Defence Construction Canada
Construction de Défense Canada

Operation and Maintenance Plan
CFS Eureka (ERK), Nunavut

In support of the
Nunavut Water Board Licence
No. 3BC-ERK1015

November 2010
Version 1.0

Prepared for:
1 Canadian Air Division,
Department of National Defence

Prepared by:
Environmental Services
Defence Construction Canada

Canada

Revision Control Page

Revision No.	Revised By	Date	Issue/Revision Description
1.0	Defence Construction Canada	November 2010	Final

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LIST OF APPENDICES

ACRONYMS

BOD	Biological Oxygen Demand
BRI-NRC	Biotechnology Research Institute of the National Research Council of Canada
CBO	Canadian Base Operator
CFS	Canadian Forces Station
DND	Department of National Defence
EC	Environment Canada
ERK	Eureka
Eureka	CFS Eureka
HAWS	High Arctic Weather Station
HazMat	Hazardous Material
MSDS	Material Safety Data Sheet
NWB	Nunavut Water Board
O&M	Operation and Maintenance
pH	Measure of acidity and alkalinity
PHC	Petroleum Hydrocarbon
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
SNP	Surveillance Network Program
TDGR	Transportation of Dangerous Goods Regulation
WHMIS	Workplace Hazardous Materials Information System

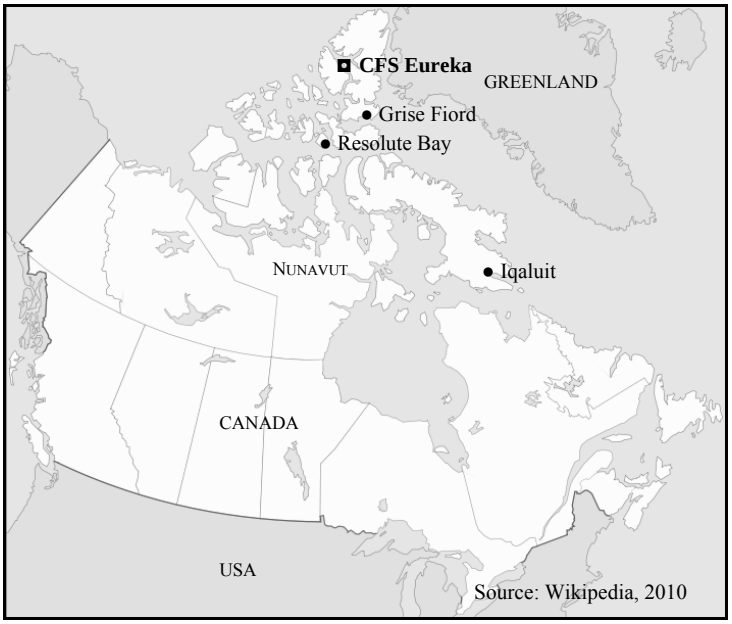
1. INTRODUCTION

1.1. Purpose

This document has been prepared in response to the requirements of the Nunavut Water Board (NWB) for the submission of an Operation and Maintenance (O&M) Plan, under Licence number 3BC-ERK1015, issued to the Department of National Defence (DND) on June 18, 2010 (refer to Appendix B). This new Class B Water Licence issued by the NWB allows for the disposal of waste during operation and maintenance of Canadian Forces Station (CFS) Eureka ("Eureka"). This Plan has been prepared in accordance with the *Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories*, published in 1996. Implementation of this O&M Plan will commence upon written NWB approval.

1.2. Location

Eureka is located approximately 0.8 km north of Slidre Fiord on the west coast of Ellesmere Island within the Qikiqtani Region of Nunavut (Latitude 79°59'20"N/ Longitude 85°56'30"W). The nearest communities to Eureka are Grise Fiord, CFS Alert and Resolute Bay, and are located approximately 450 km, 475 km and 600 km from the station. Eureka has been operational since 1947 and was originally established as a High Arctic Weather Station, and is currently a remote camp maintained by DND as a military detachment and training area. Eureka is located approximately 2 km from the Eureka High Arctic Weather Station (HAWS) operated by Environment Canada (EC).



1.3. Geophysical Environment

Soils, Geology and Terrain
The surface horizon at Eureka and surrounding area consists of tundra soils, comprised of mostly sand/gravel fill underlain by silty sandy clays. The surficial geology in the region is underlain by sandstone and shale. Eureka infrastructure (i.e., roads, buildings, etc.) is constructed on fine to course gravel fill material. The topography in the region is rolling and ridged, with altitudes not exceeding 1,000 m above sea level.

Climate
The polar climate is semi-arid. Eureka experiences cool summers and cold winters, with prevailing winds from the west. The mean annual daily temperature is -19.7°C, with summer months having a mean daily temperature of 3.5°C and winter months having a mean daily temperature of -37.6°C. Eureka experiences the most precipitation (in the form of rain and snow) during the months of July, August and September. Eureka receives on average approximately 75.5 mm of precipitation annually. Mean monthly temperatures and precipitation data are as follows:

Mean	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature (°C)	-37.1	-38.4	-37.4	-27.4	-11	2.3	5.7	2.6	-7.7	-22	-30.9	-34.7
Precipitation (mm)	2.9	2.6	2.7	3.5	3.4	8.1	12.5	14.9	10.1	7.9	3.9	3.3

Source: Environment Canada, 2010.

Permafrost
Eureka is located in a zone of continuous permafrost. The active layer in this region extends to a depth of approximately 80 cm.

Hydrology
Eureka is located in a continuously permafrost region and lacks significant surface vegetation; therefore runoff is the primary water distribution process at the site. Large trenches extend across the surface in the region, and are a result of seasonal drainage patterns (BRI-NRC, 2007). Runoff at the station generally flows south towards Slidre Fiord.

1.4. Location of Waste Facilities

Waste facilities at Eureka include a Sewage Lagoon and the following three landfills/dumps: landfill, Battery Dump and Barrel Dump. Refer to Figure 1, Appendix A for the location of these waste facilities at Eureka.

1.5. Population Projections

Eureka is only seasonally active during the summer months, which include June, July and August, and is used by DND, EC and arctic research projects (Polar Continental Shelf Project and the Polar Environment Atmospheric Research Laboratory). During the summer months the peak population is 35 people, and on average ranges between 20 to 25 people. People visiting the

station can include DND personnel, consultants, contractors, and researchers. The population is anticipated to remain the same over the next 5 years.

