Energy, Mines and Resources
Assessment and Abandoned Mines
Box 2703 - K-419
Whitehorse, YT Y1A 2C6

December 21, 2012

MEMORANDUM

Re: EBA Engineering Report "Assessment of Rail Car and Small Mixing Tank - Mount Nansen Site - Yukon" (November 2012)

This memorandum is to preface the "Assessment of Rail Car and Small Mixing Tank – Mount Nansen Site – Yukon" (November 2012) written by EBA Engineering (EBA) for Yukon Government Assessment and Abandoned Mines (AAM).

Introduction

EBA Engineering was retained in Spring 2012 to assess the hazardous material on and around the rail tank and mixing tank at the Mount Nansen Site. Following a site visit, EBA was to submit a draft report describing the results of the hazardous material assessment, the amount and type of contents found in the tanks, any applicable legislation and permits, and make recommendations for disposal of the hazardous material.

This memo summarizes the recommendations outlined by EBA in the report.

Contractor Recommendations

EBA proposed recommendations in their report; the following is a summary of those recommendations. For more specific details on the recommendations, please see the full report.

Rail Car:

- The lead-based paint (LBP) and substrate on the exterior of the rail car can be disposed of as general construction waste.
- Ensure LBP and substrate are removed and disposed of in accordance with the requirements of the Yukon Workers Compensation Health and Safety Board, the Transportation of Dangerous Goods Act and the Yukon Ministry of Environment.

- Prior to removal of LBP, adequate safe work procedures must be developed by the contractor to ensure workers are protected from exposure to finely divided airborne lead particles during the demolition work. If LBP are to be demolished in place, the contractor must implement an exposure control plan.

- Recommendations for depressurizing the rail car (as advised by Reg Foster of Quantum Murray LP):

    - Work not to occur if ambient environment is exhibiting a high humidity (>60% relative humidity) or potential for precipitation;

    - Personnel to don a class B Hazmat suit and self-contained breathing apparatus (SCBA) for respiratory protection;

    - Note direction of wind and ensure it is not in a direction towards a building or other personal on the Property;

    - Purge the pressure of the rail car while staying upwind of vapours or mist as it is being released;

    - Upon purging of the rail car the same PPE should be worn during the removal of the top plate and hatch and during sampling of the interior contents; and

    - The atmosphere within the tank may contain hazardous vapours and/or a lack of oxygen and that appropriate respiratory protection may be required as outlined above.

- The top plate and hatch at the top of the rail car may require either a plasma torch or grinding wheel to cut each stud at the plate below the bolt.

- If interior contents are present, EBA recommends qualified personnel be employed to sample contents for classification and comparison against YCSR and MMER to determine disposal procedures. All work should be completed in accordance with the Yukon Workers Compensation Health and Safety Board, the Transportation of Dangerous Goods Act and the Yukon Ministry of Environment.

- When the interior of the car is decontaminated, the rail car can be disposed of as general construction waste or for recycling of the steel components.

Mixing Tank Contents:

- EBA recommends that the liquid is pumped from the tank into a transport vehicle by an approved contractor certified in the removal of contaminated liquids and transported to a licensed facility out of territory for disposal as per applicable regulations: or, the liquid is pumped into the onsite tailings pond where an elevation in metals exists from historical mining activities

Work to be Completed

- Determine the contents of the rail tanker.
- Determine the specific quantities of all contents within the rail tanker and the two mixing tanks.
- Provide a disposal plan for the contents of the rail tanker and two mixing tanks, as well as the rail tanker vessel and tanks. The plan shall presents quantities, dimensions, types of materials, as well as specific methods for disposal for all the materials.

<u>Note:</u> Throughout the report (in text and figures) the content of the tank is referred to as H2SO4. This is believed to be incorrect, as the wording on the tank (from photos) is labelled as "SULPHUR DIOXIDE".

Sincerely,

Adrienne Turcotte
Project Officer – Environmental Monitoring
Assessment and Abandoned Mines

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ASSESSMENT OF RAIL CAR AND SMALL MIXING TANK MOUNT NANSEN SITE YUKON

REPORT

NOVEMBER 2012
ISSUED FOR USE
EBA FILE: W23101576

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Yukon Government - Yukon Energy Mines and Resources Assessment and Abandoned Mines and their agents. EBA, A Tetra Tech Company, 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 Yukon Government - Yukon Energy Mines and Resources Assessment and Abandoned Mines, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in EBA's Services Agreement. EBA's General Conditions are provided in Appendix A of this report.

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EXECUTIVE SUMMARY

EBA, A Tetra Tech Company (EBA) was retained by Government of Yukon, Assessment and Abandoned Mines (AAM) branch to provide environmental services at the Mount Nansen Site (the Property). The environmental services included sampling and assessing a labeled H_2SO_4 rail car and adjacent small green mixing tank to identify disposal options and provide recommendations for corrective actions if required.

EBA representatives Mr. Shane Dooley and Mr. Chris Harwood completed the site assessment and sampling between May 30 and 31, 2012.

Black paint on the exterior of the rail car was determined to be lead based (> 90 ppm) as per Inductively Coupled Plasma analysis. Toxicity Characteristic Leachate Properties analysis determined that the paint and substrate do not require regulated disposal as per the Hazardous Products Act (< 5 ppm).

EBA sampled the standing liquid located within the small green mixing tank to the northwest of the Mill structure. EBA estimates that at the time of sampling, the liquid at the base of the mixing tank was 0.3 m deep with no accumulation of sediment. Analytical results were compared to the "Metal Mining Effluent Regulations" (MMER) SOR/2002-222 Schedule 4, Column 4 as well as the Yukon Contaminated Sites Regulation (YCSR), September 30, 2002 for Aquatic Life (AW) Standards. Analytical results had the following exceedences:

- Cadmium (0.698 µg/L) exceeded the standard for YCSR AW of 0.6 µg/L;
- Zinc (92.7 µg/L) exceeded the standard for YCSR AW of 75 µg/L; and
- Parameters analyzed did not exceed the MMER regulations.

EBA visually assessed the rail car for an entry point to access interior contents. EBA could not identify any potential location on the rail car that was a fill port. As well, there were no identifiers on the exterior of the rail car to show the quantity of contents, if any. A hatch at the top of the rail car was opened in an attempt to determine a potential sampling point. EBA determined that the bolts holding the hatch and plate would require a cutting device as they were rusted and seized. EBA attempted and could not remove any of the bolts with the equipment available at the site.

At the top plate there were four valves, one associated with each distribution pipe and EBA attempted to move a valve to the open position to access a bolt. When the valve was actuated, the associated pipe became pressurized. EBA is unsure if the pressurization of the pipe was vapour or liquid contents from the rail car. As EBA is not certified nor trained to access pressurized vessels, the valve was returned to initial position and the assessment ceased immediately due to health and safety concerns. This information was relayed to Jeff Moore with AAM whom was onsite at the time of assessment.

