (10) and sample valve (15) open flow control valve (11).

12) Restart pump. On restart ensure that the flow is at or under 19 LPM. If not adjust flow control valve accordingly.

13) Record in the Logbook the **Time, Date** and **Cubic Meters** processed for the TM-100 change.

INSTRUCTIONS FOR CHANGING ACTIVATED CARBON DRUMS

THE MOST IMPORTANT STEP IN CHANGING THE ACTIVATED CARBON DRUM IS TO MAKE SURE THAT THE PRESSURE IN THE SYSTEM IS RELIEVED PRIOR TO REMOVING THE DRUM. THIS CAN BE ACCOMPLISHED BY OPENING THE SAMPLE VALVE AT THE INLET TO THE ACTIVATED CARBON DRUM.

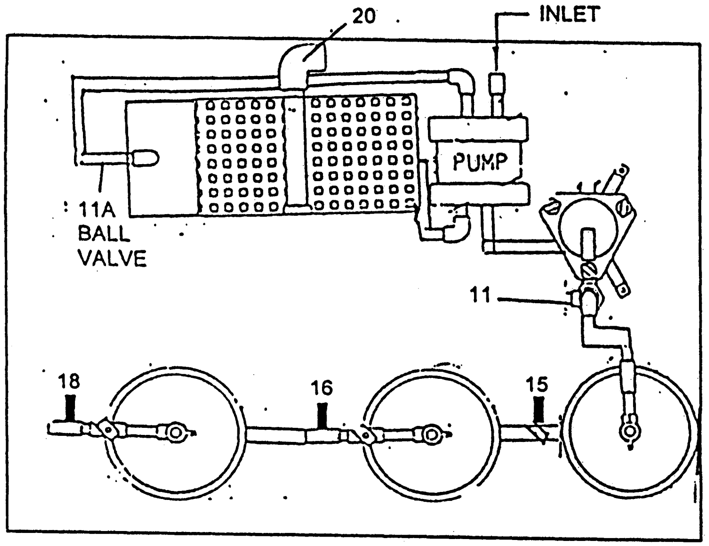
1. Check water sample from sample valve (16 and 18) and discharge. If water quality is same then carbon drum (4A) is saturated and needs to be replaced.
2. Shut the pump off. Close the flow control valve (11) prior to inlet connection on TM drum.
3. Open sample valve (15) at the bottom of the TM-100 drum to relieve internal pressure and to remove any water which may remain in the drums. Wait 15 minutes to allow any drain-water to escape.
4. Undo union (9C) on inlet and (9D) on the outlet of the first activated carbon drum.
5. Release the drum hold down device by undoing the eye bolt.

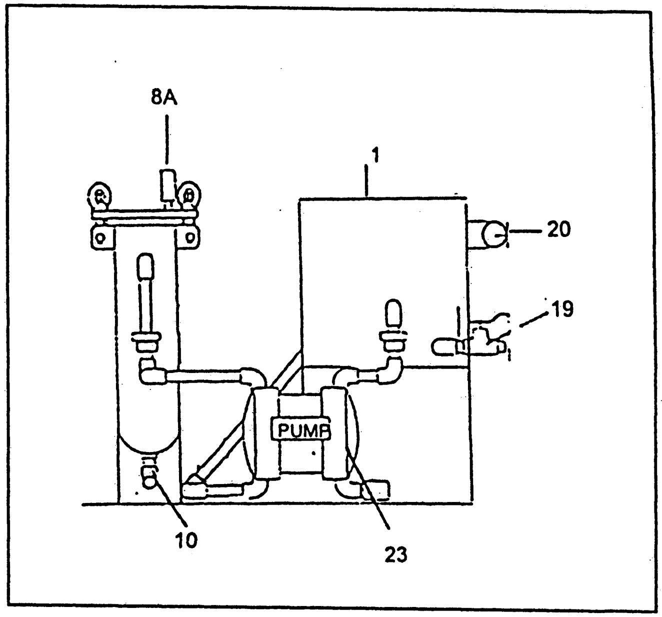
<u>NOTE:</u> The saturated weight of drums and media is approximately 250 lbs. The drums need to be handled with proper equipment to remove them from the skid.

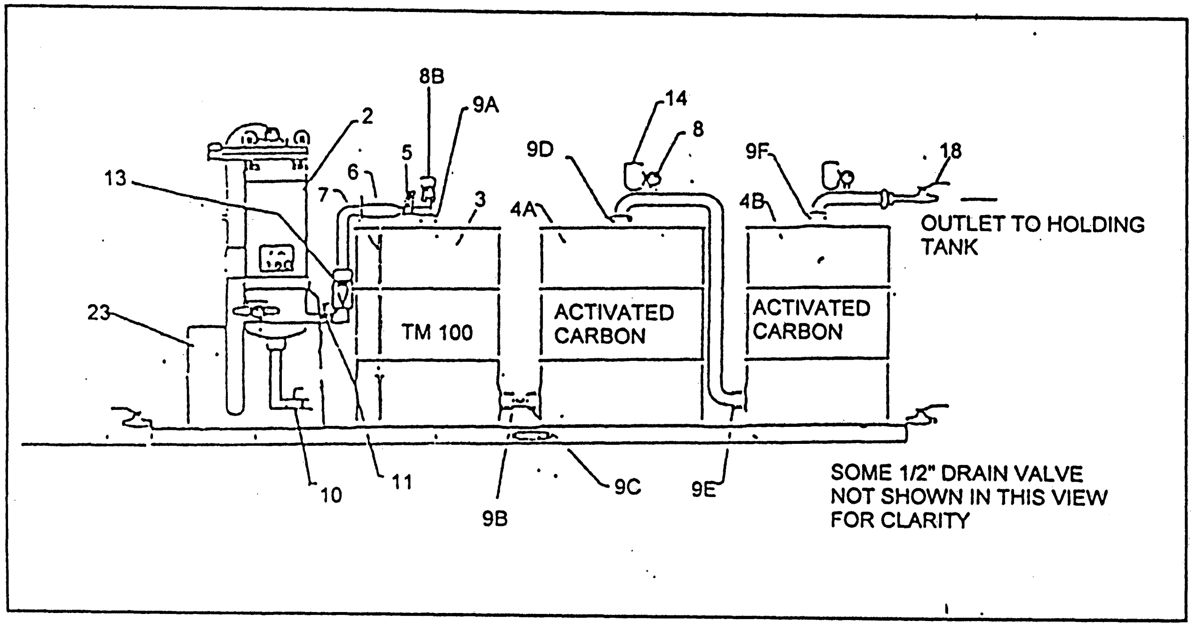
6. Undo union (9E) on the inlet and (9F) on the outlet of the second carbon drum.
7. Remove discharge hose.
8. Remove the first activated carbon drum (4A).
9. Replace with the second activated carbon drum (4B) (i.e. put the second drum in the first carbon drum position).
10. Replace the second activated carbon drum with a new activated carbon drum.
11. Exchange drum lids between the spent drums and the new carbon drum that is now in position two. The inlet connections are now in position on the new drum and the spent drum is now ready to be sealed for safe transportation. Tighten drum hold down lids securely.
12. The new drum having the newly placed inlet lid and outlet connections is ready for hook-up.

13. Replace outlet piping and union (9F) on the second carbon drum retighten the union (9F). Transfer the piping between carbon drums one and two. Replace and tighten the union (9E) on the inlet of the second carbon drum.
14. Replace and retighten union (9C) on inlet of drum and (9D) on outlet of the first carbon drum.
15. Close sample valve (16) and open flow control valve (11).
16. On restart ensure that the flow is at or under 19 LPM. If not adjust flow control valve accordingly.
17. Record in the Logbook the **Time, Date** and **Cubic Meters** processed for the Activated carbon Changes.

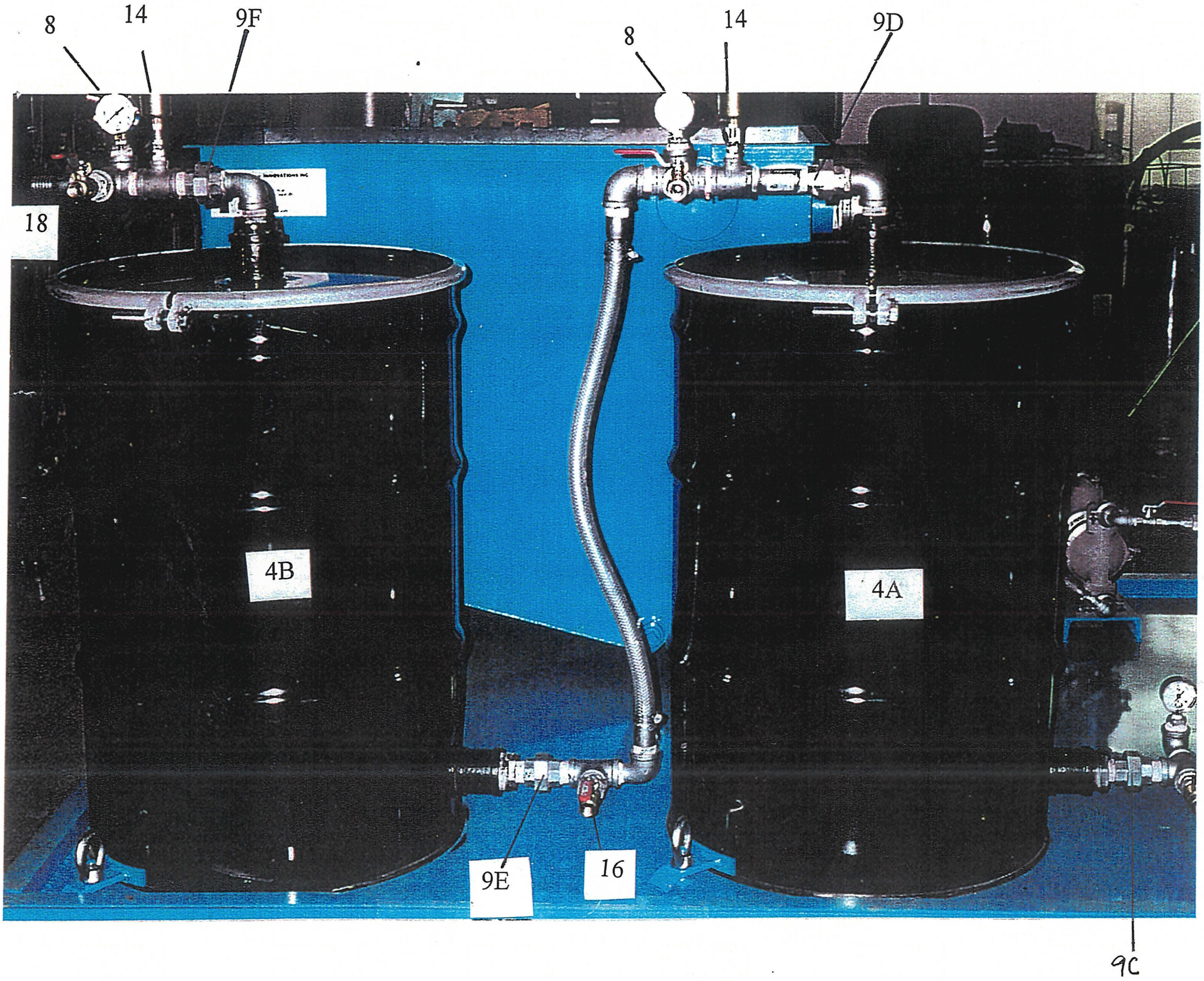
Drawing 1





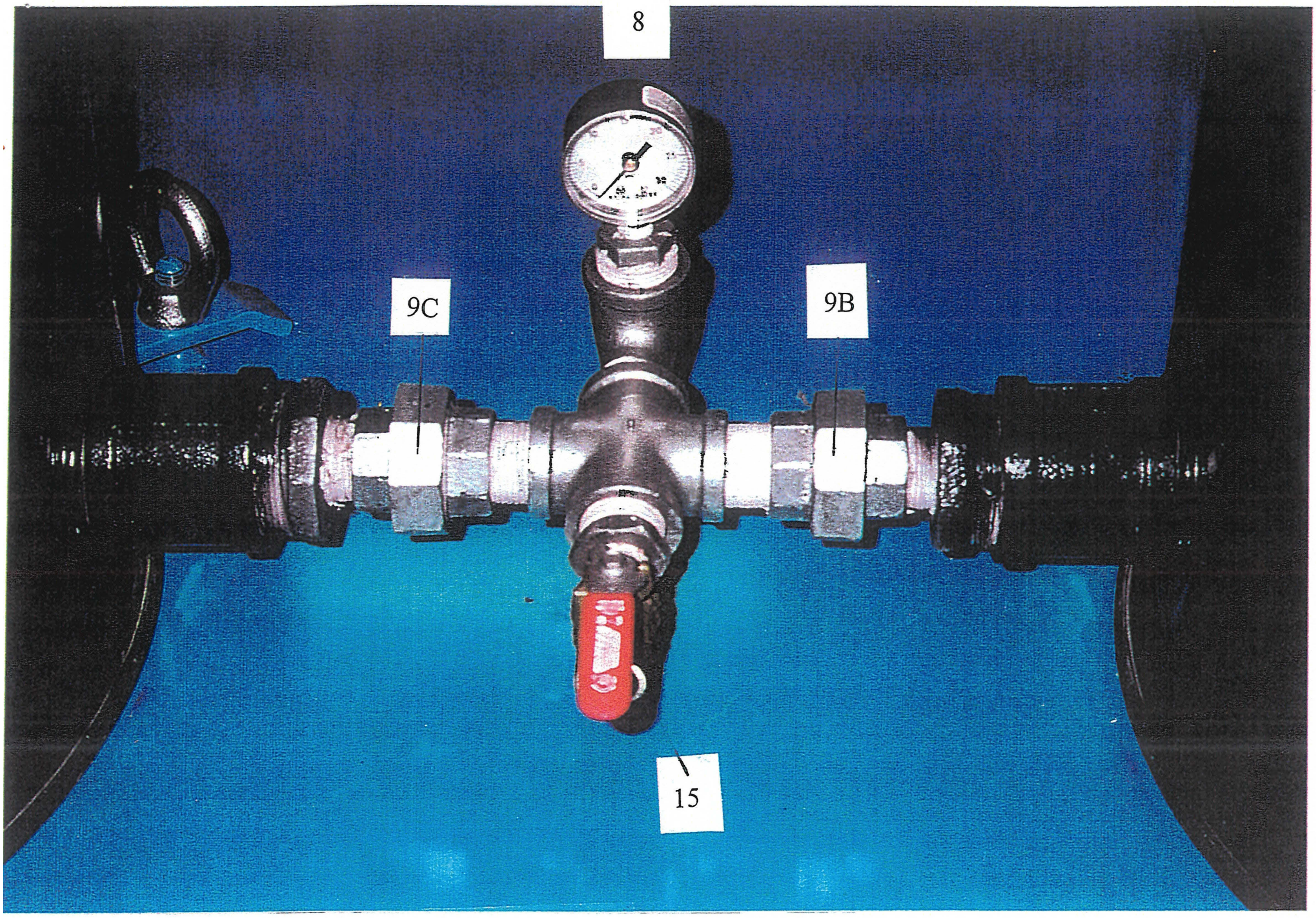


Item	Qty	Description
20	1	Oil Concentrate Discharge Pipe
19	1	Drain Valve
18	1	Sample Valve (Effluent)
17	1	Sample Valve
16	1	Drain Valve
15	1	Drain Valve
14	3	Air Eliminator
13	1	Flow Meter
11A	1	Main Flow Control Valve
11	1	Flow Control Valva
10	1	Bag Filter Drain
9F	1	Outlet Act. Carbon # 2
9E	1	Inlet Act. Carbon # 2
9D	1	Outlet Act. Carbon # 1
9C	1	Union Inlet Act. Carbon # 1
9B	1	Union Outlet – TM-100
9A	1	Union inlet – TM-100
8B	1	TM Pressure Gauge
8A	1	Bag Filter Pressure Gauge
8		Pressure Gauges
7	1	Equipment Standard
6	1	Water Meter
5	1	Pressure Relief Valve
4B	1	2nd Drum of Act. Carbon
4A	1	1st Drum of Act. Carbon
23	1	Pump
3	3	TM-100
2	2	Pre Filter
1	1	Coalescer



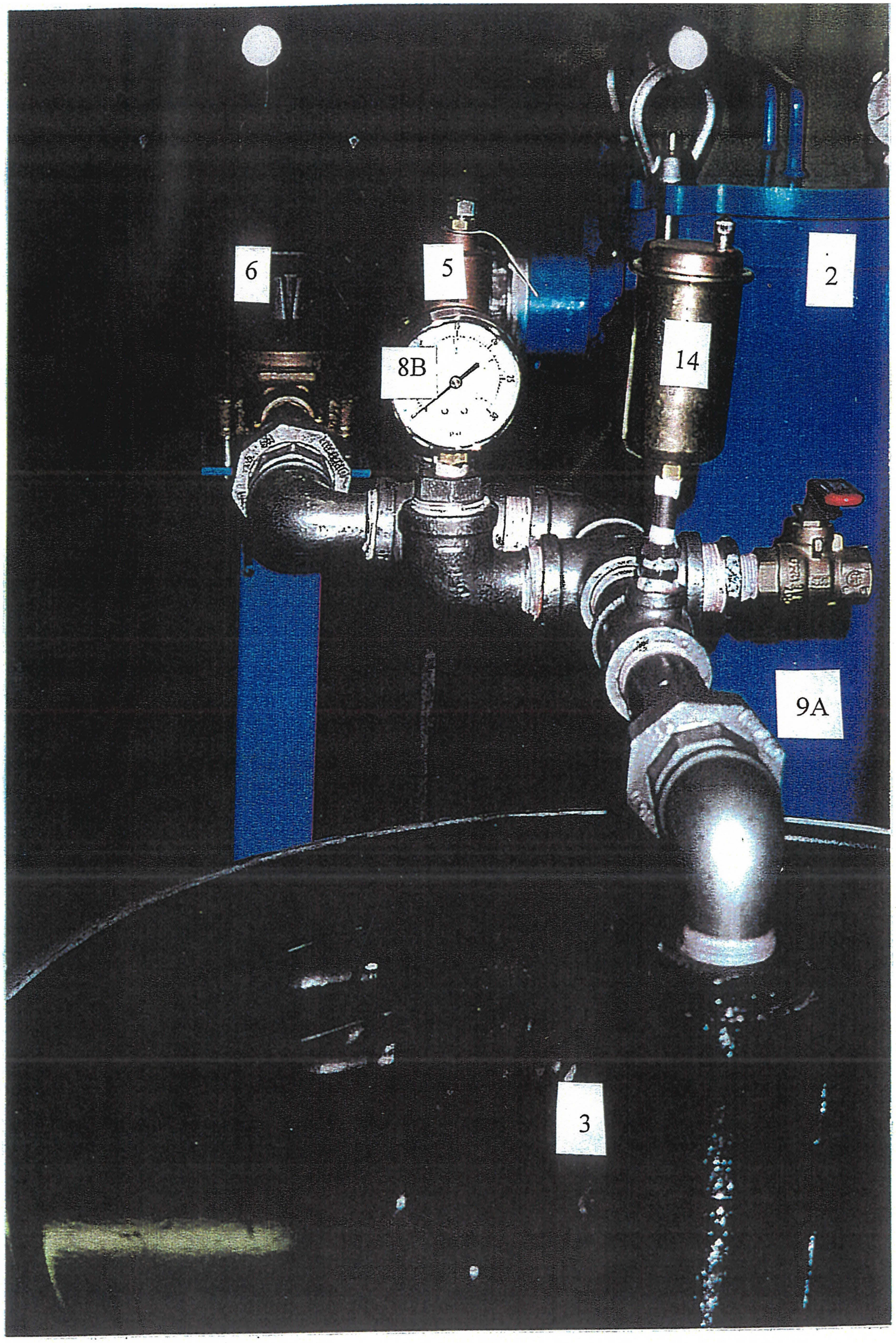
Pictorial #7 – Interconnecting Piping Carbon-Carbon

4A	1^{st} Carbon Drum
4B	2^{nd} Carbon Drum
8	Pressure Gauge
9C	Union
9D	Outlet Piping 1^{st} Drum
9E	Inlet Piping 2^{nd} Drum
9F	Outlet Piping 2^{nd} Drum
14	Air Eliminator
16	Drain Valve
18	Effluent/Discharge Sample Valve



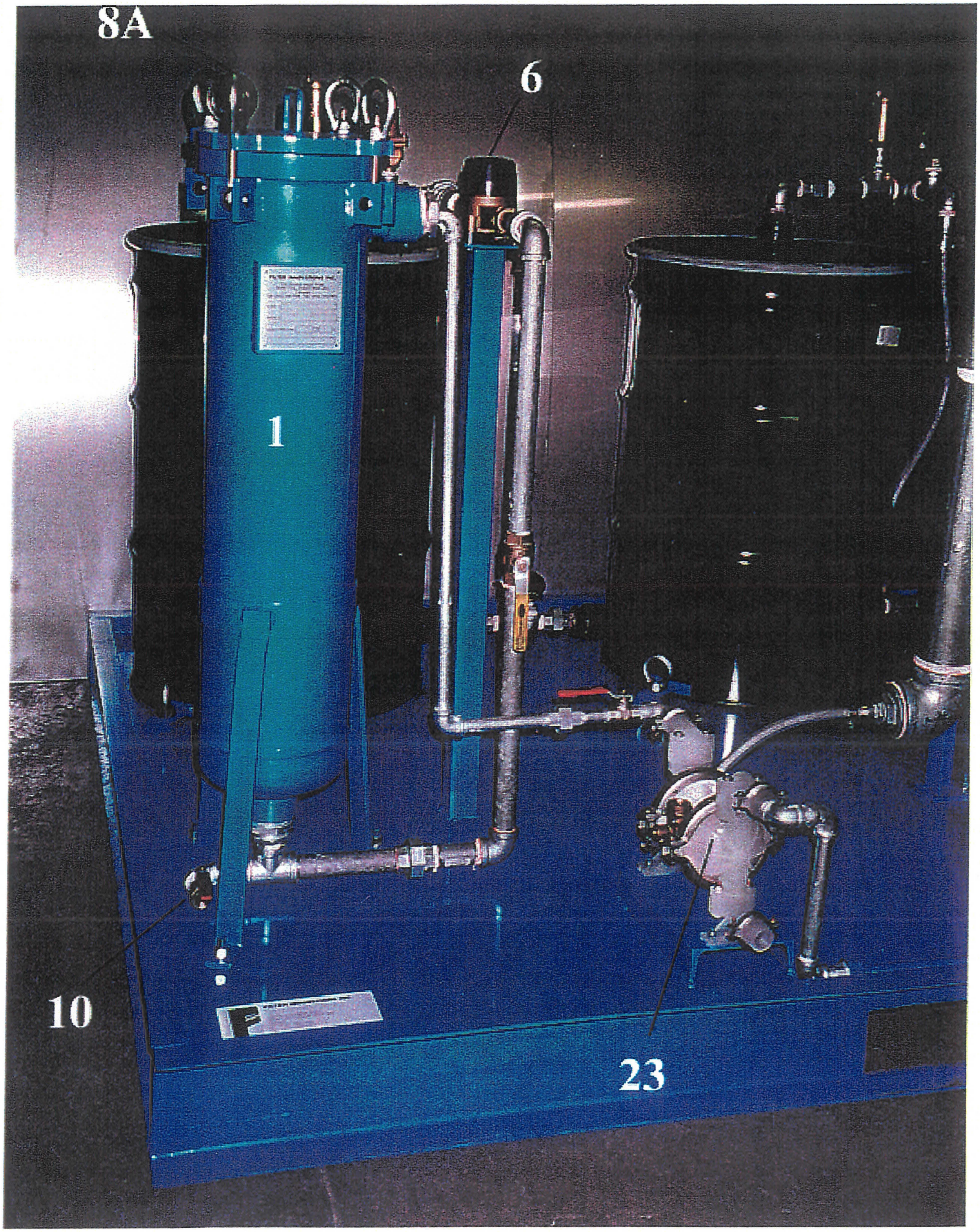
Pictorial #6 – Interconnecting Piping TM-Activated Carbon

8	Pressure Gauge
9B	Union
9C	Union
15	Drain/Sample Valve



Pictorial #5 – Inlet Piping to TM-drum

2	Bag Filter
3	TM-Drum
5	Pressure Relief Valve
6	Water Meter
8B	Pressure Gauge
9A	Union
14	Air Eliminator



Pictorial #4 – Bag Filter Layout

2	Bag Filter
6	Water Meter
8A	Pressure Gauge
10	Bag Filter Drain
23	Pump

FILTER INNOVATIONS INC.

744 Gordon Baker Road, Toronto, Ontario M2H 3B4, Canada Tel: (416) 490-7848 Fax: (416) 490-0974

Highlights Of TM-products

Economical
TM-MEDIA has a greater capacity for the absorption of higher molecular weight hydrocarbons (up to 60% of its weight), which means longer bed life (6 to 10 times longer than carbon).

Fewer pounds required in typical bed means:

1.Lower media costs
2.Reduced bed height
3.Lower equipment costs
4.Minimization of amount of waste to dispose of

Longer Bedlife means less Manpower required for bed changes.

Dependable
TM-MEDIA can accommodate increases in contaminant concentration levels caused by plant upsets. TM-MEDIA is thermally stable up to 300 degrees celsius.

Easy To Use
Versatile - can be used in columns in both the downflow and upflow mode no bed conditioning required to increase absorption capabilities. No carcinogenic dust problems associated when filing vessels.

Disposal
Filter Innovations has eliminated your disposal problem by arranging a cradle to grave life cycle this includes the acquisition of the media, the utilization of the product and the final disposition of the spent media. The final portion of this cycle is achievable because of the high BTU value of the spent media. As a result, it may be incinerated as a fuel in fuel blending programs, which are supplying cement kiln operations.

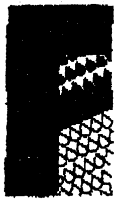
The spent media could also be disposed of at a landfill. The material is non-hazardous because it will not leach any hazardous constituents when subjected to the TCLP (Toxicity Characteristic Leaching Procedure) test for determining if a waste meets the criteria for a hazardous waste classification.

In summary, we feel that the excellent absorption capabilities of the TM-products to remove large molecular weight organic can effectively minimize the amount of contaminants discharged, as well as meet or exceed the new discharge limits set by government agencies.

FILTER INNOVATIONS INC.

744 Gordon Baker Road, Toronto, Ontario M2H 3B4, Canada Tel: (416) 490-7848 Fax: (416) 490-0974

Potential Applications



The TM-Media may be used in the following applications in the stand alone mode, such as in the treatment of steam condensate; in the pretreatment mode, for protection of other treatment processes such as activated carbon, reverse osmosis and desalination; and in the post-treatment mode, for polishing effluent from DAF units, API oily water separators, coalescers, ultrafiltration units, air strippers, and System AC units.

Process Or Waste	**Contaminants Removed**
Wood Treating	Pentacholophenol
Boiler Feed Water	Humic Acids
Metalcasting	Dye Penetrants
Natural Gas Compressors	Condensate
Industrial Stormwater	Oil And Grease
Drinking Water Treatment	Trihalomethanes (Formed On Cholrination)
Gas Sweetening	High Molecular Weight Hydrocarbons
Manufacturing Degreasing	Solvents Oil, Grease
General Parts Cleaning	Non-Ionic Surfactants
Electroplating	Heavy Metals
Paint Stripping	Various Solvents
Groundwater	PCB's, Oil, Grease, Gasoline And Diesel Contamination

"CLEANING THE WORLD WITH ACTIVATED CARBON"

GENERAL CARBON CORP.

FILTER INNOVATIONS INC.
744 Gordon Baker Road
Toronto, Ontario M2H 3B4, Canada
E-Mail: filinn@istar.ca
Tel: (416) 490-7848 Fax: (416) 490-0974

GC 12x40

GRANULAR ACTIVATED CARBON

GC 12x40 is a virgin activated carbon which is granular in form. Made from the finest grades of bituminous coal, it is ideal for many liquid phase applications including the removal of organics from water streams and the purification of potable water.

Specifications

Mesh Size - 12x40, %:	90 (min)
Less than No. 12, %:	5 (max)
Greater than No. 40, %:	5 (max)
Iodine No., mg/g:	1000 (min)
Surface Area, m^2/g:	1000 (min)
Hardness, %:	90 (min)
Abrasion No.:	80 (min)
Moisture, % (as packaged):	3.0 (max)
Typical Density, *lbs./cu.ft.:*	27-30
g/cc:	0.43-0.48

*Standard packaging is in 55 lb. vinyl bags. Other packaging is available upon request.

Caution!

Wet activated carbon removes oxygen from air causing a severe hazard to workers inside carbon vessels. Confined space/low oxygen procedures should be put in place before any entry is made. Such procedures should comply with all applicable local, state and federal guidelines.

APPENDIX E
LABORATORY ANALYTICAL RESULTS

ETL Enviro·Test
LABORATORIES
A DIVISION OF *ETL CHEMSPEC ANALYTICAL LIMITED*

ANALYTICAL REPORT

EBA ENG CONSULTANTS LTD
ATTN: S. TAYLOR

14940 123 AVE NORTH BLDG
EDMONTON AB T5V 1B4

DATE: 27-AUG-03 02:22 PM

Revision: 2

Lab Work Order #: L125248
Sampled By: S.TAYLOR
Date Received: 15-AUG-03
P.O. #:
Job #: BOSTON CAMP
Comments:

APPROVED BY: KHuebner

KAREN HUEBNER
Project Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY.
ANY REMAINING SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

LABORATORY ACCREDITATIONS:
- **STANDARDS COUNCIL OF CANADA IN COOPERATION WITH THE CANADIAN ASSOCIATION FOR ENVIRONMENTAL ANALYTICAL LABORATORIES (CAEAL)** FOR SPECIFIC TESTS AS REGISTERED BY THE COUNCIL (EDMONTON, CALGARY, GRANDE PRAIRIE, SASKATOON, WINNIPEG, THUNDER BAY, WATERLOO)
- **AMERICAN INDUSTRIAL HYGIENE ASSOCIATION (AIHA)** IN THE INDUSTRIAL HYGIENE PROGRAM (EDMONTON, WINNIPEG)
- **STANDARDS COUNCIL OF CANADA IN COOPERATION WITH THE CANADIAN FOOD INSPECTION AGENCY (CFIA)** FOR FERTILIZER AND FEED TESTING (SASKATOON) AND FOR MICROBIOLOGICAL TESTING IN FOOD (WINNIPEG)

LABORATORY RECOGNITIONS:
- **STANDARDS COUNCIL OF CANADA** - GLP COMPLIANT FACILITY (EDMONTON, OTTAWA)

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L125248-1 WT 3:30 BEFORE								
Sample Date: 13-AUG-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	2400		0.05	mg/L	15-AUG-03	15-AUG-03	CTL	R138186
BTEX and TVH (C5-C10)								
Benzene	0.94		0.0005	mg/L	15-AUG-03	16-AUG-03	IAG	R138147
Toluene	21		0.0005	mg/L	15-AUG-03	16-AUG-03	IAG	R138147
Ethylbenzene	4.0		0.0005	mg/L	15-AUG-03	16-AUG-03	IAG	R138147
Xylenes	15		0.0005	mg/L	15-AUG-03	16-AUG-03	IAG	R138147
Total Volatiles	90		0.1	mg/L	15-AUG-03	16-AUG-03	IAG	R138147
L125248-2 WT 3:30 AFTER								
Sample Date: 13-AUG-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	<0.05		0.05	mg/L	15-AUG-03	15-AUG-03	CTL	R138186
BTEX and TVH (C5-C10)								
Benzene	0.0006		0.0005	mg/L		16-AUG-03	IAG	R138147
Toluene	0.0006		0.0005	mg/L		16-AUG-03	IAG	R138147
Ethylbenzene	<0.0005		0.0005	mg/L		16-AUG-03	IAG	R138147
Xylenes	<0.0005		0.0005	mg/L		16-AUG-03	IAG	R138147
Total Volatiles	<0.1		0.1	mg/L		16-AUG-03	IAG	R138147
L125248-3 WT 5:00 BEFORE								
Sample Date: 13-AUG-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	3000		0.05	mg/L	15-AUG-03	15-AUG-03	CTL	R138186
BTEX and TVH (C5-C10)								
Benzene	0.37		0.0005	mg/L		16-AUG-03	IAG	R138147
Toluene	5.4		0.0005	mg/L		16-AUG-03	IAG	R138147
Ethylbenzene	1.3		0.0005	mg/L		16-AUG-03	IAG	R138147
Xylenes	6.9		0.0005	mg/L		16-AUG-03	IAG	R138147
Total Volatiles	44		0.1	mg/L		16-AUG-03	IAG	R138147
TEH-GC/FID Chromatogram	See Attached Chrom				15-AUG-03	15-AUG-03	CTL	R138181
L125248-4 WT 5:00 AFTER								
Sample Date: 13-AUG-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	<0.05		0.05	mg/L	15-AUG-03	15-AUG-03	CTL	R138186
BTEX and TVH (C5-C10)								
Benzene	0.0010		0.0005	mg/L	15-AUG-03	16-AUG-03	IAG	R138147
Toluene	0.0009		0.0005	mg/L	15-AUG-03	16-AUG-03	IAG	R138147
Ethylbenzene	<0.0005		0.0005	mg/L	15-AUG-03	16-AUG-03	IAG	R138147
Xylenes	<0.0005		0.0005	mg/L	15-AUG-03	16-AUG-03	IAG	R138147
Total Volatiles	<0.1		0.1	mg/L	15-AUG-03	16-AUG-03	IAG	R138147

Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Methods Listed (if applicable):

ETL Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
BTX,TVH-ED	Water	BTEX and TVH (C5-C10)	EPA 5030	EPA 5030/8015&8260-P&T GC-MS & FID
TVH includes BTEX contribution.				
TEH-ED	Water	TEH (C11-C30)		EPA 3510/8000-GC-FID
TEH-ED	Product	TEH (C11-C30)		EPA 3580/8000-GC-FID

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
ED	Enviro-Test Laboratories - Edmonton, Alberta, Canada		

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency. The Laboratory warning units are determined under column heading D.L.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
< - Less than
D.L. - Detection Limit
N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

Enviro-Test Laboratories has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, Enviro-Test Laboratories assumes no liability for the use or interpretation of the results.