1.6. Contact List

Personnel responsible for the operation and maintenance of the sewage and solid waste facilities are as follows:

Facility	Position	Telephone No.
Sewage Lagoon & Solid Waste Facilities	CFS Eureka OC – Officer Commanding	(613) 945-3145 ext 4452

2. BACKGROUND

2.1. Water Supply

The community at Eureka obtains its drinking water from the EC weather station located adjacent to the station. The EC's source of freshwater is Station Creek which begins to flow in early June. Water is transported by truck from the EC reservoir and stored in a cistern at the station. Water reservoirs in the main building and Weather Heaven supply water to these buildings; there is no water supply (i.e., piping) between buildings.

All water used at Eureka is regulated under separate licence issued to EC (Licence 3BC-EUR0611). DND does not use any other freshwater sources; therefore, the NWB Licence issued to DND does not allow for the use of freshwater. In the event that DND requires a freshwater source in addition to the water obtained from the EC facility, an application to amend this Licence is required.

2.2. Sewage

Camp sewage comprised of black and greywater passes through a digester, then piped (i.e, gravity-fed) and discharged to the sewage lagoon. The lagoon is located on the south side of the main station (refer to Figure 1, Appendix A). The lagoon is a two-stage process (i.e., two cells) which eventually discharges effluent overland, which flows downhill to the receiving water body of Slidre Fiord. The quantity of wastewater (containing sewage) discharged to the sewage outfall is estimated based on the water usage at the station.

In 2009 an upgrade to the lagoon walls was completed extending the height of walls to approximately 2.5 to 3.0 m. To facilitate improved settling within the lagoon a pipe was installed connecting the two cells to allow transfer of primarily liquid from the first cell to the second cell of the lagoon.

2.3. Solid Waste

Landfill (East Airstrip Landfill)
This landfill is situated in a ravine and has been in operation since the inception of EC's Weather Station in 1947. Historically both hazardous and non-hazardous materials were deposited here. Currently the landfill is still active and is used to dump non-combustible solid waste. Garbage is collected daily in sealed containers or plastic bags. No data exists for determining the composition of the solid waste generated at the station. The landfill is covered as time/equipment is available.

Incinerator
Combustible garbage is taken to the incinerator building and incinerated as required. Ashes are shipped to 8 Wing Trenton and disposed of at a licensed waste disposal facility.

Barrel Dump
The Barrel Dump contains empty crushed burned barrels, capped with thin layers of clean fill. Barrels are primarily aviation fuel drums.

Battery Dump
The Battery Dump has been completely backfilled and is no longer used. Batteries used for the High Arctic Data Communications System, vehicles and other equipment onsite were previously disposed of in this location. Presently, there is no visual evidence of the dump; however, a sign is posted identifying the *Department of National Defence Battery Disposal Area*.

Hazardous Materials
Hazardous materials generated at the station, such as batteries, are collected and stored in HazMat overpacks and shipped to 8 Wing Trenton for management and disposal.

3. SEWAGE LAGOON O&M PLAN

3.1. Description

Camp sewage passes through a digester prior to being discharged to the sewage lagoon. The lagoon is a two-stage process (i.e., two cells) which discharges effluent overland to the receiving water body of Slidre Fiord (approximately 700 m down gradient). The lagoon is located on the south side of the main station (refer to Figure 1, Appendix A).

3.2. Operation and Maintenance Protocols

The purpose of operation and maintenance for this system is to maintain continuous operation during the summer months, prolong system life and ensure the treatment area performs as intended. The following table outlines the frequency and tasks to be completed to operate and maintain the sewage facility.

Frequency	Tasks
Semi-annually (i.e., opening/closing of camp)	▪ Inspect sewage lines and sewage lagoon. ▪ Inspection Report submitted to the 8 Wing Construction Engineering Officer.
As required	▪ Repair piping, lagoon, etc. ▪ Sample effluent prior to release of effluent.

Maintenance records are kept onsite include the details of any maintenance undertaken at the sewage lagoon.

Weed and insect control is not required at the site.

3.3. Safety Procedures

Safety procedures have not yet been formalized for the sewage facility.

4. SOLID WASTE O&M PLAN

4.1. Description

The solid waste facilities at Eureka include a landfill, barrel dump and battery dump. Since these solid waste facilities were constructed prior to licence conditions, as-built drawings are not available. The following table identifies the contents, location, and the dimensions of the landfills and dumps onsite, and respective distances and directions from water and airport runway.

Landfills	Contents	Location	Size/Capacity	Distance from	
				Water Body	Airfield
Landfill	Non combustible solid waste	South of east end of air strip	7,500 m^3	230 m north of Slidre Fiord	N/A
Barrel Dump	Crushed empty barrels	Main station, south of air strip	N/A	N/A	N/A
Battery Dump	Depleted batteries*	Northeast of east end of airstrip	34 m x 20 m 4,350 m^3	500 m north of Slidre Fiord	N/A

* Depleted and spent batteries are shipped to 8 Wing Trenton and are no longer disposed of onsite.
N/A: Not available.

Conditions that may affect normal operations of the solid waste activities could include: flooding in low lying areas during spring melt, severe winter storms and high winds, flight cancellation (no shipping of waste south), lack of qualified personnel (i.e., certification, qualifications, expertise) to handle (i.e., store, transport, dispose) specialized wastes.

4.2. Operation and Maintenance Protocols

The community of Eureka produces numerous types of solid waste which include combustible and non-combustible waste, scrap metal, waste oil and hazardous waste, excess fuel and empty barrels. Waste is segregated onsite. Disposal procedures are waste specific and include:

- Combustible solid waste is incinerated.
- Non-combustible solid waste is landfilled.
- Bulky or scrap metal that cannot be re-used are landfilled.
- Waste oil and hazardous waste is collected, packaged and shipped to Trenton for further management/recycling; refer to Section 5.0 for further information on the disposal procedures for hazardous waste.
- Excess fuel is incinerated.
- Empty barrels are crushed and landfilled in the Barrel Dump.