EBA contacted Reg Foster, Regional Manager of Emergency Response with Quantum Murray LP in Richmond British Columbia, and he provided the following recommendations and comments regarding depressurization and access to the interior of the rail car:

- Work not to occur if ambient environment is exhibiting a high humidity (>60% relative humidity) or potential for precipitation;

- Personnel to wear a class B Hazmat suit and self-contained breathing apparatus (SCBA) for respiratory protection;
- Note direction of wind and ensure it is not in a direction towards a building or other personnel on the Property;
- Purge the pressure of the rail car while staying upwind of vapours or mist as it is being released;
- Upon purging of the rail car the same PPE should be worn during the removal of the top plate and hatch and during sampling of the interior contents; and
- The atmosphere within the tank may contain hazardous vapours and/or a lack of oxygen, therefore appropriate respiratory protection may be required as outlined above.

EBA has the following additional recommendations regarding assessment of the interior contents of the rail car:

- The top plate and hatch at the top of the rail car may require either a plasma torch or grinding wheel to cut each stud at the plate below the bolt. When the plate and hatch are released from the rail car, a small hoist attachment may be required to safely move the plate and hatch. EBA estimates the weight of the units combined to be approximately 100 kg. This cannot be safely maneuvered by a person due to the location and the round aspect at the top of the rail car.
- If interior contents are present, EBA recommends qualified personnel be employed to sample contents for classification and comparison against YCSR and MMER to determine disposal procedures. All work should be completed in accordance with, but not limited to, the Yukon Workers Compensation Health and Safety Board, the Transportation of Dangerous Goods Act and the Yukon Ministry of Environment.

The following conclusions and recommendations are presented by EBA regarding removal and disposal of lead based paint on the exterior of the rail car and the liquid sampled from within the small mixing tank:

- The paint and substrate from the exterior of the rail car can be disposed of as general construction waste. During decommissioning activities, ensure the lead based paint (LBP) and substrate are removed and disposed of in accordance with the requirements of the Yukon Workers Compensation Health and Safety Board, the Transportation of Dangerous Goods Act and the Yukon Ministry of Environment. Prior to removal of the LBP, adequate safe work procedures must be developed by the contractor to ensure workers are protected from exposure to finely divided airborne lead particles during the demolition work. During demolition of the rail car, if LBP are to be demolished in place, the contractor must implement an exposure control plan.
- EBA identified liquid within the small green exterior mixing tank which exceeds standards when compared to the YCSR-AW for Cadmium and Zinc. EBA recommends that the liquid is pumped from the tank into a transport vehicle by an approved contractor certified in the removal of contaminated liquids and transported to a licensed facility out of territory for disposal as per applicable regulations: or, the liquid is pumped into the onsite tailings pond where an elevation in metals exists from historical mining activities.

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1.0 INTRODUCTION

EBA Engineering Consultants Ltd., operating as EBA, A Tetra Tech Company (EBA), was retained by Government of Yukon, Assessment and Abandoned Mines (AAM) to provide environmental services at the Mount Nansen Site (the Property). The environmental services included sampling and assessing a labeled H_2SO_4 rail car and adjacent mixing tank to identify disposal options and provide recommendations for corrective actions if required.

EBA representatives Mr. Shane Dooley and Mr. Chris Harwood completed the site assessment and sampling between May 30 and31, 2012.

This report provides an outline of:

- Background information and scope of services;
- Applicable regulations and guidelines;
- Methodology;
- Assessment results; and
- Conclusions and recommendations.

2.0 BACKGROUND INFORMATION AND SCOPE OF SERVICES

2.1 Background Information

EBA completed a hazardous waste classification assessment at the Mount Nansen site in August 2011. Please refer to EBA's report entitled "*Hazardous Materials Classification, Mt. Nansen Mine Site, Yukon*" dated December 2011. The assessment report identified suspect hazardous materials associated with the rail car and small mixing tank and included recommendations for future sampling of the H_2SO_4 rail car for content classification.

2.2 Scope of Services

EBA's scope of services included the following:

- Review of historical report regarding assessments completed on the Property as supplied by AAM;
- Preparation of a Safe Work Plan to address potential hazards associated with the proposed work;
- Collection of exterior paint samples from rail car to determine lead content and disposal procedures;
- Sample collection of any liquid, if present within the rail car for analysis;
- Sample collection of liquid within the mixing tank for analysis;
- Sample collection of settled sediment within the mixing tank for analysis;
- Submission of collected samples for laboratory analysis;

- Interpretation of analytical data;
- Provide figures outlining sample point locations; and,
- Preparation of a final report, detailing the findings of our assessment.

3.0 REGULATIONS AND GUIDELINES

The following sub-sections outline relevant provincial/territorial and federal regulations and guidelines as they pertain to hazardous building materials.

3.1 Territorial Occupational Health and Safety Regulations

Yukon workplace health and safety is regulated by Yukon Workers Compensation Health and Safety Board under the Occupational Health and Safety Act (the Act), as amended up to 2002. The Act defines the general duties and obligations of the employer, employees and others at the workplace.

The Yukon Territory Occupational Health and Safety Regulations 2006 (OH&S Regs) (including amendments up to the date of this report) contains legal requirements that must be met by all workplaces under the inspection jurisdiction of Yukon Workers Compensation Health and Safety Board. Many parts of the OH&S Regulations have associated guidelines that are used to help interpret and apply the OH&S Regulations.

3.2 Lead Regulations

In 1976, the lead content in certain interior and exterior paint was limited to 0.5% by weight (5,000 parts per million (ppm)/ 5000 mg/kg under the federal Hazardous Products Act (HPA). In April 2005, the Governor General in Council, on the recommendation of the Minister of Health, and pursuant to Section 5 of the Hazardous Products Act, annexed the Surface Coating Materials Regulation 2005-109 and the previous acceptable level of lead in paint was amended from 0.5% by weight to 0.06% by weight (600 ppm).

In October 2010, further corrective action was taken on consumer paints that contain more lead than is allowed by law and the Government amended the Surface Coating Materials Regulations to include "Consumer Products Containing Lead (Contact with Mouth) and Surface Coating Materials Regulation." The amended Surface Coating Materials Regulation identifies that previously considered "safe" lead levels pose a significant risk to the public, especially to children and pregnant women, and significantly lowered the level of total lead allowed in paints and other surface coating materials from 600 mg/kg to 90 mg/kg - which is equivalent to a total lead concentration of 0.009%. This new lead limit is among the most stringent in the world.

Under the Hazardous Products Act, identified Lead Based Paint (LBP) must undergo Toxicity Characteristic Leachate Properties (TCLP) to determine disposal procedures. The acceptable TCLP limit for disposal of LBP is less than 5 mg/L (5 ppm). If an identified LBP exhibits a TCLP result of less than 5 ppm, the paint is not considered a hazardous material and may be disposed of as construction waste.