Enviro·Test
LABORATORIES
A DIVISION OF *ETL CHEMSPEC ANALYTICAL LIMITED*

ENVIRO-TEST QC REPORT

Workorder: L125248

Client: EBA ENG CONSULTANTS LTD
14940 123 AVE NORTH BLDG
EDMONTON AB T5V 1B4

Contact: S. TAYLOR

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX,TVH-ED	**Water**							
Batch R138147								
WG132873-2 LCS								
Benzene			122		%		71-125	18-AUG-03
Ethylbenzene			115	H	%		72-115	18-AUG-03
Toluene			124		%		68-130	18-AUG-03
Total Volatiles			109		%		61-134	18-AUG-03
Xylenes			118		%		76-123	18-AUG-03
WG132873-1 MB								
Benzene			<0.0005		mg/L		0.0005	18-AUG-03
Ethylbenzene			<0.0005		mg/L		0.0005	18-AUG-03
Toluene			<0.0005		mg/L		0.0005	18-AUG-03
Total Volatiles			<0.1		mg/L		0.1	18-AUG-03
Xylenes			<0.0005		mg/L		0.0005	18-AUG-03
TEH-ED	**Water**							
Batch R138186								
WG132932-2 LCS								
TEH (C11-C30)			114		%		67-130	15-AUG-03
WG132932-1 MB								
TEH (C11-C30)			<0.05		mg/L		0.05	15-AUG-03

Product - Batch and Sample Number Relations:

BTX,TVH-ED		1				
	R138147		L125248-1	L125248-2	L125248-3	L125248-4
TEH-ED		1				
	R138186		L125248-1	L125248-2	L125248-3	L125248-4
TEH-ED		15				
	R138181		L125248-3			
TEH-ED		15				
	R138186		L125248-1			

ENVIRO-TEST QC REPORT

Workorder # L125248

egend:

Limit	95% Confidence Interval (Laboratory Warning Limits)
DUP	Duplicate
RPD	Relative Percent Difference ((higher result-lower result)/Average, expressed as %)
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Materials
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material

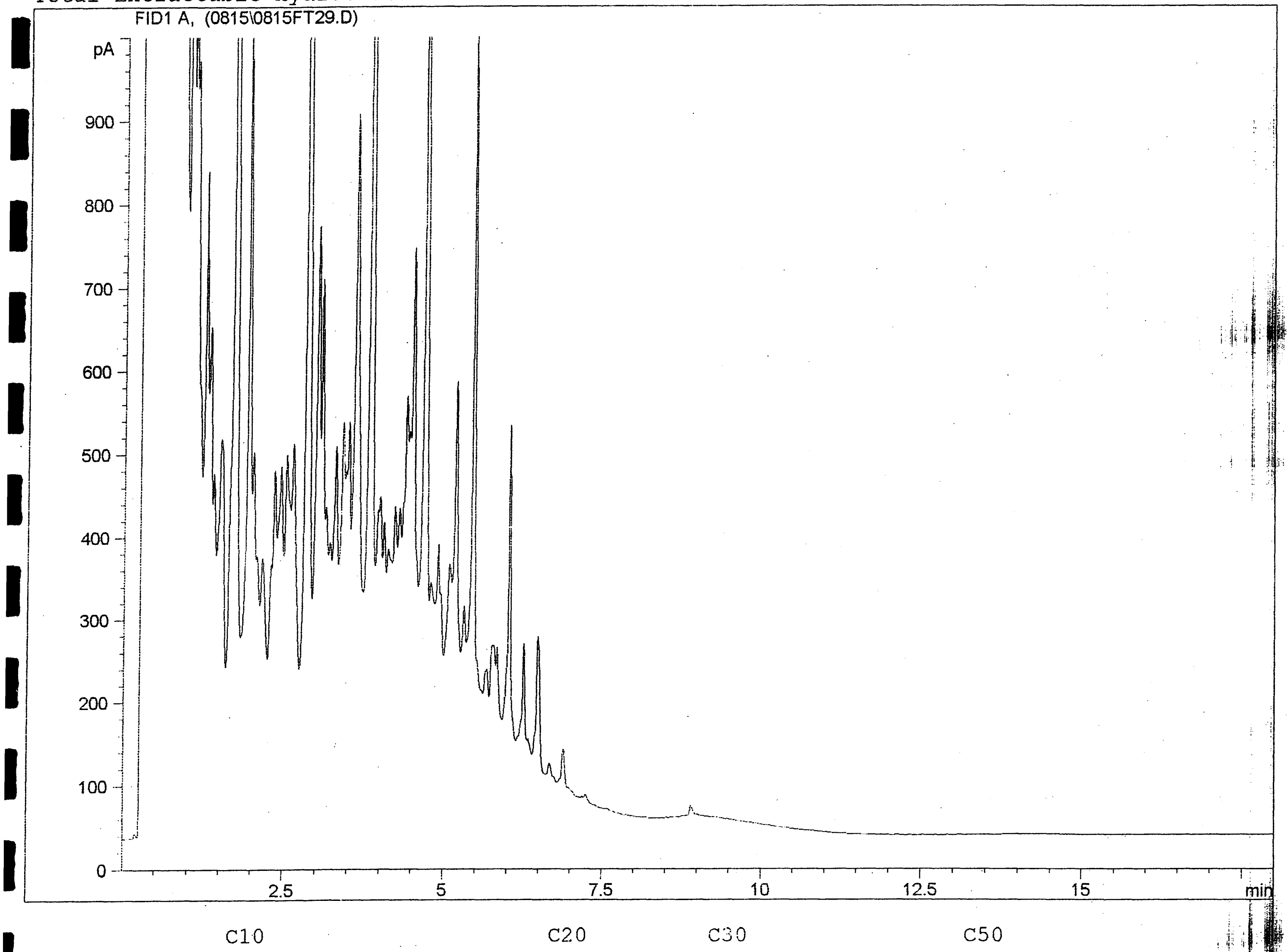
ualifier:

RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
A	Method blank exceeds acceptance limit. Blank correction not applied, unless the qualifier "RAMB" (result adjusted for method blank) appears in the Analytical Report.
B	Method blank result exceeds acceptance limit, however, it is less than 5% of sample concentration. Blank correction not applied.
E	Matrix spike recovery may fall outside the acceptance limits due to high sample background.
F	Silver recovery low, likely due to elevated choride levels in sample.
G	Outlier - No assignable cause for nonconformity has been determined.
H	Result falls within the 99% Confidence Interval (Laboratory Control Limits)
J	Duplicate results and limit(s) are expressed in terms of absolute difference.
K	The sample referenced above is of a non-standard matrix type; standard QC acceptance criteria may not be achievable.

Client ID: WT 3:30 BEFORE

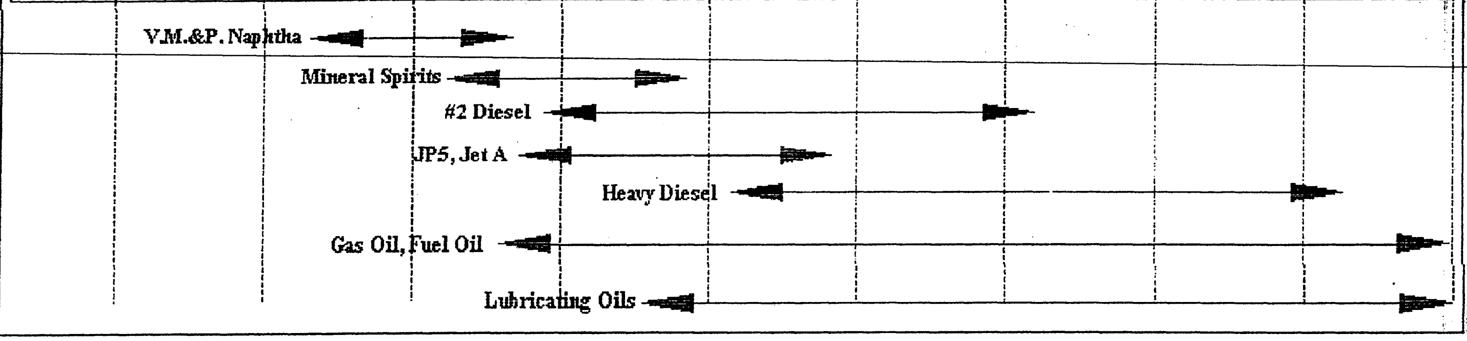
Sample ID: L125248-1 100
Injection Date: 8/16/03 1:45:54 AM
Instrument ID: Instrument B

Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

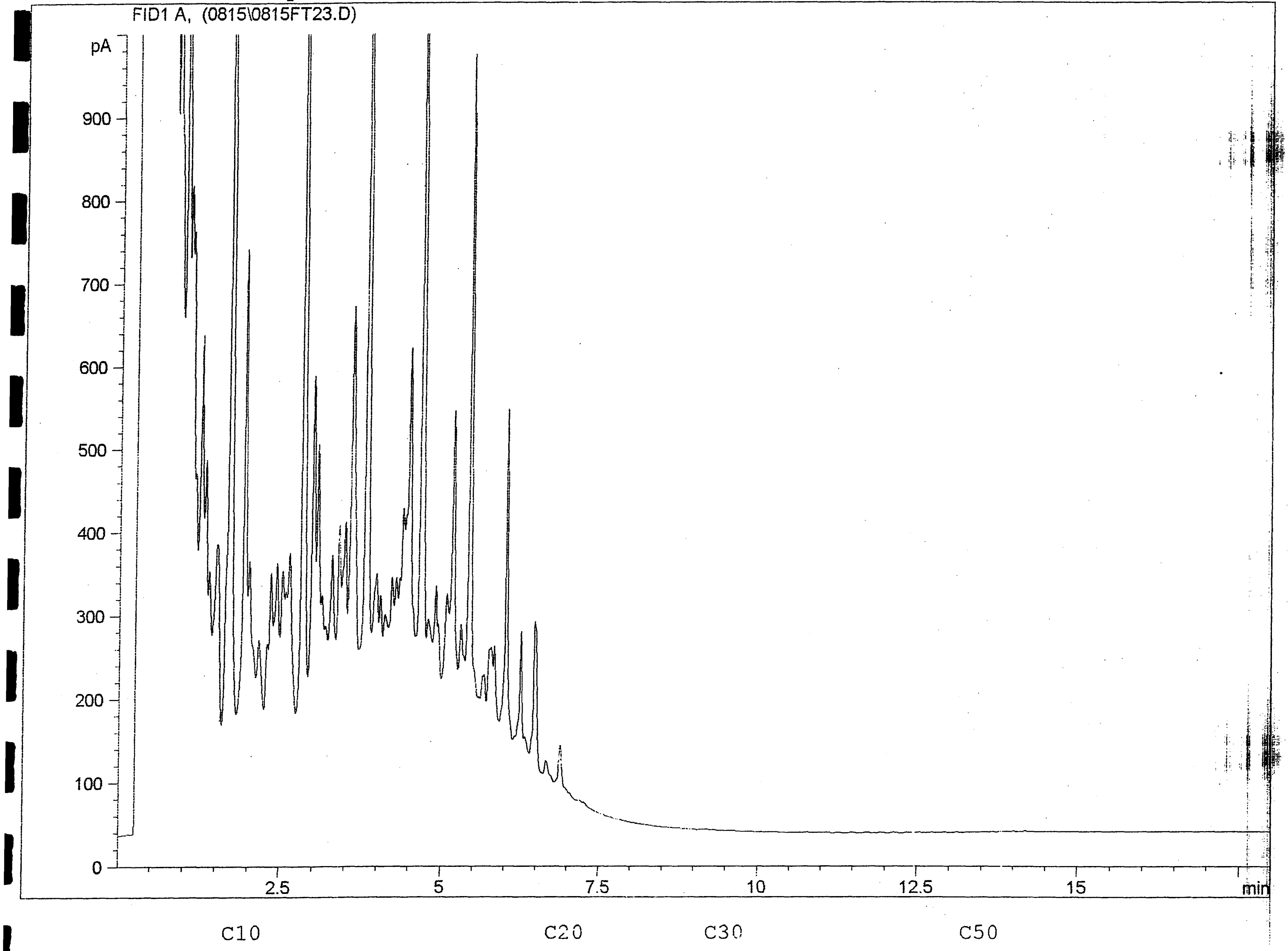


Adapted from: Drews, A.W.,ED. Manual on Hyrdocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: WT 5:00 BEFORE

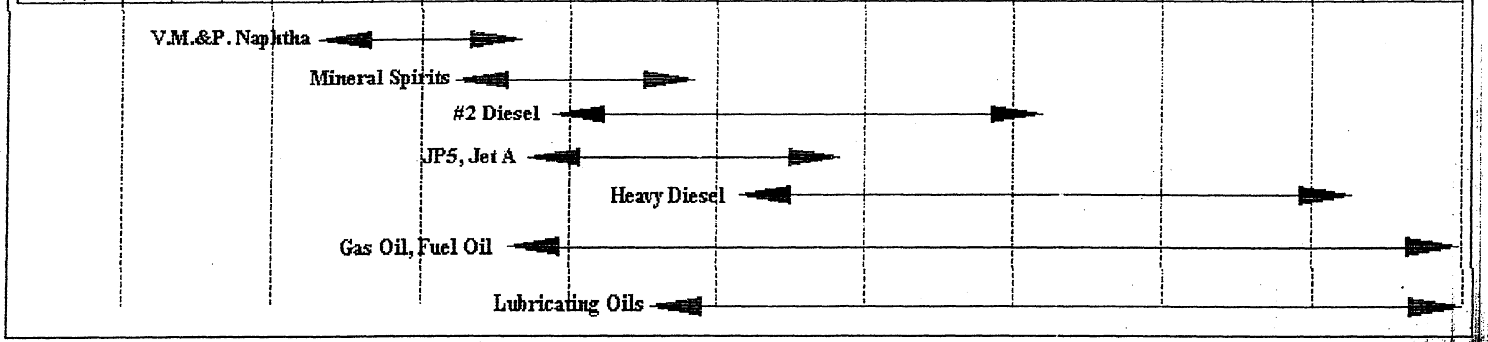
Sample ID: L125248-3 100
Injection Date: 8/15/03 11:07:27 PM
Instrument ID: Instrument B

Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



Adapted from: Drews, A.W.,ED. Manual on Hyrdocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

ETL EnviroTest LABORATORIES
A DIVISION OF ETL CHEMSPEC ANALYTICAL LIMITED

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM
CANADA TOLL FREE 1-800-668-9878

COC # 58667

Pg ____ of ____
www.envirotest.com

ETL LAB WORK ORDER # L125248

REPORT TO:
COMPANY: EBA (Edm)
CONTACT: S. Taylor
ADDRESS:
(Edm)
PHONE: 451-2130 x260 FAX:

INVOICE TO: SAME [✓ Y] / N
COMPANY:
CONTACT:
ADDRESS:
PHONE: FAX:

DATE:
REPORT DISTRIBUTION: ALL FINAL RESULTS WILL BE MAILED
EMAIL ☒ FAX ☐
EMAIL 1: staylor@eba.ca
EMAIL 2: bmurphy@eba.ca
SELECT: pdf ☒ digital ☐ both ☐

INDICATE BOTTLES: FILTERED/PRESERVED (F/P) ▶

JOB # Boston Camp
PO / AFE:
LSD:
QUOTE #

SERVICE REQUESTED
☐ REGULAR SERVICE (DEFAULT)
☐ PRIORITY SERVICE (50% SURCHARGE)
☒ EMERGENCY SERVICE (100% SURCHARGE)

ANALYSIS REQUEST

SAMPLE ID	SAMPLING LOCATION	SAMPLED BY / DATE / TIME	SAMPLING METHOD	SAMPLE TYPE	BTEX	TVH	TEH		HAZARDOUS? (Y/N)	NUMBER OF CONTAINERS	HIGHLY CONTAMINATED? (Y/N)	LAB SAMPLE #
					P	P	P					
WT 3:30 Before		S.Taylor / Aug 13/03	Valve	Water	X	X	X			3	Y	
WT 3:30 After		" "	"	"	X	X	X	1 bottle broken		3	N	
WT 5:00 Before		" "	"	"	X	X	X			3	Y	
WT 5:00 After		" "	"	"	X	X	X			3	N	

NOTES & CONDITIONS:
1. Quote number must be provided to ensure proper pricing.
2. Turnaround times will vary dependent on complexity of analysis & Lab workload at time of submission. Please contact the Lab to confirm turnaround time.
3. All hazardous samples submitted must be labeled to comply with WHMIS and TDG regulations. This must include the nature of the hazard, as well as a contact name & phone number that the Lab can contact for further information.

NOTE: Failure to properly complete all portions of this form may delay analysis.

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / NATURE OF HAZARDOUS MATERIAL

SAMPLE CONDITION
☐ FROZEN
☑ COLD
☐ AMBIENT
MEAN TEMPERATURE

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY: 15-Aug-03	DATE & TIME: 9:45
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

SAMPLE CONDITION ACCEPTABLE UPON RECEIPT? (Y/N)

REFER TO BACK FOR SAMPLING INFORMATION & REGIONAL LOCATIONS. WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

REVISED MAY 2003

ETL Enviro·Test
LABORATORIES
A DIVISION OF *ETL CHEMSPEC ANALYTICAL LIMITED*

RECEIVED
SEP 17 2003

ANALYTICAL REPORT

EBA ENG CONSULTANTS LTD
ATTN: STEVE TAYLOR
14940 123 AVE NORTH BLDG
EDMONTON AB T5V 1B4

DATE: 05-SEP-03 05:04 PM

Lab Work Order #:	L128027	**Sampled By:**	CLIENT	**Date Received:**	02-SEP-03
P.O. #:	NA				
Job #:	1740065				

Comments: 05-Sep-03
Analyses canceled for L128027-3 and -5 due to greater than 50% free product. Analyses for L128027-7 canceled due to high free product and sample had emulsified.

Sample Specific Comments: L128027-1: BTEX data revised.,

APPROVED BY: ______________________
for TONY CIARLA
Project Manager

LABORATORY ACCREDITATIONS:
- **STANDARDS COUNCIL OF CANADA IN COOPERATION WITH THE CANADIAN ASSOCIATION FOR ENVIRONMENTAL ANALYTICAL LABORATORIES (CAEAL)** FOR SPECIFIC TESTS AS REGISTERED BY THE COUNCIL (EDMONTON, CALGARY, GRANDE PRAIRIE, SASKATOON, WINNIPEG, THUNDER BAY, WATERLOO)
- **AMERICAN INDUSTRIAL HYGIENE ASSOCIATION (AIHA)** IN THE INDUSTRIAL HYGIENE PROGRAM (EDMONTON, WINNIPEG)
- **STANDARDS COUNCIL OF CANADA IN COOPERATION WITH THE CANADIAN FOOD INSPECTION AGENCY (CFIA)** FOR FERTILIZER AND FEED TESTING (SASKATOON) AND FOR MICROBIOLOGICAL TESTING IN FOOD (WINNIPEG)

LABORATORY RECOGNITIONS:
- **STANDARDS COUNCIL OF CANADA** - GLP COMPLIANT FACILITY (EDMONTON, OTTAWA)

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L128027-1 AUG 28/03 11:00AM BEFORE								
Sample Date: 29-AUG-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	270		0.05	mg/L	03-SEP-03	03-SEP-03	OAL	R141337
BTEX and TVH (C5-C10)								
Benzene	0.64		0.0005	mg/L	03-SEP-03	03-SEP-03	MMY	R141405
Toluene	3.1		0.0005	mg/L	03-SEP-03	03-SEP-03	MMY	R141405
Ethylbenzene	0.50		0.0005	mg/L	03-SEP-03	03-SEP-03	MMY	R141405
Xylenes	2.9		0.0005	mg/L	03-SEP-03	03-SEP-03	MMY	R141405
Total Volatiles	44		0.1	mg/L	03-SEP-03	03-SEP-03	MMY	R141405
Note: BTEX data revised.								
L128027-2 AUG 28/03 11:00AM AFTER								
Sample Date: 29-AUG-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	1.7		0.05	mg/L	03-SEP-03	03-SEP-03	OAL	R141337
BTEX and TVH (C5-C10)								
Benzene	0.0015		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Toluene	0.017		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Ethylbenzene	0.0014		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Xylenes	0.012		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Total Volatiles	0.1		0.1	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
L128027-4 AUG 28/03 4:00PM AFTER								
Sample Date: 29-AUG-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	2.3		0.05	mg/L	03-SEP-03	03-SEP-03	OAL	R141337
BTEX and TVH (C5-C10)								
Benzene	0.0013		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Toluene	0.012		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Ethylbenzene	0.0009		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Xylenes	0.0090		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Total Volatiles	<0.1		0.1	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
L128027-6 AUG 28/03 9:00PM AFTER								
Sample Date: 29-AUG-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	16		0.05	mg/L	03-SEP-03	03-SEP-03	OAL	R141337
BTEX and TVH (C5-C10)								
Benzene	<0.0005		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Toluene	<0.0005		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Ethylbenzene	<0.0005		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Xylenes	<0.0005		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Total Volatiles	0.2		0.1	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
L128027-8 AUG 29/03 11:00AM AFTER								
Sample Date: 30-AUG-03								
Matrix: WATER								
BTEX, TVH and TEH								

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L128027-8 AUG 29/03 11:00AM AFTER								
Sample Date: 30-AUG-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	1.7		0.05	mg/L	03-SEP-03	03-SEP-03	OAL	R141337
BTEX and TVH (C5-C10)								
Benzene	<0.0005		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Toluene	<0.0005		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Ethylbenzene	<0.0005		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Xylenes	<0.0005		0.0005	mg/L	03-SEP-03	04-SEP-03	MMY	R141405
Total Volatiles	0.4		0.1	mg/L	03-SEP-03	04-SEP-03	MMY	R141405

Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Methods Listed (if applicable):

ETL Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
BTX,TVH-CL	Water	BTEX and TVH (C5-C10)		EPA 5030/8015& 8260-P&T GC-MS/FID
TVH includes BTEX contribution.				
TEH-CL	Water	TEH (C11-C30)		EPA 3510/8000-GC-FID

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

59955

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
CL	Enviro-Test Laboratories - Calgary, Alberta, Canada		

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency. The Laboratory warning units are determined under column heading D.L.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
< - Less than
D.L. - Detection Limit
N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

Enviro-Test Laboratories has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, Enviro-Test Laboratories assumes no liability for the use or interpretation of the results.

Report Date: 05-SEP-03

ENVIRO-TEST QC REPORT

Workorder: L128027

Client: EBA ENG CONSULTANTS LTD
14940 123 AVE NORTH BLDG
EDMONTON AB T5V 1B4

Contact: STEVE TAYLOR

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX,TVH-CL	**Water**							
Batch R141405								
WG136633-2 MB								
Benzene			<0.0005		mg/L		0.0005	04-SEP-03
Ethylbenzene			<0.0005		mg/L		0.0005	04-SEP-03
Toluene			<0.0005		mg/L		0.0005	04-SEP-03
Total Volatiles			<0.1		mg/L		0.1	04-SEP-03
Xylenes			<0.0005		mg/L		0.0005	04-SEP-03
TEH-CL	**Water**							
Batch R141337								
WG136499-1 MB								
TEH (C11-C30)			<0.05		mg/L		0.05	04-SEP-03

Product - Batch and Sample Number Relations:

BTX,TVH-CL		1					
	R141405		L128027-1	L128027-2	L128027-4	L128027-6	L128027-8
TEH-CL		1					
	R141337		L128027-1	L128027-2	L128027-4	L128027-6	L128027-8

ENVIRO-TEST QC REPORT

Workorder # L128027

Legend:

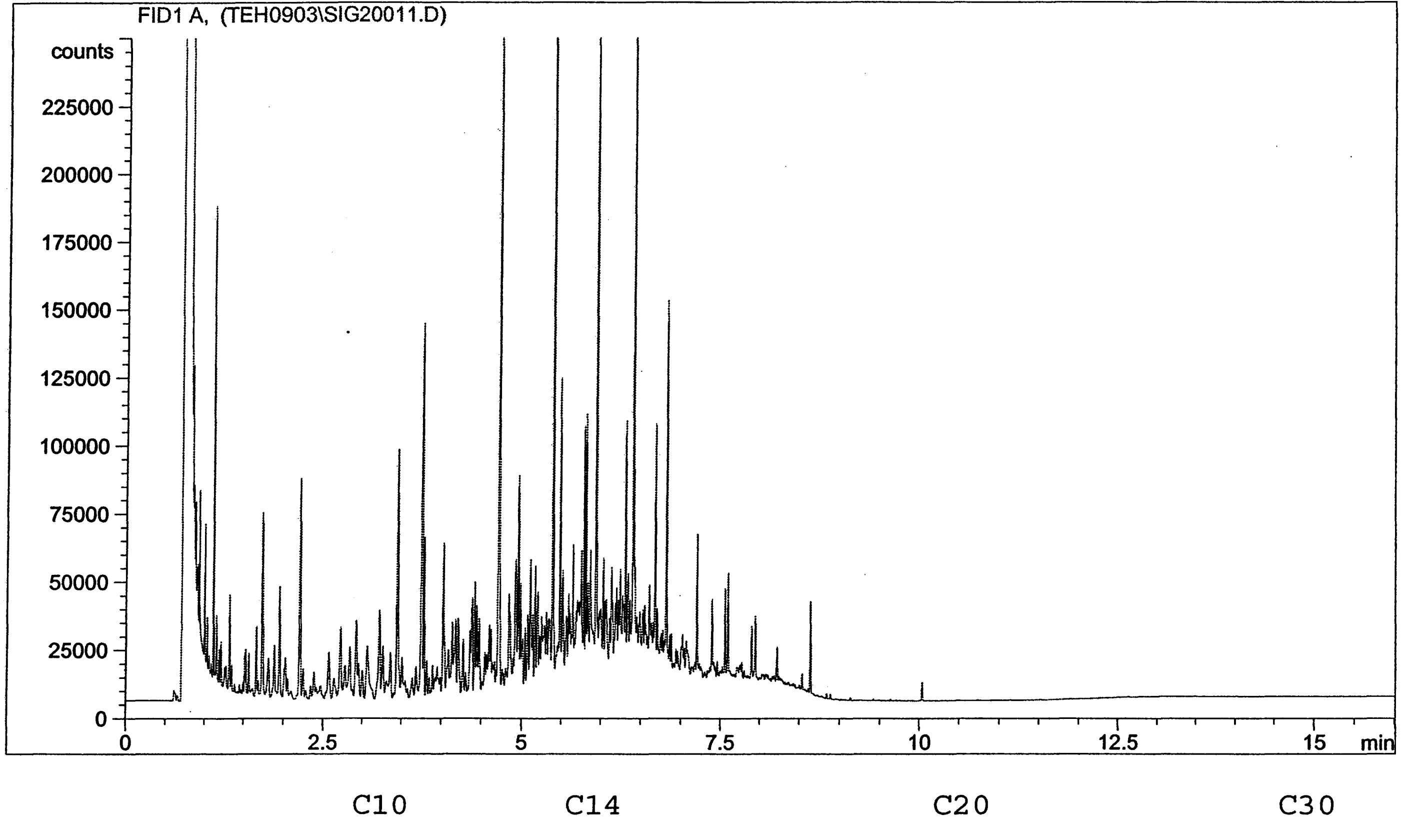
Limit	95% Confidence Interval (Laboratory Warning Limits)
DUP	Duplicate
RPD	Relative Percent Difference ((higher result-lower result)/Average, expressed as %)
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Materials
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material

Qualifier:

RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
A	Method blank exceeds acceptance limit. Blank correction not applied, unless the qualifier "RAMB" (result adjusted for method blank) appears in the Analytical Report.
B	Method blank result exceeds acceptance limit, however, it is less than 5% of sample concentration. Blank correction not applied.
D	Duplicate result may exceed limit due to increased variability for low level samples.
E	Matrix spike recovery may fall outside the acceptance limits due to high sample background.
F	Silver recovery low, likely due to elevated choride levels in sample.
G	Outlier - No assignable cause for nonconformity has been determined.
H	Result falls within the 99% Confidence Interval (Laboratory Control Limits)
J	Duplicate results and limit(s) are expressed in terms of absolute difference.
K	The sample referenced above is of a non-standard matrix type; standard QC acceptance criteria may not be achievable.

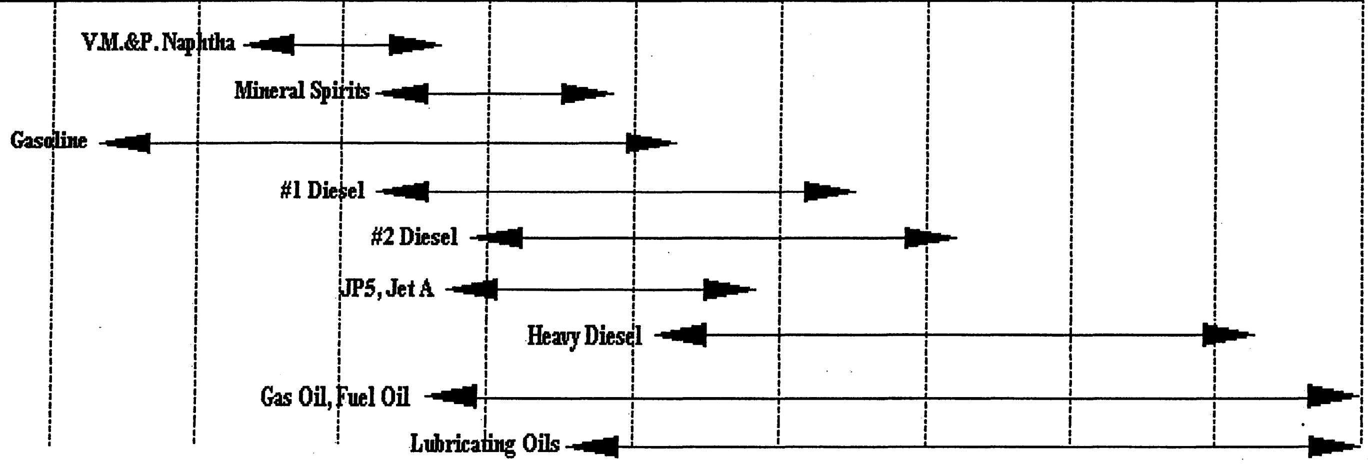
Client ID: AUG 28/03 11:00AM BEFORE
->
Sample ID: L128027-1 v4teh
Injection Date: 9/3/03
Injection Time: 3:48:32 PM
Instrument ID: teh1

Total Extractable Hydrocarbons



Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

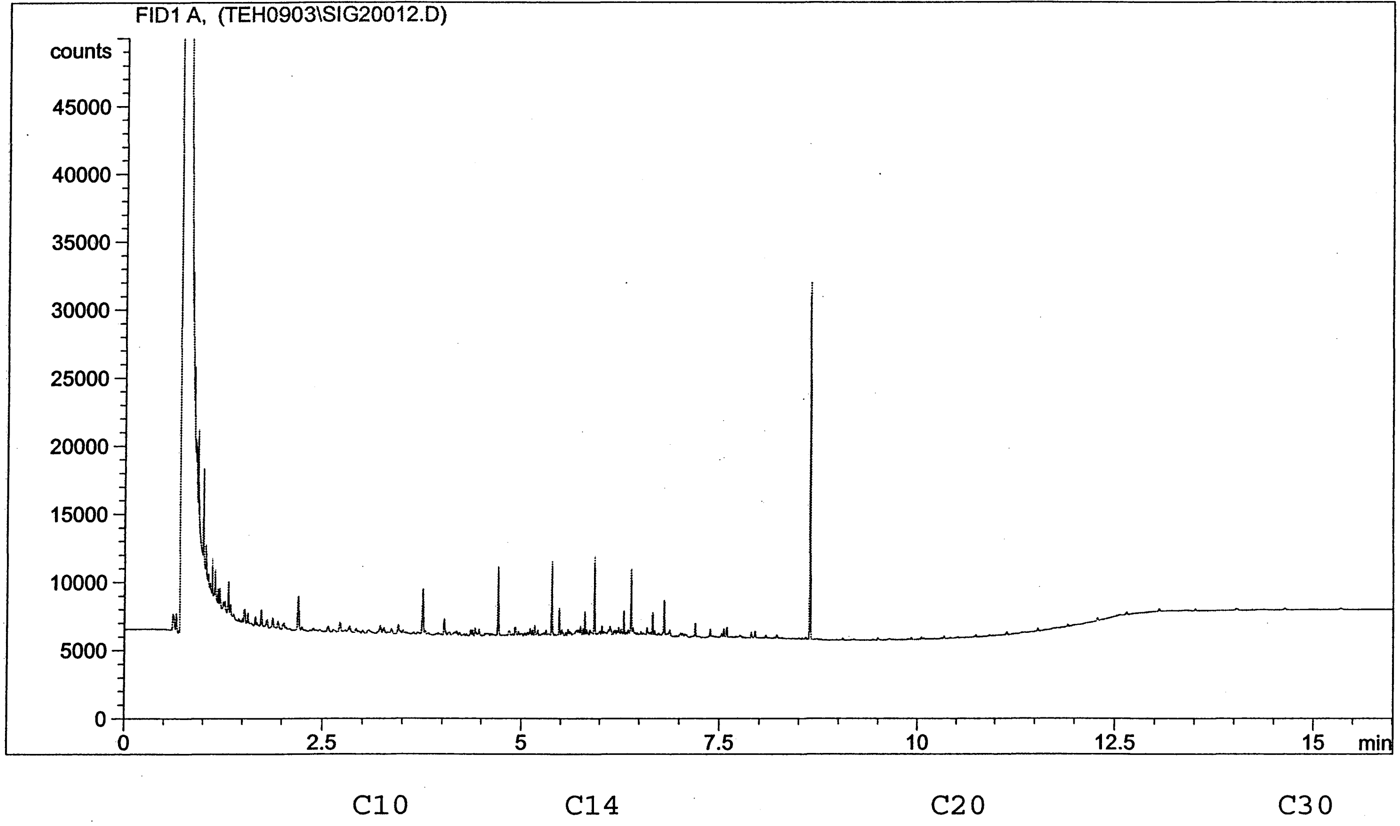


Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

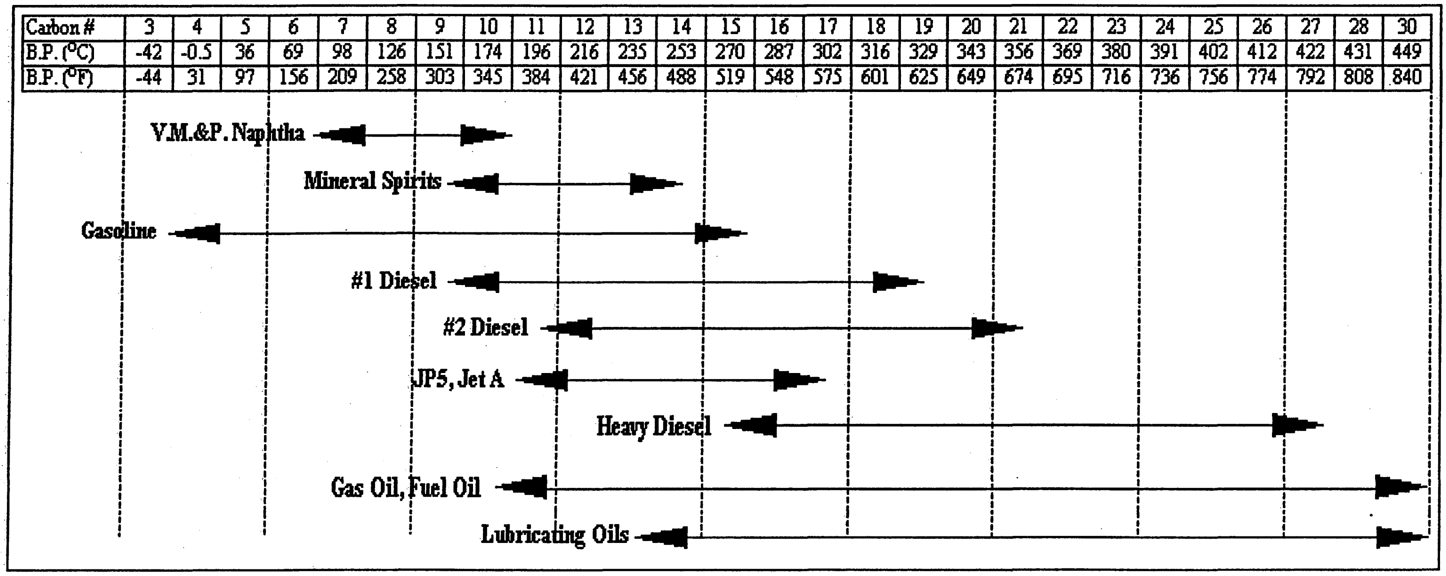
Client ID: AUG 28/03 11:00AM AFTER
->

Sample ID: L128027-2 v4teh
Injection Date: 9/3/03
Injection Time: 4:12:32 PM
Instrument ID: teh1