Solid waste maintenance activities for Eureka are identified and outlined as follows:

Activity	Procedures
Waste Collection	▪ Garbage is collected daily in sealed/secured in containers or plastic bags. ▪ For collection of Hazardous Waste refer to Section 5.
Segregation	▪ Combustible, non-combustible, and hazardous waste materials are separated.
Incineration	▪ Incineration of combustible waste at the Incinerator Building as required (i.e., at least once a week). Ash is shipped to 8 Wing and disposed of at a licensed waste disposal facility.
Preventing Windblown Debris	▪ Waste placed in sealed containers or indoors. ▪ Landfill is capped annually with clean materials (soil, gravel).
Fencing and Signs	▪ Sign is posted at the Battery Dump to identify the location (as the dump has been completely backfilled). ▪ No fencing or signs for the landfills due to strong winds. ▪ Safety signs and access control signs indoor for the incinerator building.
Odour Control	▪ There are no controls for odour at the dump aside from capping activities. ▪ Capping with gravel/fill material occurs at least annually, near the end of the summer season.

*Presently there are no alternatives to incinerating combustible waste onsite.

4.3. Safety Procedures

Solid waste at the Eureka is strictly managed to prevent animals from eating station waste. Upon arrival to the station, all personnel receive the solid waste orientation. Safety procedures for waste facility operators include adequate training (e.g., WHMIS, etc.) and the appropriate personal protective equipment (PPE) to be worn to handle waste and spills.

4.4. Incineration Management Plan

An Incineration Management Plan has not been formalized. Combustible garbage is taken to the incinerator building and incinerated as required. Incinerator ash is shipped to 8 Wing Trenton and disposed of at a licensed waste disposal facility.

5. HAZARDOUS WASTE O&M PLAN

5.1. Description

HazMat wastes at the station may include: paint, batteries, ash, battery acid, pcb (present and/or suspected), waste oil, waste oil drums, waste fuel, coolant, glycol, oil rags, oil-antifreeze mixture, oil filters, and aerosol cans.

5.2. Operation and Maintenance Protocols

Currently no Hazardous Material (HazMat) Management Plan is in place for Eureka. In the absence of this Plan the main elements of the *CFS Alert HazMat Management Plan* have been adopted (refer to Appendix C). The *CFS Alert HazMat Management Plan* defines cradle-to-grave HazMat management (e.g., distribution, storage, application, etc.) and provides direction to all onsite personnel. All HazMat wastes are identified, collected, segregated/stored, labelled, and disposed by the CBO HazMat Coordinator.

HazMat wastes are stored at registered storage sites, and as outlined in the *CFS Alert HazMat Management Plan* (Appendix C) the following is applied to serviceable HazMat storage:

- Indoors, flammable HazMat is stored in approved flammable storage cabinets of in a manner approved by the Station Fire Safety.
- Refillable compressed gas cylinders are secured upright.
- HazMat is labelled in accordance with the WHMIS guidelines.
- Incompatible classes of hazardous materials are physically separated.
- HazMat storage areas are subject to siting approval by the Station Fire Chief.

Procedures outlining the return and disposal of HazMat waste to 8 Wing Trenton are attached in Annex D of Appendix C. These procedures provide a waste transfer template which is completed and accompanies return waste during the transfer. The following information is required on HazMat waste transfers: dates of waste collection, description, volume, generator of wastes, method of storage, name of carrier transferring waste and contact. Manifests for off-base shipping conform to the Transportation of Dangerous Good Regulation (TDGR). Disposal records are maintained for all HazMat waste onsite at Eureka.

5.3. Safety Procedures

This adopted HazMat Plan applies to all personnel working onsite, including integral, lodger, contractors and sub-contractors. Hazardous wastes onsite are handled only by WHMIS-trained qualified personnel (i.e., CBO HazMat Coordinator, HazMat Technician) wearing appropriate personal protective equipment (PPE). MSDS are maintained and accessible to personnel on site.

Spill prevention measures, spill response procedures and incident reporting are outlined in the: (i) *CFS Alert HazMat Management Plan* (Appendix C), and (ii) *CFS Eureka Spill Contingency Plan* (Appendix D).

6. LANDFARM MANAGEMENT PLAN

6.1. Description

The Landfarm (i.e., Biopile) at Eureka was constructed for the purposes of remediating soil contaminated with petroleum hydrocarbons. The Landfarm is located approximately 90 m south of the airstrip (refer to Figure 1, Appendix A). The Landfarm is approximately 18 m x 3 m in size with a capacity of approximately 44 m^3. The Landfarm is comprised of the contaminated soil and a berm enclosing the Landfarm. Since this Landfarm facility was constructed prior to licence conditions, an as-built drawing is not available.

6.2. Operation and Maintenance Protocols

The Landfarm operates year-round as part of the ongoing ex-situ bioremediation project under the Contaminated Sites Program operated by the Biotechnology Research Institute of the National Research Council of Canada (BRI-NRC). Due to polar desert condition, any water accumulated within the berm is reapplied to hydrate the contaminated soil; no water is discharged outside of the Landfarm.

DND will seek confirmation from the Government of Nunavut, Department of Environment prior to the final disposal or use of the treated landfarm soils, as the disposal/use is dependent on the Treatment Objective.

6.3. Safety Procedures

This adopted HazMat Plan applies to all personnel working onsite, including integral, lodger, contractors and sub-contractors. Hazardous wastes on site are handled only by WHMIS-trained qualified personnel (i.e., CBO HazMat Coordinator, HazMat Technician) wearing appropriate personal protective equipment (PPE). MSDS are maintained and accessible to personnel on site.

Spill prevention measures, spill response procedures and incident reporting are outlined in the: (i) *CFS Alert HazMat Management Plan* (Appendix C), and (ii) *CFS Eureka Spill Contingency Plan* (Appendix D).

7. MONITORING PROGRAM

7.1. Monitoring Stations

The Eureka Monitoring Program is scheduled to commence in June 2011 as the station is only seasonally active (i.e., June through August). The Surveillance Network Program (SNP) at Eureka consists of the following 5 monitoring stations:

Station No.	Monitoring Station	Monitor	Frequency of Sampling
ERK-1	Final Discharge Point of the Sewage Treatment Facility	Quality	Prior to the release of effluent
ERK-2	Final Discharge Point of the Landfarm Facility	Quality	Prior to the release of effluent
ERK-3	Runoff/leachate from the Landfill	Quality	Monthly during periods of runoff or seepage (while station active)
ERK-4	Runoff/leachate from the Battery Dump	Quality	Monthly during periods of runoff or seepage (while station active)
ERK-5	Runoff/leachate from the Barrel Dump	Quality	Monthly during periods of runoff or seepage (while station active)

7.2. Monitoring of Water Supply

No monitoring requirements.

