HAZARDOUS MATERIALS INVENTORY AND SITE ASSESSMENT
MOUNT NANSEN MINE SITE
YUKON TERRITORY

Submitted to:

DEPARTMENT OF ENERGY, MINES AND RESOUCES
Yukon Government
c/o Hugh Copland
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EXECUTIVE SUMMARY

Kearah & WERI Environmental Contracting Limited (KWEC) was retained by the Department of Energy, Mines and Resources of the Yukon Government to conduct a hazardous materials inventory and environmental assessment at the Mount Nansen Mine site, Yukon Territory. The inventory conducted by KWEC in 2006, on behalf of the Government of Yukon, addressed the identification, quantities and methods of storage for the following materials:

a) Ore process chemicals
b) Wastewater treatment chemicals
c) Miscellaneous chemicals
d) Petroleum products and solvents
e) Inventory of hazardous materials potentially stored in various buildings located at the Mount Nansen Mine site

As part of the assessment, samples of transformer oil were obtained from seven transformers located in the scrapyard in front of the Mill. Additional oil samples were also obtained from eight drums located at the drum cache located at Warehouse 1 (W1). The former were tested for polychlorinated biphenyls (PCBs) while the latter were tested to determine the contents of the substances submitted from the selected drums.

The results of the analytical reports indicated that two of the transformers contained PCBs while the remainder had results that were below the detection limits of the testing instruments. Analysis of the oil submitted from the drum cache identified that they typically consisted of heavier hydrocarbons associated with lubricating oils and diesel fuel. Some of these samples also had various metals in the composition. One of the samples indicated that it contained lighter hydrocarbons typical of gasoline. However, one of the samples had a result that was not consistent with the presence of typical hydrocarbons and it is unclear what the contents of this sample are.

1.0 INTRODUCTION

1.1 Terms of Reference

Kearah & WERI Environmental Contracting Limited (KWEC) was retained by the Department of Energy, Mines and Resources, Yukon Government to conduct a hazardous materials inventory and environmental assessment at the Mount Nansen Mine site. These tasks were performed according to the statement of work provided by Energy, Mines and Resources. KWEC received authorization to proceed from Mr. Hugh Copland, Project Manager, Energy, Mines and Resources. The work was conducted in August 2006.

1.2 Background

Since 1942, there has been intermittent gold and silver exploration and mining in the Mount Nansen area. A mill was constructed and ore from the Huestis and Webber veins was mined underground. Two attempts at production were undertaken from September 1968 to April 1969 and again for five months from 1975–1976. Both attempts did not meet gold and silver recovery expectations and were not profitable.

BYG Natural Resources Incorporated was part or whole owner of the property since 1985, when the company and various partners began exploration of the Brown McDade vein system. A mine and mill operated from November 1996 to November 1997 and March 1998 to February 1999. In February of 1999, the company failed to meet its water license obligations and the Department of Indian Affairs and Northern Development (DIAND) ordered the company to meet these requirements or shut down. On February 17, 1999, operations ceased. The Yukon Government is currently coordinating the final cleanup.

A hazardous materials inventory and environmental assessment was conducted at the Mount Nansen Mine site in 1999 by Conor Pacific. The results of the inventory and assessment identified several materials associated with mining activity that was being stored on site, and previous and current environmental issues that may have an impact to the site and/or users of the site, which included:

a) Chemicals and reagents
b) Fuels, oils, greases and solvents
c) Sulphur dioxide (SO_2) storage tank, fuel storage tanks and pressurised gas cylinders
d) Transformers
e) Soil staining and stressed vegetation
f) Explosives
g) Surplus and/or scrap materials
h) Vehicles
i) Fill materials and solid waste
j) Infrastructure damage

1.2 Objectives

Additional activities have been conducted at the Mount Nansen Mine site since the inventory and assessment conducted in 1999. Therefore, another hazardous materials inventory was required to update the current status of materials being stored at the Mount Nansen Mine site. The inventory conducted by KWEC in 2006, on behalf of the Government of Yukon, addressed the quantities and methods of storage for the following materials:

f) Ore process chemicals
g) Wastewater treatment chemicals
h) Miscellaneous chemicals
i) Petroleum products and solvents
j) Inventory of hazardous materials potentially stored in various buildings located at the Mount Nansen Mine site

Furthermore, a site assessment was required to address additional environmental issues at the Mount Nansen Mine site that includes;

k) Purging of the SO_2 storage tank (this requirement, however, was removed from the Statement of Work since the current receiver, PricewaterhouseCoopers, is considering the re-sale of the storage tank)
l) Inventory of transformers and sampling of transformer oil for the presence of polychlorinated biphenyls (PCBs)

1.3 Scope of Work

The scope of work for this project included:

- A detailed inventory of the chemicals in storage at the mine site
- A general assessment of site conditions including the condition of the containers, storage practices, evidence of environmental impact, potential of environmental impact, *etc*
- Sampling of transformer oil from transformers being stored on site and submission to an accredited laboratory to be tested for polychlorinated biphenyls (PCBs)
- Sampling of oil-like substance obtained from the drum cache located behind the Warehouse (W1) building and submission to an accredited laboratory to analyze the contents in the samples
- Preparation of a closure report detailing site activities and discussing the sampling results

2.0 SITE DESCRIPTION

The mine is located 60km west of Carmacks and 180km north of Whitehorse, Yukon Territory, in the Little Salmon/Carmacks First Nation traditional territory. Buildings/areas that were investigated at the site included Crusher Building 1 (C1), Crusher Building 2 (C2), Generator Room, Ketza Shop (KS), Laboratory 1 (L1), Mill Building 1 (M1), Mill Building 2 (M2), Mill Boneyard, Scrapyard in front of the Mill,

Shop 1 (S1), Stockpile Area located outside under large black tarp, Tailings Pond and Warehouse 1 (W1).

3.0 SITE INVENTORY AND SITE ASSESSMENT

The chemical inventory and site assessment consisted of denoting all visible activities and any physical evidence present at the Mount Nansen Mine site. However, the chemical inventory and site assessment was limited by the availability of information at the time of the assessment. Hence, it is possible that unreported or unrecorded activities could have impacted the environmental condition of the site, which could not be identified at the time of the assessment. Verification of some of the information may not always be possible and the chemical inventory and site assessment was also limited by time, budgetary constraints and the reliability of information on the containers and from others.

Mr. Mike Mahoney, President, KWEC, conducted the chemical inventory and site assessment of the Mount Nansen Mine site. Building and storage areas that were inventoried are identified in Section 2.0. The inventory assessment identified the following:

- Chemicals and reagents (ore process, water treatment, laboratory use, *etc*)
- Fuels, oils, greases and solvents
- Above ground storage tanks and pressurized gas cylinders
- Transformers
- Soil staining
- Surplus and/or scrap materials (drums)
- General condition of storage areas and storage containers

The materials listed above were identified primarily by information obtained from Workplace Hazardous and Materials Information System (WHMIS) labels on the storage containers. However, some materials that were not labeled were identified by visual and/or olfactory observations where containers were open or easily accessible, or where the contents were visible. Some materials that could not be identified were recorded as an unknown substance. A detailed inventory of materials identified by site during the site assessment is attached in Annex A. Photographs of site activities are included in Annex B. The following summarizes the findings of the chemical inventory and site assessment on a site-by-site basis.

Crusher Building 1 (C1)

Substances found at this building included various hydrocarbons (waste oil, gear oil, motor oil, grease and kerosene.) There were also eight empty 45 gallon containers, some of which were half buried in a pile of sawdust. Furthermore, the empty drums were unclean and filled with dirt. Water has collected in the drums, causing the formation of a sludge material. All of the drums were in good condition but many were missing bungs/caps.

Crusher Building 2 (C2)

Three 45 gallon containers that contained motor oil were located at C2.

Generator Room

Materials identified in the Generator Room included various hydrocarbons (lubricants, solvent, engine degreaser, starting fluid, oil) as well as heavy duty boiler compound, paint, contact cement, stop slip belt dressing and sealant.

Ketza Shop (KS)

Various hydrocarbons that included motor oil, kerosene and lubricants were located at Building KS. In addition, seven batteries that may contain acid were being stored at the Ketza Shop, as well as cement powder, sludge material contained in three 45 gallon drums and three transformers. The transformers were modern and they did not contain PCBs. An empty waste oil tank with a capacity of 500 gallons was located inside the building. Furthermore, there was a significant amount of scrap metal and refuse within vicinity of the building. Staining that may have been caused by hydrocarbons was observed in the shop (on the dirt floor) and in the boneyard. Surface staining was also observed near the corner of the building. One older transformer was located that did not appear to have been cleaned.

Laboratory 1 (L1)

Several chemicals associated with laboratory use were identified during the site assessment, as shown in the Hazardous Materials Inventory. The site assessor was unable to identify two liquids and one powder substance since proper labeling was absent.

Mill Building 1 (M1)

Materials identified in M1 included motor oil and flocculent. M1 also contained two holding tanks that were in good condition.

Mill Building 2 (M2)

Chemicals that were located in the Mill Building included sodium metabisulfite, Ferix-3, copper sulphate, sulphuric acid and calcium fluoride. Other materials included grease, acetylene and silica sand. Various chemicals used in the water treatment process were neatly stacked within the building. Ketsa and DIAND used M2 for the cleaning of the tailings water. This was a water treatment facility. A lime silo was located behind M2 (¼ full).

Mill Boneyard

The Mill Boneyard contained 23 vehicle batteries that may contain acid.

Scrapyard in Front of Mill

The scrapyard in front of the Mill contained 12 transformers. The assessment concluded that seven of the transformers were full and the remaining five were empty. The oil from the full transformers was sampled and submitted to an accredited laboratory to be tested for PCBs; the results of the sampling program are discussed in Section 4. The lids and seals on the transformers were in poor condition and staining was observed near one of the transformers. The transformers were located on an embankment that showed evidence of erosion, which may threaten the stability of the transformers.

Shop 1 (S1)

Shop 1 contained materials that are typically found in a shop, which included compressed gases (argon, carbon dioxide, propane and nitrogen), solvents and paint materials, and motor-related fluids. S1 also contained various sized cans and containers, and oil and grease that were in use by the care and maintenance contractor under contract with the Government of Yukon. A box of fluorescent light bulbs was being stored in S1.