Total Extractable Hydrocarbons



Boiling Point Distribution Range for Petroleum Based Fuel Products

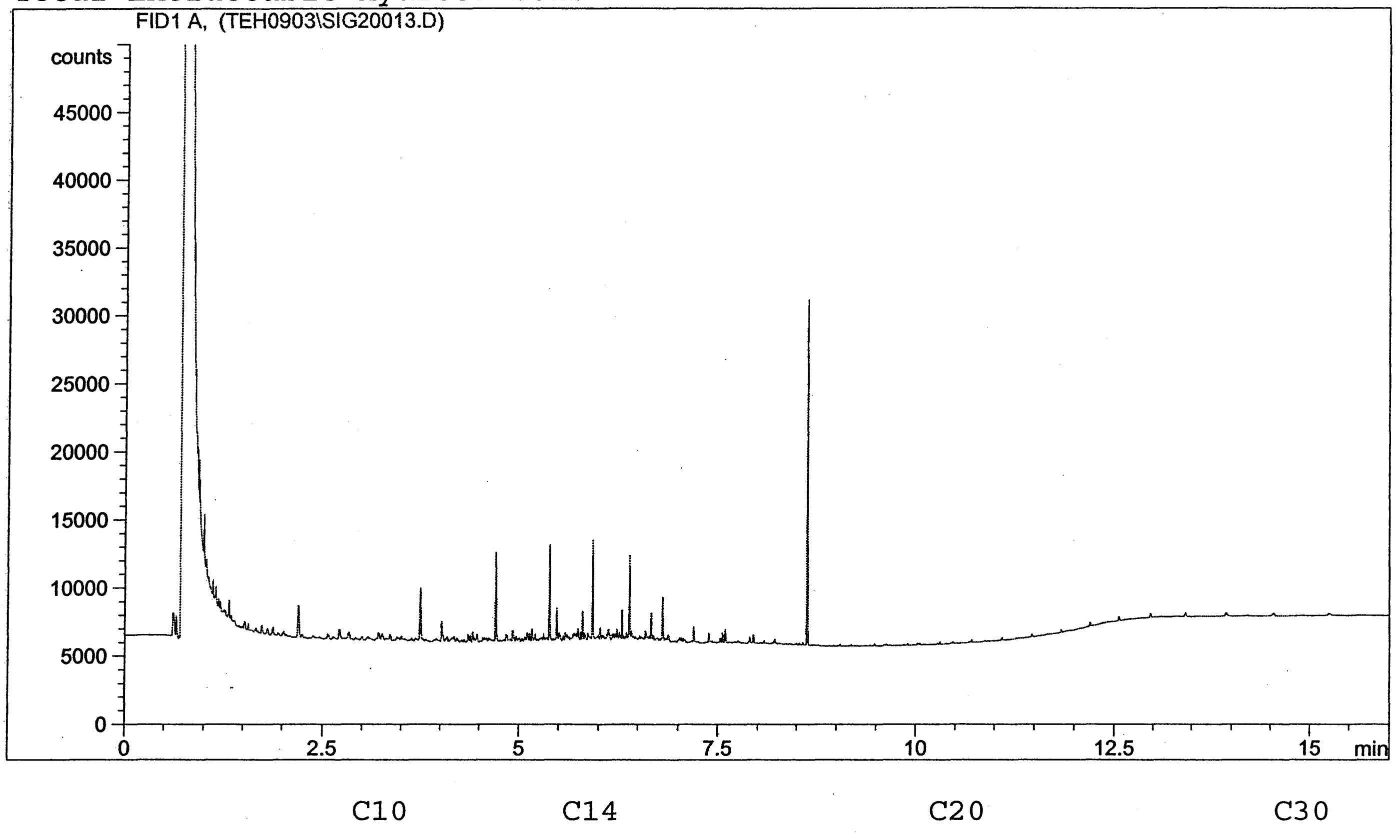


Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

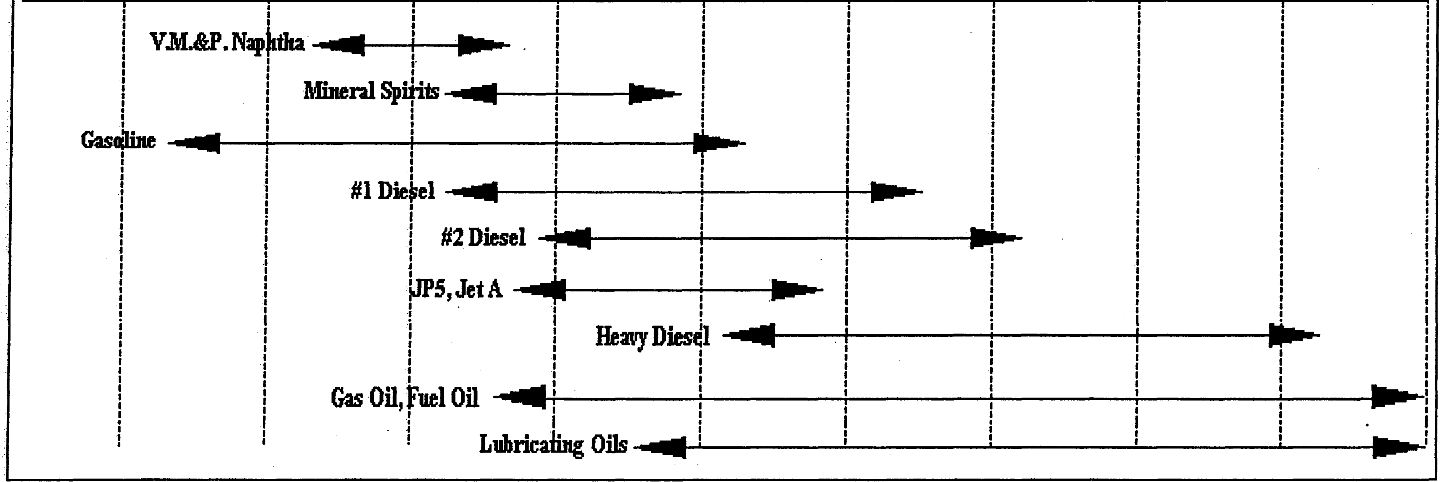
Client ID: AUG 28/03 4:00PM AFTER
->
Sample ID: L128027-4 v4teh
Injection Date: 9/3/03
Injection Time: 4:36:28 PM
Instrument ID: teh1

Total Extractable Hydrocarbons



Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

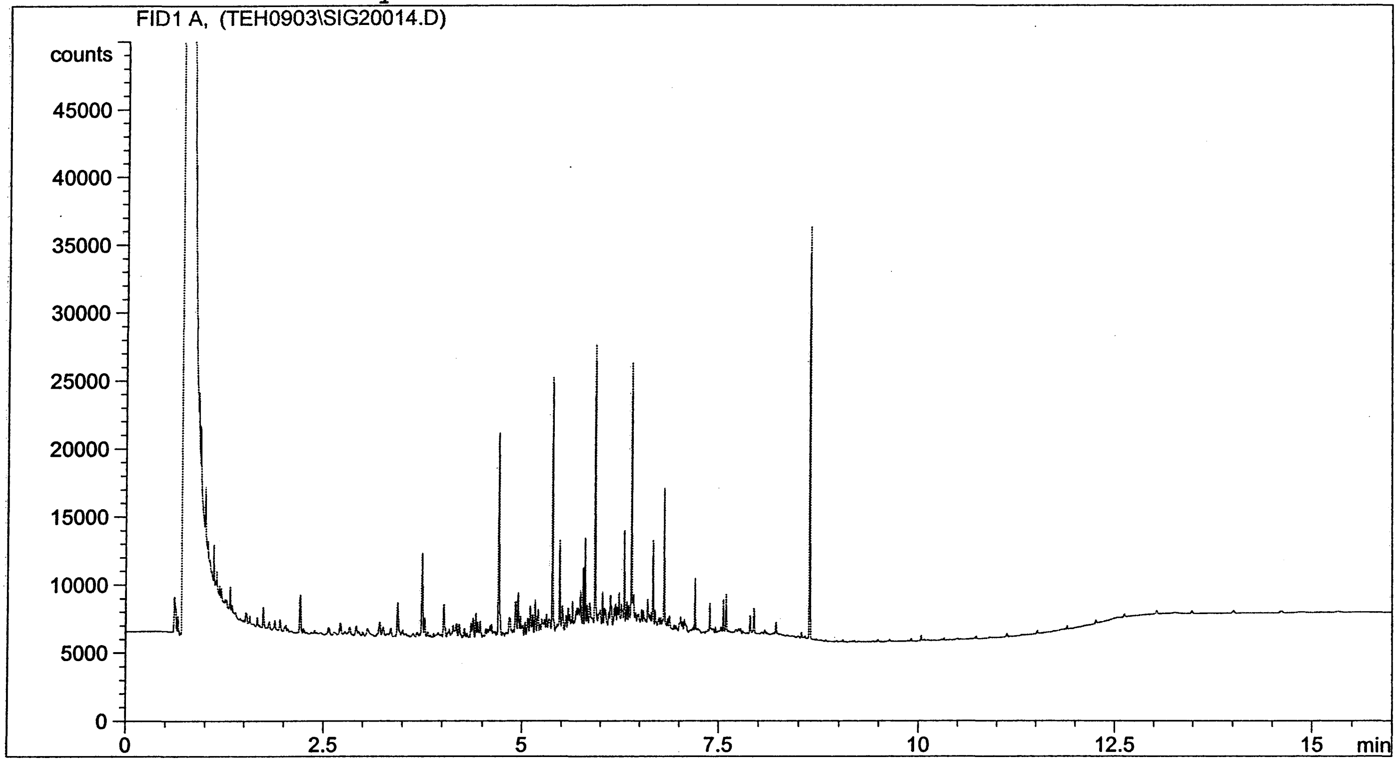


Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: AUG 29/03 9:00PM AFTER
->

Sample ID: L128027-6 v4teh
Injection Date: 9/3/03
Injection Time: 5:00:27 PM
Instrument ID: teh1

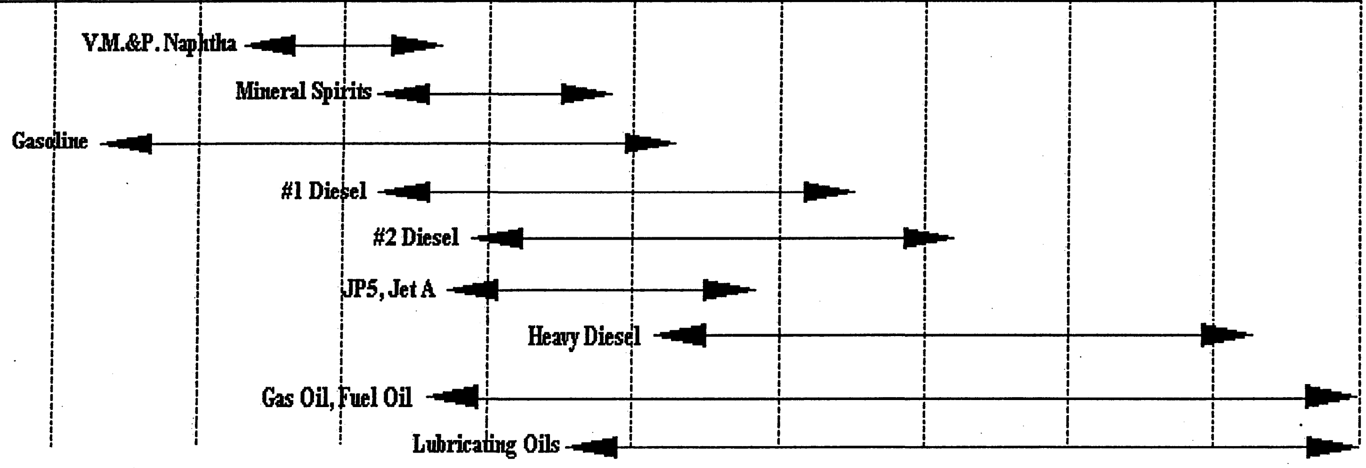
Total Extractable Hydrocarbons



C10 C14 C20 C30

Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

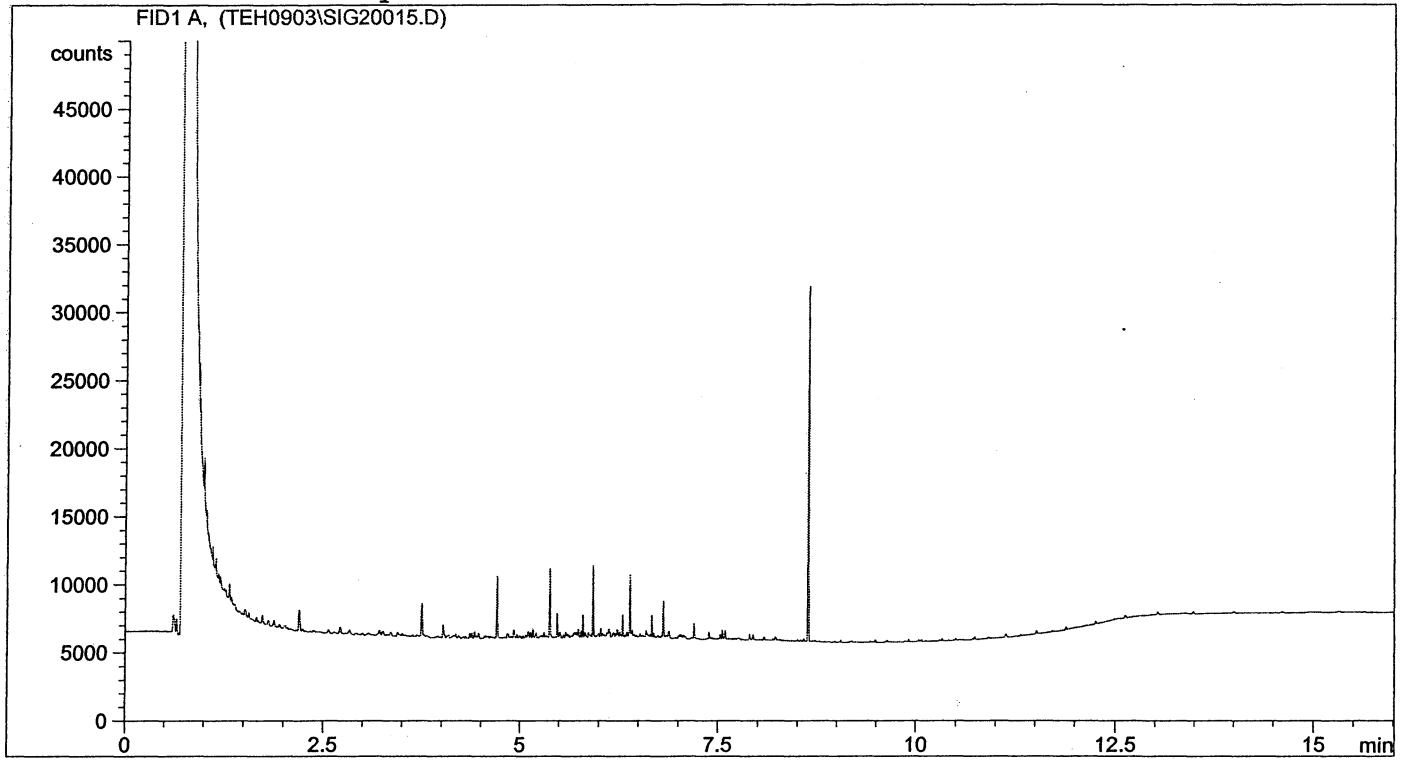


Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: AUG29/03 11:00AM AFTER
->

Sample ID: L128027-8 v4teh
Injection Date: 9/3/03
Injection Time: 5:24:27 PM
Instrument ID: teh1

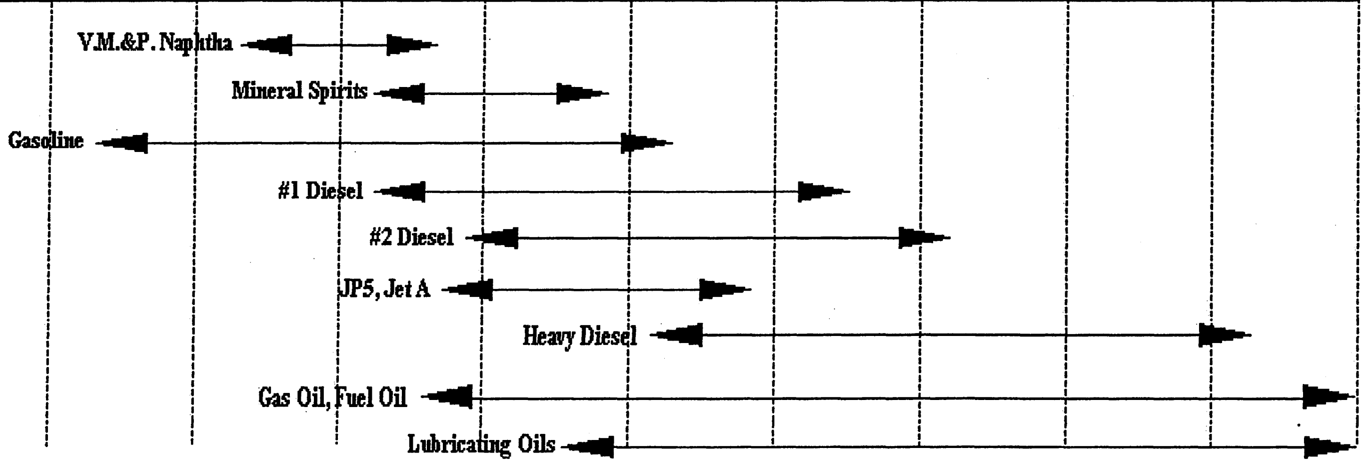
Total Extractable Hydrocarbons



C10 C14 C20 C30

Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

ETL EnviroTest LABORATORIES
A DIVISION OF *ETL CHEMSPEC ANALYTICAL LIMITED*

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM
CANADA TOLL FREE 1-800-668-9878

COC # 59955

Pg ____ of ____
www.envirotest.com

REPORT TO:
COMPANY: EBA (Edm)
CONTACT: Steve Taylor
ADDRESS: EBA Edmonton
PHONE: x260 FAX:

INVOICE TO: SAME [✓ Y] N
COMPANY:
CONTACT:
ADDRESS:
PHONE: FAX:

DATE:
REPORT DISTRIBUTION: ALL FINAL RESULTS WILL BE MAILED
EMAIL ☒ FAX ☐
EMAIL 1: staylor@eba.ca
EMAIL 2: bmurphy@eba.ca
SELECT: pdf ☒ digital ☒ both ☒
INDICATE BOTTLES: FILTERED/PRESERVED (F/P) ▶
JOB # 1740065
PO / AFE:
LSD:
QUOTE #

ETL LAB WORK ORDER # L128027

SERVICE REQUESTED
☐ REGULAR SERVICE (DEFAULT)
☐ PRIORITY SERVICE (50% SURCHARGE)
☒ EMERGENCY SERVICE (100% SURCHARGE)

ANALYSIS REQUEST

SAMPLE ID	SAMPLING LOCATION	SAMPLED BY / DATE / TIME	SAMPLING METHOD	SAMPLE TYPE	BTEX	TEH	TVH								HAZARDOUS? (Y/N)	NUMBER OF CONTAINERS	HIGHLY CONTAMINATED? (Y/N)	LAB SAMPLE #
Aug 28/03 11:00am before	Boston	Aug 29/03	from valve	Water	X	X	X			Say	29-Aug			1x250 Broken		2	✓	1
Aug 28/03 11:00am after					X	X	X							1x250 broken				2
Aug 28/03 4:00pm before					X	X	X										✓	3
Aug 28/03 4:00pm after					X	X	X											4
Aug 28/03 9:00pm before					X	X	X										✓	5
Aug 28/03 9:00pm after					X	X	X							1x250 broken				6
Aug 29/03 11:00am before		Aug 30/03			X	X	X				Say 30-Aug						✓	7
Aug 29/03 11:00am after					X	X	X							1x250 Broken 1x250mL broken				8

*Raise D.L's if necessary as per Steve

NOTES & CONDITIONS:
1. Quote number must be provided to ensure proper pricing.
2. Turnaround times will vary dependent on complexity of analysis & Lab workload at time of submission. Please contact the Lab to confirm turnaround time.
3. All hazardous samples submitted must be labeled to comply with WHMIS and TDG regulations. This must include the nature of the hazard, as well as a contact name & phone number that the Lab can contact for further information.

NOTE: Failure to properly complete all portions of this form may delay analysis.

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / NATURE OF HAZARDOUS MATERIAL

SAMPLE CONDITION
☐ FROZEN
☑ COLD
☐ AMBIENT
MEAN TEMPERATURE

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME: Sep 2/03 10:14
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

SAMPLE CONDITION ACCEPTABLE UPON RECEIPT? (Y/N)

REFER TO BACK FOR SAMPLING INFORMATION & REGIONAL LOCATIONS / WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

REVISED MAY 2003

ETL Enviro·Test
LABORATORIES
A DIVISION OF *ETL CHEMSPEC ANALYTICAL LIMITED*

ANALYTICAL REPORT

EBA ENG CONSULTANTS LTD
ATTN: STEVE TAYLOR
14940 123 AVE NORTH BLDG
EDMONTON AB T5V 1B4

DATE: 10-SEP-03 03:37 PM

Lab Work Order #: L128039
Sampled By: CLIENT
Date Received: 02-SEP-03
P.O. #:
Job #: 1740065
Comments:

APPROVED BY: KHuebner.
KAREN HUEBNER
Project Manager

LABORATORY ACCREDITATIONS:
- STANDARDS COUNCIL OF CANADA IN COOPERATION WITH THE CANADIAN ASSOCIATION FOR ENVIRONMENTAL ANALYTICAL LABORATORIES (CAEAL) FOR SPECIFIC TESTS AS REGISTERED BY THE COUNCIL (EDMONTON, CALGARY, GRANDE PRAIRIE, SASKATOON, WINNIPEG, THUNDER BAY, WATERLOO)
- AMERICAN INDUSTRIAL HYGIENE ASSOCIATION (AIHA) IN THE INDUSTRIAL HYGIENE PROGRAM (EDMONTON, WINNIPEG)
- STANDARDS COUNCIL OF CANADA IN COOPERATION WITH THE CANADIAN FOOD INSPECTION AGENCY (CFIA) FOR FERTILIZER AND FEED TESTING (SASKATOON) AND FOR MICROBIOLOGICAL TESTING IN FOOD (WINNIPEG)

LABORATORY RECOGNITIONS:
- STANDARDS COUNCIL OF CANADA - GLP COMPLIANT FACILITY (EDMONTON, OTTAWA)

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L128039-1 N. WALL 1.0M								
Sample Date: 28-AUG-03								
Matrix: SOIL								
CCME TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	700		5	mg/kg		10-SEP-03		
F1-BTEX	650		5	mg/kg		10-SEP-03		
F2 (C10-C16)	11000		5	mg/kg		10-SEP-03		
F3 (C16-C34)	4300		5	mg/kg		10-SEP-03		
F4 (C34-C50)	40		5	mg/kg		10-SEP-03		
F4G-SG (GHH-Silica)	700		100	mg/kg		10-SEP-03		
Total Hydrocarbons (C6-C50)	16000		5	mg/kg		10-SEP-03		
Chromatogram to baseline at nC50	NO					10-SEP-03		
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates					04-SEP-03	05-SEP-03	AMB	R141695
CCME BTEX								
Benzene	0.39		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Toluene	14		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Ethylbenzene	2.8		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Xylenes	31		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
% Moisture	13		0.1	%		04-SEP-03	RED	R141151
Prep/Analysis Dates					10-SEP-03	10-SEP-03	CTL	R142382
L128039-2 S. WALL 1.0M								
Sample Date: 28-AUG-03								
Matrix: SOIL								
CCME TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	17		5	mg/kg		08-SEP-03		
F1-BTEX	17		5	mg/kg		08-SEP-03		
F2 (C10-C16)	86		5	mg/kg		08-SEP-03		
F3 (C16-C34)	26		5	mg/kg		08-SEP-03		
F4 (C34-C50)	<5		5	mg/kg		08-SEP-03		
Total Hydrocarbons (C6-C50)	130		5	mg/kg		08-SEP-03		
Chromatogram to baseline at nC50	YES					08-SEP-03		
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates					04-SEP-03	05-SEP-03	AMB	R141695
CCME BTEX								
Benzene	<0.01		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Toluene	<0.01		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Ethylbenzene	<0.01		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Xylenes	0.02		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
% Moisture	9.9		0.1	%		04-SEP-03	RED	R141151
L128039-3 W. WALL 1.0M								
Sample Date: 28-AUG-03								
Matrix: SOIL								
CCME TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	12		5	mg/kg		09-SEP-03		
F1-BTEX	10		5	mg/kg		09-SEP-03		
F2 (C10-C16)	62		5	mg/kg		09-SEP-03		
F3 (C16-C34)	39		5	mg/kg		09-SEP-03		
F4 (C34-C50)	23		5	mg/kg		09-SEP-03		
F4G-SG (GHH-Silica)	100		100	mg/kg		09-SEP-03		

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L128039-3 W. WALL 1.0M								
Sample Date: 28-AUG-03								
Matrix: SOIL								
CCME TVHs and TEHs								
CCME Total Hydrocarbons								
Total Hydrocarbons (C6-C50)	140		5	mg/kg		09-SEP-03		
Chromatogram to baseline at nC50	NO					09-SEP-03		
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates					04-SEP-03	04-SEP-03	AMB	R141439
CCME BTEX								
Benzene	<0.01		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Toluene	0.31		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Ethylbenzene	0.27		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Xylenes	1.4		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
% Moisture	9.8		0.1	%		04-SEP-03	RED	R141151
Prep/Analysis Dates					08-SEP-03	08-SEP-03	AMB	R142032
L128039-4 E. WALL 1.0M								
Sample Date: 28-AUG-03								
Matrix: SOIL								
CCME TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	<5		5	mg/kg		09-SEP-03		
F1-BTEX	<5		5	mg/kg		09-SEP-03		
F2 (C10-C16)	25		5	mg/kg		09-SEP-03		
F3 (C16-C34)	46		5	mg/kg		09-SEP-03		
F4 (C34-C50)	42		5	mg/kg		09-SEP-03		
F4G-SG (GHH-Silica)	<100		100	mg/kg		09-SEP-03		
Total Hydrocarbons (C6-C50)	110		5	mg/kg		09-SEP-03		
Chromatogram to baseline at nC50	NO					09-SEP-03		
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates					04-SEP-03	05-SEP-03	AMB	R141439
CCME BTEX								
Benzene	<0.01		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Toluene	0.03		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Ethylbenzene	<0.01		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Xylenes	0.17		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
% Moisture	10		0.1	%		04-SEP-03	RED	R141151
Prep/Analysis Dates					08-SEP-03	08-SEP-03	AMB	R142032
L128039-5 W/C								
Sample Date: 28-AUG-03								
Matrix: SOIL								
CCME TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	330		5	mg/kg		10-SEP-03		
F1-BTEX	310		5	mg/kg		10-SEP-03		
F2 (C10-C16)	96000		5	mg/kg		10-SEP-03		
F3 (C16-C34)	22000		5	mg/kg		10-SEP-03		
F4 (C34-C50)	1400		5	mg/kg		10-SEP-03		
F4G-SG (GHH-Silica)	6600		100	mg/kg		10-SEP-03		
Total Hydrocarbons (C6-C50)	120000		5	mg/kg		10-SEP-03		
Chromatogram to baseline at nC50	NO					10-SEP-03		
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates					04-SEP-03	05-SEP-03	AMB	R141695
CCME BTEX								

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L128039-5 W/C								
Sample Date: 28-AUG-03								
Matrix: SOIL								
CCME TVHs and TEHs								
CCME BTEX								
Benzene	0.14		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Toluene	3.4		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Ethylbenzene	1.2		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Xylenes	13		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
% Moisture	59		0.1	%		04-SEP-03	RED	R141151
Prep/Analysis Dates					10-SEP-03	10-SEP-03	CTL	R142382
L128039-6 BASE 1.5M								
Sample Date: 28-AUG-03								
Matrix: SOIL								
CCME TVHs and TEHs								
CCME Total Hydrocarbons								
F1 (C6-C10)	69		5	mg/kg		10-SEP-03		
F1-BTEX	61		5	mg/kg		10-SEP-03		
F2 (C10-C16)	810		5	mg/kg		10-SEP-03		
F3 (C16-C34)	820		5	mg/kg		10-SEP-03		
F4 (C34-C50)	63		5	mg/kg		10-SEP-03		
F4G-SG (GHH-Silica)	400		100	mg/kg		10-SEP-03		
Total Hydrocarbons (C6-C50)	1800		5	mg/kg		10-SEP-03		
Chromatogram to baseline at nC50	NO					10-SEP-03		
CCME Total Extractable Hydrocarbons								
Prep/Analysis Dates					04-SEP-03	05-SEP-03	AMB	R141695
CCME BTEX								
Benzene	0.02		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Toluene	3.4		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Ethylbenzene	0.72		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
Xylenes	3.6		0.01	mg/kg	04-SEP-03	08-SEP-03	TKP	R141808
% Moisture	3.5		0.1	%		04-SEP-03	RED	R141151
Prep/Analysis Dates					10-SEP-03	10-SEP-03	CTL	R142382

Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Methods Listed (if applicable):

ETL Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
ETL-BTX,TVH-CCME-ED	Soil	CCME BTEX	EPA 5030	CCME CWS-PHC Dec-2000 - Pub# 1310
ETL-OGG-CCME-ED	Soil	CCME Gravimetric Heavy Hydrocarbons (Sil		CCME CWS-PHC Dec-2000 - Pub# 1310
ETL-TEH-CCME-ED	Soil	CCME Total Extractable Hydrocarbons		CCME CWS-PHC Dec-2000 - Pub# 1310
PREP-MOISTURE-ED	Soil	% Moisture		Oven dry 105C-Gravimetric

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
ED	Enviro-Test Laboratories - Edmonton, Alberta, Canada		

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency. The Laboratory warning units are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million

mg/L (units) - unit of concentration based on volume, parts per million

< - Less than

D.L. - Detection Limit

N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.

Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

Enviro-Test Laboratories has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, Enviro-Test Laboratories assumes no liability for the use or interpretation of the results.

Enviro·Test LABORATORIES
A DIVISION OF *ETL CHEMSPEC ANALYTICAL LIMITED*

ENVIRO-TEST QC REPORT

Workorder: L128039

Client: EBA ENG CONSULTANTS LTD
14940 123 AVE NORTH BLDG
EDMONTON AB T5V 1B4

Contact: STEVE TAYLOR

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ETL-BTX,TVH-CCME-ED	**Soil**							
Batch R141808								
WG136201-3	**DUP**	**L128039-6**						
Benzene		0.02	0.02	J	mg/kg	0.01	0.031	08-SEP-03
Ethylbenzene		0.72	0.84		mg/kg	16	48	08-SEP-03
Toluene		3.4	3.9		mg/kg	16	39	08-SEP-03
Xylenes		3.6	3.9		mg/kg	6.6	52	08-SEP-03
TVH: (C6-C10 / No BTEX Correction)		69	82		mg/kg	17	41	08-SEP-03
WG137193-2	**LCS**							
Benzene			104		%		60-122	08-SEP-03
Ethylbenzene			109		%		64-124	08-SEP-03
Toluene			108		%		61-126	08-SEP-03
TVH: (C6-C10 / No BTEX Correction)			119		%		59-128	08-SEP-03
Xylenes			108		%		68-122	08-SEP-03
WG137193-1	**MB**							
Benzene			<0.01		mg/kg		0.01	08-SEP-03
Ethylbenzene			<0.01		mg/kg		0.01	08-SEP-03
Toluene			<0.01		mg/kg		0.01	08-SEP-03
TVH: (C6-C10 / No BTEX Correction)			<5		mg/kg		5	08-SEP-03
Xylenes			<0.01		mg/kg		0.01	08-SEP-03
ETL-OGG-CCME-ED	**Soil**							
Batch R142382								
WG137830-1	**MB**							
Gravimetric Heavy Hydrocarbons (Silica)			0		mg/kg		100	10-SEP-03
ETL-TEH-CCME-ED	**Soil**							
Batch R141439								
WG136757-2	**LCS**							
TEH: (C10-C16)			79		%		58-118	04-SEP-03
TEH: (C16-C34)			79		%		58-118	04-SEP-03
TEH: (C34-C50)			79		%		58-118	04-SEP-03
WG136757-1	**MB**							
TEH: (C10-C16)			<5		mg/kg		5	04-SEP-03
TEH: (C16-C34)			<5		mg/kg		5	04-SEP-03
TEH: (C34-C50)			<5		mg/kg		5	04-SEP-03

ENVIRO-TEST QC REPORT

Workorder: L128039

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ETL-TEH-CCME-ED	**Soil**							
Batch R141695								
WG137048-3 DUP		**L128039-5**						
TEH: (C10-C16)		96000	110000		mg/kg	17	40	05-SEP-03
TEH: (C16-C34)		22000	26000		mg/kg	14	37	05-SEP-03
TEH: (C34-C50)		1400	1500		mg/kg	9.0	42	05-SEP-03
WG137048-4 DUP		**L128054-3**						
TEH: (C10-C16)		51	54		mg/kg	6.7	40	06-SEP-03
TEH: (C16-C34)		620	470		mg/kg	29	37	06-SEP-03
TEH: (C34-C50)		270	220		mg/kg	19	42	06-SEP-03
WG137048-2 LCS								
TEH: (C10-C16)			74		%		58-118	05-SEP-03
TEH: (C16-C34)			74		%		58-118	05-SEP-03
TEH: (C34-C50)			74		%		58-118	05-SEP-03
WG137048-5 LCS								
TEH: (C10-C16)			80		%		58-118	06-SEP-03
TEH: (C16-C34)			80		%		58-118	06-SEP-03
TEH: (C34-C50)			80		%		58-118	06-SEP-03
WG137048-1 MB								
TEH: (C10-C16)			<5		mg/kg		5	05-SEP-03
TEH: (C16-C34)			<5		mg/kg		5	05-SEP-03
TEH: (C34-C50)			<5		mg/kg		5	05-SEP-03

Product - Batch and Sample Number Relations:

ETL-BTX,TVH-CCME-ED	2					
R141808		L128039-1	L128039-2	L128039-3	L128039-4	L128039-5
		L128039-6				
ETL-OGG-CCME-ED	2					
R142032		L128039-3	L128039-4			
ETL-OGG-CCME-ED	2					
R142382		L128039-1	L128039-5	L128039-6		
ETL-TEH-CCME-ED	2					
R141439		L128039-3	L128039-4			
ETL-TEH-CCME-ED	2					
R141695		L128039-1	L128039-2	L128039-5	L128039-6	
PREP-MOISTURE-ED	2					
R141151		L128039-1	L128039-2	L128039-3	L128039-4	L128039-5
		L128039-6				

ENVIRO-TEST QC REPORT

Workorder # L128039

Legend:

Limit	95% Confidence Interval (Laboratory Warning Limits)
DUP	Duplicate
RPD	Relative Percent Difference ((higher result-lower result)/Average, expressed as %)
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Materials
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material

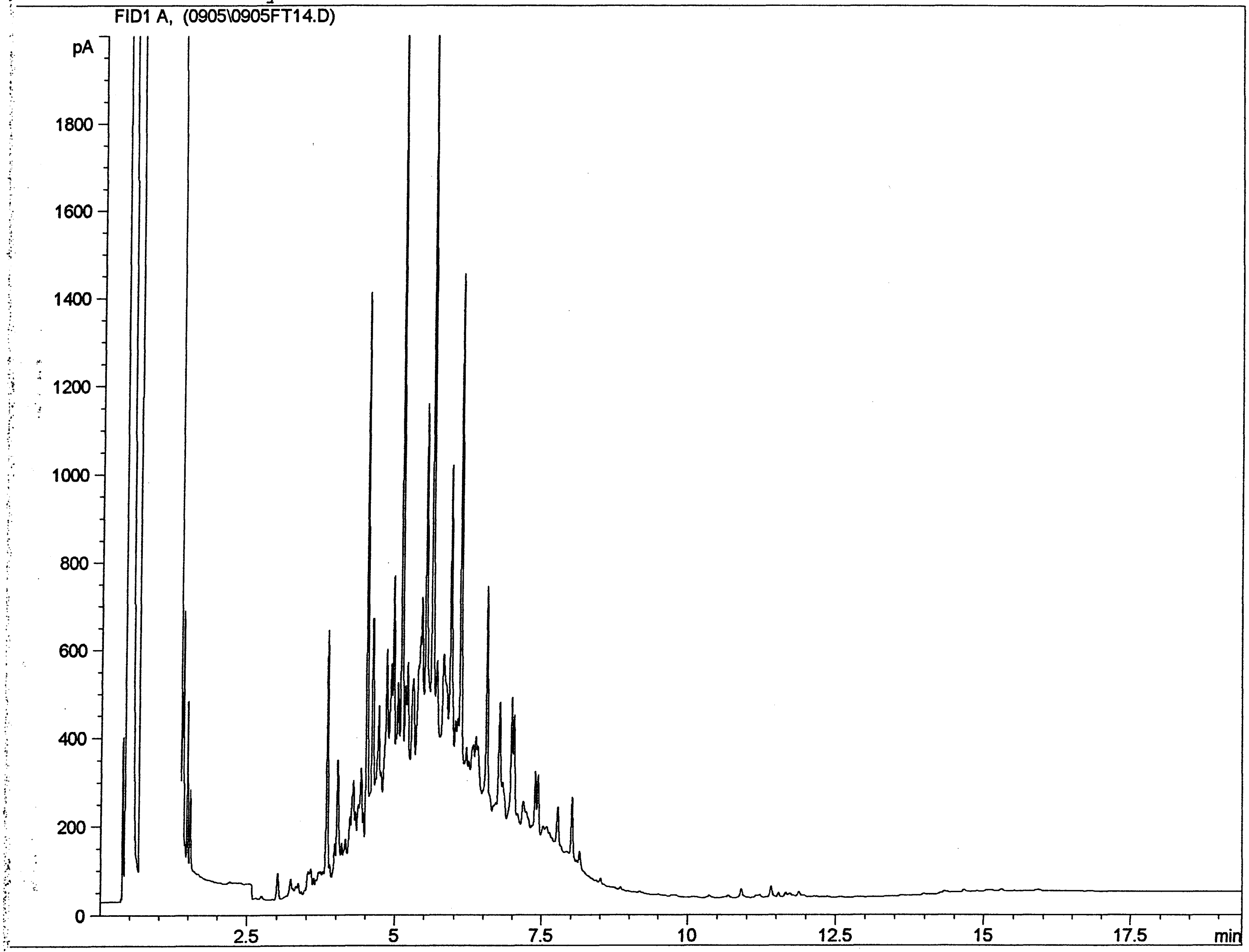
Qualifier:

RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
A	Method blank exceeds acceptance limit. Blank correction not applied, unless the qualifier "RAMB" (result adjusted for method blank) appears in the Analytical Report.
B	Method blank result exceeds acceptance limit, however, it is less than 5% of sample concentration. Blank correction not applied.
E	Matrix spike recovery may fall outside the acceptance limits due to high sample background.
F	Silver recovery low, likely due to elevated choride levels in sample.
G	Outlier - No assignable cause for nonconformity has been determined.
H	Result falls within the 99% Confidence Interval (Laboratory Control Limits)
J	Duplicate results and limit(s) are expressed in terms of absolute difference.
K	The sample referenced above is of a non-standard matrix type; standard QC acceptance criteria may not be achievable.