7.3. Monitoring of Sewage Lagoon

Sampling procedures for sewage effluent are provided in the Quality Assurance and Quality Control (QA/QC) Plan (refer to Appendix E). Sewage samples are to be analysed for BOD_5, total suspended solids, fecal coliforms, oil and grease and pH. Analytical results of effluent discharged from the sewage lagoon will be reported against and are not to exceed the effluent quality standards provided by the NWB. Results are to be reported annually to the NWB in the Annual Report.

An Inspector will be notified at least 10 days prior to discharging effluent compliant with the NWB standards from the sewage lagoon.

7.4. Monitoring of Solid Waste Facilities

Sampling procedures for the leachate are provided in the QA/QC Plan (refer to Appendix E). Sampling stations have been identified to monitor contaminants in the leachate from each of the three landfills/dumps at the station. Results are to be reported annually to the NWB in the Annual Report.

7.5. Monitoring of Landfarm

Sampling procedures for the Landfarm (i.e., Biopile) are provided in the QA/QC Plan (refer to Appendix E). Effluent samples from the Landfarm are to be analysed for benzene, toluene, ethylbenzene, lead, oil and grease and phenols. Analytical results of effluent discharged from the Landfarm will be reported against and are not to exceed the effluent quality standards provided by the NWB. Results are to be reported annually to the NWB in the Annual Report.

An Inspector will be notified at least 10 days prior to discharging effluent compliant with the NWB standards from the Landfarm; effluent is to be discharged on the land in areas at a minimum distance of 31 m from the high watermark. Effluent that does not meet the NWB effluent standards is treated as hazardous waste and disposed off-site at an approved facility.

8. INSPECTIONS, MODIFICATIONS, AND PLANS

8.1. Facility Inspections

Engineered waste facilities will be inspected annually during the summer (i.e., July or August); any required maintenance will be addressed.

8.2. Facility Modifications

The NWB is to be notified in writing at least 60 days prior to the commencement of the modifications to the water supply and waste disposal facilities. Modifications are to be consistent with the terms of the Licence (Appendix B).

8.3. Review of O&M Plan

This document shall be reviewed annually by DND to ensure that this plan remains current and consistently reflects the operations, activities and technology at Alert. Revisions required to this document shall be made as necessary, and shall be submitted to the NWB in the form of an addendum in the Annual Report.

The NWB requires notification of any changes to the operating plans or conditions associated with this project at least 30 days prior to implementation.

8.4. Abandonment and Restoration Plan

In the event the station is to close an Abandonment and Restoration Plan will be prepared and submitted to the NWB for approval 6 months prior to the abandonment of the station.

9. REFERENCES

Biotechnology Research Institute of the National Research Council of Canada (BRI-NRC). *Characterization of Contaminated Sites, CFS Alert and CFS Eureka, Nunavut, Final Report*. March 2007.

Biotechnology Research Institute of the National Research Council of Canada (BRI-NRCC). *Detailed Characterization and Econet Update of Multiple Sites at CFS-Eureka and CFS-Alert, Nunavut, Volume III – CFS-Eureka.* March 31, 2008.

Duong, D. and R. Kent. *Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories*. October 1996.

Environment Canada (EC). National Climate Data and Information Archive, Canadian Climate Normals 1971-2000. Website: http://www.climate.weatheroffice.gc.ca/climate_normals/stnselect_e.html (accessed October 6, 2010).

Environment Canada (EC). *Summary of Operations and Maintenance Procedures for Sewage, Solid Waste Disposal and Waste Treatment Facilities, Eureka High Arctic Weather Station*. November 2007.

Nunavut Water Board (NWB). *Letter and NWB Licence No. 3BC-ERK1015*. June 18, 2010.

Wikipedia. *Eureka ,Nunavut (Map)*. Website: http://en.wikipedia.org/wiki/Eureka,_Nunavut (accessed October 11, 2010).

Appendix A: Figure

Defence Construction Canada
Construction de Défense Canada

Title:
CFS Eureka Site Overview

Project:
Operation and Maintenance Plan, CFS Eureka

Client:
Department of National Defence

Date:
November 2010

Figure:
Figure 1

LEGEND

	Monitoring Station Locations
ERK-1	Sewage Treatment Facility
ERK-2	Landfarm Facility
ERK-3	Landfill
ERK-4	Battery Dump
ERK-5	Barrel Dump

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Appendix B: NWB Licence No. 3BC-ERK1015

P.O. Box 119
Gjoa Haven, NU X0B 1J0
Tel: (867) 360-6338
Fax: (867) 360-6369

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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI
OFFICE DES EAUX DU NUNAVUT

File No.: **3BC-ERK1015**

June 18, 2010

Colonel R.C. Baker
Director A4 Construction Engineering
&
Scott Edwards, Environment Manager
Department of National Defence
1 Canadian Air Division
A4 Construction Engineering
PO Box 17000 Stn Forces
Winnipeg, MB R3J 3Y5
Email: scott.edwards2@forces.gc.ca

RE: NWB Licence No. 3BC-ERK1015

Dear Colonel Baker,

Please find attached Licence No. **3BC-ERK1015** issued to the Department of National Defence by the Nunavut Water Board (NWB) pursuant to its authority under Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*. The terms and conditions of the attached Licence related to water use and waste disposal are an integral part of this approval.

If the Licensee contemplates the renewal of this Licence, it is the responsibility of the Licensee to apply to the NWB for its renewal. The past performance of the Licensee, new documentation and information, and issues raised during a public hearing, if the NWB is required to hold one, will be used to determine the terms and conditions of the Licence renewal. Note that if the Licence expires before the NWB issues a new one, then water use and waste disposal must cease, or the Licensee will be in contravention of the *Nunavut Land Claims Agreement* (NLCA) and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (NWNSRTA). However, the expiry or cancellation of a licence does not relieve the Licensee from any obligations imposed by the licence. The NWB recommends that an application for the renewal of this Licence be filed at least three (3) months prior to the Licence expiry date.

If the Licensee contemplates or requires an amendment to this licence, the NWB may decide, in the public interest, to hold a public hearing. The Licensee should submit applications for amendment as soon as possible to give the NWB sufficient time to go through the amendment process. The process and timing may vary depending on the scope of the amendment, however

a minimum of sixty (60) days is required from time of acceptance by the NWB. It is the responsibility of the Licensee to ensure that all application materials have been received and acknowledged by the Manager of Licensing.