Stockpile Area Located Outside Under Large Black Tarp

Chemicals that were found in the Stockpile Area included sodium hydroxide, manganese dioxide, borax, sodium carbonate, sodium metabisulfite, lead nitrate and sodium nitrate. Other materials included hydraulic oil, grease, and antiscalant. Additionally, several drums contained residue of sulphuric acid, muriatic acid (hydrochloric acid) and hydrogen peroxide (50%). There were also three 45 gallon drums that contained an unidentified substance; some of the drums containing the unidentified substance were damaged. The drums that contained the lead nitrate were also in poor condition and some of the pallets that were used to store some of the containers were damaged. Furthermore, six 1 ton totes that were identified as containing fertilizer contained a substance that was similar in appearance to spent activated carbon. Two of the totes were ripped open.

Tailings Pond

The Tailings Pond site contained soda lime, antiscalant and synthetic lubricant.

Warehouse 1 (W1)

Warehouse 1 contained several chemicals, as listed in Annex A. Of particular note, W1 contained 161 drums. The drums once contained sulphuric acid, muriatic acid, hydrogen peroxide and waste oil. A large proportion of the drums were unrinsed and contained residue. Approximately 2% of the drums are missing bungs/caps. Staining that was presumably due to leaking from the drums was visible at the stockpile area. Confirmatory samples were submitted from 8 drums to determine if the contents consisted of waste oil. The results of the sampling program are discussed in Section XX.

4.0 SAMPLING PROGRAM

4.1 Sampling Program

Confirmatory Soil Samples

All confirmatory samples obtained from the treatment area were submitted for analysis to ALS Laboratory Group, a Canadian Association for Environmental Analytical Laboratories (CAEAL) and Standards Council of Canada (SCC) accredited laboratory. A copy of the laboratory report is included in Annex C.

Discussion of Field Screening of Soil and Analytical Analyses

Analysis of PCBs in Oil

Oil samples were obtained from seven transformers located at the scrapyard in front of the Mill Building. In total, seven (7) oil samples were submitted for analytical analysis. The samples *Transformer 1*, *Transformer 2*, *Transformer 3*, *Transformer 4*, *Transformer 5*, *Transformer 6* and *Transformer 7* were obtained from the transformers with the corresponding numerical label. Each oil sample was tested for PCBs. The results of the analytical analyses indicated that Transformer 1 and Transformer 4 contained oil that contained PCBs. Sample *Transformer 1* had a result of 8.5 parts per million (ppm) and sample *Transformer 4* had a result of 34ppm. All other samples had results that were below the detection limits of the laboratory instruments.

Analysis of Oil Samples

Oil samples were obtained from eight 205L drums located at Warehouse 1. In total, eight (8) oil samples were submitted for analysis. Samples *Drum 1*, *Drum 3*, *Drum 5* and *Drum 7* were submitted for a special oil test to determine the contents of the oil. Additionally, these samples were also tested for aluminium, copper, iron, tin, chromium, lead ,cadmium, nickel, titanium, zinc, phosphorous, molybdenum, calcium, barium, magnesium, boron, sodium and silicon. Conversely, samples *Drum 2*, *Drum 4*, *Drum 6* and *Drum 8* were tested for petroleum hydrocarbon Fraction #1, #2, #3 and #4.

The results of the analytical analyses identified that the samples *Drum 1* and *Drum 5* consisted of used diesel engine oil, while *Drum 3* and *Drum 7* consisted of used engine oil. Furthermore, each of the samples *Drum 1*, *Drum 3*, *Drum 5* and *Drum 7* contained various amounts of metals, as shown in the laboratory report. The results of the analytical analyses conducted on samples *Drum 4* and *Drum 6* indicated that the composition was consistent with heavier hydrocarbons such as diesel fuel, while the sample *Drum 8* was consistent with lighter hydrocarbons such as gasoline. The sample *Drum 1*, however, did not have results that would indicate the presence of typical fuels; it is uncertain from the result what the contents of this sample are.

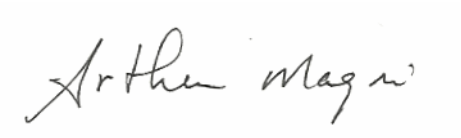
5.0 CLOSURE

The conclusions presented in this report were based on the scope of work outlined for the purpose of the investigation, and were prepared in accordance with accepted

environmental principles and practices. However, as with any environmental site assessment, the intent is to identify areas of potential concern and not to eliminate potential environmental concerns that were beyond the scope of work.

The observations made at the site do not apply to areas that could not be observed or beyond the scope of work. In addition, other materials or compounds not investigated or addressed, or beyond the scope of work could be present at the site. If other chemical parameters are identified as an environmental concern, KWEC must be notified to assess whether modification to any part of this report should be conducted. If you have any questions or concerns regarding the findings, conclusions or recommendations presented herein, please contact the undersigned.

Prepared by:



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ANNEX A

CHEMICAL INVENTORY

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY
Project No. K1005-004-06
Building Identification/No. Crusher Building 1 (C1)

Substance Name	Molecular Formula	Physical State			No. of Containers	Volume/ Container		Mass/Container		Product Sampled			Location On Site		Dangerous Good		TDG Info	Total Volume/Mass (estimated)		Comments
		S	L	G		Measurement	Unit	Measurement	Unit	Y	N	Sample ID	Description	GPS Coordinates	Y	N		Measurement	Unit	
Waste oil			✓			5	Gal						Building interior			✓				Some containers were missing lids
Empty containers					8	45	Gal						Building exterior					Unknown		The empty drums were unclean and filled with dirt. Water has collected in the drums causing sludge. Some drums were half buried in a pile of sawdust
Waste oil			✓		1	45	Gal						Building interior near entrance			✓		45	Gal	
Gear oil 80/90 heavy duty			✓		1	5	Gal						Building interior			✓		3.8	Gal	Container was ¾full
Engine oil XD30			✓		1	45	Gal						Building interior			✓		11.3	Gal	Container was ¼ full
Hydraulic oil			✓		1	45	Gal						Building interior			✓		45	Gal	
Motor oil			✓		1	45	Gal						Building interior			✓		45	Gal	
Kerosene			✓		5	5	Gal						Under crusher		✓		Class 3 PG III UN1223	10	Gal	3 empty, 2 full
Grease			✓		2	45	Gal						Beside crusher			✓		50	Gal	
																				All drums were in good condition. Many were missing bungs/caps.

LEGEND
S = solid; L = liquid; G = gas
Y = yes; N = no
Sample ID = sample identification

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY

Project No. K1005-004-06

Building Identification/No. Crusher Building 2 (C2)

Substance Name	Molecular Formula	Physical State			No. of Containers	Volume/ Container		Mass/Container		Product Sampled			Location On Site		Dangerous Good		TDG Info	Total Volume/Mass (estimated)		Comments
		S	L	G		Measurement	Unit	Measurement	Unit	Y	N	Sample ID	Description	GPS Coordinates	Y	N		Measurement	Unit	
Engine oil XD30			✓		2	45	Gal						Building interior			✓		68	Gal	One of the drums was ½ full
Engine oil XD30			✓		1	45	Gal						Lower level of C2 near back entrance			✓		45	Gal	

LEGEND
S = solid; L = liquid; G = gas
Y = yes; N = no
Sample ID = sample identification

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY
Project No. K1005-004-06
Building Identification/No. Generator Room

Substance Name	Molecular Formula	Physical State			No. of Containers	Volume/ Container		Mass/Container		Product Sampled			Location On Site		Dangerous Good		TDG Info	Total Volume/Mass (estimated)		Comments
		S	L	G		Measurement	Unit	Measurement	Unit	Y	N	Sample ID	Description	GPS Coordinates	Y	N		Measurement	Unit	
Heavy duty boiler compound					1	5	Gal											5	Gal	Item was in use
Solvent			✓		1	20	L								✓		Class 3 UN1268 PGIII	20	L	Item was in use
Engine oil XD30			✓		1	5	Gal									✓		5	Gal	
SHD50					3	20	L											30	L	One container was empty, one container was ½ full (in use); one container was full (in use)
Lubricant, SAE30			✓		2	20	L									✓		40	L	Container was full and in use
Paint, green exterior					1	3	L											3	L	Item was in use
Contact cement			✓		1	3	L											3	L	Item was in use
Engine degreaser, aerosol			✓		1			454	g							✓		–		Container was empty
Starting fluid, Gunk Liquid Fire®			✓		3			210	g							✓		420	g	Consumer commodity. Item was in use. One container was empty.
Stop slip belt dressing			✓		1			170	g							✓		170	g	Consumer commodity
Oil			✓		2	45	Gal									✓		90	Gal	
Waste oil			✓		1 (small green pail)								Outside Generator Room back entrance			✓		–		Container also contained water
Sealant, Aviation Form A Gasket			✓		1	473	mL										Class 3.2 UN1866	473	mL	Consumer commodity if container is <1L

LEGEND
S = solid; L = liquid; G = gas
Y = yes; N = no
Sample ID = sample identification

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY
Project No. K1005-004-06
Building Identification/No. Ketza Shop (KS)

Substance Name	Molecular Formula	Physical State			No. of Containers	Volume/ Container		Mass/Container		Product Sampled			Location On Site		Dangerous Good		TDG Info	Total Volume/Mass (estimated)		Comments
		S	L	G		Measurement	Unit	Measurement	Unit	Y	N	Sample ID	Description	GPS Coordinates	Y	N		Measurement	Unit	
Oil and lubricants			✓			5	Gal											Unknown		Various 5 gallon pails of oil and lubricants containing residue
Vehicle batteries					7													–		Seven discarded vehicle batteries contained acid
Cement powder	$aMoH_x(PO_y)_z * bH_2O$	✓			1			1	Ton							✓		1	Ton	Cement powder was contained in a 1 ton tote bag
Kerosene			✓		1	5	Gal						Exterior of KS		✓		Class 3 UN1223 PGIII	5	Gal	
Kerosene (?)			✓		1	45	Gal						Exterior of KS		✓		Class 3 UN1223 PGIII	2.3	Gal	Container was not labelled and ½ full; contents had a composition similar to kerosene
Kerosene			✓		1	5	Gal						Exterior of KS		✓		Class 3 UN1223 PGIII	103	Gal	Container was ¼ full
Sludge			✓		3	45	Gal						Boneyard located near KS					Unknown		Three 45 gallon barrels contained sludge
Contaminated soil		✓			1	45	Gal						Boneyard located near KS					Unknown		
Transformer oil (contained in transformers)			✓		3 (transformers)								Boneyard located near KS					Unknown		Transformers were modern and did not contain PCBs
Motor oil			✓		1	4	L						Boneyard located near KS					4		
													Interior of KS							A blue waste oil tank with a capacity of 500 gallons was empty
													Exterior of KS							Lots of scrap metal and refuse lying around outside. Corner of KS has apparent visible hydrocarbon staining presumably from oil leaks inside the building. The dirt floor of KS contains lots of staining presumably caused by hydrocarbons.
													Boneyard located near KS							One older transformer was located that did not appear to have been cleaned. Surface staining presumably from hydrocarbons was observed in the boneyard.