Client ID: N.WALL 1.0M

Sample ID: L128039-1 50
Injection Date: 9/5/03 7:39:43 PM
Instrument ID: Instrument A

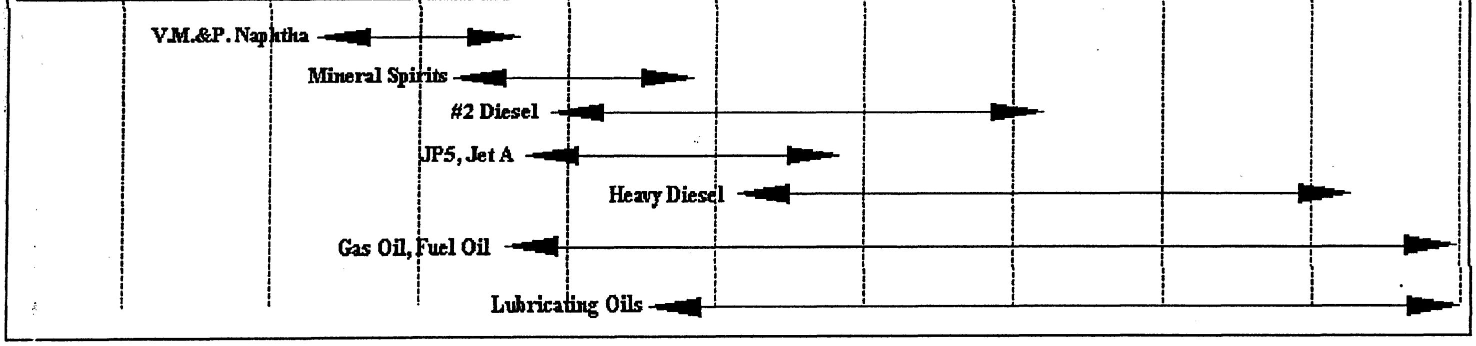
Total Extractable Hydrocarbons



C10 C20 C30 C50

Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

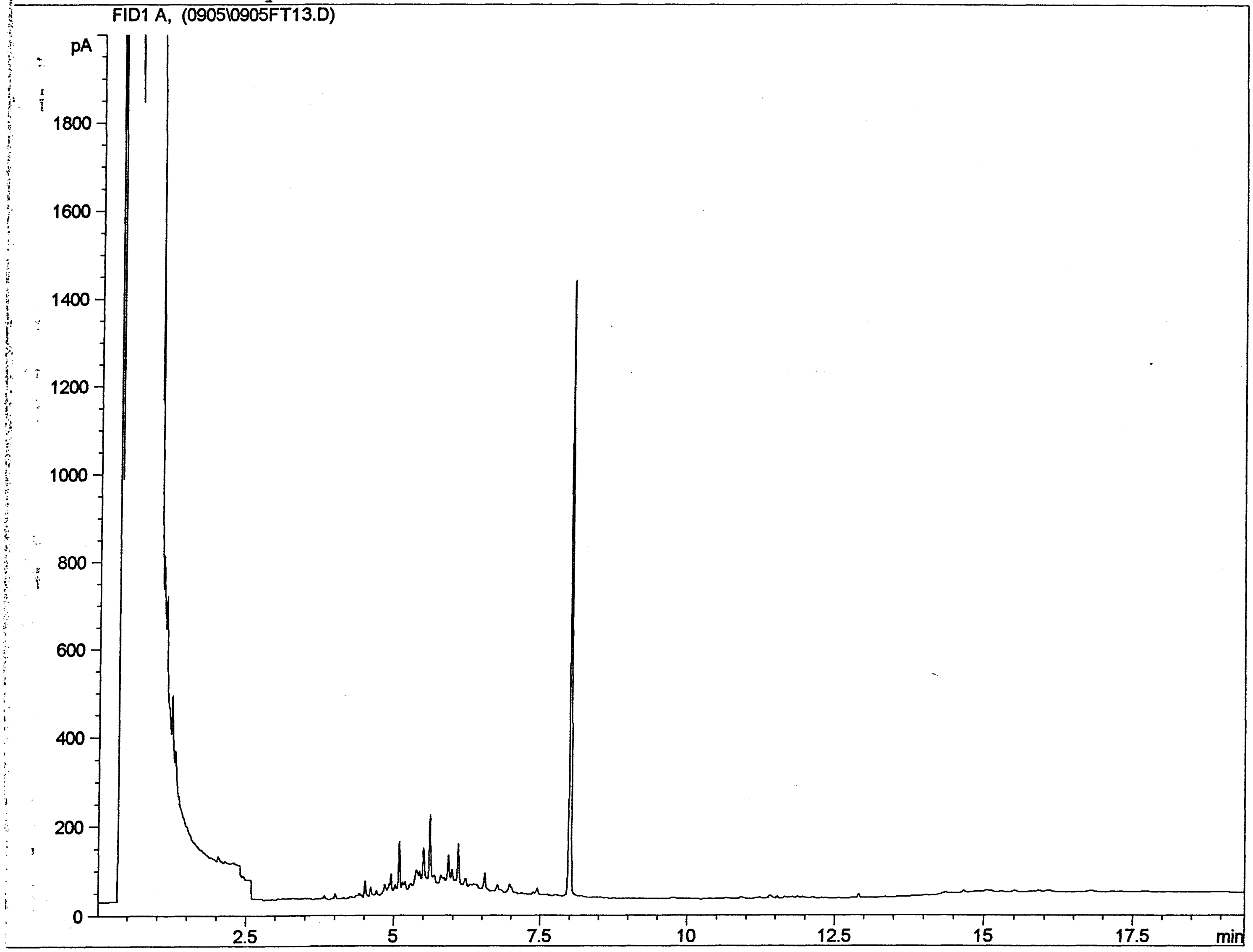


Adapted from: Drews, A.W.,ED. Manual on Hyrdocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: S.WALL 1.0M

Sample ID: L128039-2 5 RR
Injection Date: 9/5/03 7:10:40 PM
Instrument ID: Instrument A

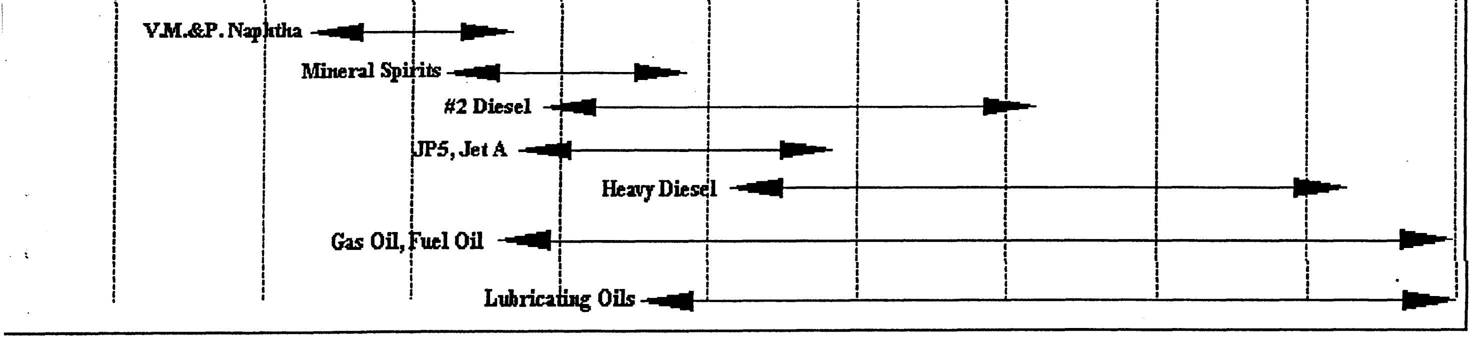
Total Extractable Hydrocarbons



C10 C20 C30 C50

Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

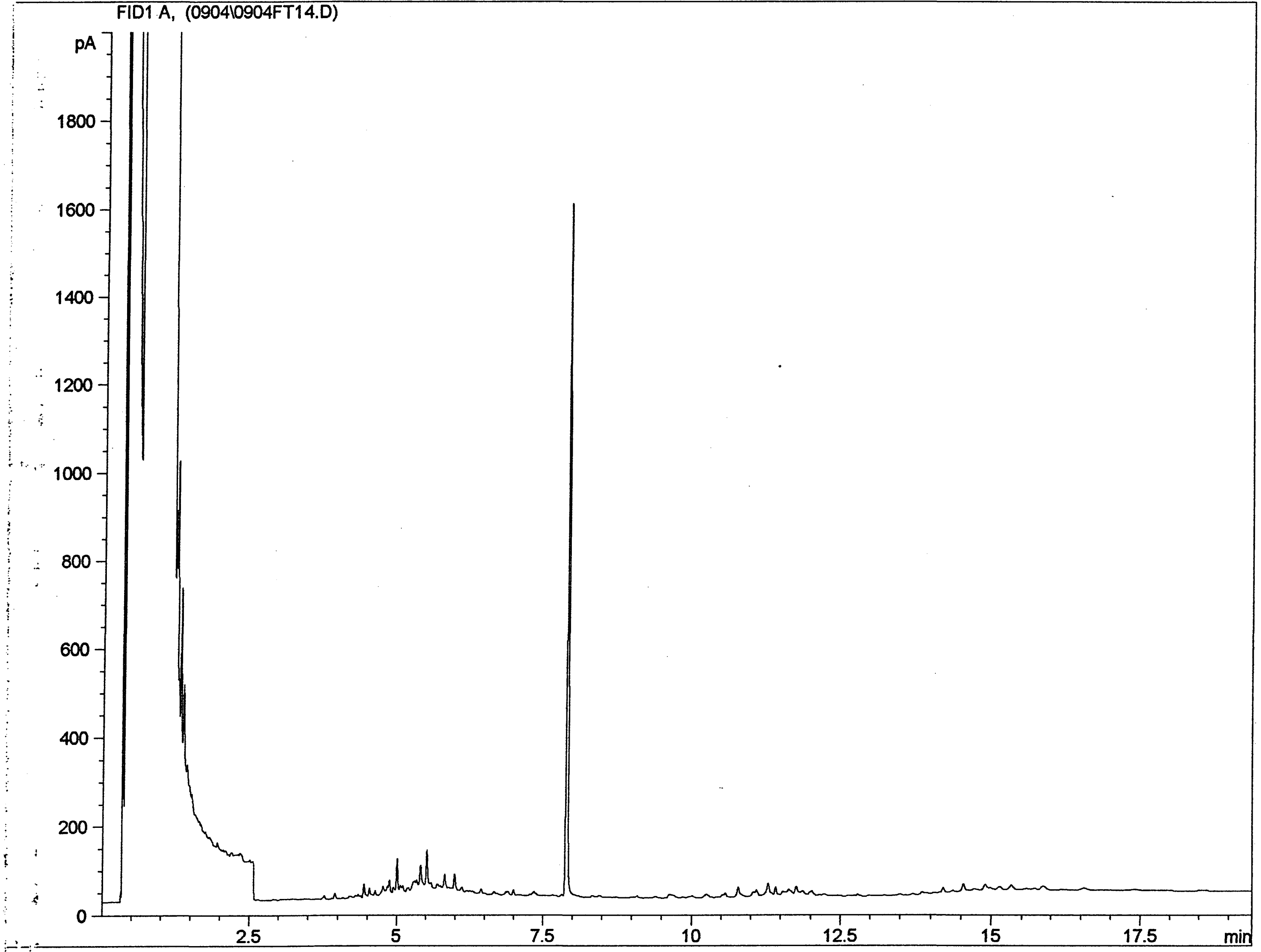


dapted from: Drews, A.W., ED. Manual on Hyrdocarbon Analysis, 4th ed.; American Society for esting and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: W.WALL 1.0M

Sample ID: L128039-3 5
Injection Date: 9/4/03 11:52:28 PM
Instrument ID: Instrument A

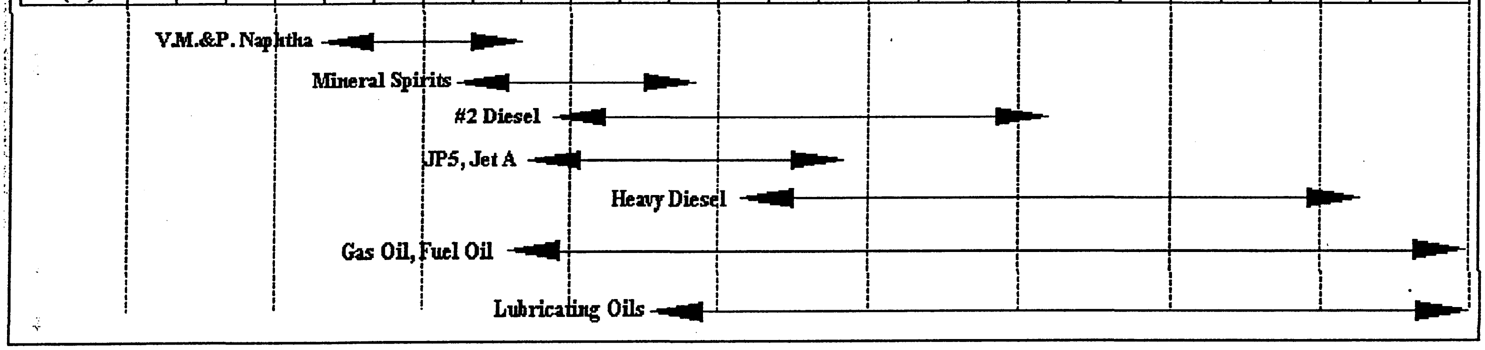
Total Extractable Hydrocarbons



C10 C20 C30 C50

Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

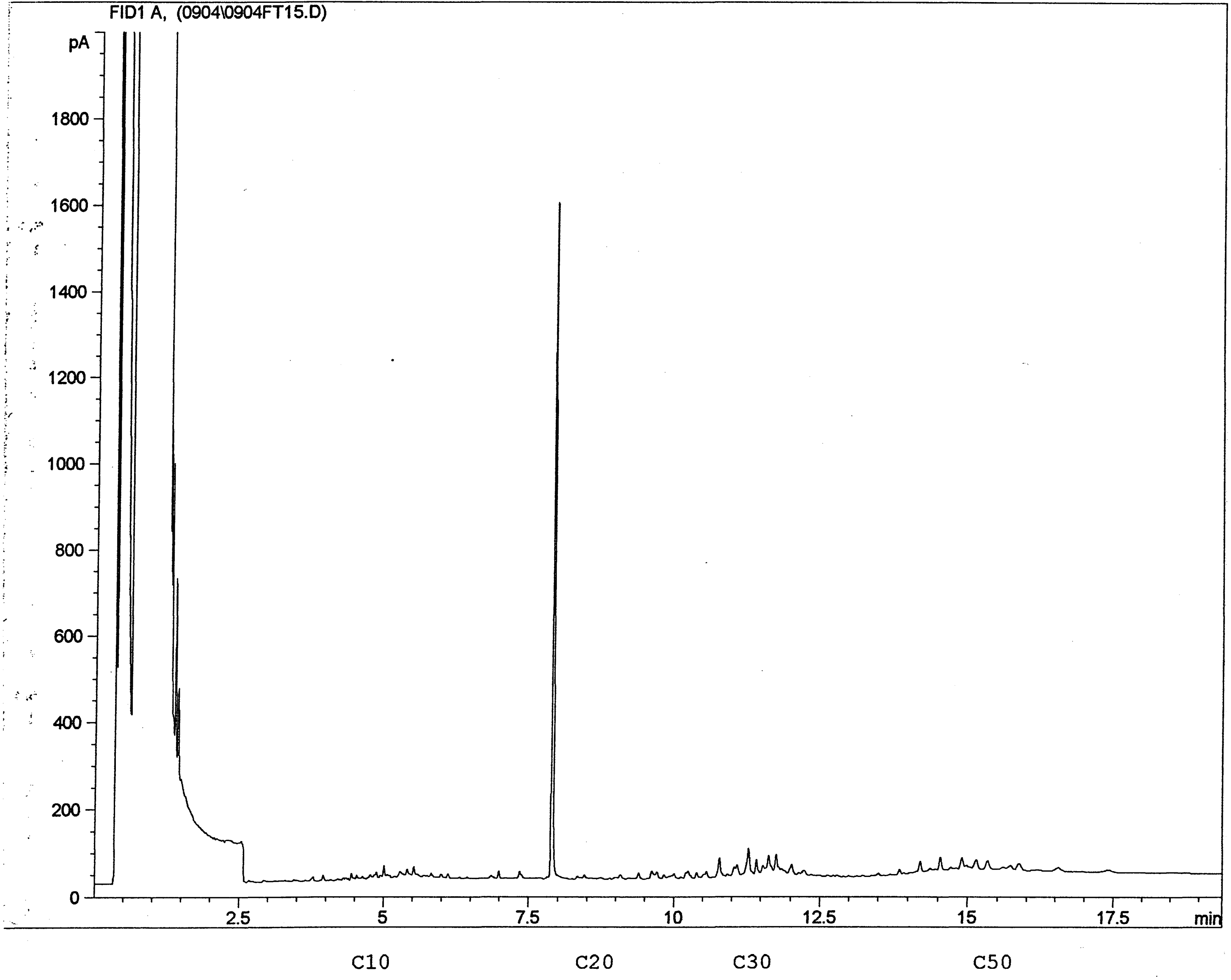


Adapted from: Drews, A.W.,ED. Manual on Hyrdocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: E.WALL 1.0M

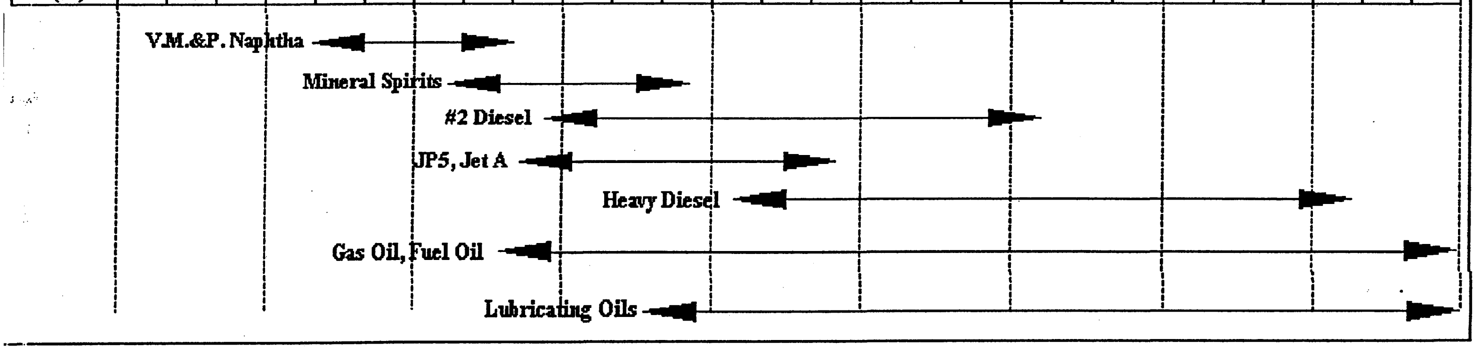
Sample ID: L128039-4 5
Injection Date: 9/5/03 12:21:24 AM
Instrument ID: Instrument A

Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



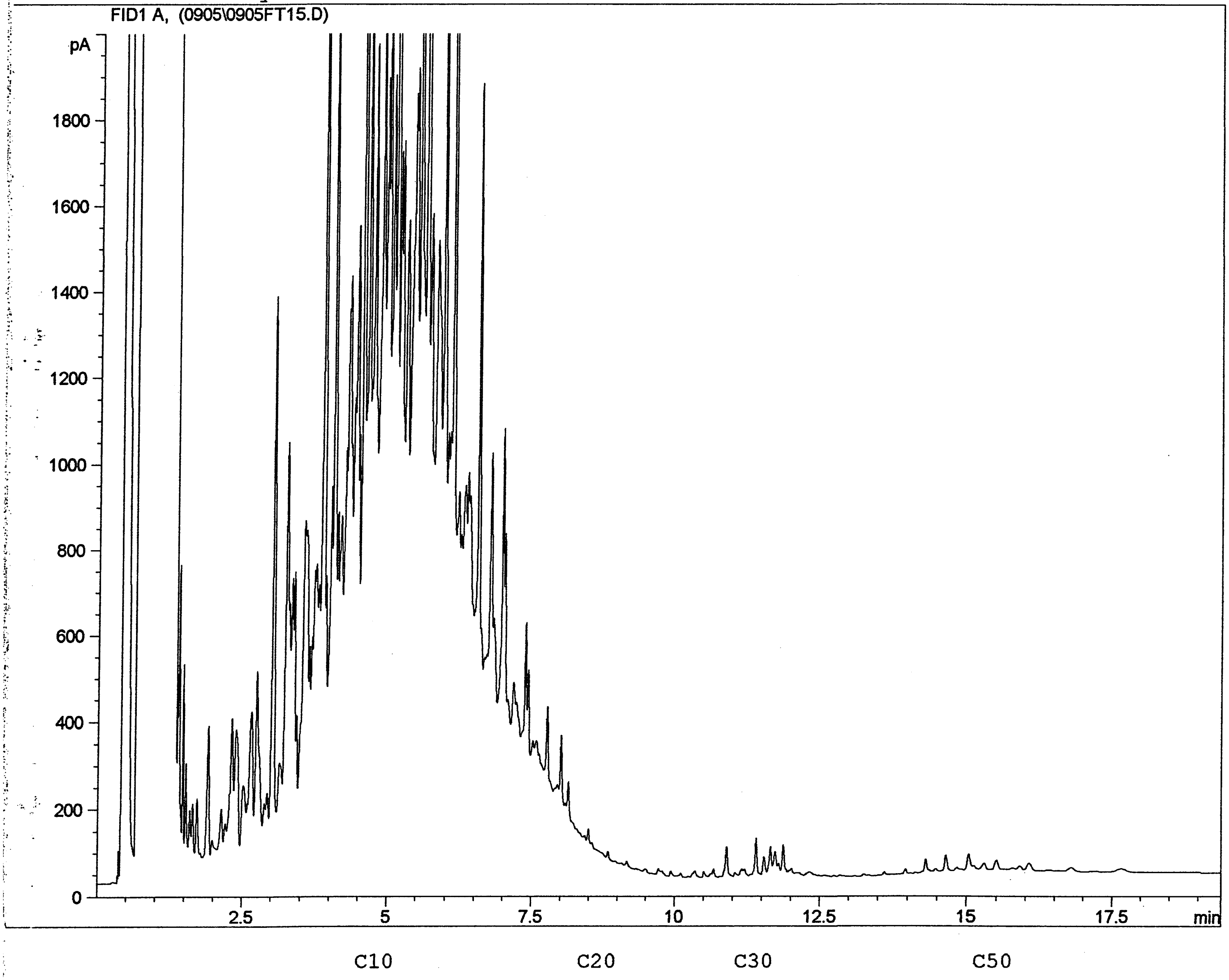
dapted from: Drews, A.W.,ED. Manual on Hyrdocarbon Analysis, 4th ed.; American Society for esting and Materials: Philadelphia, PA., 1989: p XVIII

ETL

Client ID: W/C

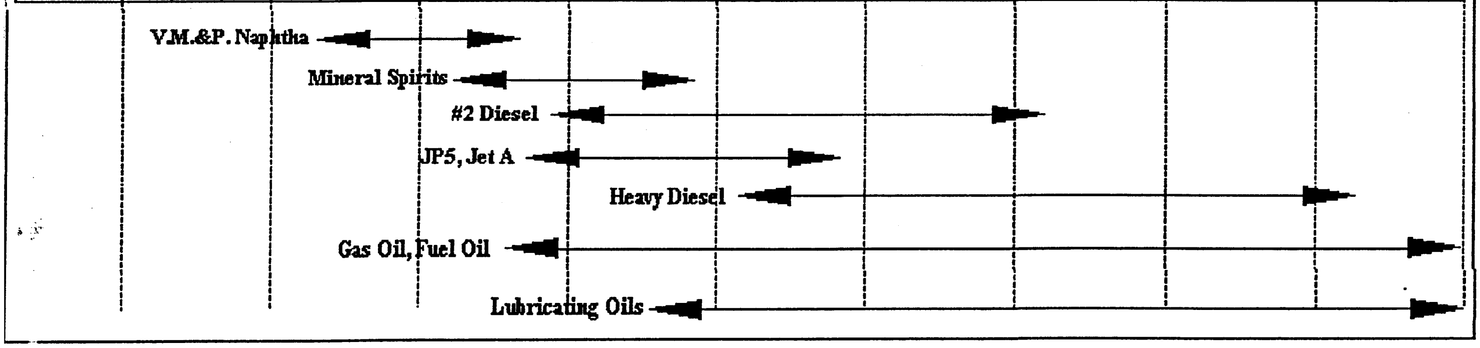
Sample ID: L128039-5 50
Injection Date: 9/5/03 8:08:33 PM
Instrument ID: Instrument A

Total Extractable Hydrocarbons



Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

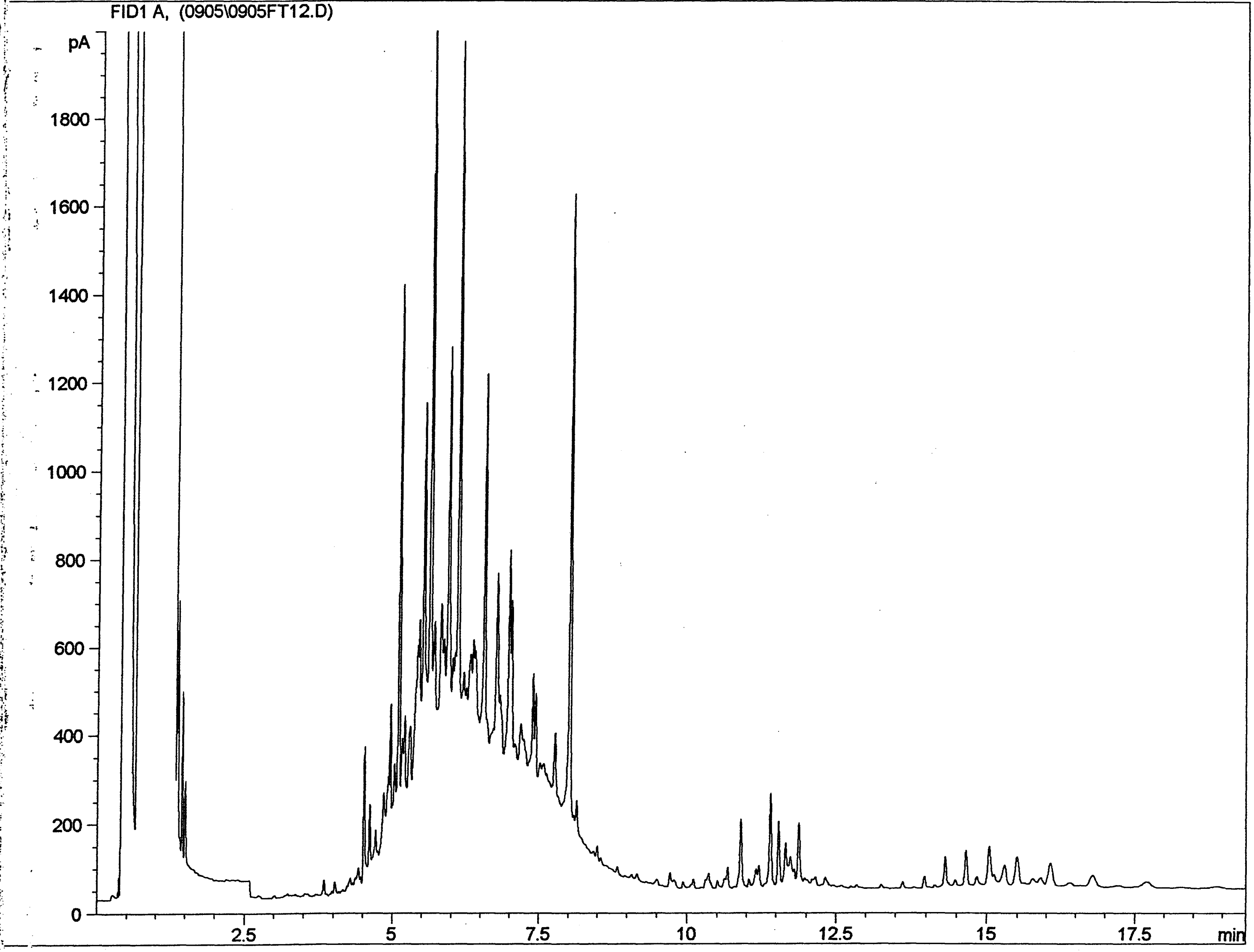


Adapted from: Drews, A.W.,ED. Manual on Hyrdocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

Client ID: BASE 1.5M

Sample ID: L128039-6 5 RR
Injection Date: 9/5/03 6:42:01 PM
Instrument ID: Instrument A

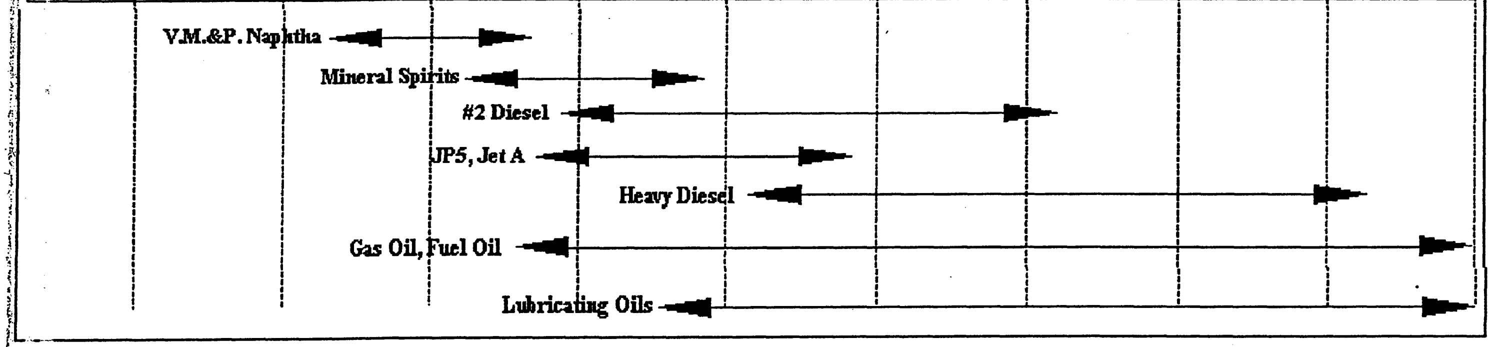
Total Extractable Hydrocarbons



C10 C20 C30 C50

Boiling Point Distribution Range of Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



Adapted from: Drews, A.W.,ED. Manual on Hyrdocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII

ETL EnviroTest LABORATORIES
A DIVISION OF ETL CHEMSPEC ANALYTICAL LIMITED

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM
CANADA TOLL FREE 1-800-668-9878

COC # 59956

Pg ____ of ____
www.envirotest.com

REPORT TO:
COMPANY: EBA (Edm)
CONTACT: Steve Taylor
ADDRESS:
Edm
PHONE: 451 2130 x260 FAX:

INVOICE TO: SAME [✓ Y] N
COMPANY:
CONTACT:
ADDRESS:
PHONE: FAX:

DATE:
REPORT DISTRIBUTION: ALL FINAL RESULTS WILL BE MAILED
EMAIL ☒ FAX ☐
EMAIL 1: Staylor @ eba.ca
EMAIL 2: bmurphy@ eba.ca
SELECT: pdf ☐ digital ☐ both ☒
INDICATE BOTTLES: FILTERED/PRESERVED (F/P) ▶
JOB # 1740065
PO / AFE:
LSD:
QUOTE #

Prep-Moisture-ED
BTX, TVH, TEH-CCME-ED

ETL LAB WORK ORDER # L128039

SERVICE REQUESTED
☒ REGULAR SERVICE (DEFAULT)
☐ PRIORITY SERVICE (50% SURCHARGE)
☐ EMERGENCY SERVICE (100% SURCHARGE)

ANALYSIS REQUEST

SAMPLE ID	SAMPLING LOCATION	SAMPLED BY / DATE / TIME	SAMPLING METHOD	SAMPLE TYPE	BTEX	F1 - F4	Chromatogram yellow dot								HAZARDOUS? (Y/N)	NUMBER OF CONTAINERS	HIGHLY CONTAMINATED? (Y/N)	LAB SAMPLE #
N. Wall 1.0m	Boston Camp	Aug 28 2003	Grab	Soil	X	X	X		1 Jar Broken							2		
S. Wall 1.0m					X	X	X									2		
W. Wall 1.0m					X	Y	Y									2		
E. Wall 1.0m					X	X	X									2		
W/C					X	X	X									2		
Base 1.5m					X	X	Y									2		

NOTES & CONDITIONS:
1. Quote number must be provided to ensure proper pricing.
2. Turnaround times will vary dependent on complexity of analysis & Lab workload at time of submission. Please contact the Lab to confirm turnaround time.
3. All hazardous samples submitted must be labeled to comply with WHMIS and TDG regulations. This must include the nature of the hazard, as well as a contact name & phone number that the Lab can contact for further information.