The NWB notes that, among other items, recommendations were made by parties concerning the requirement for incineration to comply with the Canada-wide Standards (CWS) for Dioxins and Furans and the CWS for Mercury Emissions. This requirement is supported by the Government of Nunavut and Indian and Northern Affairs Canada. Environment Canada outlined appropriate incineration equipment and best management practices required to achieve the CWS for dioxins/furans and mercury. The NWB strongly recommends that the Licensee consult the comments received from interested persons on issues identified. This information is attached for your consideration.[1]

Sincerely,

Thomas Kabloona
Nunavut Water Board
Chair

TK/tla

Enclosure: Licence No. **3BC-ERK1015**
Comments

cc: Distribution –

[1] Environment Canada, February 6, 2010; Indian and Northern Affairs Canada, February 2, 2010; and Government of Nunavut – Department of Environment, February 5, 2010.

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DECISION

LICENCE NUMBER: 3BC-ERK1015

This is the decision of the Nunavut Water Board (NWB) with respect to an application dated November 16, 2009 for a new Water Licence made by:

DEPARTMENT OF NATIONAL DEFENCE

to allow for the use of water and disposal of waste during operation and maintenance of the Canadian Forces Station Eureka, located on Ellesmere Island within the Qikiqtani Region, Nunavut, generally located at the geographical coordinates as follows:

Latitude: 79° 59' 20"N Longitude: 85° 56' 30"W

DECISION

After having received a positive land use plan conformity determination from the Nunavut Planning Commission on February 8, 2010, and following notification of exemption from screening by the Nunavut Impact Review Board on November 30, 2009, the NWB decided that the application could proceed through the regulatory process. In accordance with S.55.1 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act (NWNSRTA)* and Article 13 of the *Nunavut Land Claims Agreement (NLCA)*, public notice of the application was given and interested persons were invited to make representations to the NWB.

After reviewing the submission of the Applicant and comments provided by interested parties, the NWB, having given due regard to the facts and circumstances, the merits of the submissions made to it and to the purpose, scope and intent of the *NLCA* and of the *NWNSRTA*, waived the requirement to hold a public hearing, and determined that:

Licence Number 3BC-ERK1015 be issued subject to the terms and conditions contained therein. (Motion #: 2010-11-L03)

SIGNED this 18th day of June 2010 at Gjoa Haven, NU.

Thomas Kabloona
Nunavut Water Board
Chair

TK/tla

LICENCE NO: 3BC-ERK1015

I. INTRODUCTION

Canadian Forces Station (CFS)-Eureka is located on the shore of Slidre Fiord on the west coast of Ellesmere Island, approximately 450 km northwest of the Hamlet of Grise Fiord. CFS-Eureka was first established in 1947 as a High Arctic Weather Station. The site is maintained as a military station for personnel maintaining the communications equipment at CFS-Alert and is the military quarters for training missions to the North.

Facilities at CFS-Eureka are located at the main camp and include accommodations buildings, vehicle maintenance garage, aircraft refuelling apron, fuel storage, sewage lagoon and several landfills.

II. PROCEDURAL HISTORY

The Nunavut Water Board (NWB) received an application for a new water licence from the Department of National Defence (DND) on November 16, 2009. Following an internal completeness review of the application, the NWB requested additional information from DND on November 26, 2009.

Following receipt of additional information provided by DND on December 18, 2009, the NWB notified parties on January 6, 2010 and distributed the file for review. Following a thirty (30) day public review period, and after reviewing all submissions, the new Licence 3BC-ERK1015 has been issued.

III. GENERAL CONSIDERATIONS

The following section outlines the issues identified by the NWB and raised by interested parties and provides the background for the terms and conditions imposed within the body of the licence.

A. Term of Licence

In accordance with the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* s. 45, the NWB may issue a licence for a term not exceeding twenty-five years. In determining an appropriate term of a water licence, the Board considers a number of factors including, but not limited to; the results of Indian and Northern Affairs Canada (INAC) site inspections and the corresponding compliance record of the Applicant, as well as intervener comments provided during the application review process. Given that this is a new application, the NWB has relied mostly on the comments provided by parties during the review process.

The applicant did not request a specific term for the licence. In the past the NWB has issued 10 year licences for other sites operated by DND. However, because this is a new Licence with numerous issues that need to be addressed by the Licensee, the NWB finds that a five (5) year term is more appropriate in this case.

The Licence duration will allow the Licensee to properly carry out the terms and conditions of the Licence and will ensure that sufficient time is given to submit and implement the plans required under the licence.

B. Annual Reporting

The NWB has imposed on the Licensee, the requirement to produce an Annual Report. These Reports, which are standard requirements for most licences, are for the purpose of ensuring that the NWB has an accurate annual update of the Licensee's activities related to water use and waste disposal during a calendar year. This information is maintained on the NWB Public Registry and is available to interested parties upon request. A *"Standardized Form for Annual Reporting"* is to be used by the Licensee and is available from the NWB file transfer protocol (FTP) site under the Public Registry link at the NWB Website.

Website Public Registry:
(**ftp://nunavutwaterboard.org/ADMINISTRATION/Standardized%20Forms/**).

This form provides the basis for annual reporting and format, however individual licences with project specific reporting requirements will need to provide information in addition to that of the standard form.

C. Water Use

CFS-Eureka obtains its water from the Environment Canada (EC) weather station located adjacent to the site. The water used by EC is regulated under Licence 3BC-EUR0611. Water is trucked from the EC reservoir to CFS-Eureka, where it is placed into a cistern system.

DND did not apply to obtain water from any other freshwater source, and therefore, this Licence does not include consideration of water use. In the event DND requires water in additional to what is obtained from the EC facility, an application to amend this Licence will be required.

D. Waste Disposal

Sewage Waste

Camp sewage passes through a digester prior to being pumped via piping to a two-celled lagoon. Effluent from the lagoon passes over land and flows downhill into Slidre Fiord, less than one kilometre away. During the review of the application, the Licensee clarified that it had also been using a second lagoon that is licensed to EC. However, DND confirmed that starting in 2010, DND would only use its own two-celled lagoon facility.