LEGEND
S = solid; L = liquid; G = gas
Y = yes; N = no
Sample ID = sample identification

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY
Project No. K1005-004-06
Building Identification/No. Laboratory 1 (L1)

Substance Name	Molecular Formula	Physical State			No. of Containers	Volume/ Container		Mass/Container		Product Sampled			Location On Site		Dangerous Good		TDG Info	Total Volume/Mass (estimated)		Comments
		S	L	G		Measurement	Unit	Measurement	Unit	Y	N	Sample ID	Description	GPS Coordinates	Y	N		Measurement	Unit	
Hydrion buffer solution		✓			1			0.5	oz									0.5	oz	
Unidentified liquid			✓		1 (small vial)													Unknown		
Sodium chloride	NaCl	✓			1	100	mL									✓		75	mL	Container was ¾ full
Picric acid	$C_6H_3(NO_3)3OH$	✓			3 (small bottles)										✓		Class 4.1 UN1344 PGI	Unknown		Two containers contained trace amounts; one container was ¼ full
Acid neutralizer					1 (small container)										✓		Class 3 UN1120 PGIII	Unknown		Container was ½ full
Ammonia salicylate		✓			1 (pack of 25)											✓		Unknown		Contained in a small plastic cube container
Ammonia cyanurate		✓			1										✓		Class 8 UN2680 PGII	Unknown		Contained in a small plastic cube container
Ethylene glycol (antifreeze)	$HOCH_2CH_2OH$		✓		1	1	L									✓		1	L	
Diethylenetriam-inepentaacetic acid	$C_{14}H_{23}N_3O_{10}$		✓		3										✓		Class 9 UN3077 PG III	Unknown		
Sodium cyanide	NaCN	✓			1	1	L								✓		Class 6.1 UN1689 PG I	750	mL	Container was ¾ full
[[(Carboxymethyl)-imino]bis(ethylene nitrilo)] tetraacetic acid	$[(HOOCCH_2)2NCH_2CH_2]2NCH_3COOH$	✓			2			500	g							✓		1000	g	
Ethylenediamine -tetraacetic acid (EDTA)	$C_{10}H_{16}N_2O_8$	✓			1			500	g							✓		500	g	
Sodium carbonate anhydrous	Na_2CO_3	✓			1			2	kg							✓		2	kg	
Sodium carbonate anhydrous	Na_2CO_3	✓			1			1	lb							✓		5	oz	Container was ⅓ full
Sodium hydroxide	NaOH	✓			1			500	g						✓		Class 8 UN1823 PG II	500	g	
Sodium hydroxide	NaOH	✓			1			2	kg						✓		Class 8 UN1823 PG II	1	kg	Container was ½ full
Sodium hydroxide	NaOH	✓			1 (small plastic bottle)										✓		Class 8 UN1823 PG II	Unknown		
Sodium cyanide	NaCN				1 (bottle)										✓		Class 6.1 UN1689 PG I	Unknown		
Dissolved oxygen		✓			1 (bottle containing 3 powder pillows)													Unknown		

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY
Project No. K1005-004-06
Building Identification/No. Laboratory 1 (L1)

Sodium borate	$Na_2B_4O_7$. $10H_2O$	✓			1 (bottle)											✓		Unknown		Container only contained residue
Sodium borate	$Na_2B_4O_7$. $10H_2O$	✓			1			500	g							✓		500	g	
Zinc	Zn	✓			1	500	mL									✓		375	mL	Container was ¾ full
Copper standard	Cu		✓		1	500	mL									✓		500	mL	
Calibration standard					1 (small bottle)													Unknown		
Hydrion buffer salt		✓			1 (small yellow box)											✓		Unknown		
Nitric acid	HNO_3		✓		1	5	mL								✓		Class 8 UN2031 PG II	5	mL	
Buffer powder pillows					1 (small plastic container)													Unknown		
Reference electrode filling solution			✓		1	60	mL											60	mL	
Electrode cleaning solution			✓		2	30	mL											60	mL	
Nitrite	NO_2-		✓		2 (small vials)													Unknown		
Unidentified pink liquid			✓		1	3	Gal						Under the bench					1.5	Gal	Container was ½ full
Picric acid	2,4,6-$(NO_2)_3C_6H_2OH$	✓			2 (bottles)								Under the bench		✓		Class 4.1 UN1344 PG I	—		Containers were empty
Unidentified liquid			✓		1 (brown bottle)								Under the bench					Unknown		Container was ½ full
Reference buffer solution, pH4	KHC8H4O4 and H2O		✓		1	500	mL									✓		500	mL	
Unidentified white powder		✓			1 (beaker)	500	mL											50	mL	50mL measure
CyaniVer® 3 cyanide reagent powder pillows		✓			1 (small bag)			100	Pack -ages							✓		Unknown		
CyaniVer® 4 cyanide reagent powder pillows		✓			1 (small bag)			100	Pack -ages							✓		Unknown		
CyaniVer® 5 cyanide reagent powder pillows		✓			1 (small bag)			100	Pack -ages							✓		Unknown		
Laboratory cleaning compound					1 (medium sized bottle)													Unknown		
Lime Clear					1 (small plastic bottle)													Unknown		
Acetylene	C_2H_2			✓	1 (bottle)										✓		Class 2.1 UN1001	Unknown		

CpH cleaner					1	0.5	oz										0.5	oz	

LEGEND
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HAZARDOUS MATERIALS INVENTORY
Project No. K1005-004-06
Building Identification/No. Mill Building 1 (M1)

Substance Name	Molecular Formula	Physical State			No. of Containers	Volume/ Container		Mass/Container		Product Sampled			Location On Site		Dangerous Good		TDG Info	Total Volume/Mass (estimated)		Comments
		S	L	G		Measurement	Unit	Measurement	Unit	Y	N	Sample ID	Description	GPS Coordinates	Y	N		Measurement	Unit	
Flocculent			✓		1								Upper level of M1			✓		Unknown		Bag was ½ full
Engine oil XD30			✓		1	45	Gal						Lower level of C2 near back entrance			✓		45	Gal	
																				M1 contains 2 holding tanks that were in clean condition.

LEGEND
S = solid; L = liquid; G = gas
Y = yes; N = no
Sample ID = sample identification

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY
Project No. K1005-004-06
Building Identification/No. Mill Building 2 (M2)

Substance Name	Molecular Formula	Physical State			No. of Containers	Volume/ Container		Mass/Container		Product Sampled			Location On Site		Dangerous Good		TDG Info	Total Volume/Mass (estimated)		Comments
		S	L	G		Measurement	Unit	Measurement	Unit	Y	N	Sample ID	Description	GPS Coordinates	Y	N		Measurement	Unit	
Sodium metabisulfite	$Na_2S_2O_5$	✓			3			25	kg				Near entrance			✓		75	kg	
Ferix-3		✓			27			50	lb						✓		Class 9.2 UN3077 PG III	1350	lb	
Copper sulphate	$CuSO_45H_2O$	✓			5			25	kg						✓		Class 9 UN3077 PG III	125	kg	Bags were contained in large box with estimated 200lbs of large chunky copper sulfphate at the bottom of the box
Grease			✓		1	20	Gal						Back half of M2 water treatment facility			✓		20	Gal	Hooked up by the ball mill
Acetylene	C_2H_2			✓	2								Back half of M2 water treatment facility		✓		Class 2.1 UN1001	Unknown		
Sulphuric acid	H_2SO_4		✓		4	5	Gal						Back half of M2 water treatment facility				Class 8 UN1830 PG II	20	Gal	
Sulphuric acid	H_2SO_4		✓		1	45	Gal						Back half of M2 water treatment facility				Class 8 UN1830 PG II	45	Gal	
Sulphuric acid	H_2SO_4		✓		1	30	Gal						Back half of M2 water treatment facility				Class 8 UN1830 PG II	23	Gal	Container was ¾ full
Calcium fluoride	CaF_2	✓			11			50	lb				Basement level of M2			✓		565	lb	One of the bags was approximately ½ full
Silica sand	SiO_2	✓			4								Basement level of M2			✓		Unknown		The pails are ½ full
																				Various chemicals used in the water treatment process were neatly stacked within the building. Ketsa and DIAND used M2 for the cleaning of the tailings water. This was a water treatment facility. A lime silo was located behind M2 (¼ full)

LEGEND
S = solid; L = liquid; G = gas
Y = yes; N = no
Sample ID = sample identification

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY

Project No. K1005-004-06

Building Identification/No. Mill Boneyard

Substance Name	Molecular Formula	Physical State			No. of Containers	Volume/ Container		Mass/Container		Product Sampled			Location On Site		Dangerous Good		TDG Info	Total Volume/Mass (estimated)		Comments
		S	L	G		Measurement	Unit	Measurement	Unit	Y	N	Sample ID	Description	GPS Coordinates	Y	N		Measurement	Unit	
Vehicle batteries					23															The batteries were discarded in the yard

LEGEND
S = solid; L = liquid; G = gas
Y = yes; N = no
Sample ID = sample identification

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY

Project No. K1005-004-06

Building Identification/No. Scrapyard in Front of Mill

Substance Name	Molecular Formula	Physical State			No. of Containers	Volume/ Container		Mass/Container		Product Sampled			Location On Site		Dangerous Good		TDG Info	Total Volume/Mass (estimated)		Comments
		S	L	G		Measurement	Unit	Measurement	Unit	Y	N	Sample ID	Description	GPS Coordinates	Y	N		Measurement	Unit	
Transformer oil			✓		12					✓										Seven (7) of the transformers were full and five (5) were empty. Lids and seals were in very poor condition. Soil staining was observed near one of the transformers. The transformers were located on an embankment that showed evidence of erosion, which may threaten the stability of the transformers. A sample was obtained from each of the full transformers and submitted to an accredited laboratory to be tested for PCBs.