Within the Transportation of Dangerous Goods Act, lead in sheeting products is addressed under Class 9; Miscellaneous Products, Substances or Organisms.

3.3 Environmental Regulations

In Yukon, environmental matters pertaining to special or hazardous waste generally fall under the jurisdiction of Yukon Environment, pursuant to the Yukon Environment Act (YEA). The Special Waste Regulation (O.I.C. 1995/047) under the YEA refers to the handling, storage, transportation, treatment, recycling and disposal of special (hazardous) wastes in the territory. The regulation outlines regulated materials and criteria to be used to characterize waste as special waste.

The Federal Hazardous Waste Regulation refers to the handling, storage, transportation, treatment, recycling and disposal of hazardous wastes in the territory. The regulation outlines the materials and criteria to be used to characterize waste as hazardous.

3.4 Transportation Regulations

The transportation of special or hazardous wastes is governed (inter-territorial/provincial) under the Federal *Transportation of Dangerous Goods (TDG) Regulations (SOR 2001-286)* pursuant to the *Transportation of Dangerous Goods Act* (1992) The regulations outline the requirements for storage, handling, and transportation of such waste. In the Yukon, the Federal (TDG) regulations are adopted by the Dangerous Goods Transportation Act.

4.0 METHODOLOGY

The study included assessment of lead based paint (LBP) associated with the rail car tanker and small mixing tank. It was intended that the study would also include an assessment of the interior of the H_2SO_4 rail car to determine the contents (if any); and sample any liquid present. Liquid at the base of the small green mixing tank to the north west of the Mill structure was also sampled and analyzed for potential contaminants of concern. The methodology is explained in further detail below.

4.1 Lead-Based Paint

At the time of assessment, EBA determined that the small mixing tank was not considered to have a surface coating suspect of being lead based. The exterior coating of the small mixing tank was not an applied surface coating but what appeared to be a color introduced into the substrate at the time of manufacturing. Therefore, EBA determined that a sample was not required to be collected for analysis.

An assessment of the painted surface suspected of containing lead was conducted on the labeled H_2SO_4 rail car at the Property. As the paint on the exterior of the tanker was homogeneous in colour; it was deemed sufficient to collect just one sample for identification. The suspect LBP sample was analyzed for lead content in accordance with the requirements of the Environmental Protection Agency (EPA) analytical method 200.8 – Elements by Inductively Coupled Plasma (ICP). Suspect LBP sample was submitted to ALS Environmental Laboratory in Whitehorse, YT for analysis. Suspected LBP were assessed for potential health and safety risks based on their observed physical condition.

As outlined under the *Hazardous Products Act*, identified LBP underwent TCLP to determine disposal procedures of the paint and substrate. The acceptable TCLP limit for disposal of LBP is less than 5 mg/L (5 ppm). If an identified LBP exhibits a TCLP result of less than 5 ppm, the paint is not considered a hazardous material and may be disposed of as construction waste with the substrate.

4.2 Rail Car Sampling

EBA attempted to sample the rail car contents for classification of materials to determine proper disposal. Prior to sampling, the rail car was inspected to:

- Determine if the rail car was pressurized;
- Determine if crystals could be observed on the exterior around any openings;
- Visually identify leaks, holes or stains;
- Locate any identifiers that provide information on potential contents;
- Assess condition, estimated age if labeled, exterior rust; and
- Confirm sampling accessibility.

4.3 Small Mixing Tank Sampling

EBA assessed the small mixing tank for sampling of the internal contents, if any. As the stairs leading to the cat walk of the attached large mixing tank had been removed, EBA accessed the cat walk with the use of an onsite extension ladder. Once on top of the small mixing tank via the connected cat walk, EBA sampled internal contents of the mixing tank with a grab bottle attached to a wire. The sample was then transferred into a laboratory supplied amber glass gar and placed into a cooler with ice packs for transport and submission to ALS Environmental Laboratory in Whitehorse, YT for analysis. The contents were assessed to determine disposal procedures.

At the time of assessment, EBA did not visually identify any settled sediment at the base of the small mixing tank.

EBA assessed the small mixing tank for the overall volume and to determine quantity of internal contents. The small mixing tank was measured with a handheld measuring tape to determine the height and diameter. The dimensions of the mixing tank were determined to be approximately 4.85m in height and 5m diameter.

4.4 Personal Protective Equipment

During sampling, EBA personnel wore personal protective equipment (PPE) that is to industry standards for such work being performed. PPE included:

- Half mask respirator with P100 HEPA organic cartridge filters for sampling of fluids;
- Acid resistant rubber apron and rubber gloves extending to the elbows for sampling of the rail car;
- CSA approved full-face shield for sampling of drums;
- CSA approved hard hat;
- Leather gloves;
- Nitrile gloves;

- CSA approved safety glasses;
- Steel toed boots (leather and acid resistant rubber); and
- Hi-Viz safety vests.

Additional safety equipment onsite included a first aid kit, fire extinguisher and portable eye wash station.

5.0 ASSESSMENT RESULTS

The results of the assessment are provided in the following sub-sections.

5.1 Rail Car Assessment

The following are the results for the assessment of the rail car for LBP and interior contents.

5.1.1 Lead Based Paints

EBA collected and submitted one (1) LBP sample for laboratory analysis. Based on the findings of our assessment, LBPs were identified within the sample submitted. Table 1 summarizes sample point location and paint description. Materials confirmed to be lead based are outlined in **RED** bold.

Table 1: Results of Lead Paint Analysis, H2SO4 Rail Car, Mount. Nansen Mine Site, Yukon

Sample ID	Sample Description	ICP (mg/kg)	TCLP (mg/L)
EBA-LBP-001	**Black exterior paint on rail car**	**145**	0.51

Note: Lead detection limit ICP = 2.0 mg/kg
TCLP detection limit = 0.1 mg/L
>90 ppm by ICP = Lead based paint
>5 ppm by TCLP = Hazardous waste

Based on the findings of our assessment, the black paint on the exterior of the rail car was determined to be lead based (> 90 ppm)(EBA sample # EBA-LBP-001) as per ICP analysis. TCLP analysis determined that the paint and substrate do not require regulated disposal as per the Hazardous Products Act (< 5 ppm). The paint was deemed to be in fair condition at the time of assessment as depicted by photograph No. 1.

Sample point locations for materials collected are included in the Figures section. Photographic documentation to exhibit onsite conditions at the time of assessment are included within Appendix A. Analytical results for all materials assessed for LBP content are attached within Appendix B.