In their comments, EC and INAC raised concerns regarding the operation of the sewage treatment system. For similar projects in Nunavut, the NWB has required that the Licensee submit, for review and approval, an Operation and Maintenance Manual for wastewater treatment facilities. In agreement with the Government of Nunavut Department of

Environment (GN-DoE), INAC and EC, the NWB finds that an O&M Manual would help ensure that sewage treatment objectives are met. The O&M Manual shall be developed in accordance with the *Guidelines for the Preparation of an Operations and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories,* (Duong and Kent, 1996) and other regulatory guidelines as deemed appropriate. In accordance with the recommendation made by EC, the Manual should also include a plan do deal with sewage sludge that will require management action from time to time.

The Licensee did not submit proposed Effluent quality discharge criteria for review. In order to protect the receiving environment, the NWB has included Effluent standards for Total Suspended Solids and Biological Oxygen Demand that are consistent with the *Guidelines for the discharge of treated municipal wastewater in the Northwest Territories* (1992). Effluent discharge quality is set based on annual release to a marine fiord environment. Other standard parameters have been included for consistency with other municipal licences.

Solid Waste

DND indicated in the application that combustible solid waste is incinerated using a forced air enclosed chamber incinerator. The ash from the incinerator, along with other non-combustible waste, is placed in the landfill located near the east end of the runway. For the existing landfill facility, the NWB will require stamped as-built engineered drawings, to be submitted for review and approval, in order that the NWB has on record, engineered drawings for the approved facilities. Also, for proper management of the waste disposal facilities, including material segregation and maintenance, the Licensee is required to submit as part of the O&M Manual mentioned above, an O&M Plan for the landfill and incinerator.

Finally, where there are other landfill areas on site that have reached capacity or are no longer in use, the Licensee is required to submit an Abandonment and Restoration Plan for those facilities under Part I.

Hazardous Waste

The NWB notes that the incinerator ash is not being tested prior to disposal in the landfill and its chemical composition is unknown. In order to avoid the potential for hazardous waste being deposited in the landfill, the Licensee is required to backhaul the incinerator ash along with other hazardous waste produced at the site. Incinerator ash must be backhauled until such time as the NWB considers the submission of the O&M Plan for the incinerator required under Part H, Item 1 of the Licence.

The GN-DoE requested that hazardous materials stored on-site should be clearly marked. This recommendation is intended to help prevent possible injuries to camp personnel and/or damage to the containers. All hazardous waste should be accompanied by hazardous waste manifests with the appropriate information (generator number, carrier number, and receiver number) and backhauled annually to avoid an accumulation of waste on-site.

Landfarm

The supplemental information received on December 18, 2009 indicated that there had been fuel spills on-site and that hydrocarbon contaminated soil had been excavated and placed in a landfarm. The water licence application also indicated the operation of a landfarm on site. The construction, operation and discharge of any waste from landfarms in Nunavut requires the approval by the NWB. As engineered drawings and O&M Plan for the landfarm were not provided for review as part of the application, the NWB agrees with the GN-DoE that this information must be provided. In accordance with condition Part H, Item 1 the Licensee shall submit the required information for review and approval, including an O&M Plan for the Landfarm that addresses water, snow and runoff management.

Finally, in accordance with Part F, Item 3, the Licensee is required to submit stamped as-built engineered drawings for review and approval so that the NWB has on record, engineered drawings for the Waste Disposal Facilities.

E. Spill Contingency Plan

The Spill Contingency Plan (SCP) is generally acceptable to the NWB and has been approved by the Board. However, the SCP must be updated to include the necessary contact information and procedures identified by INAC and GN-DoE.

The NWB also notes that fuel storage on-site consists of four (4) 30,000L storage tanks located on the north side of the airstrip. The SCP does not indicate whether the fuel storage facility is lined or bermed. An as-built drawing of the facility is required.

F. Abandonment and Restoration Plan

The NWB notes that several facilities require reclamation. For example, drawing 102 in the supplemental information package shows a number of old buildings and debris areas. In addition, the Characterization of Contaminated Sites Final Report 2007/08 indicates that the Battery Dump and Barrel Dump can be closed. There is potential over the long term for impacts on water quality if these facilities are not properly reclaimed. INAC also noted in its submission that an abandonment and reclamation plan is required and the NWB agrees. The requirement for an abandonment and reclamation plan is included under Part I of the Licence.

G. Monitoring

To be consistent with other similar projects licensed by the NWB, the Board requires that the Licensee establish, implement and report on the Monitoring Program outlined in Part J of the licence. EC provided comments on the need for a monitoring program to be established.

To supplement the monitoring program, the Licensee is required to submit a Quality Assurance/Quality Control Plan, within ninety (90) days of issuance of the Licence, that provides documentation of proper methods for field sampling, preservation, shipping/sample control and is accompanied by an approval letter from an accredited laboratory responsible for the analytical requirements of the Licence. This requirement is detailed under Part J, Items 8 and 9. The Licensee shall include a map in the Annual Report showing the locations of monitoring stations for project facilities as determined through consultation with the Inspector.

NUNAVUT WATER BOARD
WATER LICENCE

Pursuant to the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to

DEPARTMENT OF NATIONAL DEFENCE, 1 CANADIAN AIR DIVISION
(Licensee)

DEPARTMENT OF NATIONAL DEFENCE, 1 CANADIAN AIR DIVISION
A4 CONSTRUCTION ENGINEERING
PO BOX 17000 STN FORCESWINNIPEG, MB, R3J 3Y5
(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use water or dispose of waste for a period subject to restrictions and conditions contained within this Licence:

Licence Number/Type:	3BC-ERK1015 TYPE "B"
Water Management Area:	NUNAVUT 05
Location:	CANADIAN FORCES STATION-EUREKA ELLESMERE ISLAND, QIKIQTANI REGION, NUNAVUT
Classification:	MUNICIPAL UNDERTAKING
Purpose:	DEPOSIT OF WASTE
Quantity of Water use not to Exceed:	NO WATER USE AUTHORIZED
Date of Licence Issuance:	JUNE 18, 2010
Expiry of Licence:	JUNE 30, 2015

This Licence, issued and recorded at Gjoa Haven, Nunavut, includes and is subject to the annexed conditions.