LEGEND
S = solid; L = liquid; G = gas
Y = yes; N = no
Sample ID = sample identification

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY
Project No. K1005-004-06
Building Identification/No. Shop 1 (S1)

Substance Name	Molecular Formula	Physical State			No. of Containers	Volume/ Container		Mass/Container		Product Sampled			Location On Site		Dangerous Good		TDG Info	Total Volume/Mass (estimated)		Comments
		S	L	G		Measurement	Unit	Measurement	Unit	Y	N	Sample ID	Description	GPS Coordinates	Y	N		Measurement	Unit	
Ethylene glycol (antifreeze)	$HOCH_2CH_2OH$		✓		1	45	Gal						Entrance to shop			✓		–		Container was empty
Hydraulic oil			✓		1	45	Gal						Entrance to shop			✓		45	Gal	
Solvent			✓		1	45	Gal						Entrance to shop		✓		Class 3 UN1268 PGIII	45	Gal	
Argon compressed gas	Ar			✓	1								Entrance to shop		✓		Class 2.2 UN1006	Unknown		
Carbon dioxide	CO_2			✓	1								Entrance to shop		✓		Class 2.2 UN1003	Unknown		
Lead monoxide	PbO	✓			1								Entrance to shop			✓		Unknown		Container was ¾ full
Potassium biphthalate	$HOOC-C_6H_4COOK$	✓			1								Entrance to shop			✓		Unknown		
Methylacetylene propadiene, stabilized (MPS gas)				✓	3			16	oz				S1 office		✓		Class 2.1 UN1060	48	oz	
Solvent and cleaners, various			✓		6	240-500	mL						S1 office inside cupboard		✓		Class 3 NA1993 or UN1268 PG III	Unknown		TDG information may vary with products
Hydrochloric acid	HCl		✓		1	4	L						S1 office inside cupboard		✓		Class 8 UN1789 PG II	4	L	
Descaler 110					1	5	Gal						Tool room					5	Gal	
Methyl hydrate	CH_3OH		✓		1	4	L								✓		Class 3 (6.1) UN1230 PG II	4	L	
Propane	C_3H_8			✓	1 (yellow bottle)										✓		Class 2.1 UN1978	Unknown		
Nitrogen, compressed gas	N_2			✓	1 (bottle)										✓		Class 2.2 UN1066	Unknown		
PVC solvent			✓		1	4	L								✓		Class 3 UN1133 PGII	4	L	
ABS 66Y solvent cement			✓		2	4	L								✓		Class 3 UN1133 PGII	8	L	In containers up to 20L, shipped as CONSUMER COMMODITY. If shipment exceeds 500kg, shipped as CONSUMER COMMODITY—ADHESIVES CLASS 3. In containers >20L see TDG Information.
Primer cleaner			✓		1	4	L								✓		Class 3 UN1993 PGII	1	L	In containers <1L, shipped as CONSUMER COMMODITY. Container was ¼ full.
Paint thinner			✓		1	4	L								✓		Class 3 UN1268 PGIII	1	L	Container was ¼ full
Diesel engine starting fluid			✓		1	18	oz								✓		Class 2.1 UN1954	18	oz	

Nordberg standard crushing backing material					9 (containers)										✓		UN1719	Unknown		
																				The shop also contained various sized cans and containers that are still in use by the staff. Various types of oil and grease contained in the tool room where also still in use by the staff. A box of fluorescent light bulbs was stored in Shop 1.

LEGEND
S = solid; L = liquid; G = gas
Y = yes; N = no
Sample ID = sample identification

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY
Project No. K1005-004-06
Building Identification/No. Stockpile Area Located Outside Under Large Black Tarp

Substance Name	Molecular Formula	Physical State			No. of Containers	Volume/ Container		Mass/Container		Product Sampled			Location On Site		Dangerous Good		TDG Info	Total Volume/Mass (estimated)		Comments
		S	L	G		Measurement	Unit	Measurement	Unit	Y	N	Sample ID	Description	GPS Coordinates	Y	N		Measurement	Unit	
Sodium hydroxide	NaOH	✓			6	45	Gal								✓		Class 8 UN1823 PGII	270	Gal	
Manganese dioxide	MnO_2	✓			36	5	Gal								✓		Class 5.1 UN1479 PGIII	180	Gal	
Borax	$B_4Na_2O_7$ $10H_2O$	✓			9 (pallets)											✓		Unknown		
Sodium carbonate	Na_2CO_3	✓			13 (pallets)											✓		Unknown		Some pallets were damaged
Unidentified substance					3	45	Gal											135	Gal	Some drums were damaged
Calcium hydroxide (hydrated lime)	$Ca(OH)_2$	✓			2 (pallets)											✓		Unknown		
Sodium metabisulfite	$Na2S_2O_5$	✓			1 (pallet)											✓		Unknown		
Sulphuric acid	H_2SO_4		✓		17	45	Gal						Pallets adjacent to stockpile area		✓		Class 8 UN1830 PGII	Unknown		Drums contained residue
Muriatic acid	HCl		✓		11	45	Gal						Pallets adjacent to stockpile area		✓		Class 8 UN1789 PGII	Unknown		Drums contained residue
Hydrogen peroxide, 50%	H_2O_2		✓		10	45	Gal						Pallets adjacent to stockpile area		✓		Class 5.1 UN2014 PGII	Unknown		Drum contained residue
Lead nitrate	$Pb(NO_3)_2$	✓			12			25	kg				Pallets adjacent to stockpile area		✓		Class 5.1, 6.1 UN1469 PGII	300	kg	Drums are in poor condition
Sodium nitrate	$NaNO_3$	✓			20			25	kg				Pallets adjacent to stockpile area		✓		Class 5.1 UN1498 PGIII	500	kg	
Spent activated carbon (?)					6			1	Ton				Pallets adjacent to stockpile area					6	Ton	Six, 1 ton totes were labelled fertilizer but the appearance of the contents was similar to spent activated carbon. Two of the bags were ripped. TDG information will not be the same as virgin activated carbon due to the mixture with adsorbates during use. Adsorbates can provide characteristics for which other classifications apply. A laboratory analysis may be required to determine shipping information.
Hydraulic oil, Spartan68			✓		4	45	Gal						Pallets adjacent to stockpile area					180	Gal	
GW Prevent 855 Antiscalant					3	45	Gal						Pallets adjacent to stockpile area					135	Gal	
Dynagear® grease			✓		3			55	kg				Pallets adjacent to stockpile			✓		165	kg	

												area							
Dynagear® grease			✓		1 (barrel)							Pallets adjacent to stockpile area			✓		Unknown		Barrel contained used oil and water

LEGEND
S = solid; L = liquid; G = gas
Y = yes; N = no
Sample ID = sample identification

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY

Project No. K1005-004-06

Building Identification/No. Tailings Pond

Substance Name	Molecular Formula	Physical State			No. of Containers	Volume/ Container		Mass/Container		Product Sampled			Location On Site		Dangerous Good		TDG Info	Total Volume/Mass (estimated)		Comments
		S	L	G		Measurement	Unit	Measurement	Unit	Y	N	Sample ID	Description	GPS Coordinates	Y	N		Measurement	Unit	
Soda lime		✓			7	5	Gal								✓		Class 8 UN1907 PGIII	35	Gal	
GW Prevent 855 Antiscalant					1	45	Gal											45	Gal	
Synthetic lubricant, Mobil®			✓															Unknown		Container was ½ full

LEGEND
S = solid; L = liquid; G = gas
Y = yes; N = no
Sample ID = sample identification

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY
Project No. K1005-004-06
Building Identification/No. Warehouse 1 (W1)

Substance Name	Molecular Formula	Physical State			No. of Containers	Volume/ Container		Mass/Container		Product Sampled			Location On Site		Dangerous Good		TDG Info	Total Volume/Mass (estimated)		Comments
		S	L	G		Measurement	Unit	Measurement	Unit	Y	N	Sample ID	Description	GPS Coordinates	Y	N		Measurement	Unit	
Purlite					12			300	lb									3600	lb	There were no labels on the containers
Ethylene glycol (antifreeze)	$HOCH_2CH_2OH$		✓		80	4	L									✓		320	L	Containers were contained in 20 cases with 4 containers/case
Sodium metabisulfite	$Na_2S_2O_5$	✓			2 (closed pallets)											✓		Unknown		
Ferix-3		✓			25			50	lb						✓		Class 9.2 UN3077 PG III	1250	lb	
Flocculent			✓		135			50	lb							✓		6750	lb	Bags were placed on 3 pallets (40 bags/pallet); 15 bags were stored on an opened pallet
Gear lube, 10W			✓		1	45	Gal											45	Gal	
Percol		✓			3			25	kg							✓		75	kg	
Fertilizer (nitrogen, phosphoric acid)					6			25	kg									150	kg	
Oxalic acid, dihydrate		✓			1			500	g				Cupboard labelled *Hazardous Goods Only*			✓	Class 8 UN3261 PG II	250	g	Container was ½ full
Silver nitrate	$AgNO_3$	✓			2			500	g				Cupboard labelled *Hazardous Goods Only*		✓		Class 5.1 UN1493 PG II	440	g	One container was ¾ full; one container was 1/8 full
Silver nitrate	$AgNO_3$	✓			2			100	g				Cupboard labelled *Hazardous Goods Only*		✓		Class 5.1 UN1493 PG II	150	g	Each container was ¾ full
Silver nitrate	$AgNO_3$	✓			1			4	oz				Cupboard labelled *Hazardous Goods Only*		✓		Class 5.1 UN1493 PG II	3	oz	One container was ¾ full
Arsenic trioxide	As_2O_3	✓			1			100	g				Cupboard labelled *Hazardous Goods Only*		✓		Class 5.1 UN1493 PG II	20	g	Container was 1/5 full
Sodium hydroxide	NaOH	✓			1 (plastic bottle)								Cupboard labelled *Hazardous Goods Only*		✓		Class 8 UN1823 PG II	Unknown		
Sodium carbonate, anhydrous	Na_2CO_3	✓			2			2	kg				Cupboard labelled *Hazardous Goods Only*			✓		3	kg	Each container was ¾ full
Diethylenetriam-inepentaacetic acid	$C_{14}H_{23}N_3O_{10}$	✓			1			500	g				Cupboard labelled *Hazardous Goods Only*		✓		Class 9 UN3077 PG III	Unknown		Trace residue in container

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY
Project No. K1005-004-06
Building Identification/No. Warehouse 1 (W1)