5.1.2 Rail Car Sampling, Interior Contents

EBA visually assessed the rail car for an entry point to access interior contents. EBA identified the following:

- The rail car was pressurized;
- Crystals were not observed on the exterior around any openings;

- Visually identified a breach in the exterior of the rail car at both end toward the base where the exterior had rusted through. The rail car appears to be double walled. No staining was identified on the ground under the rail car;
- The rail car was identified by a label stating H_2SO_4 contents;
- Age is unknown; and
- Point of sampling was not determined.

EBA could not identify any potential location on the rail car that was a fill port and where an assessment for internal contents could be conducted. As well, there were no identifiers on the exterior of the rail car to show the quantity of contents, if any. A hatch at the top of the rail car (EBA photograph No. 1) was opened to determine if there was a potential sampling point. EBA opened the hatch on the top of the rail car to determine that all supply and return piping is routed into the car through this point which is sealed with a 2" steel plate (EBA photograph No. 2). The plate is connected to the top hatch with approximately 24 x 1.5" diameter bolts. It appears that someone had previously attempted to remove the bolts as 6 have been cut and removed at the top end of the plate (EBA photograph No. 3).

At the time of assessment, EBA attempted to determine if the remaining bolts holding the hatch could be removed with the use of a wrench. EBA determined that the bolts holding the hatch and plate would require a cutting device as they were rusted and seized. EBA attempted and could not remove any of the bolts with the equipment available at the site.

At the top plate there were four valves, one associated with each pipe and EBA attempted to move a valve to the open position to access a bolt. When the valve was actuated, the associated pipe became pressurized. EBA is unsure if the pressurization of the pipe was vapour or liquid contents from the rail car. As EBA is not certified nor trained to access pressurized vessels, the valve was returned to initial position and the assessment ceased immediately and due to health and safety concerns. This information was relayed to Jeff Moore with AAM whom was onsite at the time of assessment.

5.2 Small Mixing Tank Sampling

EBA sampled the standing liquid located within the small green mixing tank to the northwest of the Mill structure adjacent to the large green mixing tank which was sampled by EBA in 2011. EBA estimates that at the time of sampling, the liquid at the base of the mixing tank was 0.3 meter deep, as determined with a handheld measuring tape with no accumulation of sediment. EBA estimates that the total volume of liquid within the tank to be approximately 5500 L. EBA sample No EBA-MN-2012-001 was collected from the liquid in the base of the small mixing tank with the use of a grab bottle attached to wire.

Analytical results for liquids sampled are outlined in Table 2 within the Table section. Analytical certificates of analysis are included within Appendix B. Analytical results were compared to the "Metal Mining Effluent Regulations" (MMER) SOR/2002-222 Schedule 4, Column 4 as well as the Yukon Contaminated Sites Regulation (YCSR), September 30, 2002 for Aquatic Life (AW) Standards. These regulations were used for comparison purposes. Analytical results had the following exceedences:

- Cadmium (0.698 µg/L) exceeded the standard for YCSR AW of 0.6 µg/L;

- Zinc (92.7 µg/L) exceeded the standard for YCSR AW of 75 µg/L; and
- Parameters analyzed did not exceed the MMER regulations.

6.0 CONCLUSIONS AND RECOMMENDATIONS

EBA presents the following conclusions and recommendations based on the assessment completed:

6.1 Lead Based Paint

LBPs were identified within the exterior black paint on the rail car; however the concentrations were below the applicable TCLP limit of 5 ppm therefore the paint and substrate can be disposed of as general construction waste.

During decommissioning activities, ensure the LBP and substrate are removed and disposed of in accordance with the requirements of the Yukon Workers Compensation Health and Safety Board, the Transportation of Dangerous Goods Act and the Yukon Ministry of Environment. Prior to removal of the LBP, adequate safe work procedures must be developed by the contractor to ensure workers are protected from exposure to finely divided airborne lead particles during the demolition work. During demolition of the rail car, if LBP are to be demolished in place, the contractor must implement an exposure control plan.

6.2 Rail Car Interior Content Assessment

EBA was unable to assess the contents of the rail car as it was believed to be under pressure.

EBA contacted Reg Foster, Regional Manager of Emergency Response with Quantum Murray LP in Richmond British Columbia, and he recommended the following for depressurizing the rail car to access interior for sampling:

- Work not to occur if ambient environment is exhibiting a high humidity (>60% relative humidity) or potential for precipitation;
- Personal to don a class B Hazmat suit and self-contained breathing apparatus (SCBA) for respiratory protection;
- Note direction of wind and ensure it is not in a direction towards a building or other personal on the Property;
- Purge the pressure of the rail car while staying upwind of vapours or mist as it is being released; and,
- Upon purging of the rail car the same PPE should be worn during the removal of the top plate and hatch and during sampling of the interior contents;
- The atmosphere within the tank may contain hazardous vapours and/or a lack of oxygen and that appropriate respiratory protection may be required as outlined above.

EBA has the following additional recommendations:

- The top plate and hatch at the top of the rail car may require either a plasma torch or grinding wheel to cut each stud at the plate below the bolt. When the plate and hatch are released from the rail car, a

small hoist attachment may be required to safely move the plate and hatch. EBA estimates the weight of the units combined (hatch and top plate) to be approximately 100 kg. This cannot be safely maneuvered by a person due to the location and the round aspect at the top of the rail car.

- If interior contents are present, EBA recommends qualified personnel be employed to sample contents for classification and comparison against YCSR and MMER to determine disposal procedures. All work should be completed in accordance with, but not limited to, the Yukon Workers Compensation Health and Safety Board, the Transportation of Dangerous Goods Act and the Yukon Ministry of Environment.
- When the interior of the car is decontaminated, the rail car can be disposed of as general construction waste or for recycling of the steel components.

6.3 Contaminated Liquids Within Small Mixing Tank

EBA identified liquid within the small green exterior mixing tank which exceeds standards when compared to the YCSR-AW for Cadmium and Zinc. At the time of assessment there was no sediment present within the mixing tank.

EBA recommends that the liquid is pumped from the tank into a transport vehicle by an approved contractor certified in the removal of contaminated liquids and transported to a licensed facility out of territory for disposal as per applicable regulations: or, the liquid is pumped into the onsite tailings pond where an elevation in metals exists from historical mining activities.

6.4 Tendering Process

EBA recommends that this report not be used solely for the tendering process in the removal and disposal of hazardous/regulated materials identified within this report. EBA recommends that a hazardous materials technical specification and scope of services is included within tender documents for such work.

7.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Government of Yukon Assessment & Abandoned Mines and its agents. EBA, A Tetra Tech Company, 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 Government of Yukon Assessment & Abandoned Mines, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this report is subject to the terms and conditions stated in EBA's Services Agreement. EBA's General Conditions are provided in Appendix C of this report.

8.0 CLOSURE

We trust this report meets your present requirements. Should you have any questions or comments, please contact the undersigned at your convenience.