Thomas Kabloona,
Nunavut Water Board Chair

PART A: SCOPE, DEFINITIONS AND ENFORCEMENT

1. **Scope**

This Licence allows for the disposal of waste for a Municipal Undertaking classified as per Schedule II of the *Regulations,* at the Canadian Forces Station Eureka, located on the western shore of Ellesmere Island within the Qikiqtani Region, Nunavut.

a. This Licence is issued subject to the conditions contained herein with respect to the taking of water and the depositing of waste of any type in any waters or in any place under any conditions where such waste or any other waste that results from the deposits of such waste may enter any waters. Whenever new Regulations are made or existing *Regulations* are amended by the Governor in Council under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*, or other statutes imposing more stringent conditions relating to the quantity or type of waste that may be so deposited or under which any such waste may be so deposited, this Licence shall be deemed, upon promulgation of such Regulations, to be subject to such requirements; and

b. Compliance with the terms and conditions of this Licence does not absolve the Licensee from responsibility for compliance with the requirements of all applicable Federal, Territorial and Municipal legislation.

2. **Definitions**

"**Act**" means the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

"**Addendum**" means the supplemental text that is added to a full plan or report usually included at the end of the document and is not intended to require a full resubmission of the revised report.

"**Amendment**" means a change to original terms and conditions of this Licence requiring correction, addition or deletion of specific terms and conditions of the Licence; modifications inconsistent with the terms of the set terms and conditions of the Licence;

''**Appurtenant Undertaking**'' means an undertaking in relation to which a use of water or a deposit of waste is permitted by a licence issued by the Board;

"Board" means the Nunavut Water Board established under the *Nunavut Land Claims Agreement* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act;*

"Fuel Storage Facility" means the facility consisting of four (4) 30,000 L double-walled storage tanks as described in the water licence application dated November 16, 2009;

"Effluent" means treated or untreated liquid waste material that is discharged into the environment from a structure such as a settling pond, landfarm or a treatment plant;

"Engineer" means a professional engineer registered to practice in Nunavut in accordance with the Engineering, Geological and Geophysical Act (Nunavut) S.N.W.T. 1998, c.38, s.5;

"Greywater" means all liquid wastes from showers, baths, sinks, kitchens and domestic washing facilities, but does not include toilet wastes;

"Inspector" means an Inspector designated by the Minister under Section 85 (1) of the *Act*;

"Landfarm Facility"; means the facility designed to treat hydrocarbon contaminated soil as describe in the water licence application dated November 16, 2009.

"Landfill" means the facility designed to contain non-hazardous solid waste as described in the application dated November 16, 2009;

"Licensee" means the holder of this Licence;

"Modification" means an alteration to a physical work that introduces a new structure or eliminates an existing structure and does not alter the purpose or function of the work, but does not include an expansion;

"Nunavut Land Claims Agreement" (NLCA) means the *"Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada*", including its preamble and schedules, and any amendments to that agreement made pursuant to it;

"Regulations" means the *Northwest Territories Water Regulations sor/93-303 8th June, 1993,* omitting Section 5, Water Use or Waste Deposit Without a Licence;

"Sewage" means all Toilet Wastes and Greywater;

"Sewage Treatment Facility" means the two-celled lagoon described in the water licence application dated November 16, 2009;

"Spill Contingency Plan" means a Plan developed to deal with unforeseen petroleum and hazardous materials events that may occur during the operations conducted under the Licence;

"Toilet Wastes" means all human excreta and associated products, but does not include Greywater;

"Waste" means, as defined in S.4 of the *Act*, any substance that, by itself or in combination with other substances found in water, would have the effect of altering the quality of any water to which the substance is added to an extent that is detrimental to its use by people or by any animal, fish or plant, or any water that would have that effect because of the quantity or concentration of the substances contained in it or because it has been treated or changed, by heat or other means;

"Waste Disposal Facilities" means the Sewage Treatment Facility, Landfill and Landfarm;

3. **Enforcement**

a. Failure to comply with this Licence will be a violation of the *Act*, subjecting the Licensee to the enforcement measures and the penalties provided for in the *Act*;

b. All inspection and enforcement services regarding this Licence will be provided by Inspectors appointed under the *Act*; and

c. For the purpose of enforcing this Licence and with respect to the use of water and deposit or discharge of waste by the Licensee, Inspectors appointed under the *Act,* hold all powers, privileges and protections that are conferred upon them by the *Act* or by other applicable law.

PART B: GENERAL CONDITIONS

1. The Licensee shall file an Annual Report on the appurtenant undertaking with the Board no later than March 31st of the year following the calendar year being reported, containing the following information:

a. A summary report of waste disposal activities;
b. A list of unauthorized discharges and a summary of follow-up actions taken;
c. An up-to-date copy of the Spill Contingency Plan, including contact information;
d. The location of waste deposition in accordance with Part J, Item 2.
e. A description of all progressive and or final reclamation work undertaken, including photographic records of site conditions before, during and after completion of restoration work;
f. A summary of all results and information requested under the Monitoring Program;
g. Map of monitoring program locations; and
h. Any other details on waste disposal requested by the Board by November 1 of the year being reported.

2. The Licensee shall notify the NWB of any changes in operating plans or conditions associated with this project at least thirty (30) days prior to any such change.

3. The Licensee shall, for all Plans submitted under this Licence, include a proposed timetable for implementation. Plans submitted, cannot be undertaken without subsequent written Board approval and direction. The Board may alter or modify a Plan if necessary to achieve the legislative objectives and will notify the Licensee in writing of acceptance, rejection or alteration of the Plan.

4. The Licensee shall, for all Plans submitted under this Licence, implement the Plan as approved by the Board in writing.

5. The Licensee shall review the Plans referred to in this Licence, as required by changes in operation and/or technology, and modify the Plan accordingly. Revisions to the Plans are to be submitted in the form of an Addendum to be included with the Annual Report.

6. Every Plan to be carried out pursuant to the terms and conditions of this Licence shall become a part of this Licence, and any additional terms and conditions imposed upon approval of a Plan by the Board become part of this Licence. All terms and conditions of the Licence should be contemplated in the development of a Plan where appropriate.

7. The Licensee shall maintain a copy of this Licence at the site of operations at all times. Any communication with respect to this Licence shall be made in writing to the attention of:

(a) Manager of Licensing:
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0
Telephone: (867) 360-6338
Fax: (867) 360-6369
Email: licensing@nunavutwaterboard.org

(b) Inspector Contact:
Water Resources Officer, INAC
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0
Telephone: (867) 975-4295
Fax: (867) 979-6445

8. The Licensee shall submit one paper copy and one electronic copy of all reports, studies, and plans to the Board. Reports, Plans or studies submitted to the Board by the Licensee shall include a detailed executive summary in Inuktitut.