Sodium hydroxide	NaOH	✓			2			1	kg				Cupboard labelled *Hazardous Goods Only*		✓		Class 8 UN1823 PG II	1.5	kg	Each container was ¾ full
Arsenic (III) oxide	As_2O_3	✓			1			250	g				Cupboard labelled *Hazardous Goods Only*		✓		Class 6.1 UN1561 PG II	188	g	Container was ¾ full
Nitric acid	HNO_3		✓		70	5	mL						Cupboard labelled *Hazardous Goods Only*		✓		Class 8 UN2031 PG II	350	mL	
Potassium iodide	KI	✓			1			500	g				Cupboard labelled *Hazardous Goods Only*			✓		375	g	Container was ¾ full
3 D.O. electrolyte					1 (package)								Cupboard labelled *Hazardous Goods Only*					Unknown		
Ethylenediamin-tetraacetic acid (EDTA)	$C_{10}H_{16}N_2O_8$	✓			1			500	g				Cupboard labelled *Hazardous Goods Only*			✓		375	g	Container was ¾ full
Phenolphthalein	$C_{20}H_{14}O_4$	✓			1			100	g				Cupboard labelled *Hazardous Goods Only*			✓		100	g	
Fanapart padding adhesive			✓		1 (small container)								Cupboard labelled *Hazardous Goods Only*			✓		Unknown		Product contains propylene glycol and ethanol
Sulphuric acid	H_2SO_4		✓		18	2	mL						Cupboard labelled *Hazardous Goods Only*		✓		Class 8 UN1830 PG II	36	mL	Vials were contained in a plastic bag
Tube lube			✓		2 (small bottles)								Cupboard labelled *Hazardous Goods Only*					Unknown		
Sulphur dioxide	SO_2		✓		1 (small container)								Cupboard labelled *Hazardous Goods Only*		✓		Class 2.3 UN1079	Unknown		
Sulphur dioxide	SO_2		✓		10 (small glass tubes)								Storage Room		✓		Class 2.3 UN1079	Unknown		
Sealing cement					1 (small container)								Cupboard labelled *Hazardous Goods Only*					Unknown		
Unidentified substance			✓		1 (blue plastic bottle)								Storage Room					Unknown		
Unidentified substance			✓		3 (milk containers)								Storage Room					Unknown		
Bone ash		✓			9			1	lb				Storage Room			✓		8.3	lb	3 containers were ¾ full
Pyridine	C_5H_5N		✓		1	1	L						Storage Room		✓		Class 3 UN1282 PG II	1	L	

MOUNT NANSEN MINE SITE
HAZARDOUS MATERIALS INVENTORY
Project No. K1005-004-06
Building Identification/No. Warehouse 1 (W1)

Pyridine	C_5H_5N		✓		4	4	L						Storage Room		✓		Class 3 UN1282 PG II	16	L	
Nickelous chloride	$NiCl_2$	✓			1			500	g				Storage Room		✓		Class 6.1 UN3288 PG III	500	g	
Unidentified substance					1 (small plastic container)								Storage Room					Unknown		
Methanol	CH_3OH		✓		6	4	L						Storage Room		✓		Class 3 UN1230 PG II	24	L	
Reference buffer solution, pH 4	$KHC_8H_4O_4$ and H_2O		✓		1	500	mL						Storage Room			✓		500	mL	
Methyl isobutyl ketone	$CH_3COCH_2CH(CH_3)_2$		✓		4	4	L						Storage Room		✓		Class 3 UN1245 PG II	16	L	
Disodium tetraborate	$B_4Na_2O_7$ $10H_2O$	✓			1			2.5	kg				Storage Room			✓		2.5	kg	
Lead acetate	$Pb(C_2H3O_2)_2$. $3H_2O$	✓			1			500	g				Storage Room		✓		Class 6.1 UN1616 PG III	500	g	
Nicotinic acid	$C_6H_5NO_2$	✓			5			250	g				Storage Room			✓		1250	g	
Sodium acetate	CH_3COONa $3H_2O$	✓			2			3	kg				Storage Room			✓		6	kg	
Magnesium chloride	$MgCl_2$ $6H_2O$	✓			1			2.5	kg				Storage Room			✓		2.5	kg	
Silica sand	SiO_2	✓			3			22.7	kg				Storage Room			✓		68.1	kg	
Silica sand	SiO_2	✓			1			25	kg				Storage Room			✓		25	kg	Bag was contained inside an orange plastic bag
Sodium carbonate	Na_2CO_3	✓			1			22	kg				Storage Room			✓		22	kg	
Potassium nitrate	KNO_3	✓			1	5	Gal						Storage Room		✓		Class 5.1 UN1486 PG III	5	Gal	
Sodium nitrate	$NaNO_3$	✓			1 (bag)								Storage Room				Class 5.1 UN1498 PG III	Unknown		The bag was contained inside a metal pail
Percol					1			25	kg				Storage Room					25	kg	The 25kg bag was contained inside a black plastic bag
Ground silica		✓			1			25	kg				Storage Room			✓		25	kg	
Silica		✓											Storage Room			✓		Unknown		Contained in red bucket along with sodium silicate
Sodium silicate	Na_4O_4Si		✓										Storage Room			✓		Unknown		Contained in red bucket along with silica
Silica		✓											Storage Room			✓		Unknown		Contained in white bucket along with sodium silicate

Sodium silicate	Na_4O_4Si		✓										Storage Room			✓		Unknown		Contained in white bucket along with silica
Test lead, c.p.													Storage Room					Unknown		Contained in two grey buckets
Floor sweepings (?)													Storage Room					Unknown		Red Coleman® cooler with what appears to be floor sweepings
Sulphuric acid	H_2SO_4		✓		161	45	Gal			✓			Drum stockpile behind W1		✓		Class 8 UN1830 PG II	Unknown		Total drum count in the stockpile area was 161. The drums once contained sulphuric acid, muriatic acid, hydrogen peroxide and waste oil. A large proportion of the drums were unrinsed and contained residue. Approximately 2% of the drums are missing bungs/caps. The maintenance person indicated that half of the drums were placed there by him. Confirmatory samples were submitted from 8 drums to determine if the contents consisted of waste oil. Staining that was presumably due to leaking from the drums was visible at the stockpile area.
Muriatic acid	HCl		✓												✓		Class 8 UN1789 PG II			
Hydrogen peroxide	H_2O_2		✓												✓		Class 5.1, 8 UN2014 PG II			
Waste oil			✓													✓				

LEGEND
S = solid; L = liquid; G = gas
Y = yes; N = no
Sample ID = sample identification

ANNEX B

PHOTOGRAPHS

Photo 1: Crusher Building

Photo 2: Mill Building

Photos 3 & 4: Ore piles around crusher feed

Photo 5: Discarded drums

Photo 6: Sawdust pile with buried drums

Photo 7: Exterior of Crusher Building 1 (C1)

Photo 8: Entrance to C1

Photo 9: Interior of C1

Photo 10: Interior of C1

Photo 11: Interior of C1

Photo 12: Entrance to Crusher Building 2 (C2)

Photo 13: Interior of C2

Photo 14: Entrance to Mill Building 1 (M1)

Photo 15: Entrance to Mill Building 2 (M2)

Photo 16: Sodium metabisulfite inside M2

Photo 17: Ferix-3 inside M2

Photo 18: Bag of copper sulphate

Photo 19: Box of copper sulphate

Photo 20: Interior of back half of M2

Photo 21: Interior of back half of M2

Photo 22: Pails of sulphuric acid

Photo 23: Three 30 gallon sulphuric acid drums outside of backdoor

Photo 24: Lime silo behind M2 (25% full)

Photo 25: Stacks of fluorspar in the basement of M2 (gold press room)

Photo 26: Four pails of silica sand in the gold press room

Photo 27: Entrance to Shop 1 (S1)

Photo 28: Drums stored inside S1 (in use)

Photo 29: Standard crusher backing material in S1

Photo 30: Chemical storage closet in Laboratory 1 (L1)

Photo 31: Chemicals on table in L1

Photo 32: Cupboard labeled *Hazardous Goods Only*

Photo 33: Stockpile area under black tarp

Photo 34: Stockpile area under black tarp

Photo 35: Stockpile area under black tarp

Photo 36: Stockpile area under black tarp

Photo 37: Stockpile area under black tarp

Photo 38: Stockpile area under black tarp

Photo 39: 1 ton totes suspected of containing spent activated carbon

Photo 40: Contents of tote bags

Photo 41: Two tote bags were ripped

Photo 42: Drums containing lead nitrate

Photo 43: Ketza Shop was in good shape

Photo 44: Empty 5 gallon pails in corner of Ketza Shop

Photo 45: Empty waste oil tank in Ketza Shop

Photo 46: Lubricants in Ketza Shop

Photo 47: Discarded batteries in Ketza Shop

Photo 48: 1 ton tote in Ketza Shop

Photo 49: Drums containing kerosene behind Ketza Shop

Photo 50: Example of soil staining

Photo 51: Ketza Shop boneyard

Photo 52: Transformers in boneyard

Photo 53: Old fuel storage tank

ANNEX C

LABORATORY REPORT

PRELIMINARY RESULTS

ENVIRONMENTAL MANAGEMENT & TECH

ATTN: ARTHUR MAGRI

Reported On: 18-OCT-06 09:16 AM

805 BLACKDALE ROAD

WEST ST. PAUL MB R4A 9A4

Lab Work Order #: **L424179**

Date Received: **21-AUG-06**

Project P.O. #:

Job Reference: KEARAH ENVIRONMENT MOUNT NANSEN

Legal Site Desc:

CofC Numbers:

Other Information:

Comments:

ROY JONES
General Manager, Edmonton

For any questions about this report please contact your Account Manager:

CATHERINE EVARISTO-CORDERO

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A Campbell Brothers Limited Company