NOTE: Failure to properly complete all portions of this form may delay analysis.

GUIDELINES / REGULATIONS
CCME

SPECIAL INSTRUCTIONS / NATURE OF HAZARDOUS MATERIAL

SAMPLE CONDITION
☐ FROZEN
☑ COLD
☐ AMBIENT
MEAN TEMPERATURE
SAMPLE CONDITION ACCEPTABLE UPON RECEIPT? (Y/N)

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME: Sep 2/03 10:14
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

REFER TO BACK FOR SAMPLING INFORMATION & REGIONAL LOCATIONS
WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY
REVISED MAY 2003

ETL Enviro·Test
LABORATORIES
A DIVISION OF *ETL CHEMSPEC ANALYTICAL LIMITED*

ANALYTICAL REPORT

EBA ENG CONSULTANTS LTD
ATTN: STEVE TAYLOR
14940 123 AVE NORTH BLDG
EDMONTON AB T5V 1B4

DATE: 24-SEP-03 02:15 PM

Lab Work Order #:	L130912	**Sampled By:**	D.STAPLETON	**Date Received:**	17-SEP-03
Project P.O. #:	NA				
Project Reference:	1740065				

Comments: L130912-1, -3, -5, -7, -9, -11, -13, -15 BTEX, TVH, TEH ANALYSIS CANCELLED DUE TO FREE PHASE HYDROCARBONS

APPROVED BY:
TONY CIARLA
Project Manager

LABORATORY ACCREDITATIONS:
- **STANDARDS COUNCIL OF CANADA IN COOPERATION WITH THE CANADIAN ASSOCIATION FOR ENVIRONMENTAL ANALYTICAL LABORATORIES (CAEAL)** FOR SPECIFIC TESTS AS REGISTERED BY THE COUNCIL (EDMONTON, CALGARY, GRANDE PRAIRIE, SASKATOON, WINNIPEG, THUNDER BAY, WATERLOO)
- **AMERICAN INDUSTRIAL HYGIENE ASSOCIATION (AIHA)** IN THE INDUSTRIAL HYGIENE PROGRAM (EDMONTON, WINNIPEG)
- **STANDARDS COUNCIL OF CANADA IN COOPERATION WITH THE CANADIAN FOOD INSPECTION AGENCY (CFIA)** FOR FERTILIZER AND FEED TESTING (SASKATOON) AND FOR MICROBIOLOGICAL TESTING IN FOOD (WINNIPEG)

LABORATORY RECOGNITIONS:
- **STANDARDS COUNCIL OF CANADA** - GLP COMPLIANT FACILITY (EDMONTON, OTTAWA)

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L130912-2 SEPT 5 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	280		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								
Benzene	<0.0005		0.0005	mg/L	21-SEP-03	20-SEP-03	MNM	R144569
Toluene	<0.0005		0.0005	mg/L	21-SEP-03	20-SEP-03	MNM	R144569
Ethylbenzene	<0.0005		0.0005	mg/L	21-SEP-03	20-SEP-03	MNM	R144569
Xylenes	0.0018		0.0005	mg/L	21-SEP-03	20-SEP-03	MNM	R144569
Total Volatiles	0.8		0.1	mg/L	21-SEP-03	20-SEP-03	MNM	R144569
L130912-4 SEPT 6 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	180		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								
Benzene	<0.0005		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Toluene	0.0013		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Ethylbenzene	<0.0005		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Xylenes	0.0008		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Total Volatiles	0.9		0.1	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
L130912-6 SEPT 7 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	47		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								
Benzene	<0.0005		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Toluene	0.0006		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Ethylbenzene	<0.0005		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Xylenes	0.0033		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Total Volatiles	<0.1		0.1	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
L130912-8 SEPT 8 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	57		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								
Benzene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Toluene	0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Ethylbenzene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Xylenes	0.0033		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Total Volatiles	0.1		0.1	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
L130912-10 SEPT 9 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	200		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L130912-10 SEPT 9 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
BTEX and TVH (C5-C10)								
Benzene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Toluene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Ethylbenzene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Xylenes	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Total Volatiles	0.2		0.1	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
L130912-12 SEPT 10 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	66		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								
Benzene	0.0022		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Toluene	0.014		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Ethylbenzene	0.0063		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Xylenes	0.028		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Total Volatiles	1.3		0.1	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
L130912-14 SEPT 11 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	440		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								
Benzene	0.0028		0.0005	mg/L	21-SEP-03	23-SEP-03	MNM	R144569
Toluene	0.018		0.0005	mg/L	21-SEP-03	23-SEP-03	MNM	R144569
Ethylbenzene	0.0093		0.0005	mg/L	21-SEP-03	23-SEP-03	MNM	R144569
Xylenes	0.032		0.0005	mg/L	21-SEP-03	23-SEP-03	MNM	R144569
Total Volatiles	0.4		0.1	mg/L	21-SEP-03	23-SEP-03	MNM	R144569
L130912-16 SEPT 4 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	54		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								
Benzene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Toluene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Ethylbenzene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Xylenes	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Total Volatiles	1.2		0.1	mg/L	22-SEP-03	22-SEP-03	MNM	R144569

Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Methods Listed (if applicable):

ETL Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
BTX,TVH-CL	Water	BTEX and TVH (C5-C10)	EPA 5030B	EPA 5030/8015& 8260-P&T GC-MS/FID
TVH includes BTEX contribution.				
TEH-CL	Water	TEH (C11-C30)	EPA 3550B	EPA 3510/8000-GC-FID

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

59951 59954

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
CL	Enviro-Test Laboratories - Calgary, Alberta, Canada		

GLOSSARY OF REPORT TERMS

Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.

The reported surrogate recovery value provides a measure of method efficiency. The Laboratory warning units are determined under column heading D.L.

mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
< - Less than
D.L. - Detection Limit
N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

Enviro-Test Laboratories has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, Enviro-Test Laboratories assumes no liability for the use or interpretation of the results.

ETL Enviro·Test
LABORATORIES
A DIVISION OF ETL CHEMSPEC ANALYTICAL LIMITED

Report Date: 24-SEP-03

ENVIRO-TEST QC REPORT

Workorder: L130912

Client: EBA ENG CONSULTANTS LTD
14940 123 AVE NORTH BLDG
EDMONTON AB T5V 1B4

Contact: STEVE TAYLOR

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX,TVH-CL	**Water**							
Batch R144569								
WG140108-2 DUP		**L130912-6**						
Benzene		<0.0005	<0.0005	RPD-NA	mg/L	N/A	20	20-SEP-03
Ethylbenzene		<0.0005	<0.0005	RPD-NA	mg/L	N/A	20	20-SEP-03
Toluene		0.0006	0.0005	J	mg/L	0.0001	0.0015	20-SEP-03
Total Volatiles		<0.1	<0.1	RPD-NA	mg/L	N/A	25	20-SEP-03
Xylenes		0.0033	0.0033	J	mg/L	0.0000	0.0015	20-SEP-03
WG140108-6 DUP		**L130821-2**						
Benzene		<0.0005	<0.0005	RPD-NA	mg/L	N/A	20	20-SEP-03
Ethylbenzene		<0.0005	<0.0005	RPD-NA	mg/L	N/A	20	20-SEP-03
Toluene		<0.0005	<0.0005	RPD-NA	mg/L	N/A	20	20-SEP-03
Total Volatiles		<0.1	<0.1	RPD-NA	mg/L	N/A	25	20-SEP-03
Xylenes		<0.0005	<0.0005	RPD-NA	mg/L	N/A	20	20-SEP-03
WG140108-1 LCS								
Benzene			89		%		85-115	20-SEP-03
Ethylbenzene			88		%		85-115	20-SEP-03
Toluene			89		%		85-115	20-SEP-03
Total Volatiles			104		%		85-115	20-SEP-03
Xylenes			90		%		85-115	20-SEP-03
WG140108-4 MB								
Benzene			<0.0005		mg/L		0.0005	21-SEP-03
Ethylbenzene			<0.0005		mg/L		0.0005	21-SEP-03
Toluene			<0.0005		mg/L		0.0005	21-SEP-03
Total Volatiles			<0.1		mg/L		0.1	21-SEP-03
Xylenes			<0.0005		mg/L		0.0005	21-SEP-03
TEH-CL	**Water**							
Batch R144641								
WG139784-4 DUP		**L130912-16**						
TEH (C11-C30)		54	50		mg/L	8.1	25	20-SEP-03
WG140265-3 DUP		**L130821-2**						
TEH (C11-C30)		<0.05	<0.05	RPD-NA	mg/L	N/A	25	20-SEP-03
WG140265-1 MB								
TEH (C11-C30)			<0.05		mg/L		0.05	17-SEP-03
WG140265-4 MS		**L130821-1**						
TEH (C11-C30)			102		%		65-125	20-SEP-03

ENVIRO-TEST QC REPORT

Workorder: L130912

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
Product - Batch and Sample Number Relations:								
BTX,TVH-CL	1							
R144569		L130912-2	L130912-4		L130912-6	L130912-8		L130912-10
		L130912-12	L130912-14		L130912-16			
TEH-CL	1							
R144641		L130912-2	L130912-4		L130912-6	L130912-8		L130912-10
		L130912-12	L130912-14		L130912-16			

ENVIRO-TEST QC REPORT

Workorder # L130912

Legend:

Limit	95% Confidence Interval (Laboratory Warning Limits)
DUP	Duplicate
RPD	Relative Percent Difference ((higher result-lower result)/Average, expressed as %)
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Materials
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material

Qualifier:

RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
A	Method blank exceeds acceptance limit. Blank correction not applied, unless the qualifier "RAMB" (result adjusted for method blank) appears in the Analytical Report.
B	Method blank result exceeds acceptance limit, however, it is less than 5% of sample concentration. Blank correction not applied.
E	Matrix spike recovery may fall outside the acceptance limits due to high sample background.
F	Silver recovery low, likely due to elevated choride levels in sample.
G	Outlier - No assignable cause for nonconformity has been determined.
H	Result falls within the 99% Confidence Interval (Laboratory Control Limits)
J	Duplicate results and limit(s) are expressed in terms of absolute difference.
K	The sample referenced above is of a non-standard matrix type; standard QC acceptance criteria may not be achievable.

Client ID: SEPT 5 3PM AFTER

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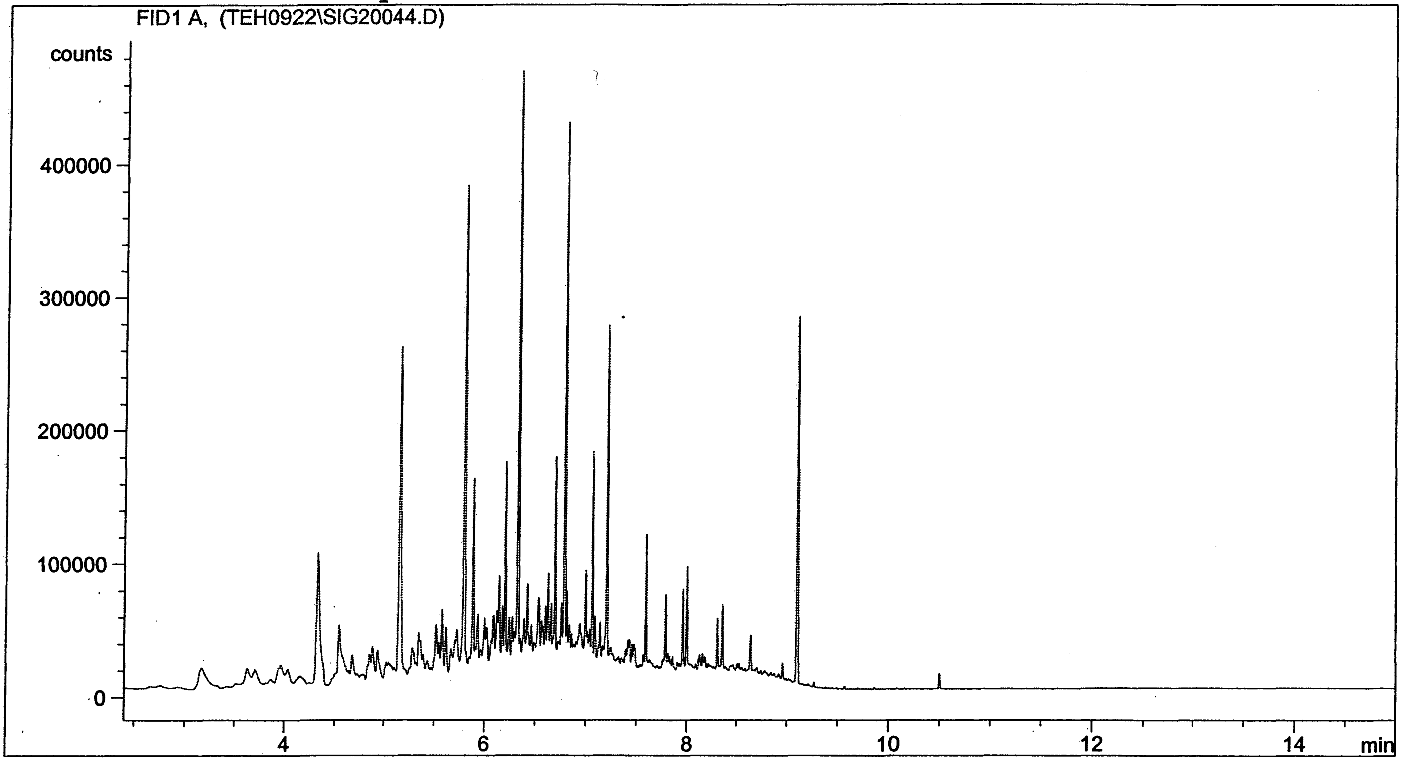
Sample ID: L130912-2 v4teh
Injection Date: 9/20/03
Injection Time: 12:06:39 PM
Instrument ID: teh1

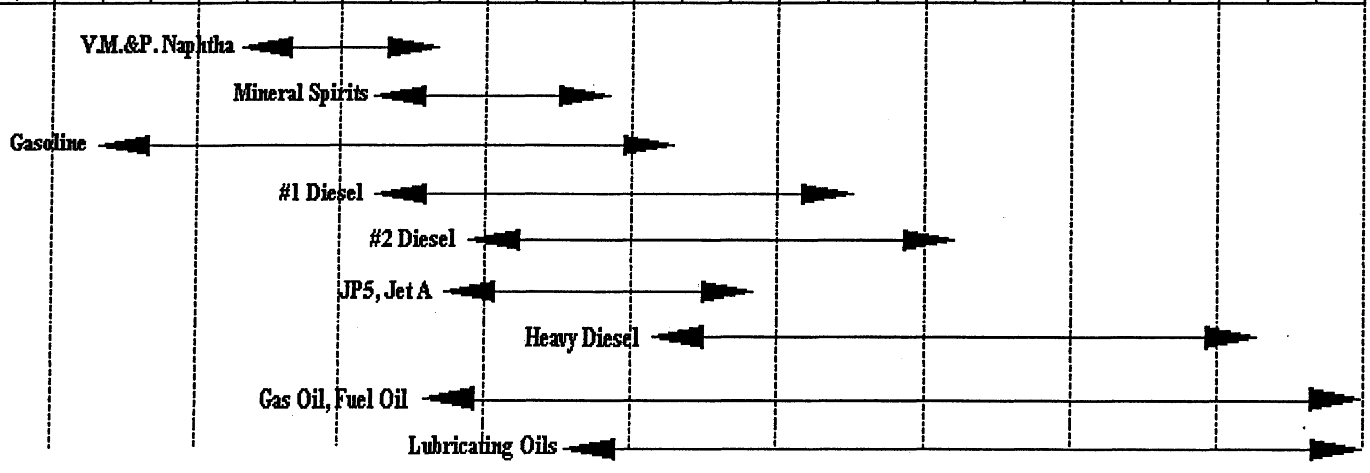
Total Extractable Hydrocarbons



C10 C14 C20 C30

Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: SEPT 6 3PM AFTER

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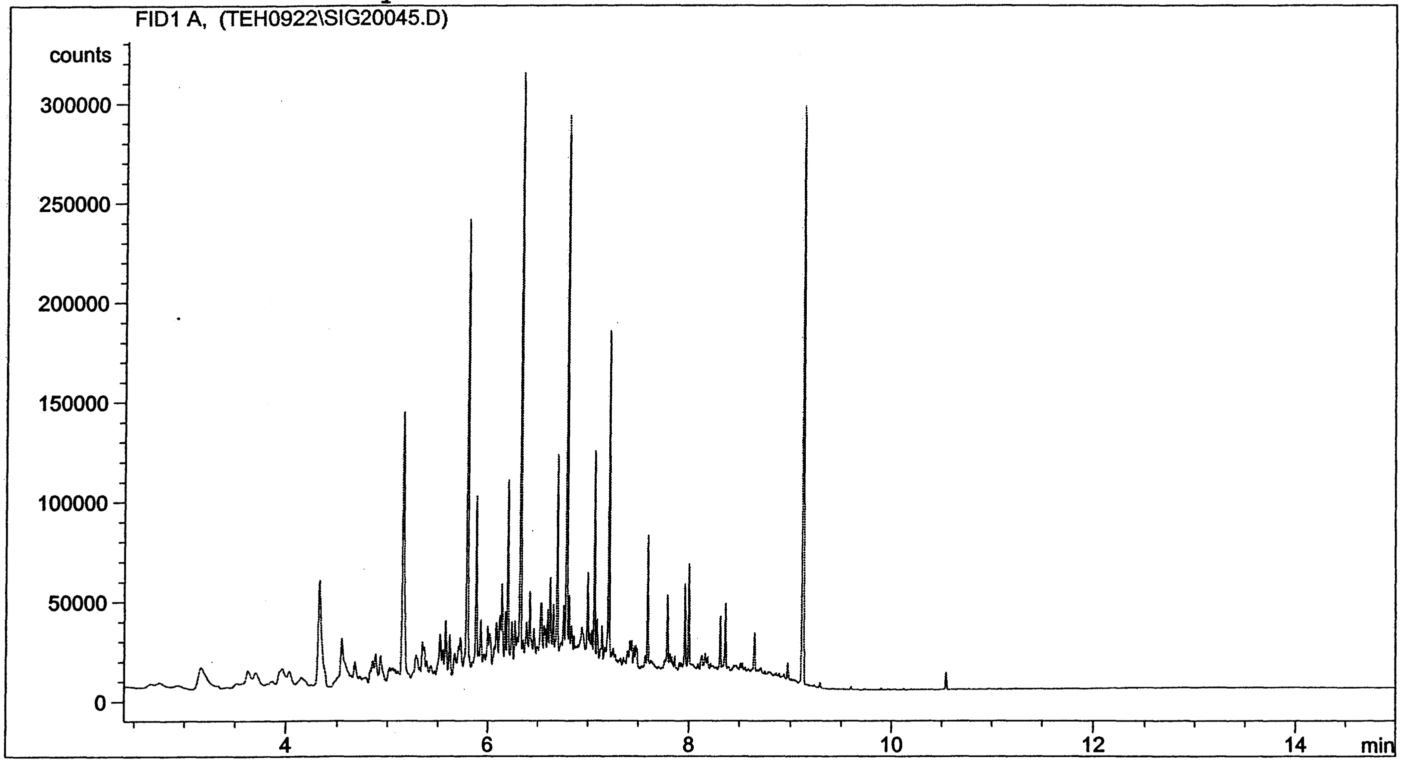
Sample ID: L130912-4 v3teh
Injection Date: 9/20/03
Injection Time: 12:30:09 PM
Instrument ID: teh1

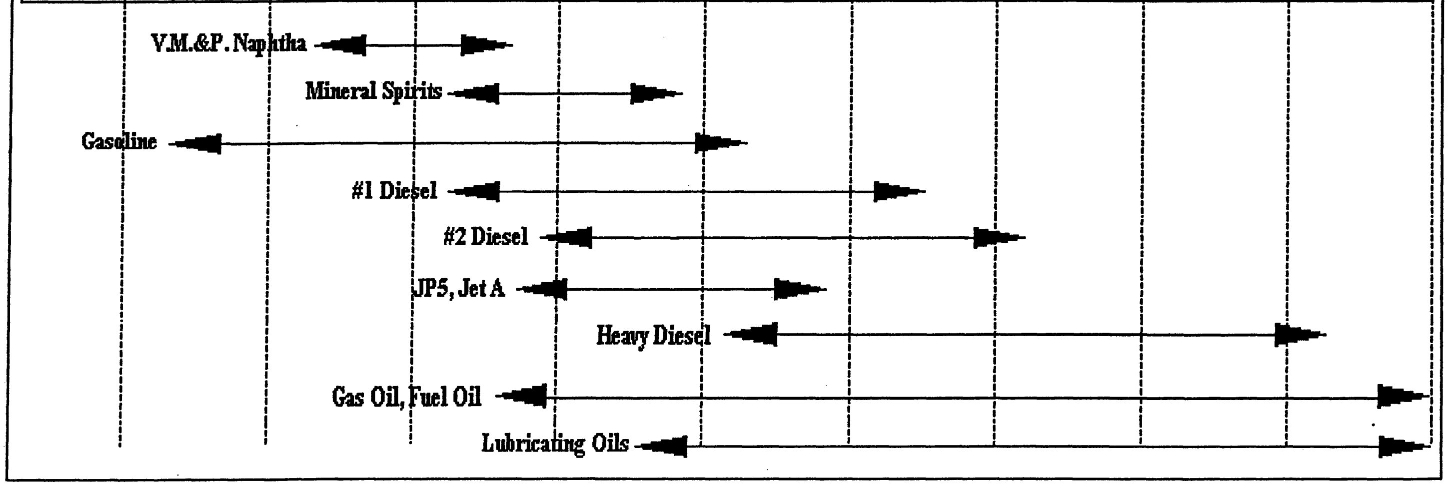
Total Extractable Hydrocarbons



C10 C14 C20 C30

Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: SEPT 7 3PM AFTER

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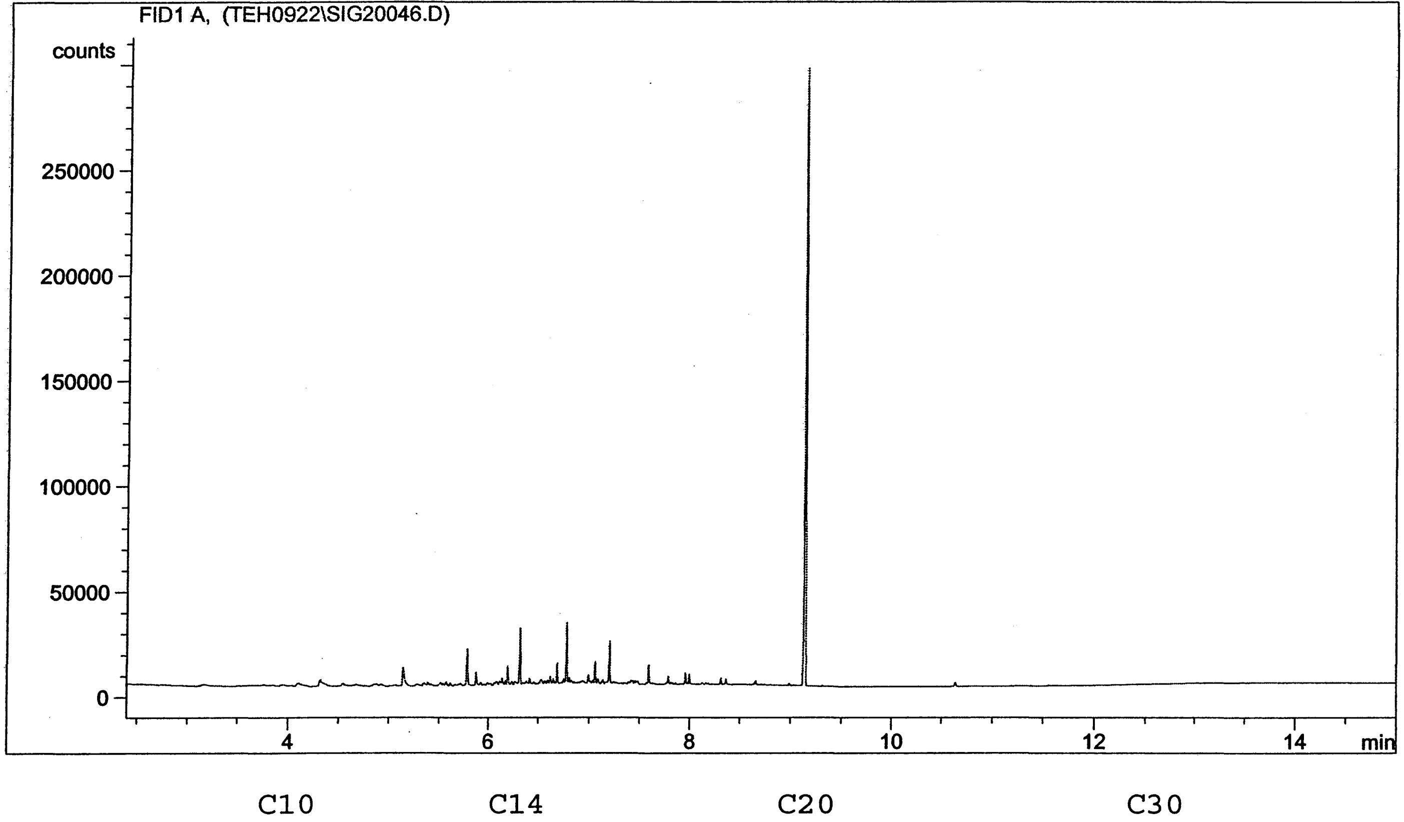
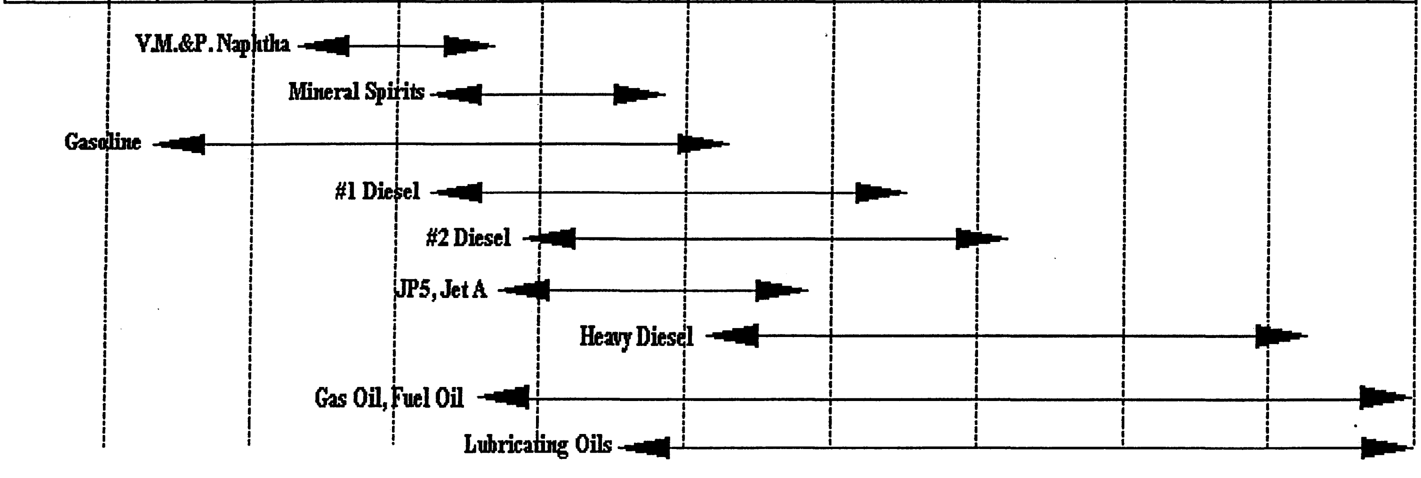
Sample ID: L130912-6 v4teh
Injection Date: 9/20/03
Injection Time: 12:53:43 PM
Instrument ID: teh1

Total Extractable Hydrocarbons



Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: SEPT 8 3PM AFTER

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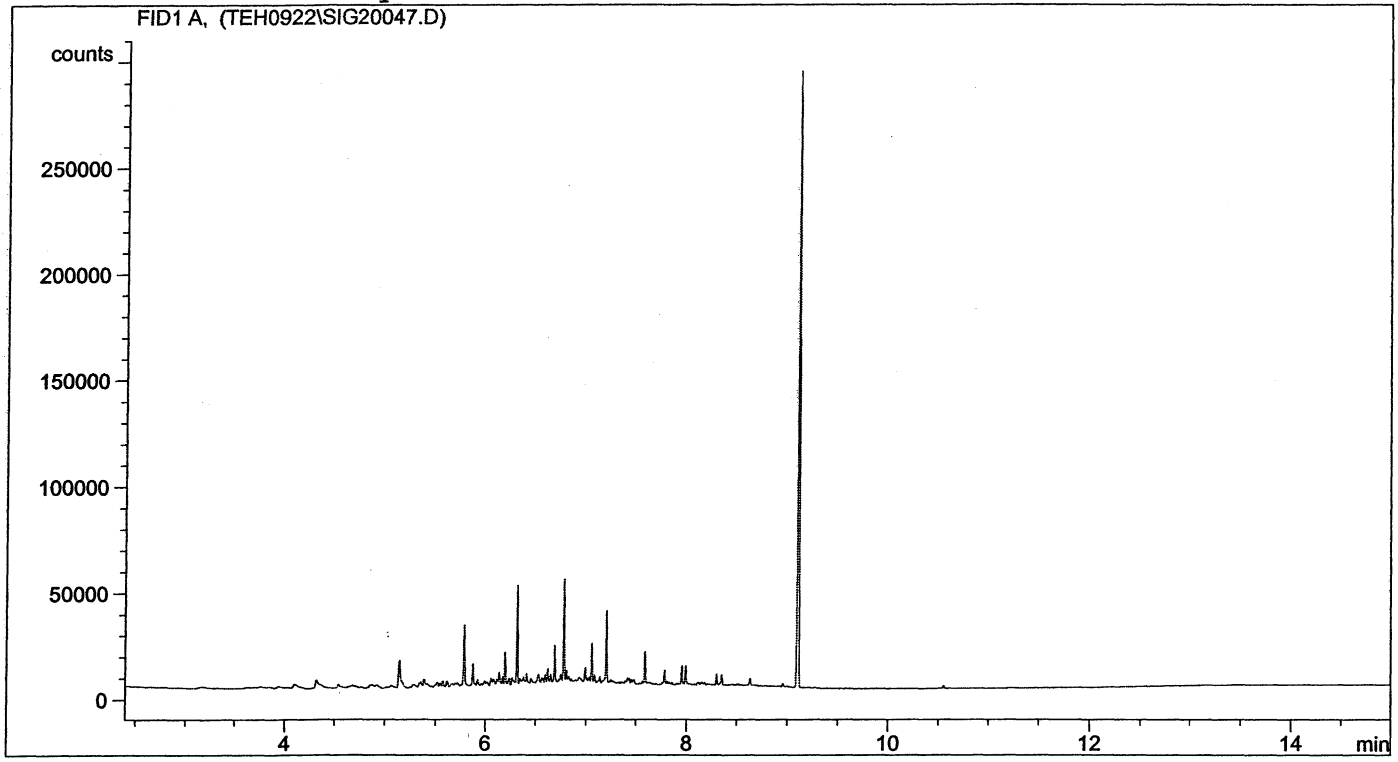
Sample ID: L130912-8 v4teh
Injection Date: 9/20/03
Injection Time: 1:17:16 PM
Instrument ID: teh1