Sincerely,
EBA, A Tetra Tech Company

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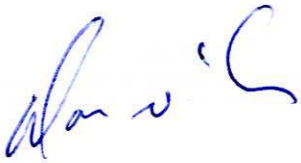

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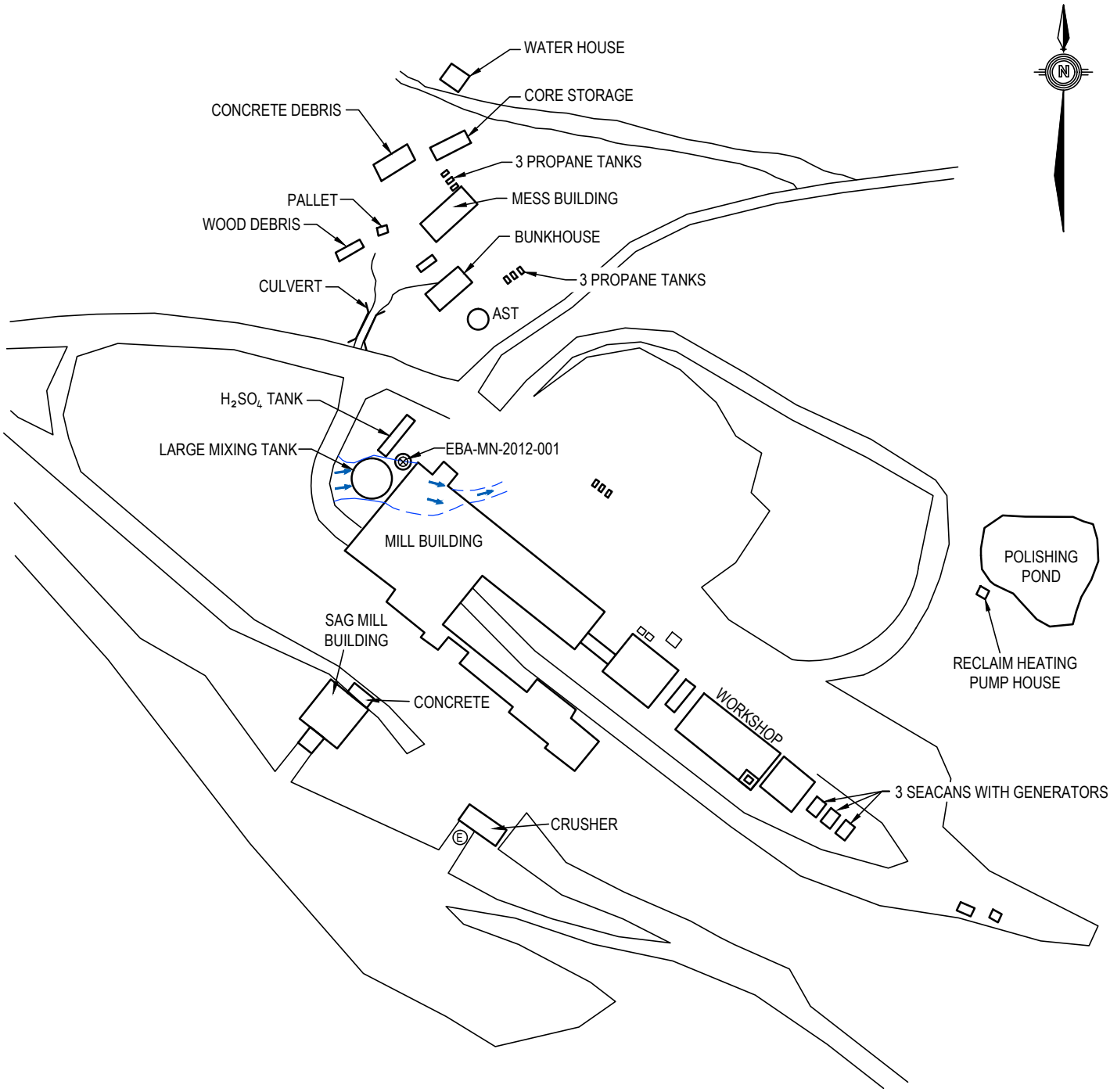
TABLES

Table 2: Fluid Sampling Summary

Sample Identification	Units	CSR AW Std	MMER Std	EBA-MN-2012-001
Physical Tests				
pH	pH	-	-	7.43
Cyanides				
Cyanide, Total	ug/L	50	2,000	<5.0
Total Metals				
Aluminum (Al)-Total	ug/L	-	-	10
Antimony (Sb)-Total	ug/L	200	-	2.11
Arsenic (As)-Total	ug/L	50	1,000	4.1
Barium (Ba)-Total	ug/L	10,000	-	<20
Beryllium (Be)-Total	ug/L	53	-	<5.0
Boron (B)-Total	ug/L	-	-	<100
Cadmium (Cd)-Total	ug/L	0.6	-	**0.698**
Calcium (Ca)-Total	ug/L	-	-	84300
Chromium (Cr)-Total	ug/L	10	-	<0.5
Cobalt (Co)-Total	ug/L	9	-	<0.5
Copper (Cu)-Total	ug/L	20	600	2.2
Iron (Fe)-Total	ug/L	-	-	145
Lead (Pb)-Total	ug/L	50	400	2.4
Lithium (Li)-Total	ug/L	-	-	<50
Magnesium (Mg)-Total	ug/L	-	-	2550
Manganese (Mn)-Total	ug/L	-	-	234
Molybdenum (Mo)-Total	ug/L	10,000	-	<1.0
Nickel (Ni)-Total	ug/L	250	1,000	<5.0
Selenium (Se)-Total	ug/L	10	-	<1.0
Silver (Ag)-Total	ug/L	0.5	-	0.119
Sodium (Na)-Total	ug/L	-	-	21100
Thallium (Tl)-Total	ug/L	3	-	<0.20
Titanium (Ti)-Total	ug/L	1,000	-	<50
Vanadium (V)-Total	ug/L	-	-	<30
Zinc (Zn)-Total	ug/L	75	1000	**92.7**
Hydrocarbons				
EPH10-19	mg/Kg	5,000	-	<250
EPH19-32	mg/Kg	5,000	-	<250
Glycols				
Diethylene Glycol	ug/L	-	-	<5000
Ethylene Glycol	ug/L	1,920 mg/l	-	<5000
1,2-Propylene Glycol	ug/L	5,000 mg/l	-	<5000

Exceedence as per Metal Mining Effluent Regulations Schedule 4, Column 4

FIGURES



NOTE
THIS DRAWING IS NOT TO SCALE

LEGEND:

- DIRECTION OF WATER INGRESS

CLIENT

Yukon Government

A TETRA TECH COMPANY

SMALL MIXING TANK AND RAIL CAR ASSESSMENT
MT. NANSEN MINE SITE, YUKON

SITE PLAN - MILL AND SURROUNDING AREA

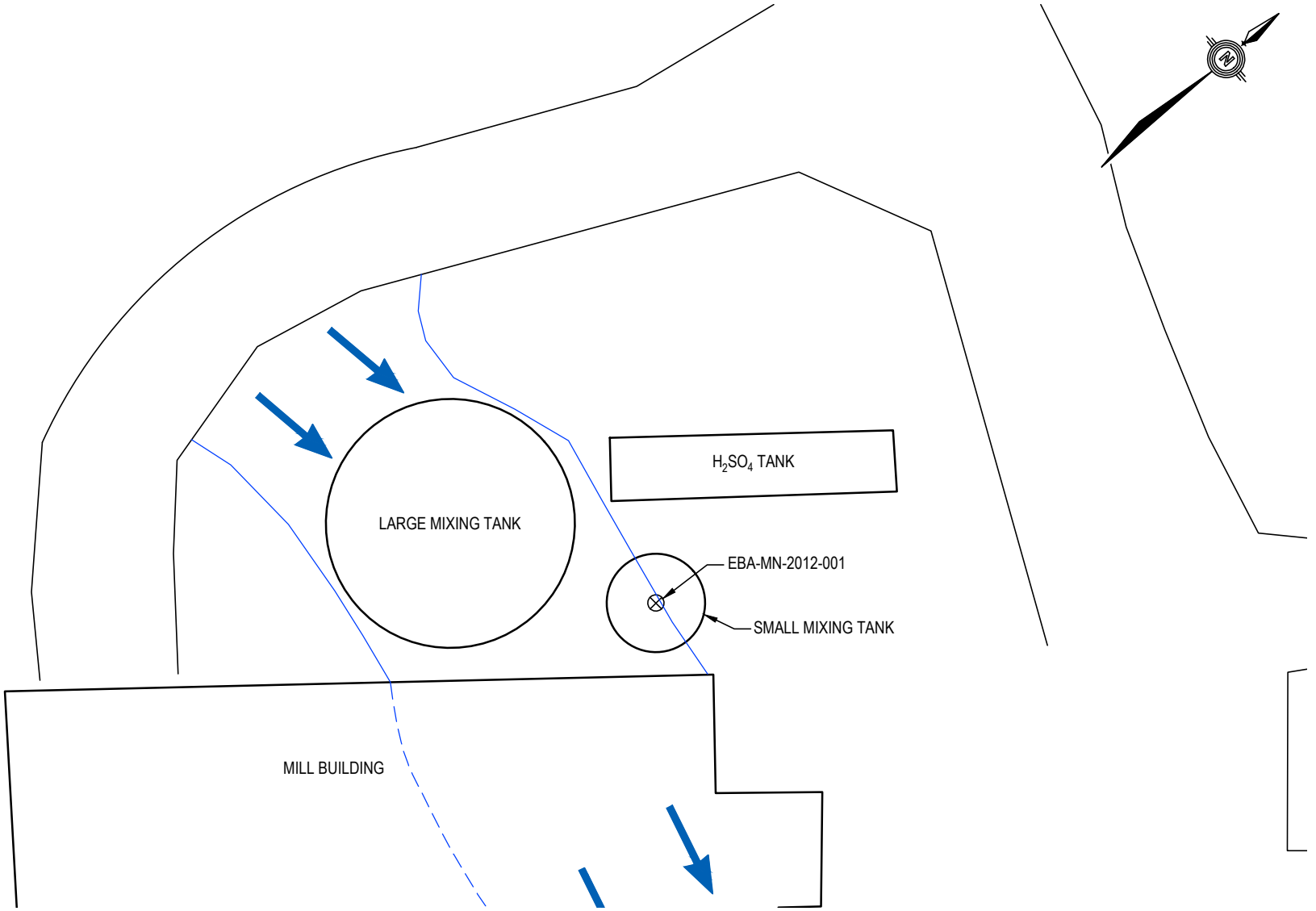
PROJECT NO.	DWN	CKD	REV
W23101576	CB	SGD	0

OFFICE	DATE
EBA-WHSE	July 25, 2012

Figure 1

Q:\Whitehorse\Data\0201drawings\Mt Nansen\W23101576 Small Mixing Tank and Rail Car Assessment\W23101576 Fig.1-2_R0.dwg [FIGURE 1] July 25, 2012 - 11:19:11 am (BY: BUCHAN, CAMERON)

Q:\Whitehorse\Data\0201drawings\Mt Nansen\W23101576 Small Mixing Tank and Rail Car Assessment\W23101576 Fig.1-2_R0.dwg [FIGURE 2] July 25, 2012 - 11:19:59 am (BY: BUCHAN, CAMERON)



LEGEND:

⊗ - APPROXIMATE LOCATION OF SAMPLE POINT

→ - DIRECTION OF WATER INGRESS INTO LOWER MILL LEVEL

NOTE

THIS DRAWING IS NOT TO SCALE

CLIENT

Yukon Government

eba A TETRA TECH COMPANY

SMALL MIXING TANK AND RAIL CAR ASSESSMENT
MT. NANSEN MINE SITE, YUKON

SMALL MIXING TANK AND RAIL CAR

PROJECT NO.	DWN	CKD	REV
W23101576	CB	SGD	0

OFFICE	DATE
EBA-WHSE	July 25, 2012

Figure 2

APPENDIX A
PHOTOGRAPHIC DOCUMENTATION

Photo 1: H_2SO_4 Rail car with small green mixing tank in back ground. EBA LBP sample number EBA-LBP-001 is the black paint associated with the exterior of the rail car.

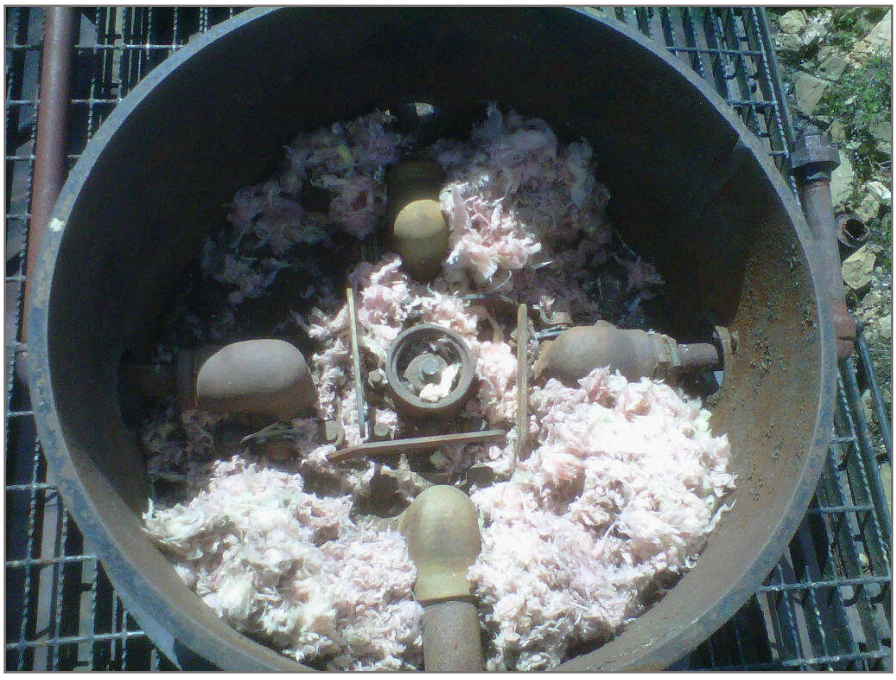


Photo 2: Piping and associated valves entering the top hatch of the rail car.