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L424179-1 DRUM 1								
Sampled By: MIKE MAHONEY on 08-AUG-06								
Matrix: LIQUID								
Special Request	See Attached					02-OCT-06	PB	R450700
L424179-2 DRUM 2								
Sampled By: MIKE MAHONEY on 08-AUG-06								
Matrix: LIQUID								
C1-C30 GC/FID Scan	See attached				03-OCT-06	04-OCT-06	DNH	R449851
Note: Not a hydrocarbon product sample								
L424179-3 DRUM 3								
Sampled By: MIKE MAHONEY on 08-AUG-06								
Matrix: LIQUID								
Special Request	See Attached					02-OCT-06	PB	R450700
L424179-4 DRUM 4								
Sampled By: MIKE MAHONEY on 08-AUG-06								
Matrix: LIQUID								
C1-C30 GC/FID Scan	See attached				03-OCT-06	04-OCT-06	DNH	R449851
Note: Sample contains hydrocarbon >C30.								
L424179-5 DRUM 5								
Sampled By: MIKE MAHONEY on 08-AUG-06								
Matrix: LIQUID								
Special Request	See Attached					02-OCT-06	PB	R450700
L424179-6 DRUM 6								
Sampled By: MIKE MAHONEY on 08-AUG-06								
Matrix: LIQUID								
C1-C30 GC/FID Scan	See attached				03-OCT-06	04-OCT-06	DNH	R449851
Note: Sample contains hydrocarbon >C30.								
L424179-7 DRUM 7								
Sampled By: MIKE MAHONEY on 08-AUG-06								
Matrix: LIQUID								
Special Request	See Attached					02-OCT-06	PB	R450700
L424179-8 DRUM 8								
Sampled By: MIKE MAHONEY on 08-AUG-06								
Matrix: LIQUID								
C1-C30 GC/FID Scan	See attached				03-OCT-06	04-OCT-06	DNH	R449851
Note: Sample contains hydrocarbon >C30.								
L424179-9 TRANSFORMER 1								
Sampled By: MIKE MAHONEY on 08-AUG-06								
Matrix: LIQUID								
PCBs								
Aroclor 1016	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
Aroclor 1221	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
Aroclor 1232	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
Aroclor 1242	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
Aroclor 1248	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L424179-9	TRANSFORMER 1								
Sampled By:	MIKE MAHONEY on 08-AUG-06								
Matrix:	LIQUID								
PCBs									
	Aroclor 1254	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1260	8.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1262	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1268	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Total PCBs	8.5		2	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
Surr:	Decachlorobiphenyl	82		68-132	%	03-OCT-06	04-OCT-06	GP	R449811
L424179-10	TRANSFORMER 2								
Sampled By:	MIKE MAHONEY on 08-AUG-06								
Matrix:	LIQUID								
PCBs									
	Aroclor 1016	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1221	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1232	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1242	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1248	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1254	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1260	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1262	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1268	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Total PCBs	<2.0		2	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
Surr:	Decachlorobiphenyl	71		68-132	%	03-OCT-06	04-OCT-06	GP	R449811
L424179-11	TRANSFORMER 3								
Sampled By:	MIKE MAHONEY on 08-AUG-06								
Matrix:	LIQUID								
PCBs									
	Aroclor 1016	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1221	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1232	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1242	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1248	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1254	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1260	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1262	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1268	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Total PCBs	<2.0		2	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
Surr:	Decachlorobiphenyl	70		68-132	%	03-OCT-06	04-OCT-06	GP	R449811
L424179-12	TRANSFORMER 4								
Sampled By:	MIKE MAHONEY on 08-AUG-06								
Matrix:	LIQUID								
PCBs									
	Aroclor 1016	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1221	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1232	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1242	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1248	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1254	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1260	34		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L424179-12	TRANSFORMER 4								
Sampled By:	MIKE MAHONEY on 08-AUG-06								
Matrix:	LIQUID								
PCBs									
	Aroclor 1262	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1268	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Total PCBs	34		2	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
Surr:	Decachlorobiphenyl	93		68-132	%	03-OCT-06	04-OCT-06	GP	R449811
L424179-13	TRANSFORMER 5								
Sampled By:	MIKE MAHONEY on 08-AUG-06								
Matrix:	LIQUID								
PCBs									
	Aroclor 1016	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1221	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1232	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1242	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1248	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1254	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1260	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1262	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1268	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Total PCBs	<2.0		2	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
Surr:	Decachlorobiphenyl	104		68-132	%	03-OCT-06	04-OCT-06	GP	R449811
L424179-14	TRANSFORMER 6								
Sampled By:	MIKE MAHONEY on 08-AUG-06								
Matrix:	LIQUID								
PCBs									
	Aroclor 1016	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1221	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1232	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1242	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1248	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1254	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1260	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1262	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1268	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Total PCBs	<2.0		2	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
Surr:	Decachlorobiphenyl	103		68-132	%	03-OCT-06	04-OCT-06	GP	R449811
L424179-15	TRANSFORMER 7								
Sampled By:	MIKE MAHONEY on 08-AUG-06								
Matrix:	LIQUID								
PCBs									
	Aroclor 1016	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1221	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1232	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1242	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1248	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1254	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1260	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1262	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1268	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811

ALS LABORATORY GROUP ANALYTICAL REPORT

Sample Details/Parameters		Result	Qualifier*	D.L.	Units	Extracted	Analyzed	By	Batch
L424179-15	TRANSFORMER 7								
Sampled By:	MIKE MAHONEY on 08-AUG-06								
Matrix:	LIQUID								
PCBs									
	Total PCBs	<2.0		2	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
Surr:	Decachlorobiphenyl	105		68-132	%	03-OCT-06	04-OCT-06	GP	R449811
L424179-16	DRUM 9								
Sampled By:	MIKE MAHONEY on 08-AUG-06								
Matrix:	LIQUID								
PCBs									
	Aroclor 1016	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1221	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1232	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1242	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1248	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1254	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1260	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1262	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Aroclor 1268	<0.5		0.5	mg/kg	03-OCT-06	04-OCT-06	GP	R449811
	Total PCBs	<2.0		2	mg/kg	03-OCT-06	04-OCT-06	GP	R449811

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

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
SOL:MI	Surrogate recovery outside acceptable limits due to matrix interference

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Preparation Method Reference(Based On)	Analytical Method Reference(Based On)
HIS-C1/C30-CL	Product	C1-C30 GC/FID Scan		EPA 3580/8000-GC-FID
PCB-ED	Product	PCBs		EPA 8082-GC-ECD

** 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
CL	ALS LABORATORY GROUP - CALGARY, ALBERTA, CANADA	ED	ALS LABORATORY GROUP - 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 environmental 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 control limits 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. - The reporting 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.

ALS Laboratory Group 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, ALS Laboratory Group assumes no liability for the use or interpretation of the results.

LABORATORY REPORT

ALS Laboratory Group.
9936-67 Avenue
Edmonton, AB
T6E 0P5
Attention: Norma Jestin

Lab no.: 2409 - 1, 2
Date Report: Oct 06, 2006
Sample in: Oct 02, 2006
P.O. No.: L424179

Re: Oil sample for special oil test package-SPL3.

Test	Lab no.	Results 2409-1	Results 2409-2
	Sample ID.	L424179-1, Drum 1	L424179-3, Drum 3
1. Appearance		Dark oil	Dark oil
2. Viscosity, cst@40°C		110	72.66
3. Total Acid no. (TAN)		1.71	2.23
4. Sediment, % by volume		0.06	0.04
5. Water, % by volume		32.3	0.01
6. Visible Particles		Lots of dirt particles	Lots of small particles
Aluminium		8	1
Copper		12	<1
Iron		27	3
Tin		1	<1
Chromium		1	<1
Lead		7	<1
Cadmium		<1	<1
Nickel		<1	1
Titanium		<1	<1
Zinc		944	443
Phosphorous		255	378
Molybdenum		83	34
Calcium		2203	1195
Barium		<1	<1
Magnesium		361	95
Boron		170	71
Sodium		23	16
Silicon		11	<1
Remarks		Used diesel engine oil	Used engine oil

Tested by: P.S.(chemist)
Member of ASTM
JS:TL

Approved by _____
James Szeto, B.Sc.
Chief Chemist

LABORATORY REPORT

ALS Laboratory Group.
9936-67 Avenue
Edmonton, AB
T6E 0P5
Attention: Norma Jestin

Lab no.: 2409 - 3, 4
Date Report: Oct 06, 2006
Sample in: Oct 02, 2006
P.O. No.: L424179

Re: Oil sample for special oil test package-SPL3.

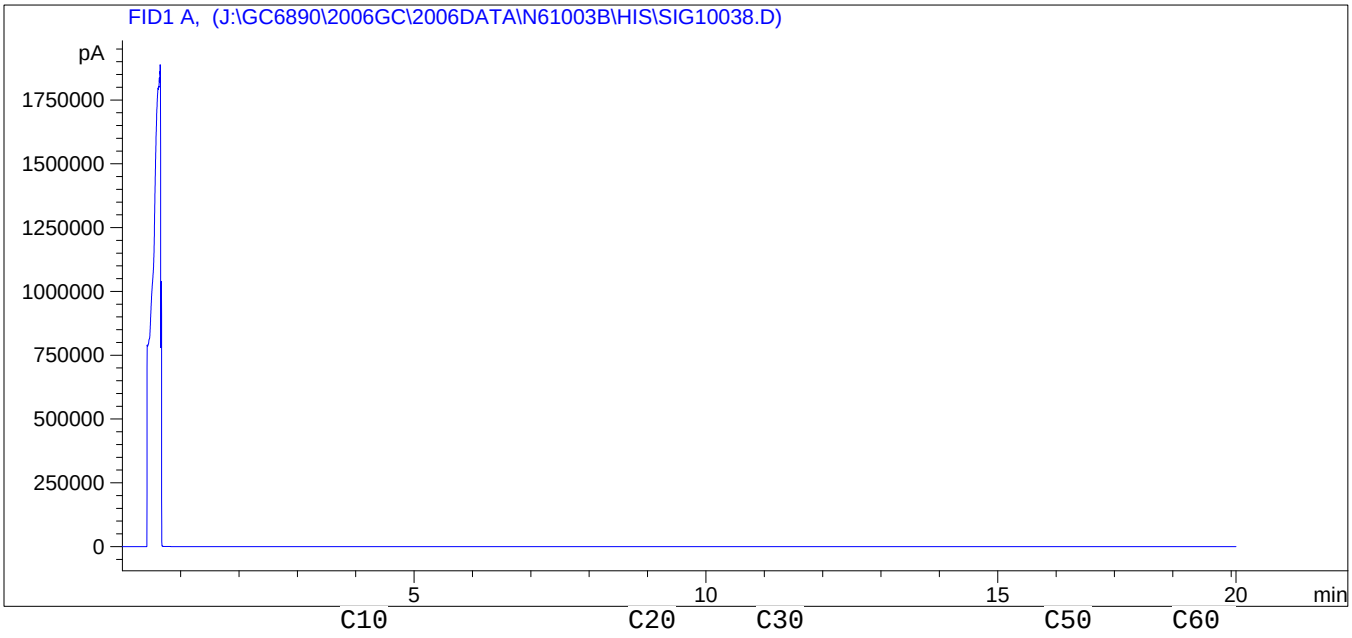
Test	Results	
Lab no.	2409-3	2409-4
Sample ID.	L424179-5, Drum 5	L424179-7, Drum 7
1. Appearance	Dark oil	Dark oil
2. Viscosity, cst@40°C	55.42	99.05
3. Total Acid no. (TAN)	2.16	3.13
4. Sediment, % by volume	0.06	0.20
5. Water, % by volume	0.01	0.40
6. Visible Particles	Some dirt particles	Some dirt particles
Aluminium	2	2
Copper	1	3
Iron	7	15
Tin	<1	<1
Chromium	<1	<1
Lead	2	2
Cadmium	<1	<1
Nickel	<1	<1
Titanium	<1	<1
Zinc	1063	1251
Phosphorous	875	1428
Molybdenum	80	3
Calcium	2538	3782
Barium	<1	1
Magnesium	228	9
Boron	154	<1
Sodium	26	37
Silicon	<1	<1
Remarks	Used diesel engine oil	Used engine oil