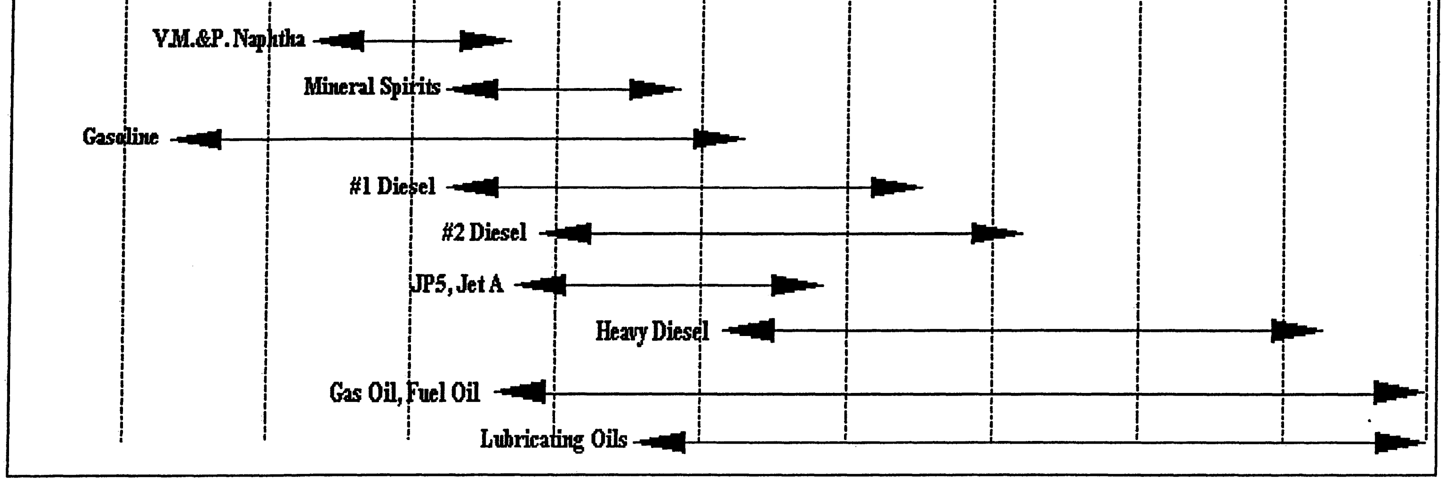
Total Extractable Hydrocarbons



C10 C14 C20 C30

Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: SEPT 9 3PM AFTER

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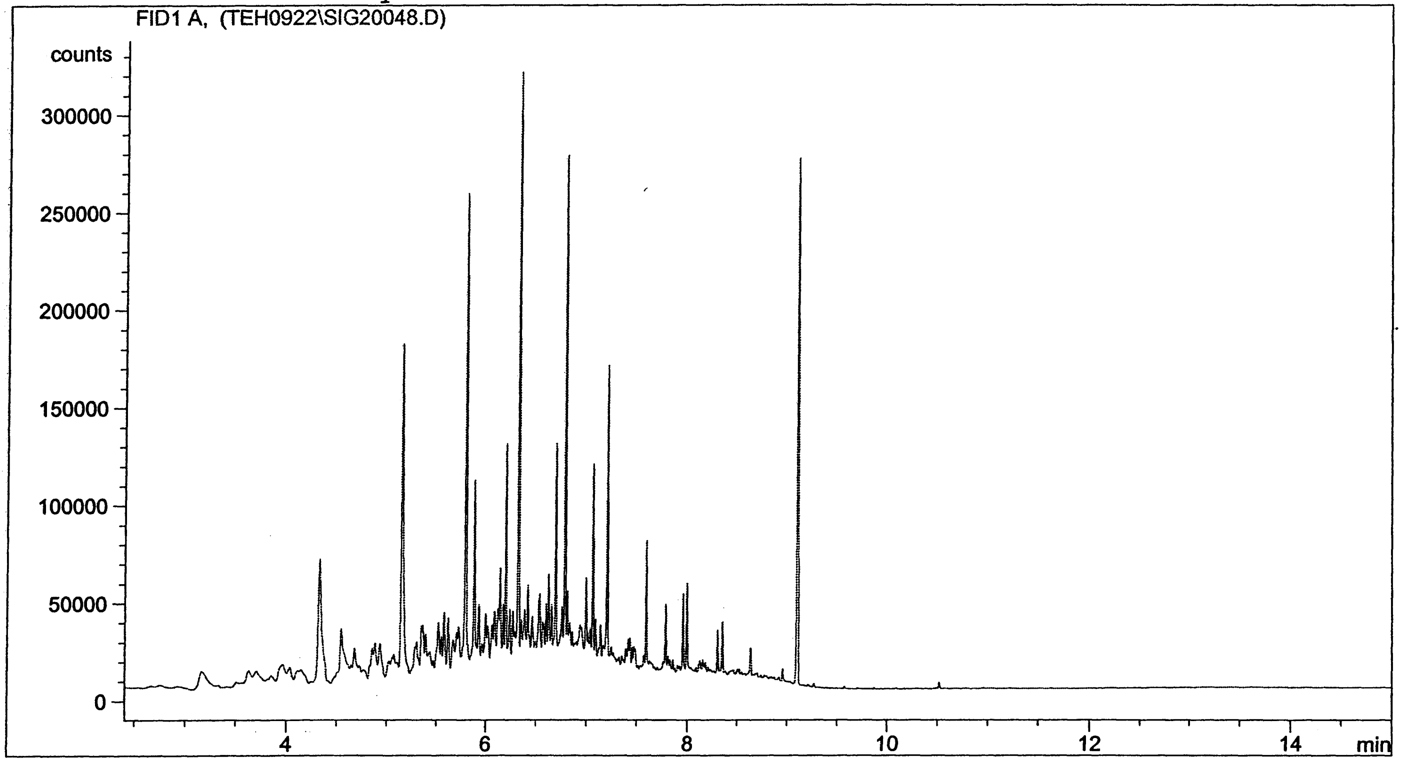
Sample ID: L130912-10 v4teh
Injection Date: 9/20/03
Injection Time: 1:40:51 PM
Instrument ID: teh1

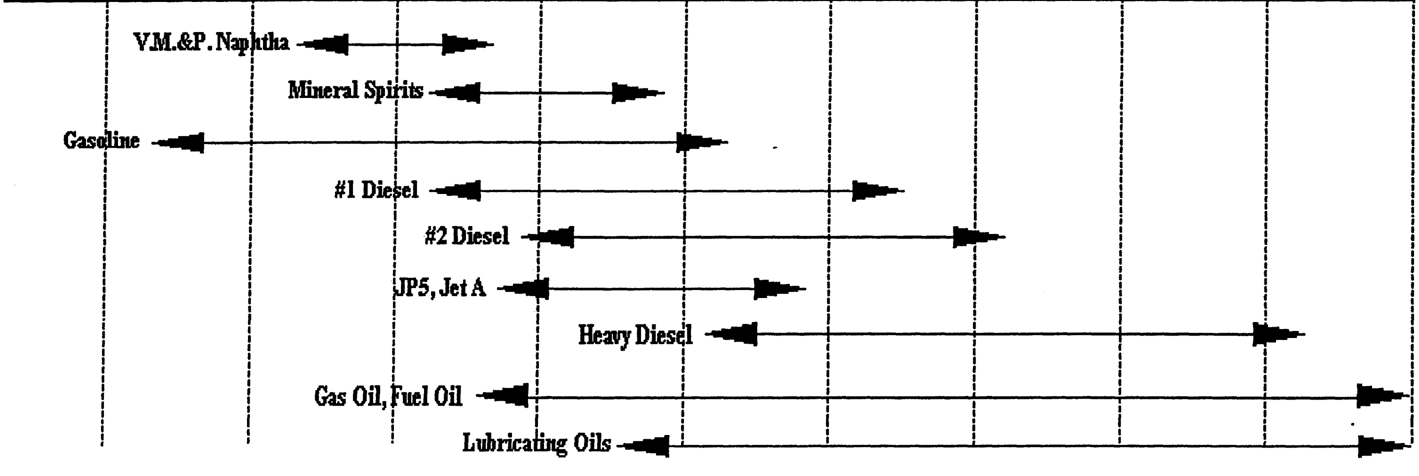
Total Extractable Hydrocarbons



C10 C14 C20 C30

Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P.(°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P.(°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840

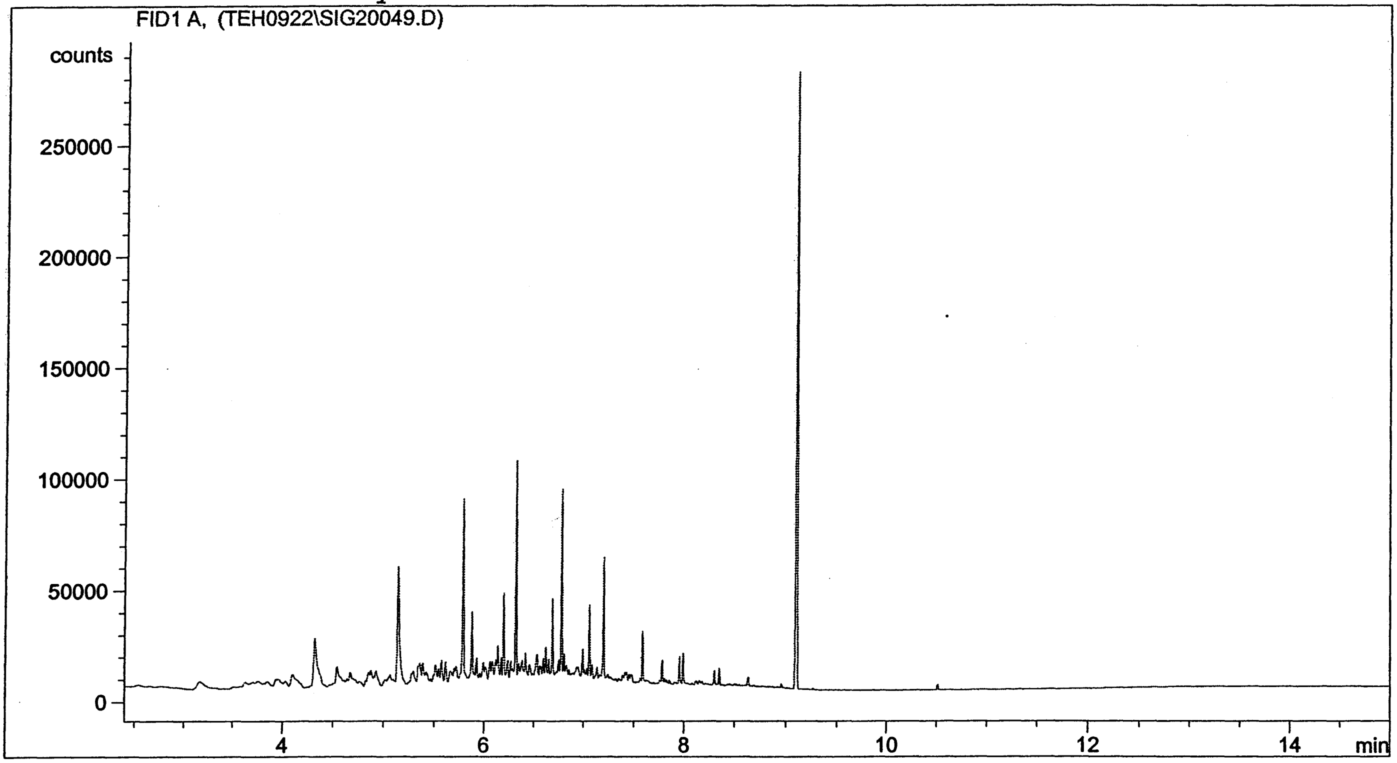


Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID:	SEPT 10 3PM AFTER
Sample ID:	L130912-12 v4teh
Injection Date:	9/20/03
Injection Time:	2:04:30 PM
Instrument ID:	teh1

->

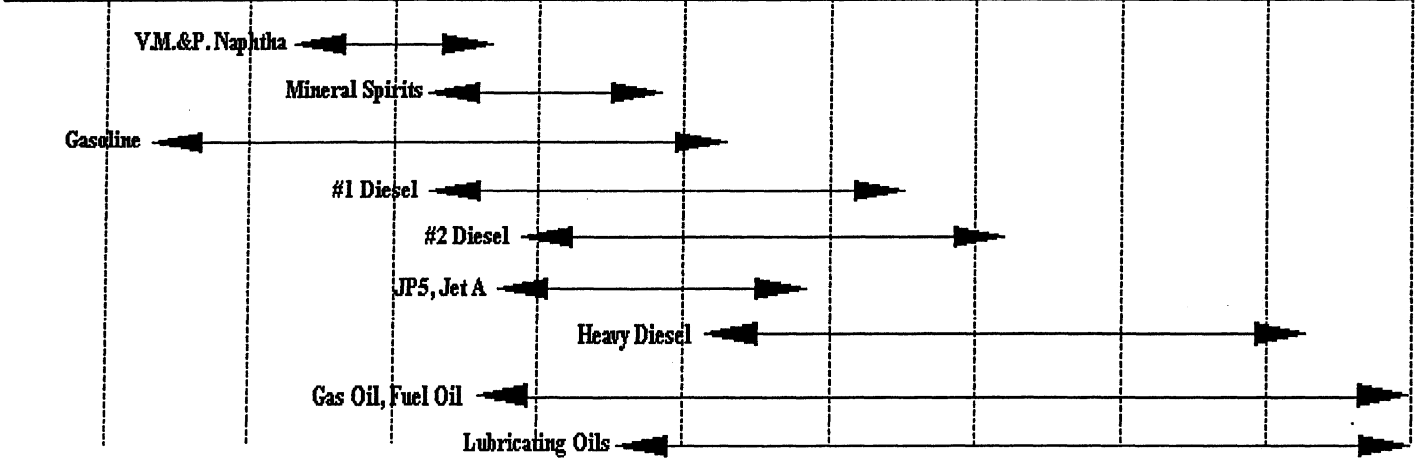
Total Extractable Hydrocarbons



C10 C14 C20 C30

Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

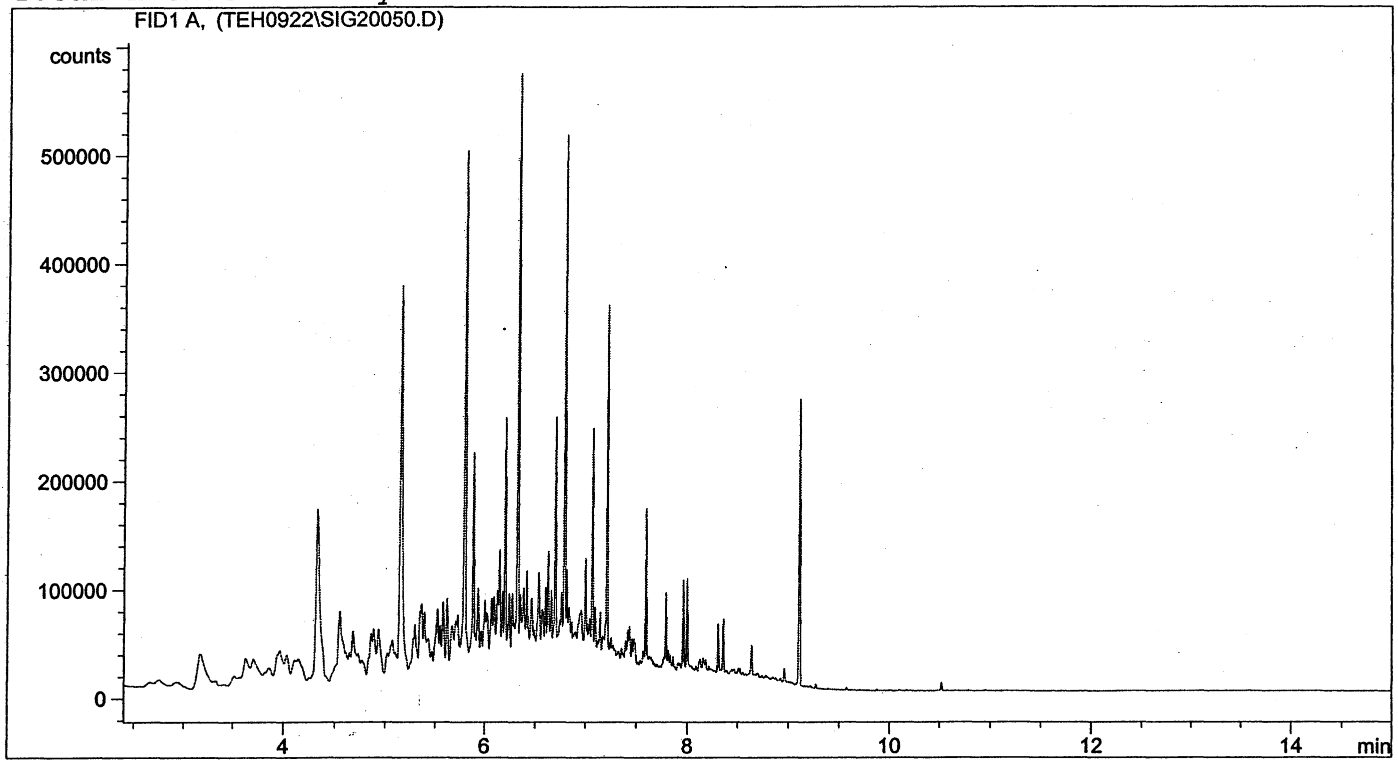
ETL

Client ID: SEPT 11 3PM AFTER

->

Sample ID: L130912-14 v4teh
Injection Date: 9/20/03
Injection Time: 2:28:08 PM
Instrument ID: teh1

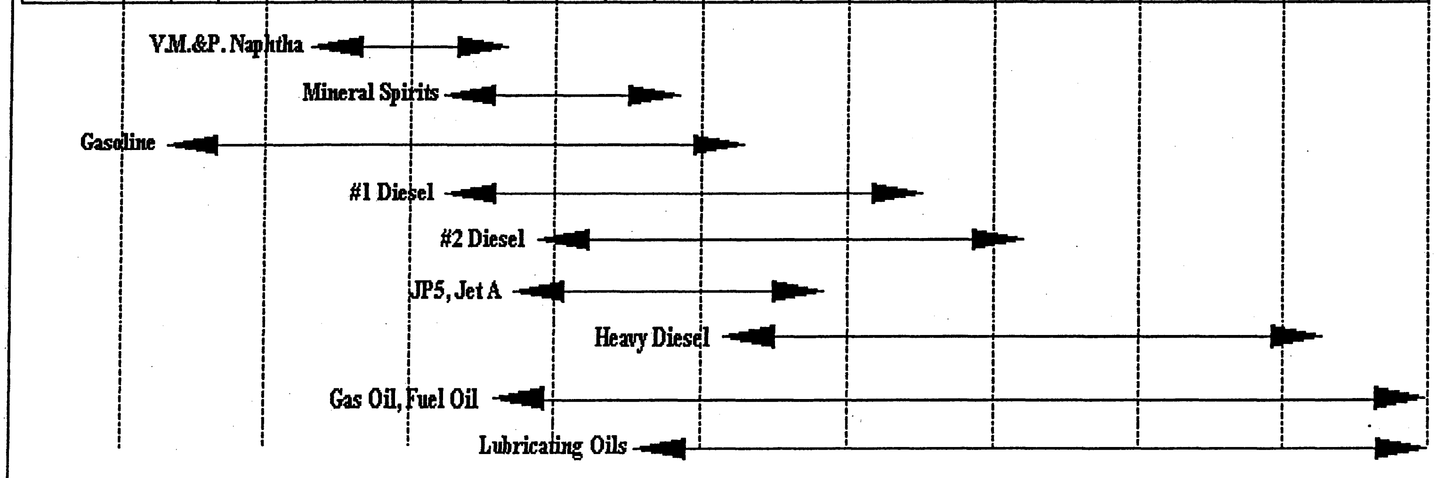
Total Extractable Hydrocarbons



C10 C14 C20 C30

Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



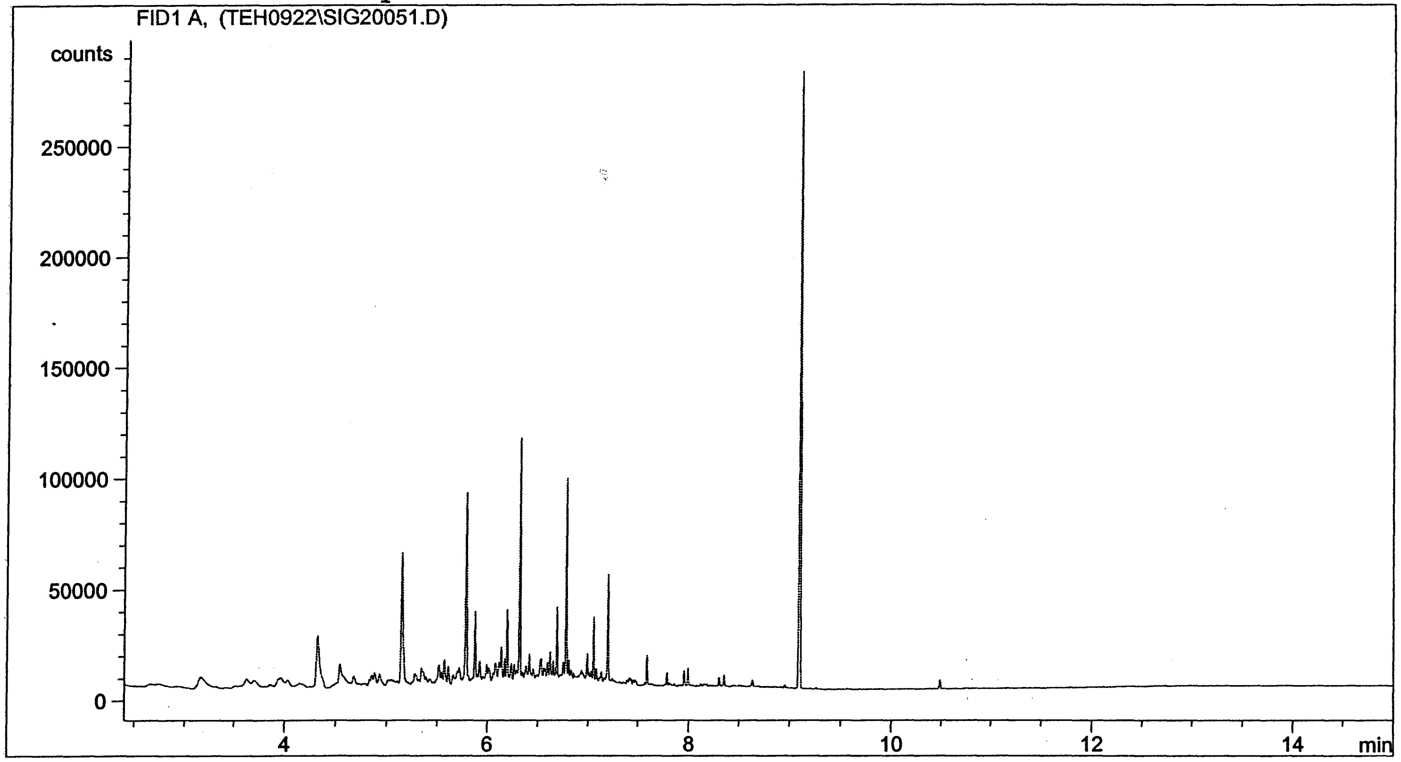
Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: SEPT 4 3PM AFTER

->

Sample ID: L130912-16 v4teh
Injection Date: 9/20/03
Injection Time: 2:52:02 PM
Instrument ID: teh1

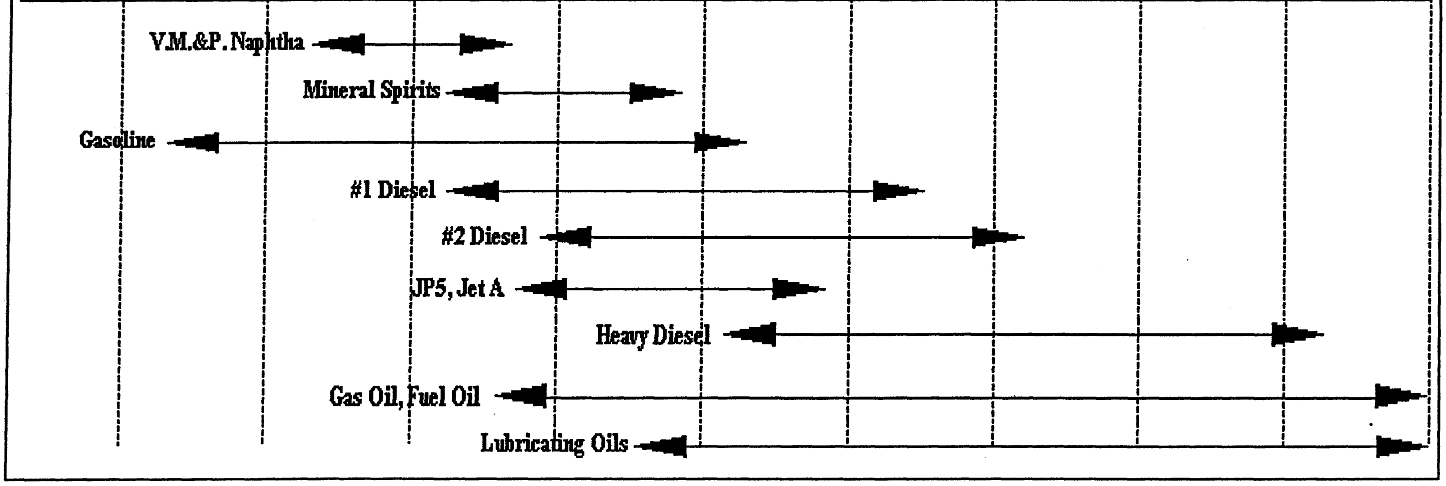
Total Extractable Hydrocarbons



C10 C14 C20 C30

Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

EnviroTest LABORATORIES
A DIVISION OF ETL CHEMSPEC ANALYTICAL LIMITED

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM
CANADA TOLL FREE 1-800-668-9878

COC # 59954 Tracking Pg CL of
www.envirotest.com

DATE:

ETL LAB WORK ORDER # L130912

REPORT TO:
COMPANY: EBA (Edm)
CONTACT: Steve Taylor
ADDRESS:
PHONE: 451-2130 x260 FAX:

REPORT DISTRIBUTION: ALL FINAL RESULTS WILL BE MAILED
EMAIL ☒ FAX ☐
EMAIL 1: staylor@eba.ca
EMAIL 2: bmurphy@eba.ca
SELECT: pdf ☐ digital ☐ both ☒

SERVICE REQUESTED
☒ REGULAR SERVICE (DEFAULT)
☐ PRIORITY SERVICE (50% SURCHARGE)
☐ EMERGENCY SERVICE (100% SURCHARGE) 0402

INVOICE TO: SAME [✓ Y] N
COMPANY:
CONTACT:
ADDRESS:
PHONE: FAX:

INDICATE BOTTLES: FILTERED/PRESERVED (F/P) ▶
JOB # 1740065
PO / AFE:
LSD:
QUOTE #

ANALYSIS REQUEST

SAMPLE ID	SAMPLING LOCATION	SAMPLED BY / DATE / TIME	SAMPLING METHOD	SAMPLE TYPE	BTEX	TEH	TVH								HAZARDOUS? (Y/N)	NUMBER OF CONTAINERS	HIGHLY CONTAMINATED? (Y/N)	LAB SAMPLE #
Sept 5 3pm Before		D.Stapleton/Sept 5		Water	X	X	X									2	Y	1
Sept 5 3pm After					X	X	X									2		2
SEPT 6 3PM BEFORE					X	X	X									2	/	3
SEPT 6 3PM AFTER					X	X	X									2		4
SEPT 7 3 PM BEFORE					X	X	X									1	Y	5
SEPT 7 3 PM AFTER					X	X	X									1		6
SEPT 8 3 PM BEFORE					X	X	X									1	Y	7
SEPT 8 3 PM AFTER					X	X	X									1		8
SEPT 9 3 PM BEFORE					X	X	X									2	Y	9
SEPT 9 3PM AFTER					X	X	X									2		10

NOTES & CONDITIONS:
1. Quote number must be provided to ensure proper pricing.
2. Turnaround times will vary dependent on complexity of analysis & Lab workload at time of submission. Please contact the Lab to confirm turnaround time.
3. All hazardous samples submitted must be labeled to comply with WHMIS and TDG regulations. This must include the nature of the hazard, as well as a contact name & phone number that the Lab can contact for further information.

NOTE: Failure to properly complete all portions of this form may delay analysis.

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / NATURE OF HAZARDOUS MATERIAL

SAMPLE CONDITION
☐ FROZEN
☑ COLD
☐ AMBIENT
MEAN TEMPERATURE

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME: 1200 17-Sep-03
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

SAMPLE CONDITION ACCEPTABLE UPON RECEIPT? (Y/N)

REFER TO BACK FOR SAMPLING INFORMATION & REGIONAL LOCATIONS WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY REVISED MAY 2003

ETL EnviroTest LABORATORIES
A DIVISION OF *ETL CHEMSPEC ANALYTICAL LIMITED*

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM
CANADA TOLL FREE 1-800-668-9878

COC # 59951

Pg ____ of ____
www.envirotest.com

DATE:

ETL LAB WORK ORDER #

REPORT TO:
COMPANY: EBA (EDM)
CONTACT: STEVE TAYLOR
ADDRESS:
PHONE: 451 2130 x260 FAX:

REPORT DISTRIBUTION: ALL FINAL RESULTS WILL BE MAILED
EMAIL ☐ FAX ☐
EMAIL 1: Staylor@eba.ca
EMAIL 2: bmurphy@eba.ca
SELECT: pdf ☐ digital ☐ both ☒

SERVICE REQUESTED
☒ REGULAR SERVICE (DEFAULT)
☐ PRIORITY SERVICE (50% SURCHARGE)
☐ EMERGENCY SERVICE (100% SURCHARGE)

INVOICE TO: SAME [✓ Y] N
COMPANY:
CONTACT:
ADDRESS:
PHONE: FAX:

INDICATE BOTTLES: FILTERED/PRESERVED (F/P) ▶
JOB # 1740065
PO / AFE:
LSD:
QUOTE #

ANALYSIS REQUEST

SAMPLE ID	SAMPLING LOCATION	SAMPLED BY / DATE / TIME	SAMPLING METHOD	SAMPLE TYPE	BTEX	TEH	TVH								HAZARDOUS? (Y/N)	NUMBER OF CONTAINERS	HIGHLY CONTAMINATED? (Y/N)	LAB SAMPLE #
SEPT 10 3PM BEFORE		D STAPLETON		WATER	X	X	X									2	Y	11
SEPT 10 3PM AFTER		D STAPLETON		|	X	X	X									2		12
SEPT 11 3PM BEFORE		|		|	X	X	X									2	Y	13
SEPT 11 3PM AFTER				|	X	X	X									2		14
SEPT 4 3PM BEFORE					X	X	X									2	Y	15
SEPT 4 3PM AFTER					X	X	X									2		16

NOTES & CONDITIONS:
1. Quote number must be provided to ensure proper pricing.
2. Turnaround times will vary dependent on complexity of analysis & Lab workload at time of submission. Please contact the Lab to confirm turnaround time.
3. All hazardous samples submitted must be labeled to comply with WHMIS and TDG regulations. This must include the nature of the hazard, as well as a contact name & phone number that the Lab can contact for further information.

NOTE: Failure to properly complete all portions of this form may delay analysis.

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / NATURE OF HAZARDOUS MATERIAL

SAMPLE CONDITION
☐ FROZEN
☐ COLD
☐ AMBIENT
MEAN TEMPERATURE

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

SAMPLE CONDITION ACCEPTABLE UPON RECEIPT? (Y/N)

REFER TO BACK FOR SAMPLING INFORMATION & REGIONAL LOCATIONS

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

REVISED MAY 2003

ETL Enviro·Test
LABORATORIES
A DIVISION OF *ETL CHEMSPEC ANALYTICAL LIMITED*

RECEIVED
OCT 2 0 2003

ANALYTICAL REPORT

EBA ENG CONSULTANTS LTD
ATTN: STEVE TAYLOR
14940 123 AVE NORTH BLDG
EDMONTON AB T5V 1B4

DATE: 09-OCT-03 01:45 PM

Lab Work Order #: L130912
Sampled By: D.STAPLETON
Date Received: 17-SEP-03
Project P.O. #: NA
Project Reference: 1740065

Comments: L130912-1, -3, -5, -7, -9, -11, -13, -15 BTEX, TVH, TEH ANALYSIS CANCELLED DUE TO FREE PHASE HYDROCARBONS

09-Oct-03 Revised report: TEH Calculation error L130912-2, 4, 6, 8, 10, 12, 14, 16

APPROVED BY: ______________________
TONY CIARLA
Project Manager

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN AUTHORITY OF THE LABORATORY. ANY REMAINING SAMPLES WILL BE DISPOSED OF AFTER 30 DAYS FOLLOWING ANALYSIS. PLEASE CONTACT THE LAB IF YOU REQUIRE ADDITIONAL SAMPLE STORAGE TIME.

LABORATORY ACCREDITATIONS:
- **STANDARDS COUNCIL OF CANADA IN COOPERATION WITH THE CANADIAN ASSOCIATION FOR ENVIRONMENTAL ANALYTICAL LABORATORIES (CAEAL)** FOR SPECIFIC TESTS AS REGISTERED BY THE COUNCIL (EDMONTON, CALGARY, GRANDE PRAIRIE, SASKATOON, WINNIPEG, THUNDER BAY, WATERLOO)
- **AMERICAN INDUSTRIAL HYGIENE ASSOCIATION (AIHA)** IN THE INDUSTRIAL HYGIENE PROGRAM (EDMONTON, WINNIPEG)
- **STANDARDS COUNCIL OF CANADA IN COOPERATION WITH THE CANADIAN FOOD INSPECTION AGENCY (CFIA)** FOR FERTILIZER AND FEED TESTING (SASKATOON) AND FOR MICROBIOLOGICAL TESTING IN FOOD (WINNIPEG)

LABORATORY RECOGNITIONS:
- **STANDARDS COUNCIL OF CANADA** - GLP COMPLIANT FACILITY (EDMONTON, OTTAWA)

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L130912-2 SEPT 5 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	19		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								
Benzene	<0.0005		0.0005	mg/L	21-SEP-03	20-SEP-03	MNM	R144569
Toluene	<0.0005		0.0005	mg/L	21-SEP-03	20-SEP-03	MNM	R144569
Ethylbenzene	<0.0005		0.0005	mg/L	21-SEP-03	20-SEP-03	MNM	R144569
Xylenes	0.0018		0.0005	mg/L	21-SEP-03	20-SEP-03	MNM	R144569
Total Volatiles	0.8		0.1	mg/L	21-SEP-03	20-SEP-03	MNM	R144569
L130912-4 SEPT 6 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	12		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								
Benzene	<0.0005		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Toluene	0.0013		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Ethylbenzene	<0.0005		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Xylenes	0.0008		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Total Volatiles	0.9		0.1	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
L130912-6 SEPT 7 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	3.2		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								
Benzene	<0.0005		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Toluene	0.0006		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Ethylbenzene	<0.0005		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Xylenes	0.0033		0.0005	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
Total Volatiles	<0.1		0.1	mg/L	22-SEP-03	20-SEP-03	MNM	R144569
L130912-8 SEPT 8 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	3.9		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								
Benzene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Toluene	0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Ethylbenzene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Xylenes	0.0033		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Total Volatiles	0.1		0.1	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
L130912-10 SEPT 9 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	13		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641

ENVIRO-TEST ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier	D.L.	Units	Extracted	Analyzed	By	Batch
L130912-10 SEPT 9 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
BTEX and TVH (C5-C10)								
Benzene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Toluene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Ethylbenzene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Xylenes	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Total Volatiles	0.2		0.1	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
L130912-12 SEPT 10 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	4.5		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								
Benzene	0.0022		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Toluene	0.014		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Ethylbenzene	0.0063		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Xylenes	0.028		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Total Volatiles	1.3		0.1	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
L130912-14 SEPT 11 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	30		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								
Benzene	0.0028		0.0005	mg/L	21-SEP-03	23-SEP-03	MNM	R144569
Toluene	0.018		0.0005	mg/L	21-SEP-03	23-SEP-03	MNM	R144569
Ethylbenzene	0.0093		0.0005	mg/L	21-SEP-03	23-SEP-03	MNM	R144569
Xylenes	0.032		0.0005	mg/L	21-SEP-03	23-SEP-03	MNM	R144569
Total Volatiles	0.4		0.1	mg/L	21-SEP-03	23-SEP-03	MNM	R144569
L130912-16 SEPT 4 3PM AFTER								
Sample Date: 05-SEP-03								
Matrix: WATER								
BTEX, TVH and TEH								
TEH (C11-C30)	3.7		0.05	mg/L	19-SEP-03	20-SEP-03	OAL	R144641
BTEX and TVH (C5-C10)								
Benzene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Toluene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Ethylbenzene	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Xylenes	<0.0005		0.0005	mg/L	22-SEP-03	22-SEP-03	MNM	R144569
Total Volatiles	1.2		0.1	mg/L	22-SEP-03	22-SEP-03	MNM	R144569

Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

Methods Listed (if applicable):

ETL Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
BTX,TVH-CL	Water	BTEX and TVH (C5-C10)	EPA 5030B	EPA 5030/8015& 8260-P&T GC-MS/FID
TVH includes BTEX contribution.				
TEH-CL	Water	TEH (C11-C30)	EPA 3550B	EPA 3510/8000-GC-FID

** Laboratory Methods employed follow in-house procedures, which are generally based on nationally or internationally accepted methodologies.

Chain of Custody numbers:

59951 59954

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
CL	Enviro-Test Laboratories - Calgary, Alberta, Canada		

GLOSSARY OF REPORT TERMS
Surr - A surrogate is an organic compound that is similar to the target analyte(s) in chemical composition and behavior but not normally detected in enviromental samples. Prior to sample processing, samples are fortified with one or more surrogate compounds.
The reported surrogate recovery value provides a measure of method efficiency. The Laboratory warning units are determined under column heading D.L.
mg/kg (units) - unit of concentration based on mass, parts per million
mg/L (units) - unit of concentration based on volume, parts per million
< - Less than
D.L. - Detection Limit
N/A - Result not available. Refer to qualifier code and definition for explanation

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
UNLESS OTHERWISE STATED, SAMPLES ARE NOT CORRECTED FOR CLIENT FIELD BLANKS.
Although test results are generated under strict QA/QC protocols, any unsigned test reports, faxes, or emails are considered preliminary.