Photo 3: Exterior bolts holding the top hatch and plate in place. Evidence of bolts historically removed in the background.

Photo 4: Exterior bolts holding the top hatch and plate in place.

APPENDIX B
ANALYTICAL CERTIFICATES

EBA ENGINEERING CONSULTANTS LTD.
ATTN: Shane Dooley
Calcite Business Centre
Unit 6 - 151 Industrial Road
Whitehorse YT Y1A 2V3

Date Received: 04-JUL-12
Report Date: 17-JUL-12 15:55 (MT)
Version: FINAL REV. 2

Client Phone: 867-668-3068

Certificate of Analysis

Lab Work Order #: L1172793

Project P.O. #: NOT SUBMITTED
Job Reference: W23101576
C of C Numbers: 10-218028
Legal Site Desc:

Comments: ADDITIONAL 16-JUL-12 11:44
ADDITIONAL 16-JUL-12 10:37

17-JUL-12: This report replaces the previously reported L1172793 and includes additionally requested analyses.

Brent Mack
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1172793-1				
	Description	SOLID				
	Sampled Date	28-JUN-12				
	Sampled Time					
	Client ID	EBA-LB P-001				
Grouping	**Analyte**					
BULK						
Metals	Lead (Pb) (mg/kg)	145				

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1172793-1				
	Description	SOLID				
	Sampled Date	28-JUN-12				
	Sampled Time					
	Client ID	EBA-LB P-001				
Grouping	**Analyte**					
WASTE						
TCLP Metals	Lead (Pb)-Leachable (ug/L)	510				

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1172793-2				
	Description	WATER				
	Sampled Date	28-JUN-12				
	Sampled Time					
	Client ID	EBA-MN-2012-001				
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (ug/L)	221000				
	pH (pH)	7.43				
Cyanides	Cyanide, Total (ug/L)	<5.0				
Total Metals	Aluminum (Al)-Total (ug/L)	10				
	Antimony (Sb)-Total (ug/L)	2.11				
	Arsenic (As)-Total (ug/L)	4.1				
	Barium (Ba)-Total (ug/L)	<20				
	Beryllium (Be)-Total (ug/L)	<5.0				
	Boron (B)-Total (ug/L)	<100				
	Cadmium (Cd)-Total (ug/L)	0.698				
	Calcium (Ca)-Total (ug/L)	84300				
	Chromium (Cr)-Total (ug/L)	<0.50				
	Cobalt (Co)-Total (ug/L)	<0.50				
	Copper (Cu)-Total (ug/L)	2.2				
	Iron (Fe)-Total (ug/L)	145				
	Lead (Pb)-Total (ug/L)	2.4				
	Lithium (Li)-Total (ug/L)	<50				
	Magnesium (Mg)-Total (ug/L)	2550				
	Manganese (Mn)-Total (ug/L)	234				
	Mercury (Hg)-Total (ug/L)	<0.20				
	Molybdenum (Mo)-Total (ug/L)	<1.0				
	Nickel (Ni)-Total (ug/L)	<5.0				
	Selenium (Se)-Total (ug/L)	<1.0				
	Silver (Ag)-Total (ug/L)	0.119				
	Sodium (Na)-Total (ug/L)	21100				
	Thallium (Tl)-Total (ug/L)	<0.20				
	Titanium (Ti)-Total (ug/L)	<50				
	Uranium (U)-Total (ug/L)	<0.20				
	Vanadium (V)-Total (ug/L)	<30				
	Zinc (Zn)-Total (ug/L)	92.7				
Hydrocarbons	EPH10-19 (ug/L)	<250				
	EPH19-32 (ug/L)	<250				
Glycols	Diethylene Glycol (ug/L)	<5000				
	Ethylene Glycol (ug/L)	<5000				
	1,2-Propylene Glycol (ug/L)	<5000				

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CN-T-CFA-VA	Water	Total Cyanide in water by CFA	ISO 14403:2002

This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

EPH-SF-FID-VA	Water	EPH in Water by GCFID	BCMOE EPH GCFID

This analysis is carried out in accordance with the British Columbia Ministry of Environment, Lands and Parks (BCMELP) Analytical Method for Contaminated Sites "Extractable Petroleum Hydrocarbons in Water by GC/FID" (Version 2.1, July 1999). The procedure involves extraction of the entire water sample with dichloromethane. The extract is then solvent exchanged to toluene and analysed by capillary column gas chromatography with flame ionization detection (GC/FID). EPH results include Polycyclic Aromatic Hydrocarbons (PAH) and are therefore not equivalent to Light and Heavy Extractable Petroleum Hydrocarbons (LEPH/HEPH).

GLY-WAT-FID-VA	Water	Glycols in Water by GCFID	SW-846, METHOD 8015B, EPA

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8015B, published by the United States Environmental Protection Agency (EPA). The procedure involves treatment of the sample with a strong base (NaOH) and benzoyl chloride to form the corresponding benzoate esters. The benzoate esters are then extracted with iso-octane and the extract is analyzed by capillary column gas chromatography with flame ionization detection (FID).

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-TOT-CVAFS-VA	Water	Total Mercury in Water by CVAFS	EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry (EPA Method 245.7).