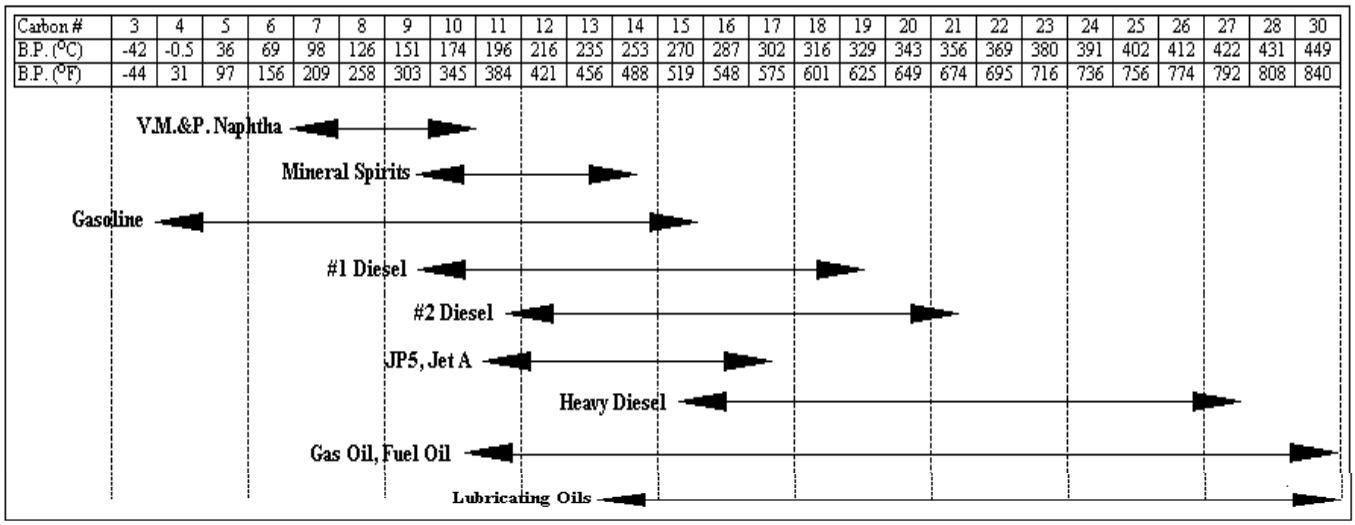
Tested by: P.S.(chemist)
Member of ASTM
JS:TL

Approved by _____
James Szeto, B.Sc.
Chief Chemist

Client ID: DRUM 2

Sample ID: L424179-2 HIS
Injection Date: 10/4/2006 2:23:10 PM
Injection Time: 10/4/2006 2:23:10 PM
Instrument ID: Instrument 1
Operator: organics

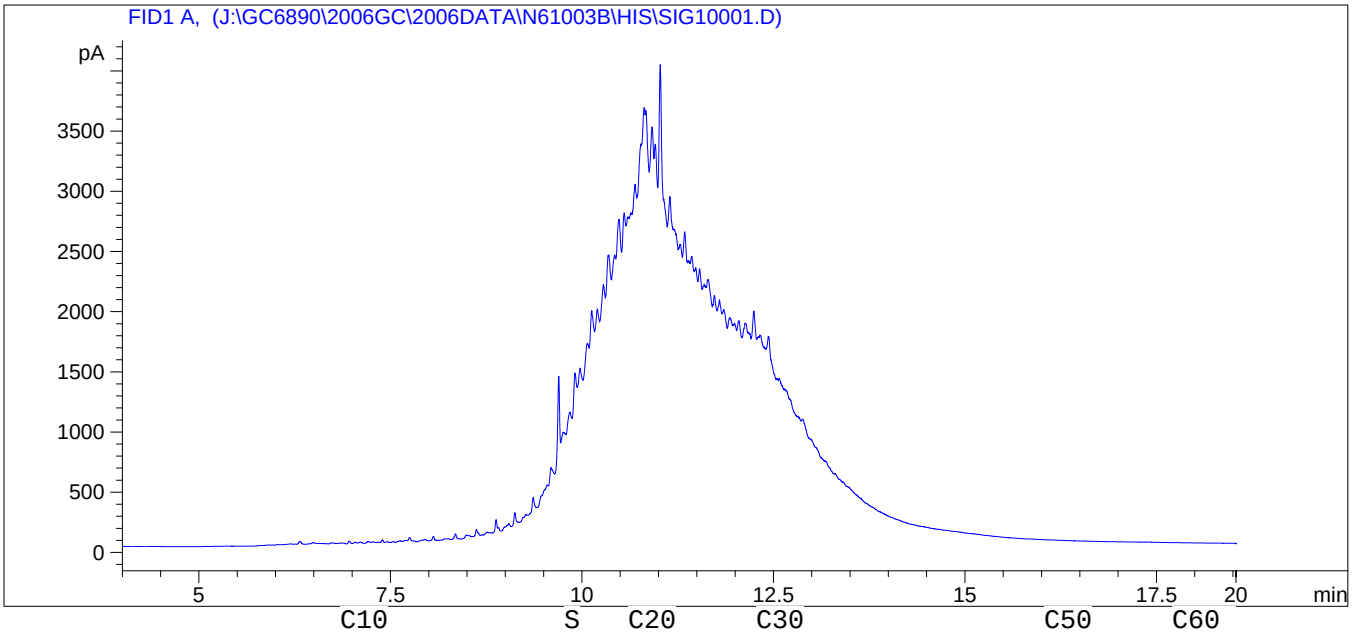




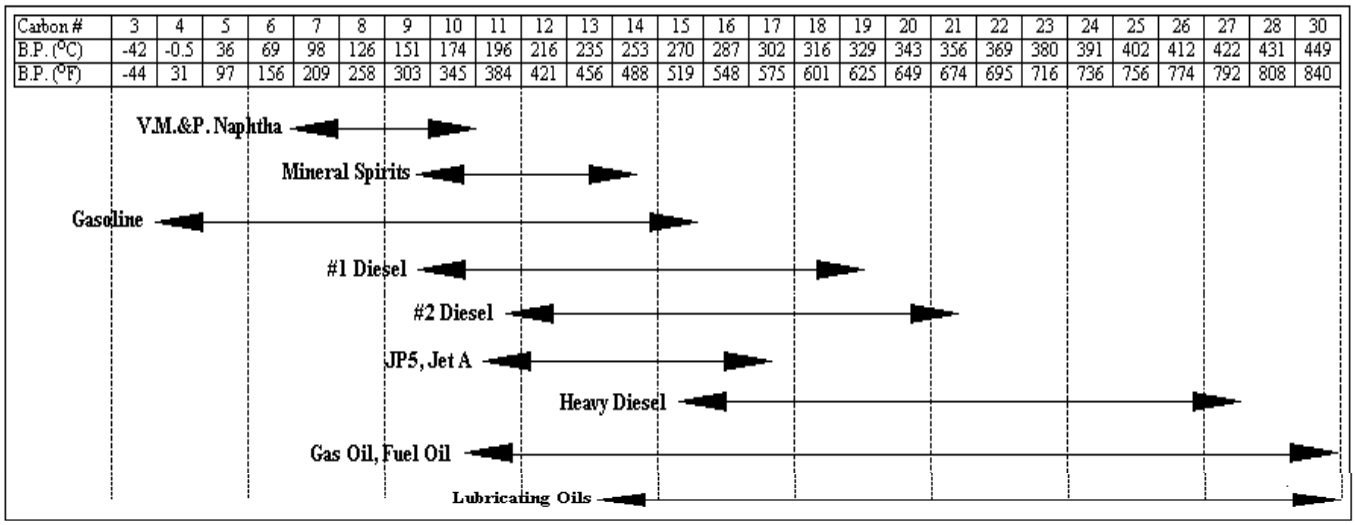
Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: DRUM 4

Sample ID: L424179-4 HIS
Injection Date: 10/3/2006 5:48:55 PM
Injection Time: 10/3/2006 5:48:55 PM
Instrument ID: Instrument 1
Operator: organics