Enviro-Test Laboratories has an extensive QA/QC program where all analytical data reported is analyzed using approved referenced procedures followed by checks and reviews by senior managers and quality assurance personnel. However, since the results are obtained from chemical measurements and thus cannot be guaranteed, Enviro-Test Laboratories assumes no liability for the use or interpretation of the results.

ETL Enviro·Test
LABORATORIES
A DIVISION OF *ETL CHEMSPEC ANALYTICAL LIMITED*

Report Date: 09-OCT-03

ENVIRO-TEST QC REPORT

Workorder: L130912

Client: EBA ENG CONSULTANTS LTD
14940 123 AVE NORTH BLDG
EDMONTON AB T5V 1B4

Contact: STEVE TAYLOR

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
BTX,TVH-CL	**Water**							
Batch R144569								
WG140108-2 DUP		**L130912-6**						
Benzene		<0.0005	<0.0005	RPD-NA	mg/L	N/A	20	20-SEP-03
Ethylbenzene		<0.0005	<0.0005	RPD-NA	mg/L	N/A	20	20-SEP-03
Toluene		0.0006	0.0005	J	mg/L	0.0001	0.0015	20-SEP-03
Total Volatiles		<0.1	<0.1	RPD-NA	mg/L	N/A	25	20-SEP-03
Xylenes		0.0033	0.0033	J	mg/L	0.0000	0.0015	20-SEP-03
WG140108-6 DUP		**L130821-2**						
Benzene		<0.0005	<0.0005	RPD-NA	mg/L	N/A	20	20-SEP-03
Ethylbenzene		<0.0005	<0.0005	RPD-NA	mg/L	N/A	20	20-SEP-03
Toluene		<0.0005	<0.0005	RPD-NA	mg/L	N/A	20	20-SEP-03
Total Volatiles		<0.1	<0.1	RPD-NA	mg/L	N/A	25	20-SEP-03
Xylenes		<0.0005	<0.0005	RPD-NA	mg/L	N/A	20	20-SEP-03
WG140108-1 LCS								
Benzene			89		%		85-115	20-SEP-03
Ethylbenzene			88		%		85-115	20-SEP-03
Toluene			89		%		85-115	20-SEP-03
Total Volatiles			104		%		85-115	20-SEP-03
Xylenes			90		%		85-115	20-SEP-03
WG140108-4 MB								
Benzene			<0.0005		mg/L		0.0005	21-SEP-03
Ethylbenzene			<0.0005		mg/L		0.0005	21-SEP-03
Toluene			<0.0005		mg/L		0.0005	21-SEP-03
Total Volatiles			<0.1		mg/L		0.1	21-SEP-03
Xylenes			<0.0005		mg/L		0.0005	21-SEP-03
TEH-CL	**Water**							
Batch R144641								
WG140265-3 DUP		**L130821-2**						
TEH (C11-C30)		<0.05	<0.05	RPD-NA	mg/L	N/A	25	20-SEP-03
WG140265-1 MB								
TEH (C11-C30)			<0.05		mg/L		0.05	17-SEP-03
WG140265-4 MS		**L130821-1**						
TEH (C11-C30)			102		%		65-125	20-SEP-03

ENVIRO-TEST QC REPORT

Workorder: L130912

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
Product - Batch and Sample Number Relations:								
BTX,TVH-CL	1							
R144569		L130912-2	L130912-4	L130912-6		L130912-8	L130912-10	
		L130912-12	L130912-14	L130912-16				
TEH-CL	1							
R144641		L130912-2	L130912-4	L130912-6		L130912-8	L130912-10	
		L130912-12	L130912-14	L130912-16				

ENVIRO-TEST QC REPORT

Workorder # L130912

Legend:

Limit	95% Confidence Interval (Laboratory Warning Limits)
DUP	Duplicate
RPD	Relative Percent Difference ((higher result-lower result)/Average, expressed as %)
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Materials
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material

Qualifier:

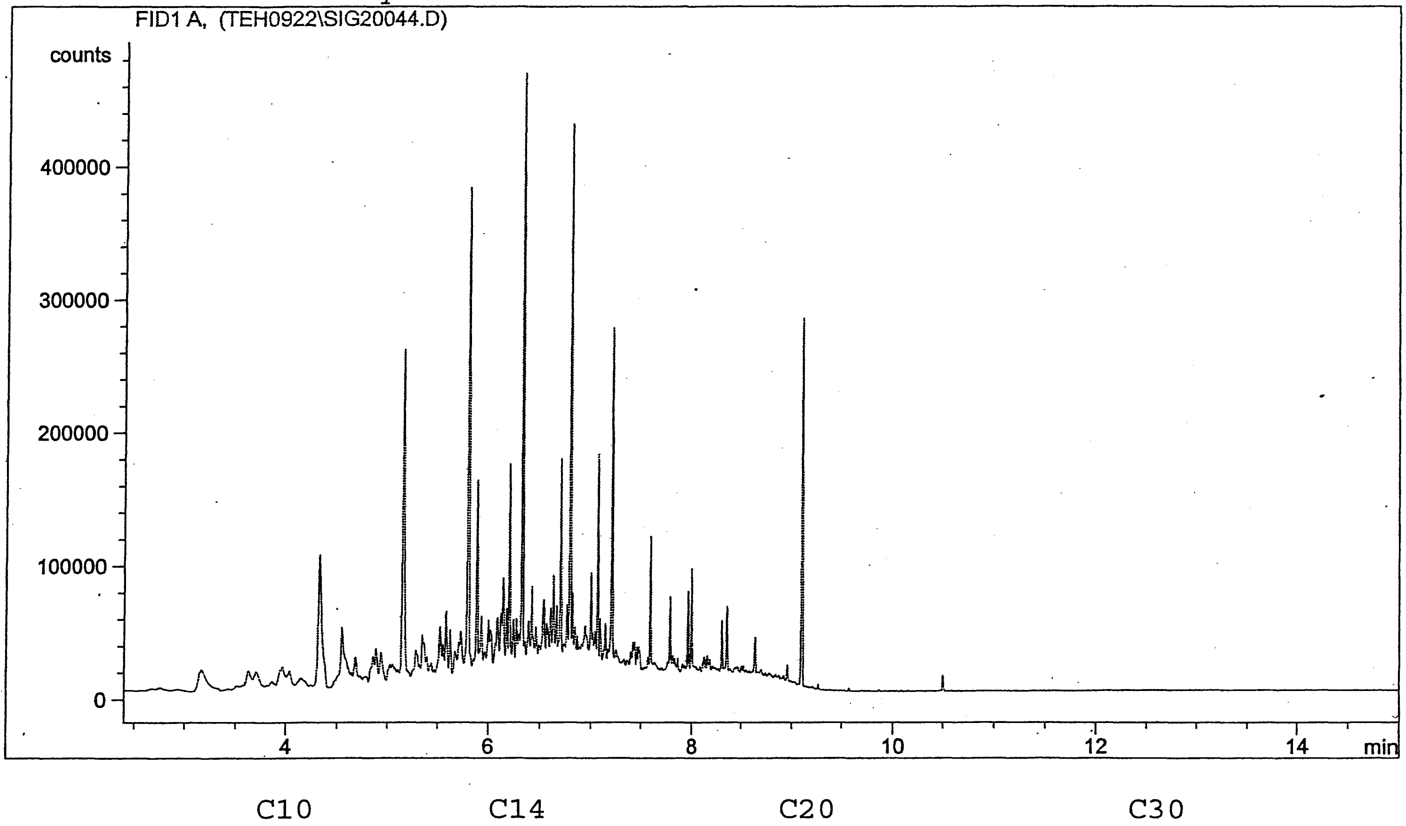
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
A	Method blank exceeds acceptance limit. Blank correction not applied, unless the qualifier "RAMB" (result adjusted for method blank) appears in the Analytical Report.
B	Method blank result exceeds acceptance limit, however, it is less than 5% of sample concentration. Blank correction not applied.
E	Matrix spike recovery may fall outside the acceptance limits due to high sample background.
F	Silver recovery low, likely due to elevated choride levels in sample.
G	Outlier - No assignable cause for nonconformity has been determined.
H	Result falls within the 99% Confidence Interval (Laboratory Control Limits)
J	Duplicate results and limit(s) are expressed in terms of absolute difference.
K	The sample referenced above is of a non-standard matrix type; standard QC acceptance criteria may not be achievable.

Client ID: SEPT 5 3PM AFTER

->

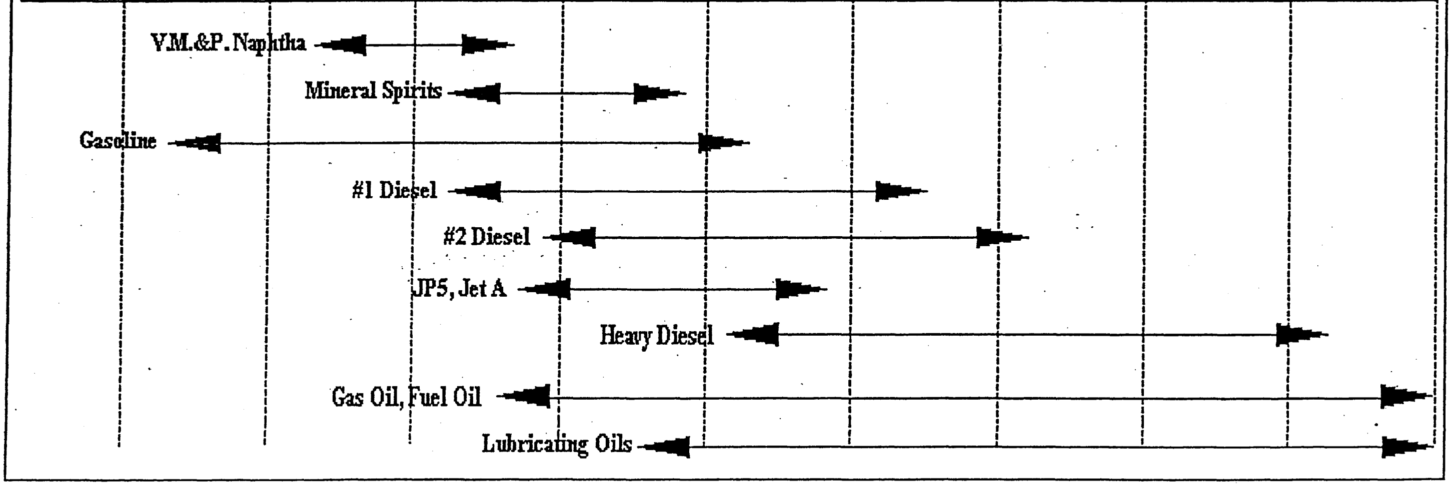
Sample ID: L130912-2 v4teh
Injection Date: 9/20/03
Injection Time: 12:06:39 PM
Instrument ID: teh1

Total Extractable Hydrocarbons



Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



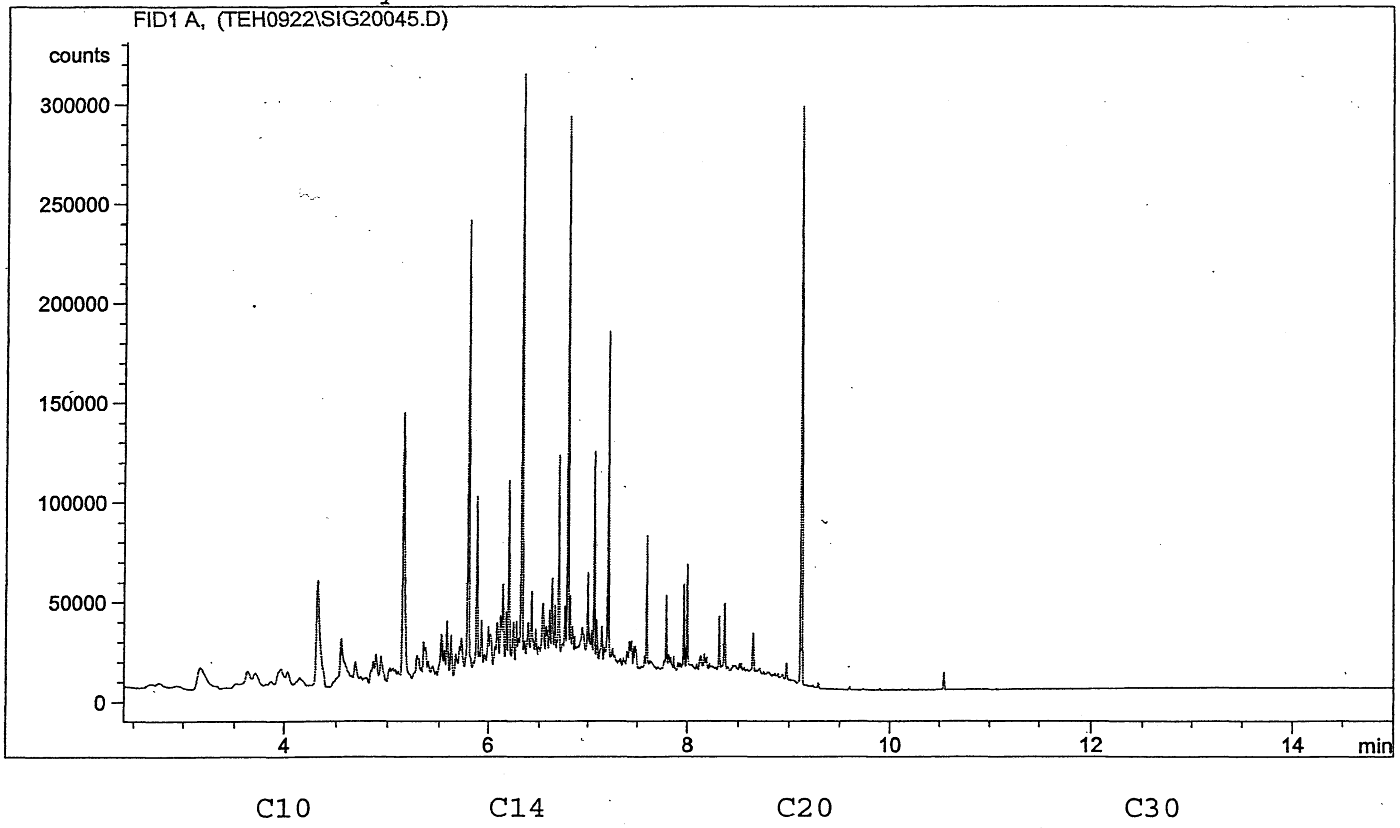
Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: SEPT 6 3PM AFTER

->

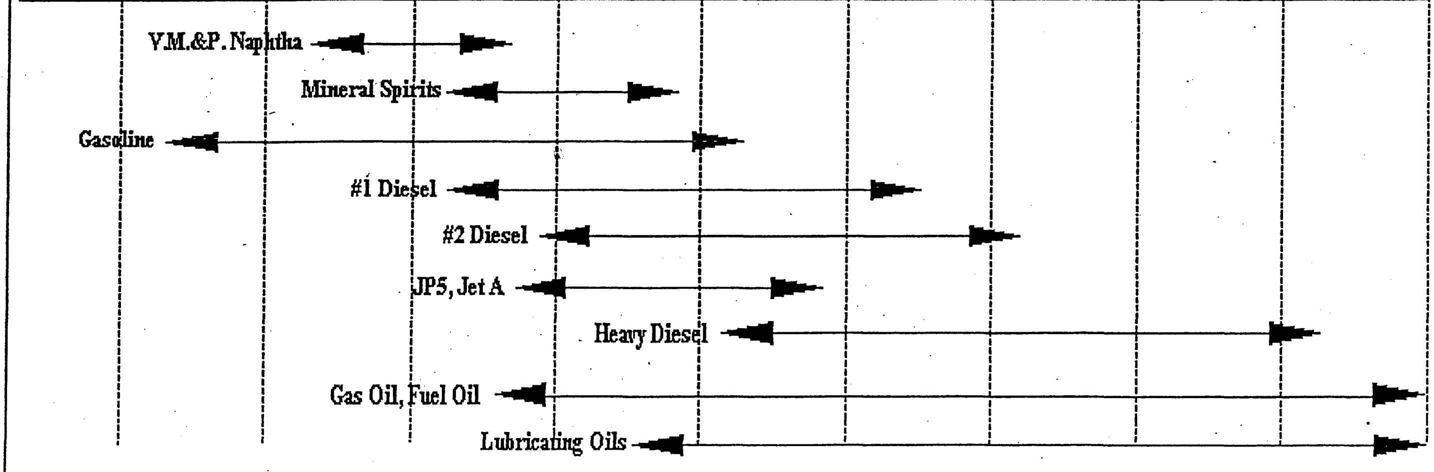
Sample ID: L130912-4 v3teh
Injection Date: 9/20/03
Injection Time: 12:30:09 PM
Instrument ID: teh1

Total Extractable Hydrocarbons



Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



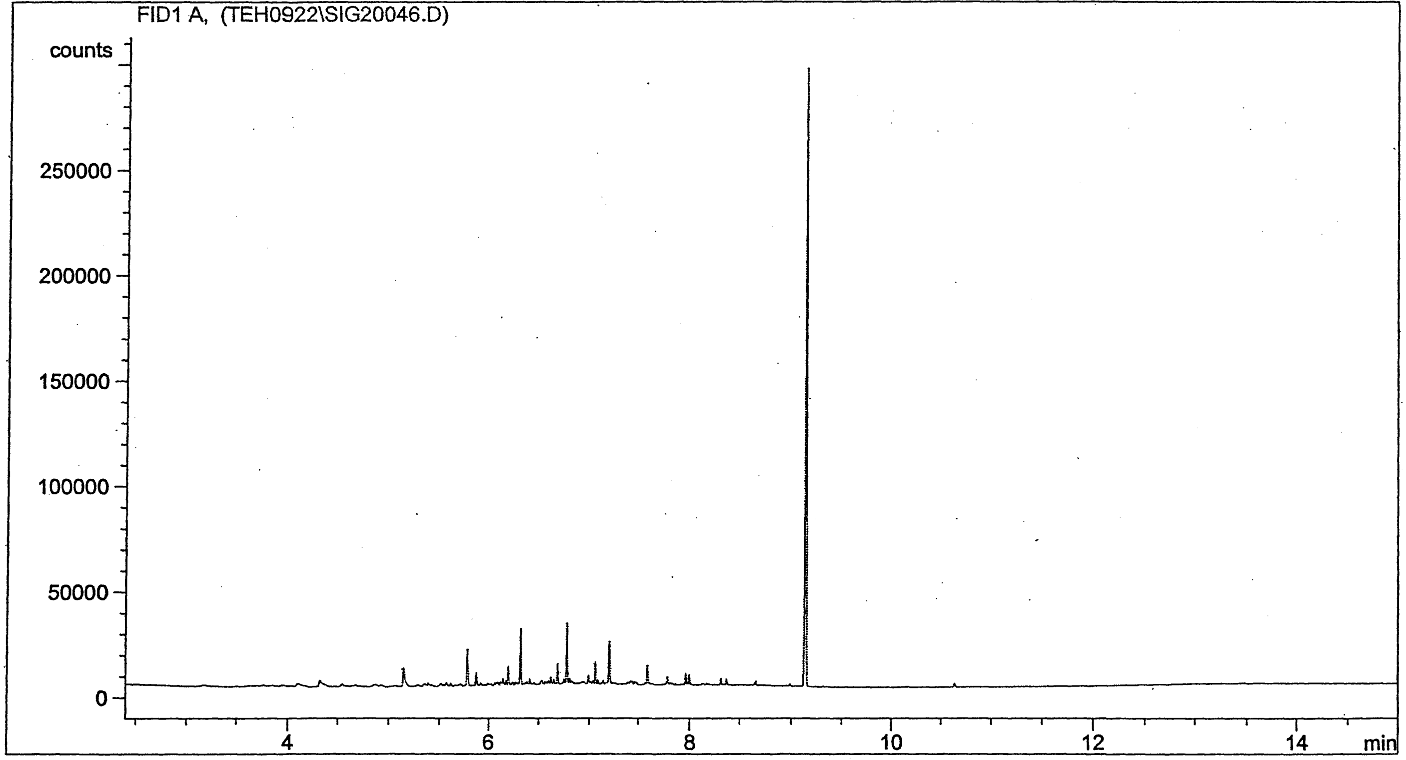
Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: SEPT 7 3PM AFTER

->

Sample ID: L130912-6 v4teh
Injection Date: 9/20/03
Injection Time: 12:53:43 PM
Instrument ID: teh1

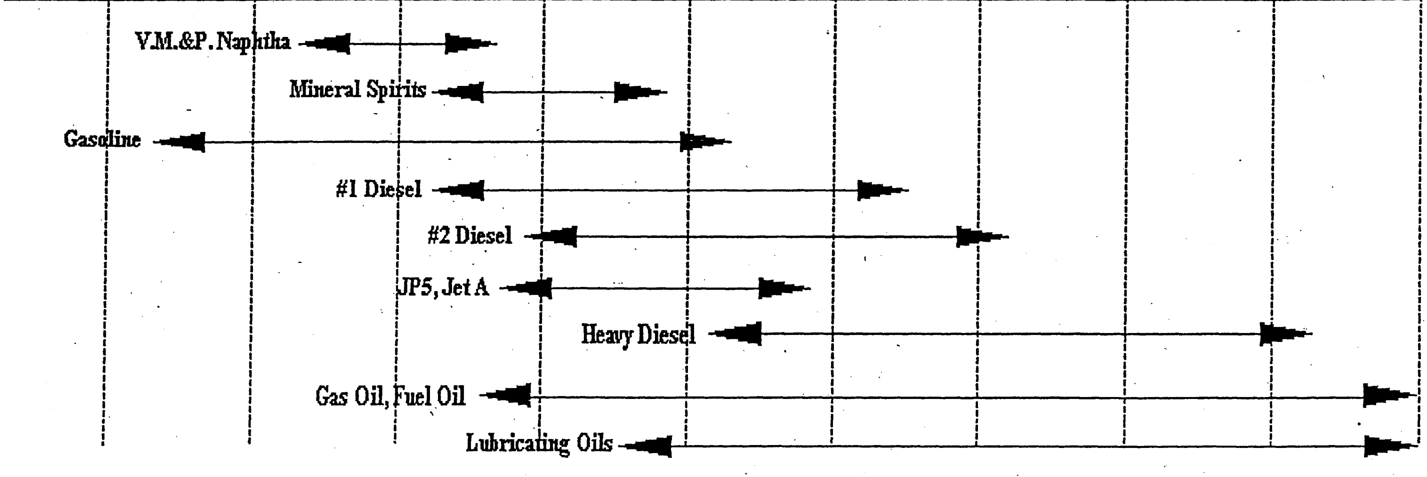
Total Extractable Hydrocarbons



C10 C14 C20 C30

Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



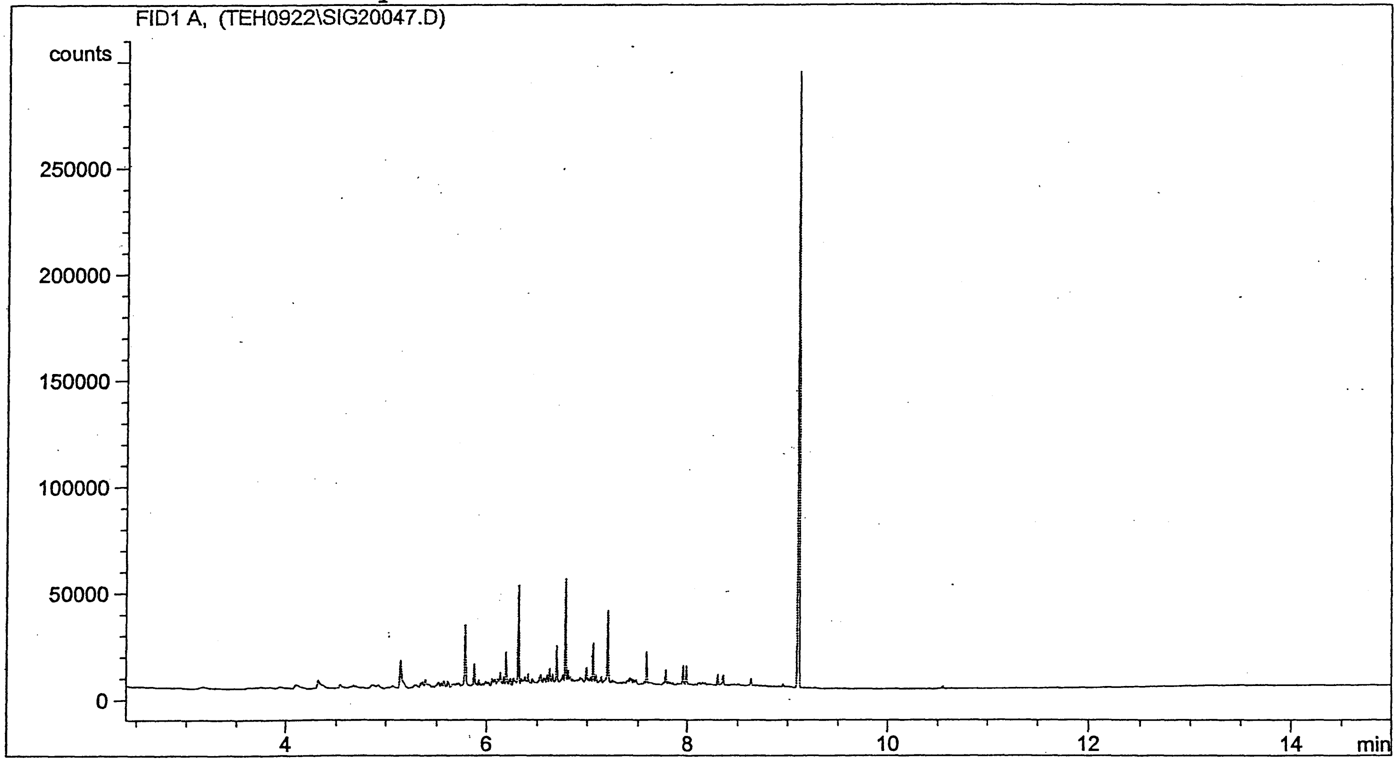
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: SEPT 8 3PM AFTER

->

Sample ID: L130912-8 v4teh
Injection Date: 9/20/03
Injection Time: 1:17:16 PM
Instrument ID: teh1

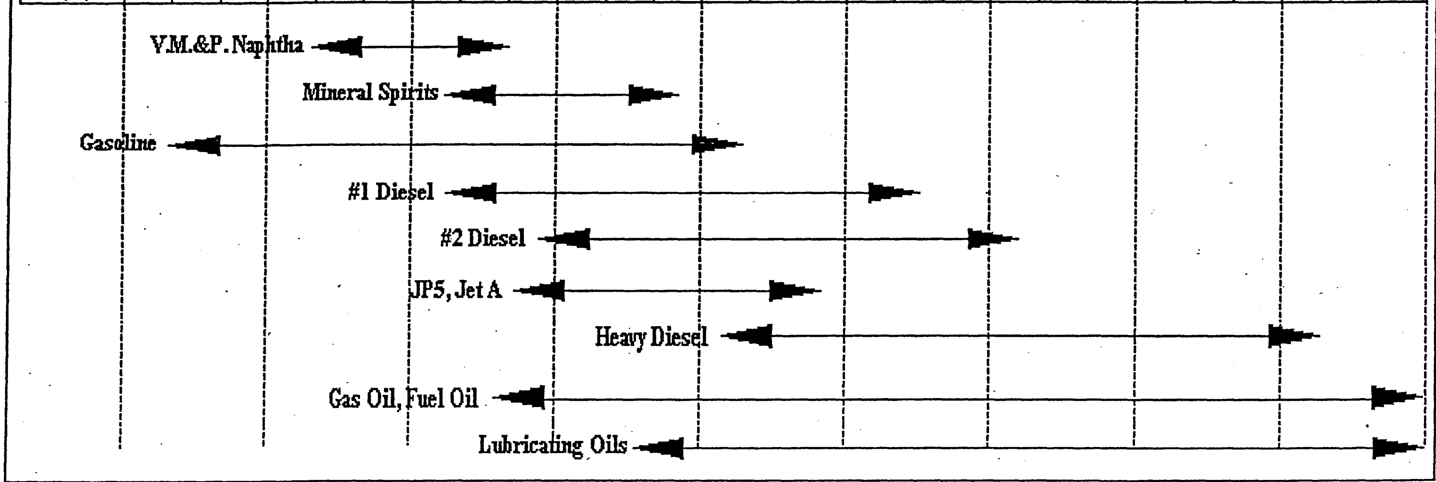
Total Extractable Hydrocarbons



C10 C14 C20 C30

Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

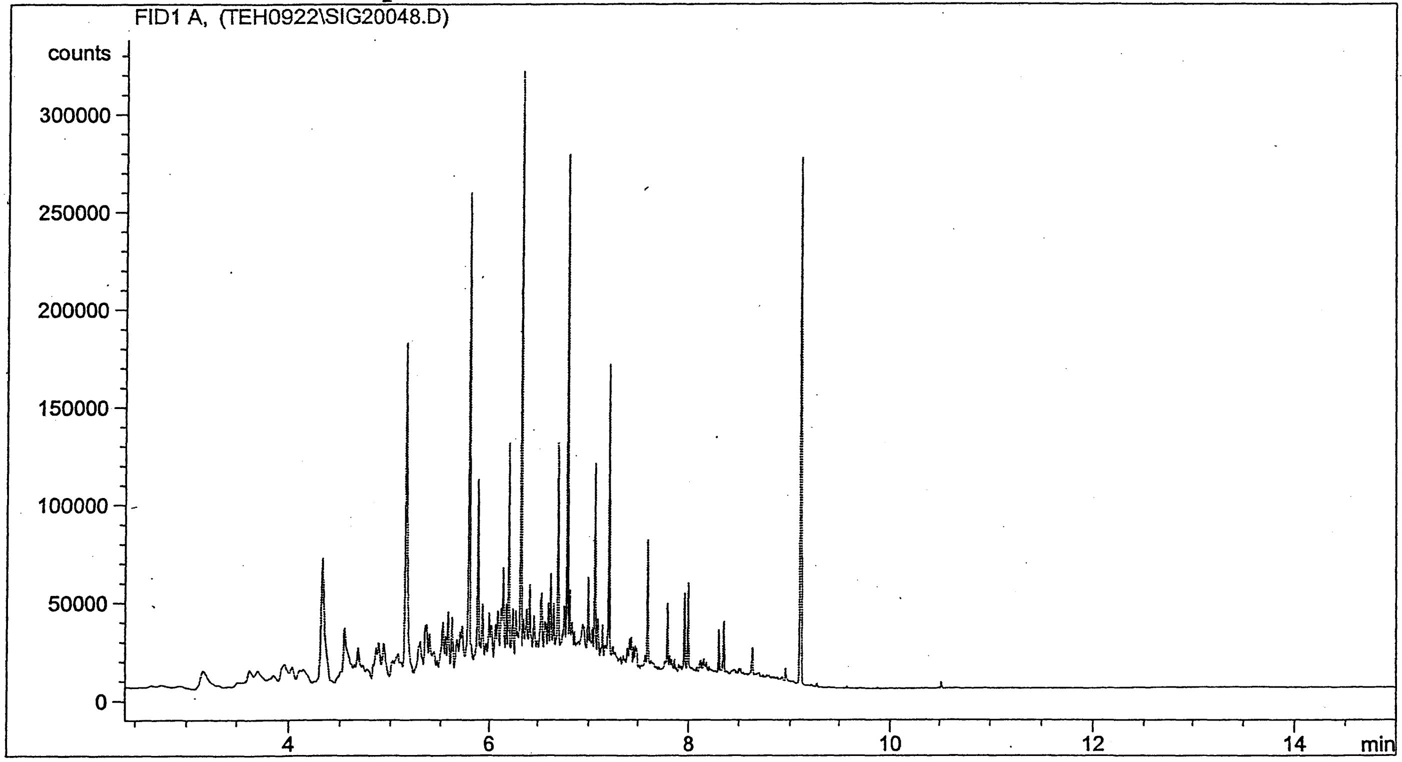
ETL

Client ID: SEPT 9 3PM AFTER

->

Sample ID: L130912-10 v4teh
Injection Date: 9/20/03
Injection Time: 1:40:51 PM
Instrument ID: teh1

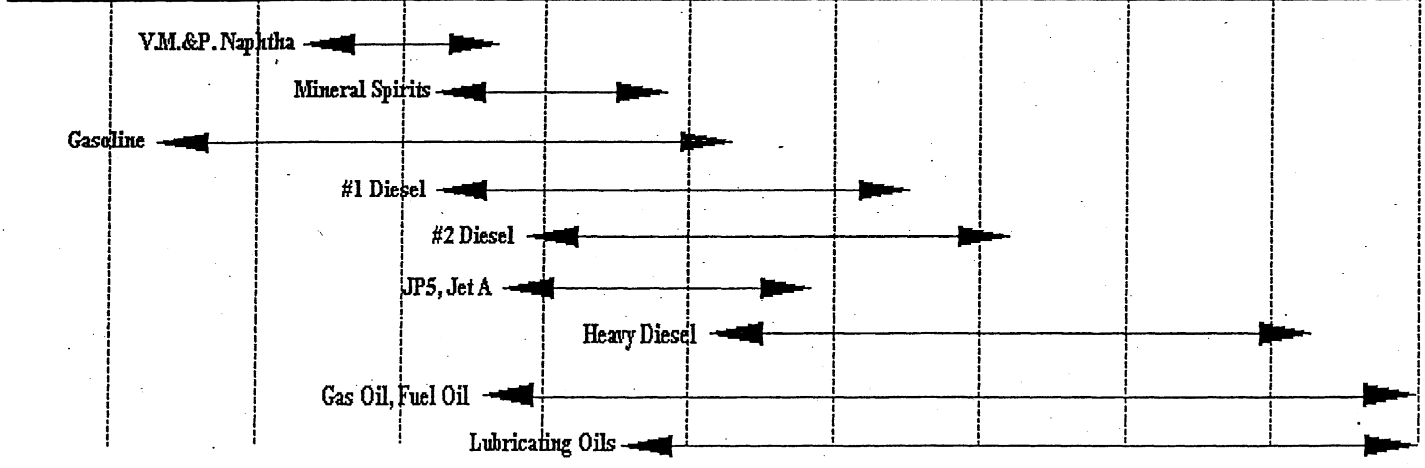
Total Extractable Hydrocarbons



C10 C14 C20 C30

Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



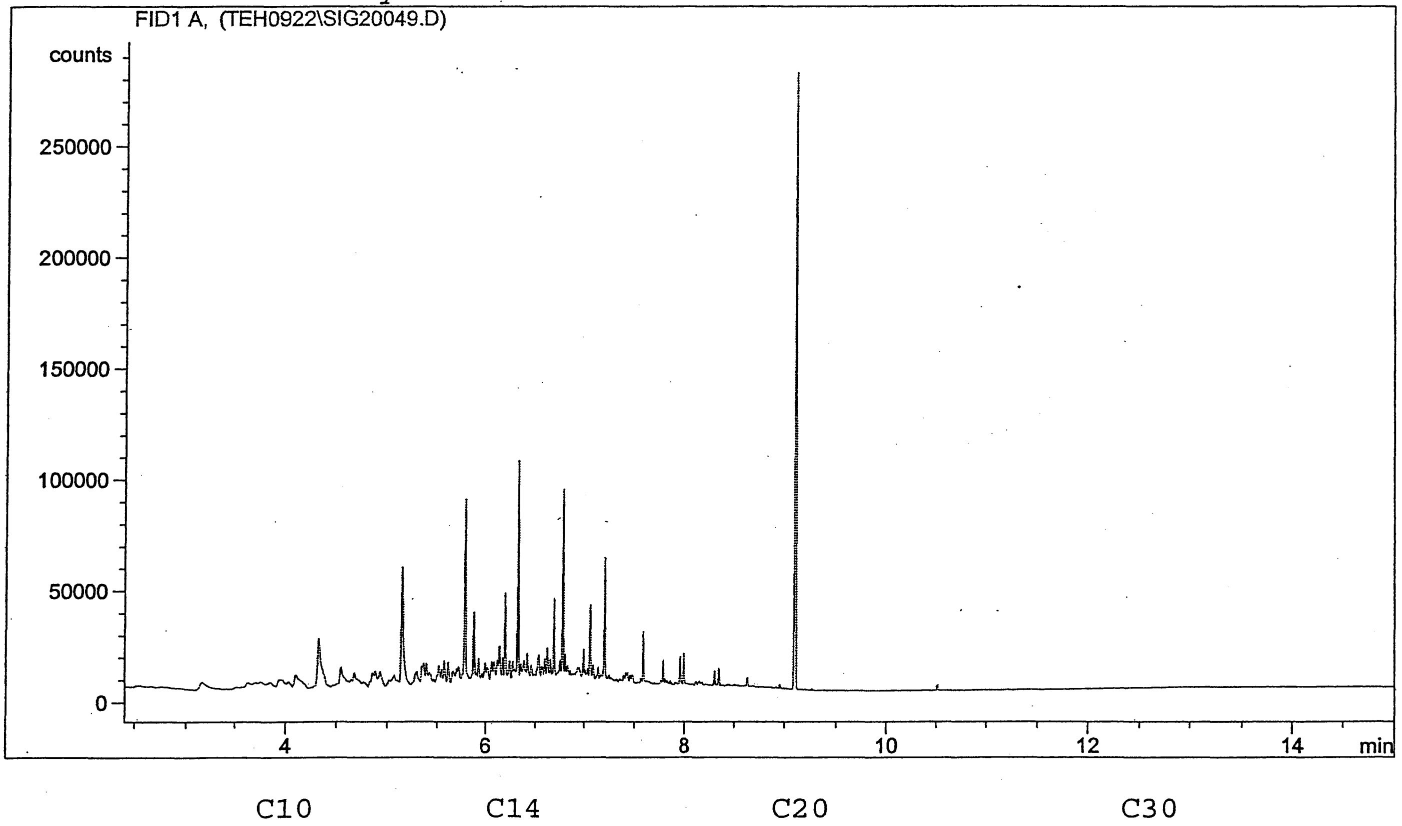
Adapted from: Drews, A.W., ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: SEPT 10 3PM AFTER