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-TOT-LOW-MS-VA	Water	Total Metals in Water by ICPMS(Low)	EPA SW-846 3005A/6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

PB-200.2-ICP-ED	Bulk	Lead in Paint by ICPOES	EPA 200.2/6010B
PB-TCLP-ED	Waste	Leachable Lead (Pb), TCLP	SW 846 -1311/6020-ICPMS on TCLP Leachate
PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PH-PCT-VA	Water	pH by Meter (Automated)	APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

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
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BC, CANADA

Chain of Custody Numbers:

10-218028

Reference Information

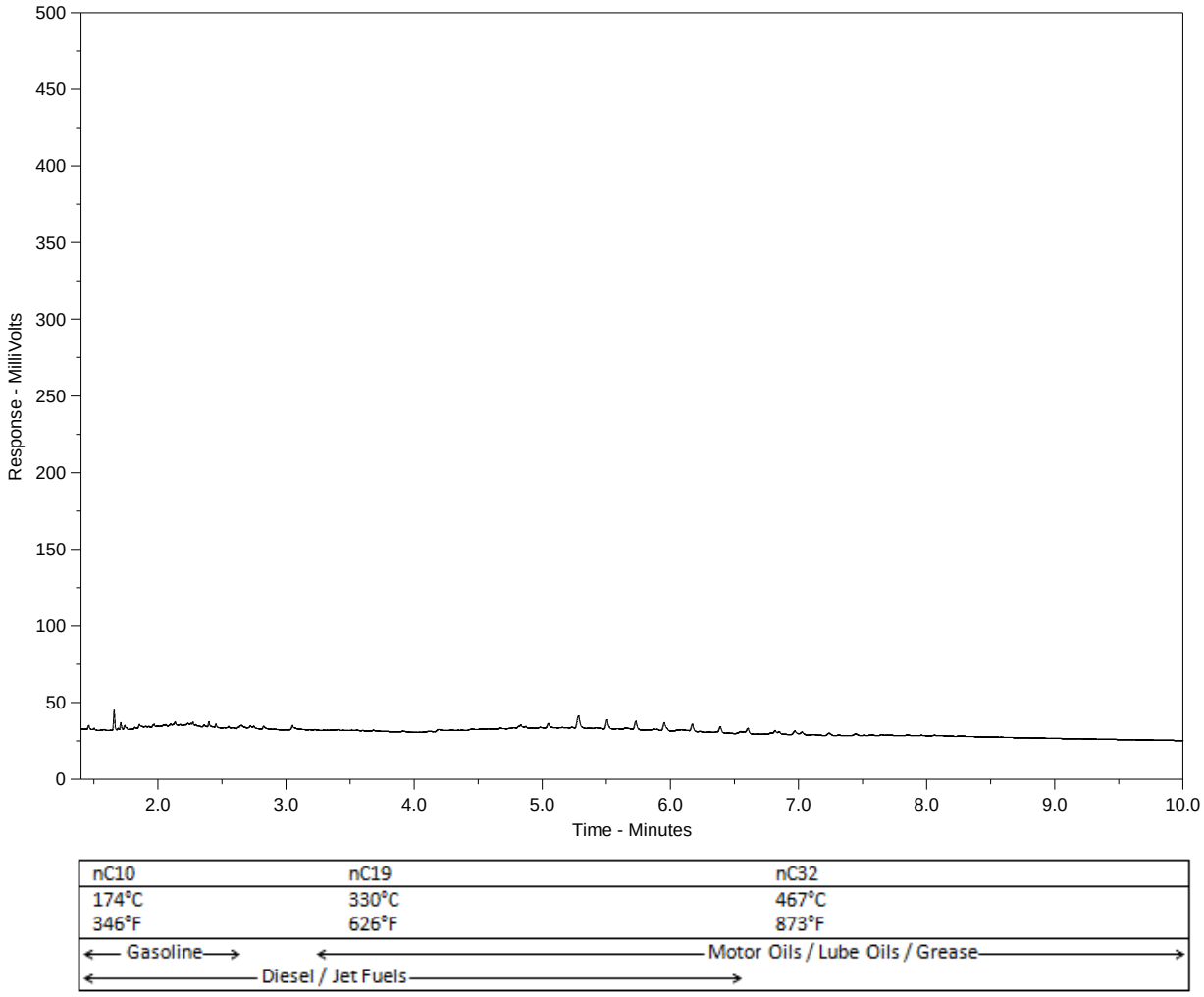
GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
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.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Hydrocarbon Distribution Report

ALS Sample ID: L1172793-2
Client Sample ID: EBA-MN-2012-001



The EPH Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample. For further interpretation, a current library of reference products is available on www.alsglobal.com or upon request.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products, and three n-alkane hydrocarbon marker compounds. Retention times may vary between samples by as much as 0.5 minutes.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor, and the response scale at the left.

A "-L-" in the sample ID denotes a low level sample. A "-S-" denotes a silica gel cleaned sample.

10-218028

ALS Environmental

Chain of Custody / Analytical Request Form
Canada Toll Free: 1 800 668 9878
www.alsglobal.com

Page 1 of 1

Report To	Report Format / Distribution	Service Request: (Rush subject to availability - Contact ALS to confirm TAT)
Company: EBA Engineering	Standard: ✓ Other (specify):	✓ Regular (Standard Turnaround Times - Business Days)
Contact: Shane Dooley	Select: PDF ✓ Excel ✓ Digital Fax	Priority (2-4 Business Days)-50% surcharge - Contact ALS to confirm TAT
Address: Unit 6 151 Industrial	Email 1: sdooley@eba.ca	Emergency (1-2 Business Days)-100% Surcharge - Contact ALS to confirm TAT
	Email 2: chorwood@eba.ca	Same Day or Weekend Emergency - Contact ALS to confirm TAT
Phone: 867-668-3068 Fax:		
Invoice To Same as Report ? (circle) Yes or No (if No, provide details)	**Client / Project Information**	**Analysis Request**
Copy of Invoice with Report? (circle) Yes or No	Job #: ~~154~~ W23815 ~~76~~	(Indicate Filtered or Preserved, F/P)
Company:	PO / AFE:	
Contact:	LSD:	
Address:		
Phone: Fax:	Quote #:	
Lab Work Order # (lab use only) L1172793	**ALS Contact:**	**Sampler:**

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	~~Leach~~ Metals	Total Lead (TLP)	pH	Total Cyanide	Total Metals	Hydrocarbons	Glycols							Number of Containers
	EBA-LBP-001	Jun 28/12	—	Solid		✓												
	EBA-MN-2012-001	Jun 28/12	—	Water			✓	✓	✓	✓	✓							

Special Instructions / Regulation with water or land use (CCME- Freshwater Aquatic Life/BC CSR-Commercial/AB Tier 1-Natural/ETC) / Hazardous Details

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)			SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)			
Released by:	Date:	Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
C. Howard.	July 4	1:00 pm.		04-JUL-12	14:00	10.3 °C				

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION | WHITE - LABORATORY COPY | YELLOW - CLIENT COPY | GENF 18.01 Front

APPENDIX C
EBA GENERAL CONDITIONS

GENERAL CONDITIONS

GEO-ENVIRONMENTAL REPORT

This report incorporates and is subject to these “General Conditions”.

1.0 USE OF REPORT AND OWNERSHIP

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 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), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by EBA shall be deemed to be the original for the Project.

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.

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.

3.0 NOTIFICATION OF AUTHORITIES

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.

4.0 INFORMATION PROVIDED TO EBA BY OTHERS

During the performance of the work and the preparation of the report, EBA may rely 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.