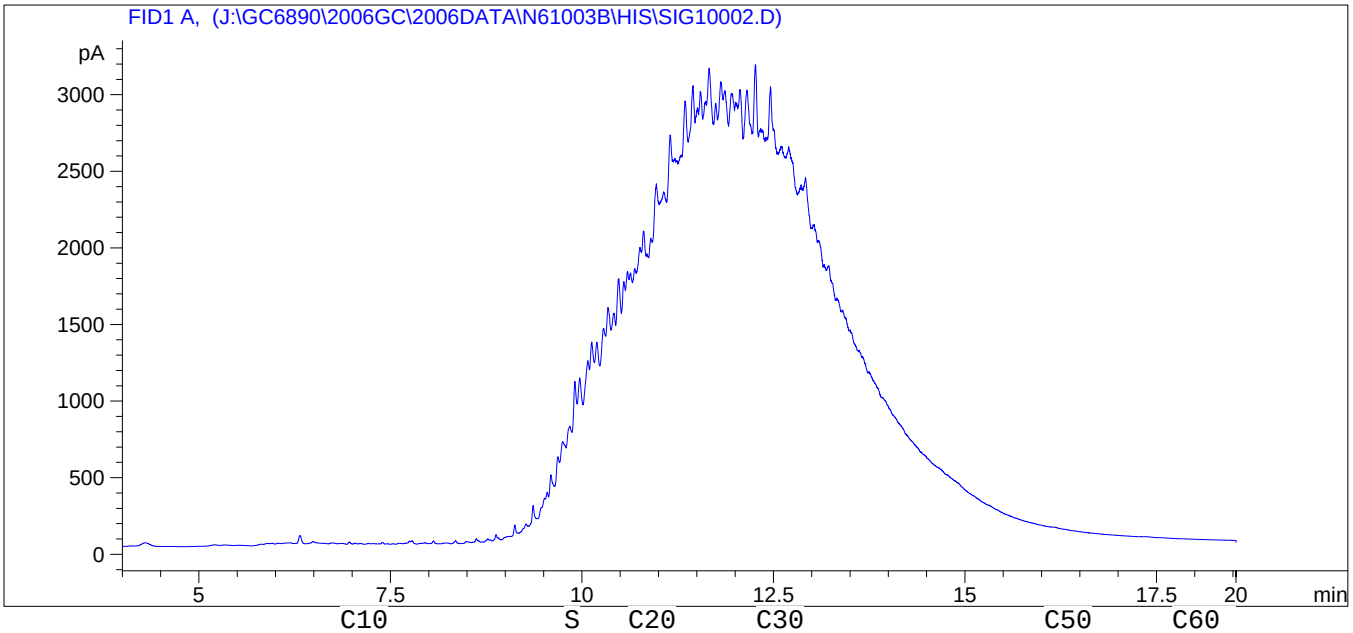
Carbon #	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	30
B.P. (°C)	-42	-0.5	36	69	98	126	151	174	196	216	235	253	270	287	302	316	329	343	356	369	380	391	402	412	422	431	449
B.P. (°F)	-44	31	97	156	209	258	303	345	384	421	456	488	519	548	575	601	625	649	674	695	716	736	756	774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

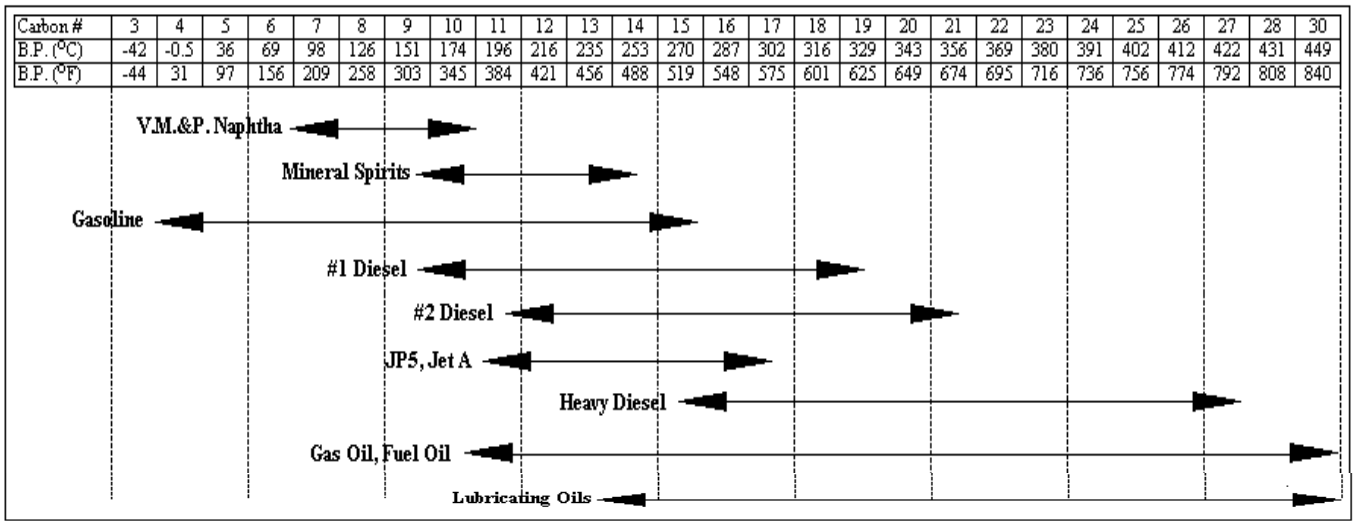


Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: DRUM 6

Sample ID: L424179-6 HIS
Injection Date: 10/3/2006 6:21:43 PM
Injection Time: 10/3/2006 6:21:43 PM
Instrument ID: Instrument 1
Operator: organics

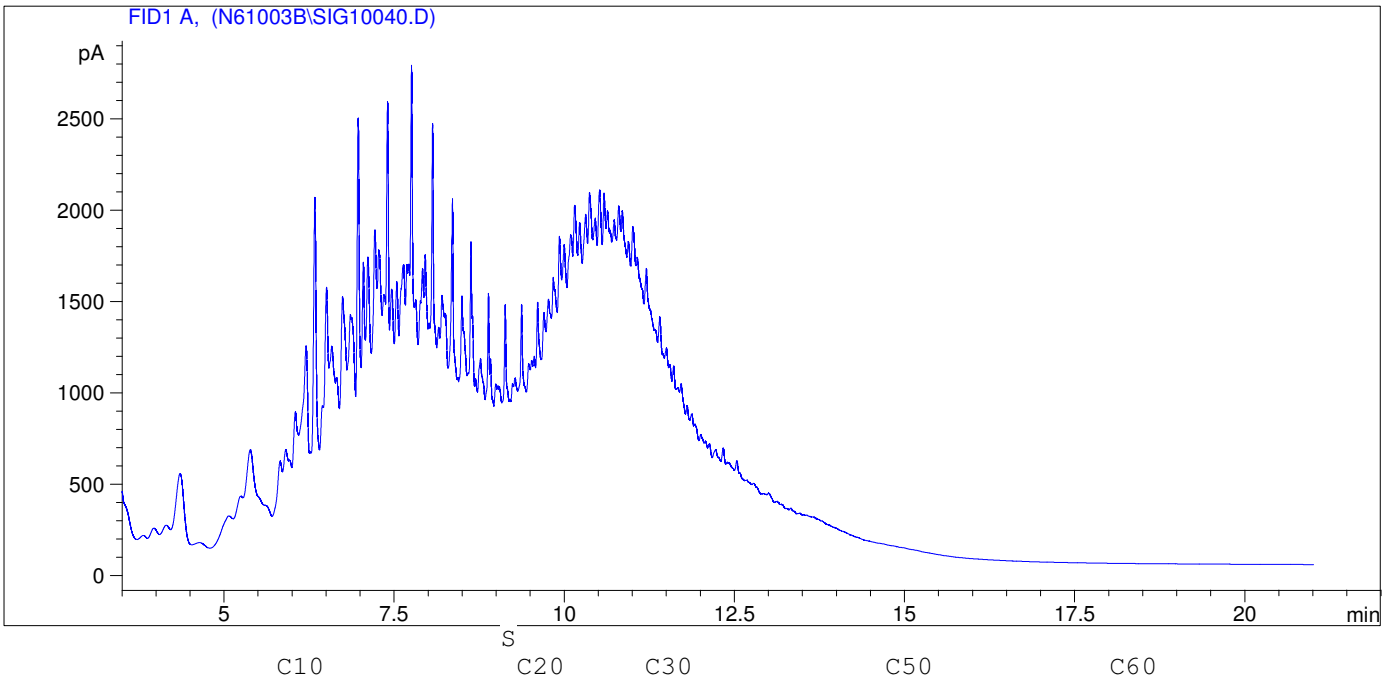




Adapted from: Drews, A.W.,ED. Manual on Hydrocarbon Analysis, 4th ed.; American Society for Testing and Materials: Philadelphia, PA., 1989: p XVIII.

Client ID: DRUM 8

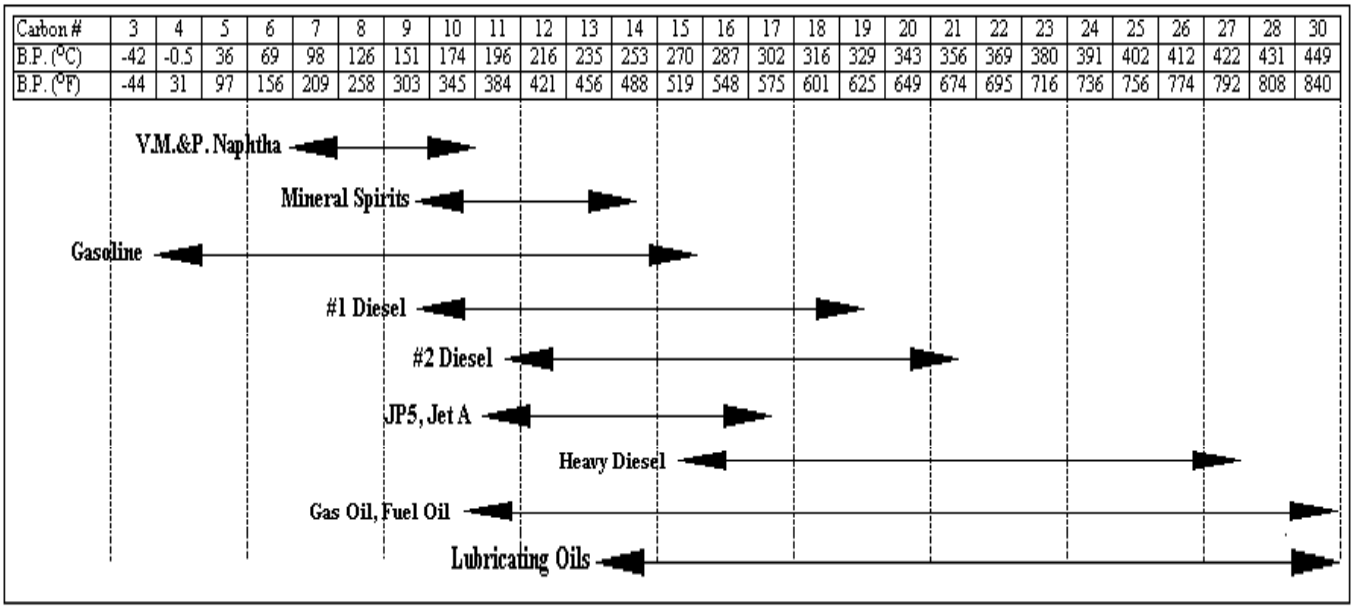
Sample ID: L424179-8 HIS
Injection Date: 10/4/2006 3:28:16 PM
Injection Time: 10/4/2006 3:28:16 PM
Instrument ID: Instrument 1
Operator: organics



S=Surrogate

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.