->

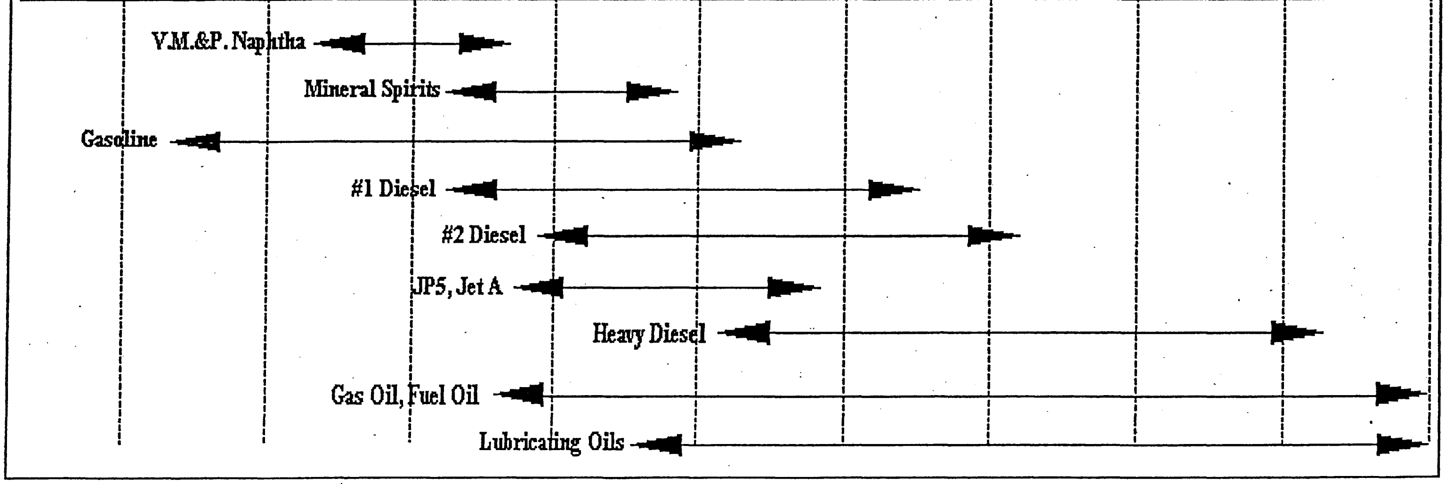
Sample ID: L130912-12 v4teh
Injection Date: 9/20/03
Injection Time: 2:04:30 PM
Instrument ID: teh1

Total Extractable Hydrocarbons



Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



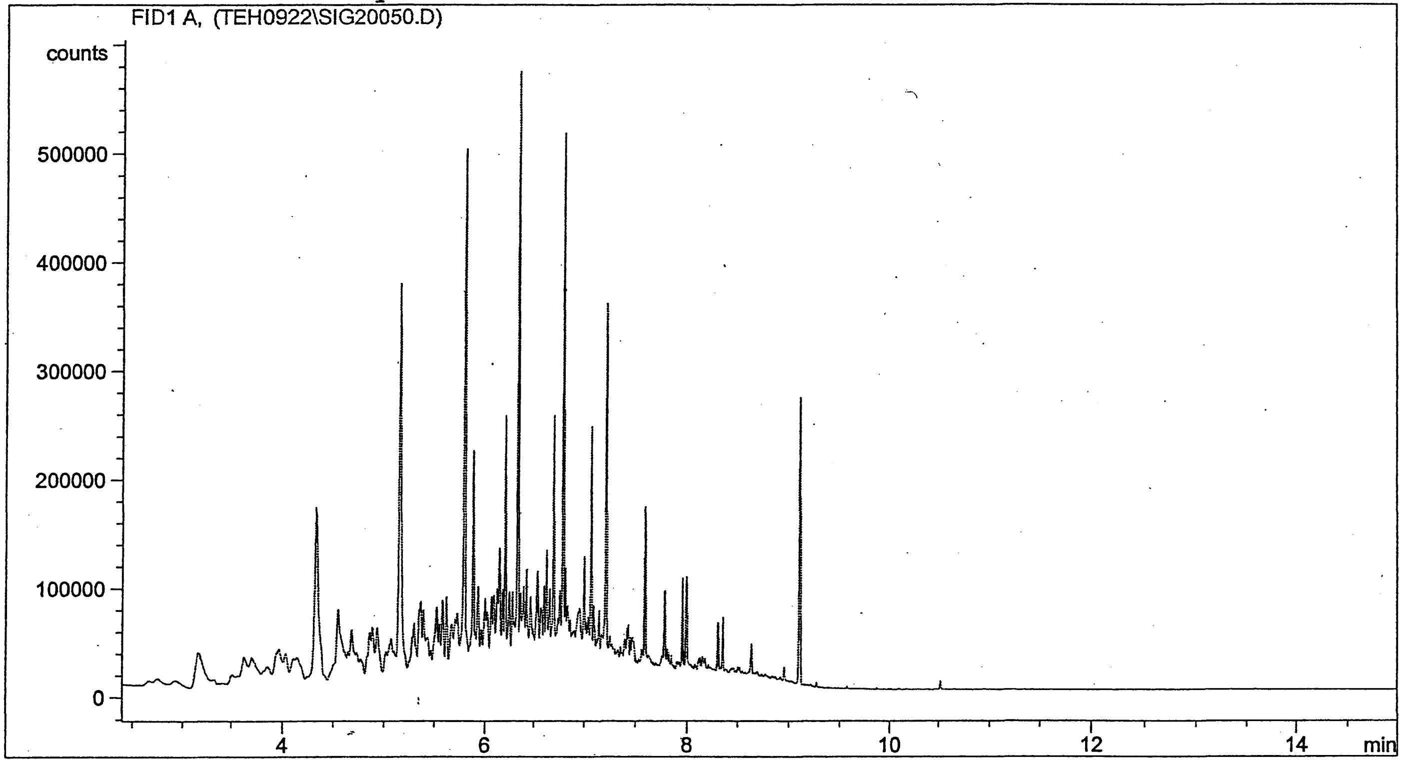
Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: SEPT 11 3PM AFTER

->

Sample ID: L130912-14 v4teh
Injection Date: 9/20/03
Injection Time: 2:28:08 PM
Instrument ID: teh1

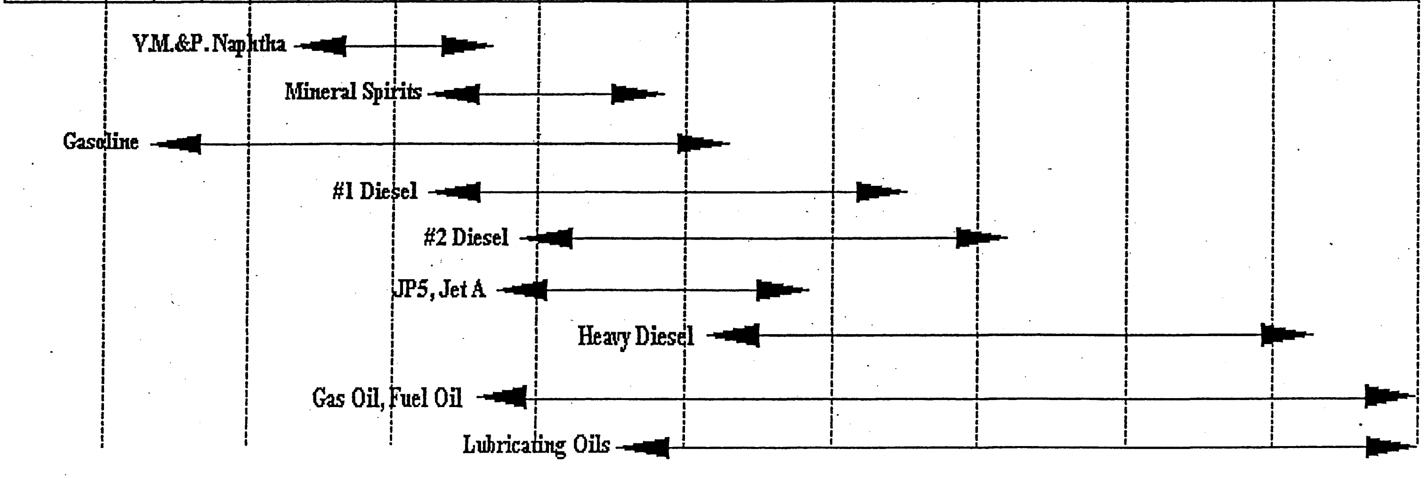
Total Extractable Hydrocarbons



C10 C14 C20 C30

Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



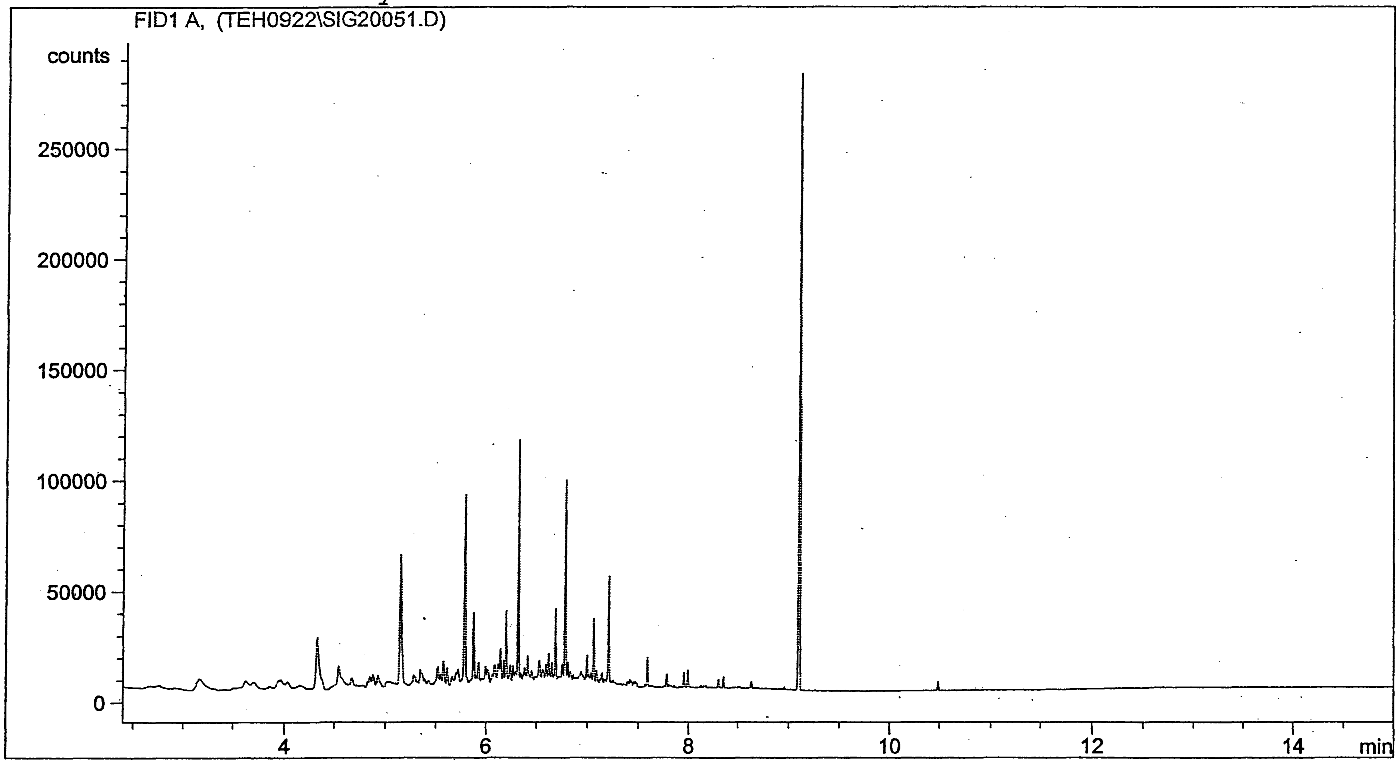
Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: SEPT 4 3PM AFTER

->

Sample ID: L130912-16 v4teh
Injection Date: 9/20/03
Injection Time: 2:52:02 PM
Instrument ID: teh1

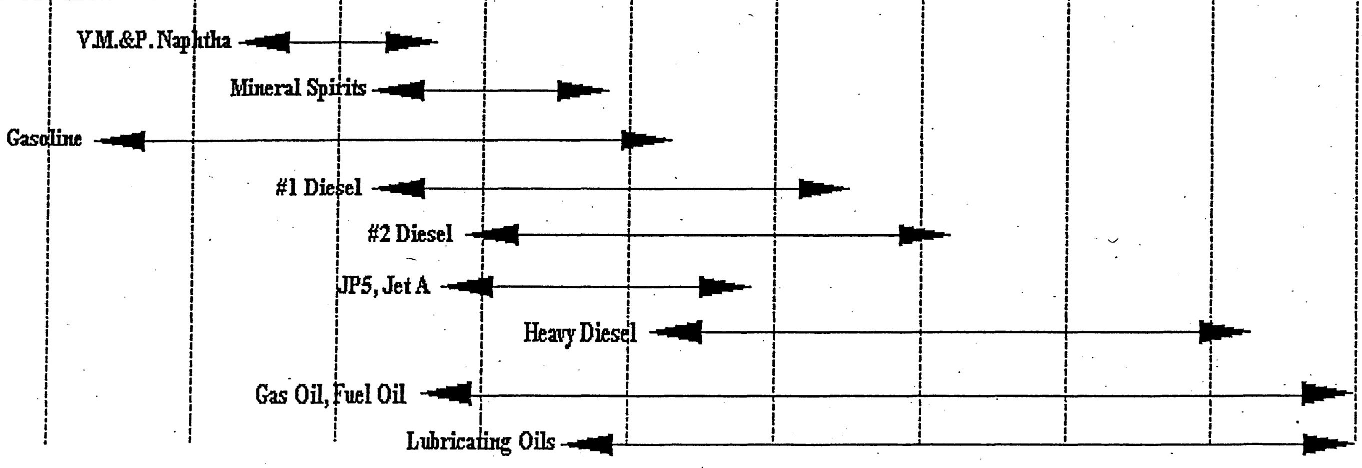
Total Extractable Hydrocarbons



C10 C14 C20 C30

Boiling Point Distribution Range for Petroleum Based Fuel Products

Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774	792	808	840



Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

ETL Enviro-Test LABORATORIES
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COC # 59954 Tracking Pg CL of ____
www.envirotest.com

REPORT TO:
COMPANY: EBA (Edm)
CONTACT: Steve Taylor
ADDRESS:
PHONE: 451-2130 x260 FAX:

INVOICE TO: SAME [✓ Y] N
COMPANY:
CONTACT:
ADDRESS:
PHONE: FAX:

DATE:
REPORT DISTRIBUTION: ALL FINAL RESULTS WILL BE MAILED
EMAIL ☒ FAX ☐
EMAIL 1: staylor@eba.ca
EMAIL 2: bmurphy@eba.ca
SELECT: pdf ☐ digital ☐ both ☒

INDICATE BOTTLES: FILTERED/PRESERVED (F/P) ▶
JOB # 1740065
PO / AFE:
LSD:
QUOTE #

ETL LAB WORK ORDER # L130912

SERVICE REQUESTED
☒ REGULAR SERVICE (DEFAULT)
☐ PRIORITY SERVICE (50% SURCHARGE)
☐ EMERGENCY SERVICE (100% SURCHARGE) b/62

ANALYSIS REQUEST

SAMPLE ID	SAMPLING LOCATION	SAMPLED BY / DATE / TIME	SAMPLING METHOD	SAMPLE TYPE	BTEX	TEH	TVH	HAZARDOUS? (Y/N)	NUMBER OF CONTAINERS	HIGHLY CONTAMINATED? (Y/N)	LAB SAMPLE #
Sept 5 3pm Before		D.Stapleton/Sept 5		Water	X	X	X		2	Y	1
Sept 5 3pm After					X	X	X		2		2
SEPT 6 3PM BEFORE					X	X	X		2	Y	3
SEPT 6 3PM AFTER					X	X	X		2		4
SEPT 7 3 PM BEFORE					X	X	X		1	Y	5
SEPT 7 3 PM AFTER					X	X	X		1		6
SEPT 8 3 PM BEFORE					X	X	X		1	Y	7
SEPT 8 3 PM AFTER					X	X	X		1		8
SEPT 9 3PM BEFORE					X	X	X		2	Y	9
SEPT 9 3PM AFTER					X	X	X		2		10

NOTES & CONDITIONS:
1. Quote number must be provided to ensure proper pricing.
2. Turnaround times will vary dependent on complexity of analysis & Lab workload at time of submission. Please contact the Lab to confirm turnaround time.
3. All hazardous samples submitted must be labeled to comply with WHMIS and TDG regulations. This must include the nature of the hazard, as well as a contact name & phone number that the Lab can contact for further information.

NOTE: Failure to properly complete all portions of this form may delay analysis.

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / NATURE OF HAZARDOUS MATERIAL

SAMPLE CONDITION
☐ FROZEN
☑ COLD
☐ AMBIENT
MEAN TEMPERATURE

RELINQUISHED BY: DATE & TIME:
RECEIVED BY: DATE & TIME: 1800 17-Sep-03
SAMPLE CONDITION ACCEPTABLE UPON RECEIPT? (Y/N)

RELINQUISHED BY: DATE & TIME:
RECEIVED BY: DATE & TIME:

REFER TO BACK FOR SAMPLING INFORMATION & REGIONAL LOCATIONS. WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

REVISED MAY 2003

EnviroTest LABORATORIES
A DIVISION OF ETL CHEMSPEC ANALYTICAL LIMITED

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM
CANADA TOLL FREE 1-800-668-9878

COC # 59954 Tracking Pg 2 of ____
www.envirotest.com

REPORT TO:
COMPANY: EBA (Edm)
CONTACT: [illegible]
ADDRESS:
PHONE: [illegible] x260 FAX:

INVOICE TO: SAME Y / N
COMPANY:
CONTACT:
ADDRESS:
PHONE: FAX:

DATE:
REPORT DISTRIBUTION: ALL FINAL RESULTS WILL BE MAILED
EMAIL ☒ FAX ☐
EMAIL 1: staylor@eba.ca
EMAIL 2: [illegible]@eba.ca
SELECT: pdf ☐ digital ☐ both ☒
INDICATE BOTTLES: FILTERED/PRESERVED (F/P) ▶
JOB # 1740065
PO / AFE:
LSD:
QUOTE #

ETL LAB WORK ORDER # L120912

SERVICE REQUESTED
☒ REGULAR SERVICE (DEFAULT)
☐ PRIORITY SERVICE (50% SURCHARGE)
☐ EMERGENCY SERVICE (100% SURCHARGE)

ANALYSIS REQUEST

SAMPLE ID	SAMPLING LOCATION	SAMPLED BY / DATE / TIME	SAMPLING METHOD	SAMPLE TYPE	BTEX	TEH	TVH								HAZARDOUS? (Y/N)	NUMBER OF CONTAINERS	HIGHLY CONTAMINATED? (Y/N)	LAB SAMPLE #
Sept 5 3pm Before		D.Stapleton/Sept 5		Water	X	X	X									2		1
Sept 5 3pm After					X	X	X									2		2
SEPT 6 3PM BEFORE					X	X	X									2	Y	3
SEPT 6 3PM AFTER					X	X	X									1		4
SEPT 7 3PM BEFORE					X	X	X									1	Y	
SEPT 7 3PM AFTER					X	X	X									1		
SEPT 8 3PM BEFORE					X	X	X									1	Y	7
SEPT 8 3PM AFTER					X	X	X									1		8
SEPT 9 3PM BEFORE					X	X	X									2	Y	9
SEPT 9 3PM AFTER						X	X									2		10

NOTES & CONDITIONS:
1. Quote number must be provided to ensure proper pricing.
2. Turnaround times will vary dependent on complexity of analysis & Lab workload at time of submission. Please contact the Lab to confirm turnaround time.
3. All hazardous samples submitted must be labeled to comply with WHMIS and TDG regulations. This must include the nature of the hazard, as well as a contact name & phone number that the Lab can contact for further information.

NOTE: Failure to properly complete all portions of this form may delay analysis.

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / NATURE OF HAZARDOUS MATERIAL

SAMPLE CONDITION
☐ FROZEN
☑ COLD
☐ AMBIENT
MEAN TEMPERATURE

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME: 1200 17-Sep-06
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

SAMPLE CONDITION ACCEPTABLE UPON RECEIPT? (Y/N)

REFER TO BACK FOR SAMPLING INFORMATION & REGIONAL LOCATIONS WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

REVISED MAY 2003

ETL Enviro·Test LABORATORIES
A DIVISION OF *ETL CHEMSPEC ANALYTICAL LIMITED*

CHAIN OF CUSTODY / ANALYTICAL REQUEST FORM
CANADA TOLL FREE 1-800-668-9878

COC # 59951

Pg ____ of ____
www.envirotest.com

REPORT TO:
COMPANY: EBA (EDM)
CONTACT: STEVE TAYLOR
ADDRESS:
x260
PHONE: 451 2130 FAX:

INVOICE TO: SAME [✓ Y] / N
COMPANY:
CONTACT:
ADDRESS:
PHONE: FAX:

DATE:
REPORT DISTRIBUTION: ALL FINAL RESULTS WILL BE MAILED
EMAIL ☐ FAX ☐
EMAIL 1: Staybr@eba.ca
EMAIL 2: bmurphy@eba.ca
SELECT: pdf ☐ digital ☐ both ☒

INDICATE BOTTLES: FILTERED/PRESERVED (F/P) ▶

JOB # 1740065
PO / AFE:
LSD:
QUOTE #

ETL LAB WORK ORDER #

SERVICE REQUESTED
☒ REGULAR SERVICE (DEFAULT)
☐ PRIORITY SERVICE (50% SURCHARGE)
☐ EMERGENCY SERVICE (100% SURCHARGE)

ANALYSIS REQUEST

SAMPLE ID	SAMPLING LOCATION	SAMPLED BY / DATE / TIME	SAMPLING METHOD	SAMPLE TYPE	BTEX	TEH	TVH								HAZARDOUS? (Y/N)	NUMBER OF CONTAINERS	HIGHLY CONTAMINATED? (Y/N)	LAB SAMPLE #
SEPT 10 3PM BEFORE		D STAPLETON		WATER	X	X	X									2	Y	11
SEPT. 10 3PM AFTER		D STAPLETON		|	X	X	X									2		12
SEPT 11 3PM BEFORE		|		|	X	X	X									2	Y	13
SEPT 11 3PM AFTER					X	X	X									2		14
SEPT 4 3PM BEFORE					X	X	X									2	Y	15
SEPT 4 3PM AFTER					X	X	X									2		16

NOTES & CONDITIONS:
1. Quote number must be provided to ensure proper pricing.
2. Turnaround times will vary dependent on complexity of analysis & Lab workload at time of submission. Please contact the Lab to confirm turnaround time.
3. All hazardous samples submitted must be labeled to comply with WHMIS and TDG regulations. This must include the nature of the hazard, as well as a contact name & phone number that the Lab can contact for further information.

NOTE: Failure to properly complete all portions of this form may delay analysis.

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / NATURE OF HAZARDOUS MATERIAL

SAMPLE CONDITION
☐ FROZEN
☐ COLD
☐ AMBIENT
MEAN TEMPERATURE

RELINQUISHED BY: DATE & TIME: RECEIVED BY: DATE & TIME:
RELINQUISHED BY: DATE & TIME: RECEIVED BY: DATE & TIME:

SAMPLE CONDITION ACCEPTABLE UPON RECEIPT? (Y/N)

REFER TO BACK FOR SAMPLING INFORMATION & REGIONAL LOCATIONS WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

REVISED MAY 2003

ETL EnviroTest LABORATORIES
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COC # 59951

Pg ____ of ____
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CONTACT: STEVE TAYLOR
ADDRESS:
x260
PHONE: 451 2130 FAX:

INVOICE TO: SAME [✓ Y] / N
COMPANY:
CONTACT:
ADDRESS:
PHONE: FAX:

DATE:
REPORT DISTRIBUTION: ALL FINAL RESULTS WILL BE MAILED
EMAIL ☐ FAX ☐
EMAIL 1: Staylor@eba.ca
EMAIL 2: bmurphy@eba.ca
SELECT: pdf ☐ digital ☐ both ☒

INDICATE BOTTLES: FILTERED/PRESERVED (F/P) ▶
JOB # 1740065
PO / AFE:
LSD:
QUOTE #

ETL LAB WORK ORDER #

SERVICE REQUESTED
☒ REGULAR SERVICE (DEFAULT)
☐ PRIORITY SERVICE (50% SURCHARGE)
☐ EMERGENCY SERVICE (100% SURCHARGE)

ANALYSIS REQUEST

SAMPLE ID	SAMPLING LOCATION	SAMPLED BY / DATE / TIME	SAMPLING METHOD	SAMPLE TYPE	BTEX	TEH	TVH								HAZARDOUS? (Y/N)	NUMBER OF CONTAINERS	HIGHLY CONTAMINATED? (Y/N)	LAB SAMPLE #
SEPT 10 3PM BEFORE		D Simpson		WATER	X	X	X									2		11
SEPT 10 3PM AFTER		D Simpson			X	X	X									2		12
SEPT 11 3PM BEFORE					X	X	X									2	Y	13
SEPT 11 3PM AFTER					X	X	X									2		14
SEPT 4 3PM BEFORE					X	X	X									2		15
SEPT 4 3PM AFTER					X	X	X									2	Y	16

NOTES & CONDITIONS:
1. Quote number must be provided to ensure proper pricing.
2. Turnaround times will vary dependent on complexity of analysis & Lab workload at time of submission. Please contact the Lab to confirm turnaround time.
3. All hazardous samples submitted must be labeled to comply with WHMIS and TDG regulations. This must include the nature of the hazard, as well as a contact name & phone number that the Lab can contact for further information.

NOTE: Failure to properly complete all portions of this form may delay analysis.

GUIDELINES / REGULATIONS

SPECIAL INSTRUCTIONS / NATURE OF HAZARDOUS MATERIAL

SAMPLE CONDITION
☐ FROZEN
☐ COLD
☐ AMBIENT
MEAN TEMPERATURE

SAMPLE CONDITION ACCEPTABLE UPON RECEIPT? (Y/N)

RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:
RELINQUISHED BY:	DATE & TIME:	RECEIVED BY:	DATE & TIME:

REFER TO BACK FOR SAMPLING INFORMATION & REGIONAL LOCATIONS   WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

REVISED MAY 2003

APPENDIX F
NOTICE OF DISCHARGE

Miramar
Mining

MIRAMAR HOPE BAY LTD.

300 - 889 Harbourside Drive, North Vancouver, B.C. V7P 3S1 Canada
Phone 604-985-2572 Fax 604-980-0731

27 August 2003 ***Via e-mail only:***

Mr. Philippe di Pizzo
Executive Director
Nunavut Water Board,
P.O. Box 119
Gjoa Haven, NU, X0E 1J0

Dear Mr. di Pizzo,

Re: Water License: NWB1BOS0106 – Notice of Discharge:

Further to my telephone call with Dionne Filiatrault on August 27, 2003, I mentioned that we intended to discharge treated water that was collected during the response to the fuel spill that occurred on June 28, 2003 and reported to the 24 Hour spill line and recorded as Spill # 03-452.

As I mentioned we have had consultant supervision on the response to this spill and a component of this response was the installation of a water filtration process that treats the oil contaminated water that has been collected. The filtration system has performed well with the treated water being deposited into the North settling pond. This pond has been relined with a liner to ensure containment until discharge. We attach lab results for samples of influent into the treatment system and effluent from the treatment system and based on these results, which are well within industry standards, we intend to discharge the contents of the North Settling Pond commencing on September 6, 2003 and will continue this discharge until all contaminated water has been processed. We expect that treatment and discharge will be completed by 30th September, 2003.

You will note that we have directly copied the DIAND water use inspector so he is aware of the planned discharge. We understand that the inspector is planning a routine inspection next week and this will provide the opportunity for him to see firsthand MHBL's response activities to Spill # 03-452.

If you have any questions related to this matter, please do not hesitate to contact the undersigned on the above numbers or 1-780-975-2550, or you can contact me by e-mail at hugh_r_wilson@hotmail.com; or hwilson@miramarmining.com.

Sincerely,
Miramar Hope Bay Ltd.

Original signed by :" H. R. Wilson"

Hugh R. Wilson,
Manager, Environmental Affairs

CC: Dionne Filiatrault, Snr. Tech. Adv. NBW (by e-mail only)
Constantine Bodykevich, Water Resources Officer DIAND (by e-mail only)
Brad Mercer: Project Manager/Boston- MHBL (e-mail only)
D. Fonseca: MHBL Vancouver (e-mail only)

Attach: Enviro-Test laboratory results:

APPENDIX G
EBA TERMS AND CONDITIONS

EBA Engineering Consultants Ltd. (EBA)
ENVIRONMENTAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these "General Conditions".

1.0 USE OF REPORT

This report pertains to a specific site, a specific development, and a specific scope of work. It is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site or proposed development would necessitate a supplementary investigation and assessment.

This report and the assessments and recommendations contained in it are intended for the sole use of EBA's client. EBA does not accept any responsibility for the accuracy of any of the data, the analysis or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 LIMITATIONS OF REPORT

This report is based solely on the conditions which existed on site at the time of EBA's investigation. The client, and any other parties using this report with the express written consent of the client and EBA, acknowledge that conditions affecting the environmental assessment of the site can vary with time and that the conclusions and recommendations set out in this report are time sensitive.

The client, and any other party using this report with the express written consent of the client and EBA, also acknowledge that the conclusions and recommendations set out in this report are based on limited observations and testing on the subject site and that conditions may vary across the site which, in turn, could affect the conclusions and recommendations made.

The client acknowledges that EBA is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the client.

2.1 Information Provided to EBA by Others

During the performance of the work and the preparation of this report, EBA may have relied on information provided by persons other than the client. While EBA endeavours to verify the accuracy of such information when instructed to do so by the client, EBA accepts no responsibility for the accuracy or the reliability of such information which may affect the report.

3.0 LIMITATION OF LIABILITY

The client recognizes that property containing contaminants and hazardous wastes creates a high risk of claims brought by third parties arising out of the presence of those materials. In consideration of these risks, and in consideration of EBA providing the services requested, the client agrees that EBA's liability to the client, with respect to any issues relating to contaminants or other hazardous wastes located on the subject site shall be limited as follows:

(1) With respect to any claims brought against EBA by the client arising out of the provision or failure to provide services hereunder shall be limited to the amount of fees paid by the client to EBA under this Agreement, whether the action is based on breach of contract or tort;

(2) With respect to claims brought by third parties arising out of the presence of contaminants or hazardous wastes on the subject site, the client agrees to indemnify, defend and hold harmless EBA from and against any and all claim or claims, action or actions, demands, damages, penalties, fines, losses, costs and expenses of every nature and kind whatsoever, including solicitor-client costs, arising or alleged to arise either in whole or part out of services provided by EBA, whether the claim be brought against EBA for breach of contract or tort.

4.0 JOB SITE SAFETY

EBA is only responsible for the activities of its employees on the job site and is not responsible for the supervision of any other persons whatsoever. The presence of EBA personnel on site shall not be construed in any way to relieve the client or any other persons on site from their responsibility for job site safety.

5.0 DISCLOSURE OF INFORMATION BY CLIENT

The client agrees to fully cooperate with EBA with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The client acknowledges that in order for EBA to properly provide the service, EBA is relying upon the full disclosure and accuracy of any such information.

6.0 STANDARD OF CARE

Services performed by EBA for this report have been conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Engineering judgement has been applied in developing the conclusions and/or recommendations provided in this report. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of this report.

7.0 EMERGENCY PROCEDURES

The client undertakes to inform EBA of all hazardous conditions, or possible hazardous conditions which are known to it. The client recognizes that the activities of EBA may uncover previously unknown hazardous materials or conditions and that such discovery may result in the necessity to undertake emergency procedures to protect EBA employees, other persons and the environment. These procedures may involve additional costs outside of any budgets previously agreed upon. The client agrees to pay EBA for any expenses incurred as a result of such discoveries and to compensate EBA through payment of additional fees and expenses for time spent by EBA to deal with the consequences of such discoveries.

8.0 NOTIFICATION OF AUTHORITIES

The client acknowledges that in certain instances the discovery of hazardous substances or conditions and materials may require that regulatory agencies and other persons be informed and the client agrees that notification to such bodies or persons as required may be done by EBA in its reasonably exercised discretion.

9.0 OWNERSHIP OF INSTRUMENTS OF SERVICE

The client acknowledges that all reports, plans, and data generated by EBA during the performance of the work and other documents prepared by EBA are considered its professional work product and shall remain the copyright property of EBA.

10.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by EBA shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancies, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by EBA shall be deemed to be the overall original for the Project.

The Client agrees that both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. The Client warrants that EBA's instruments of professional service will be used only and exactly as submitted by EBA.

The Client recognizes and agrees that electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.