9. The Licensee shall ensure that any document(s) or correspondence submitted by the Licensee to the Board is received and acknowledged by the Manager of Licensing.

10. This Licence is assignable as provided for in Section 44 of the *Act*.

PART C: CONDITIONS APPLYING TO WATER USE

1. Withdrawal of water is not authorized under this Licence.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall locate areas designated for waste disposal at a minimum distance of thirty one (31) metres from the ordinary high water mark of any water body such that the quality, quantity or flow of water is not impaired, unless otherwise approved by the Board in writing.

2. The Licensee is authorized to deposit nonhazardous, non-combustible waste in the onsite Landfill.

3. The Licensee is authorized to dispose of all acceptable food waste, paper waste and untreated wood products in an incinerator.

4. The Licensee shall not open burn plastics, wood treated with preservatives, electric wire, Styrofoam, asbestos or painted wood to prevent the deposition of waste materials of incomplete combustion and/or leachate from contaminated ash residual, from impacting any surrounding waters, unless otherwise approved by the Board in writing.

5. The Licensee shall backhaul and dispose of all hazardous wastes and waste oil generated through the course of the operation in a licensed waste disposal facility.

6. The Licensee shall backhaul and dispose of incinerator ash generated through the course of the operation in a licensed waste disposal facility, unless otherwise approved by the Board in writing.

7. The Licensee shall maintain records of all waste backhauled and records of confirmation of proper disposal of backhauled waste. These records shall be made available to an Inspector upon request.

8. The Licensee shall provide at least ten (10) days notification to an Inspector, prior to initiating any Effluent discharge from the Sewage Treatment Facility or Landfarm.

9. The Licensee shall direct all Sewage to the Sewage Treatment Facility.

10. Effluent discharged from the Sewage Treatment Facility at monitoring station ERK-1 shall not exceed the following Effluent quality limits:

Parameter	Maximum Concentration of any Grab Sample
BOD_5	80 mg/L
Total Suspended Solids	70 mg/L
Fecal Coliforms	1 x 10^6 CFU/100 mL
Oil and grease	No visible sheen
pH	between 6 and 9

11. Effluent discharge from the Landfarm Facility at monitoring station ERK-2 shall not exceed the following Effluent quality limits:

Parameter	Maximum Concentration of any Grab Sample
Benzene(µg/L)	370
Toluene(µg/L)	2
Ethylbenzene(µg/L)	90
Lead(µg/L)	1
Oil and Grease(mg/L)	15 and no visible sheen
Phenols (µg/L)	20

12. If Effluent does not meet the Effluent quality limits of Part D, Item 11, it shall be considered hazardous waste and disposed off-site at an approved facility.

PART E: CONDITIONS FOR CAMPS, ACCESS INFRASTRUCTURES AND OPERATIONS

1. The Licensee shall not store material on the surface or banks of frozen streams or lakes except what is for immediate use.

2. All activities shall be conducted in such a way as to minimize impacts on surface drainage and the Licensee shall immediately undertake any corrective measures in the event of any impacts on surface drainage.

3. With respect to access road, pad construction or other earthworks, the deposition of debris or sediment into or onto any water body is prohibited. These materials shall be disposed a distance of at least thirty one (31) metres from the ordinary high water mark in such a fashion that they do not enter the water.

PART F: CONDITIONS APPLYING TO MODIFICATIONS AND CONSTRUCTION

1. The Licensee may, without written consent from the Board, carry out Modifications to the Waste Disposal Facilities provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:

   a. the Licensee has notified the Board in writing of such proposed Modifications at least sixty (60) days prior to beginning the Modifications;
   b. such Modifications do not place the Licensee in contravention of the Licence or the *Act*;
   c. the Board has not, during the sixty (60) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than sixty (60) days; and
   d. the Board has not rejected the proposed Modifications.

2. Modifications for which all of the conditions referred to in Part F, Item 1 have not been met, can be carried out only with written approval from the Board.

3. The Licensee shall provide as-built plans and drawings of the Modifications and construction referred to in this Licence within ninety (90) days of completion of the Modification and construction. These plans and drawings shall be stamped by an Engineer.

4. The Licensee shall within ninety (90) days following issuance of the Licence, provide to the Board as-built drawings signed and stamped by an Engineer for the Landfill, Landfarm, Sewage Lagoon and Fuel Storage Facility.

PART G: CONDITIONS APPLYING TO SPILL CONTINGENCY PLANNING

1. The Board has approved the Plan entitled Spill Contingency Plan, Fort Eureka, dated November, 2009 that was submitted as additional information with the Application.

2. Licensee shall provide an addendum to the Plan referred to in Part G, Item 1, and submit to the Board within ninety (90) days of issuance of the Licence, including the contact information as identified in submissions provided by parties during its review.

3. The Licensee shall prevent any chemicals, petroleum products or wastes associated with the project do not enter water. All sumps and fuel caches shall be located at a distance of at least thirty one (31) metres from the ordinary high water mark of any adjacent water body and inspected on a regular basis.

4. The Licensee shall ensure that any equipment maintenance and servicing be conducted in designated areas and shall implement special procedures (such as the use of drip pans) to manage motor fluids and other waste and contain potential spills.

5. If during the term of this Licence, an unauthorized discharge of waste occurs, or if such a discharge is foreseeable, the Licensee shall:

   a. Employ the appropriate Spill Contingency Plan;

   b. Report the spill immediately to the 24-Hour Spill Line at (867) 920-8130 and to the Inspector at (867) 975-4295; and

   c. For each spill occurrence, submit to the Inspector, no later than thirty (30) days after initially reporting the event, a detailed report that will include the amount and type of spilled product, the GPS location of the spill, and the measures taken to contain and clean up the spill site.

PART H: CONDITIONS APPLYING TO OPERATIONS AND MAINTENANCE

1. The Licensee shall submit to the Board for approval in writing, within ninety (90) days of issuance of the Licence, an Operations and Maintenance Manual prepared where appropriate, in accordance with the *"Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories; 1996"*. The Manual shall take into consideration the comments received during the application review process and shall contain the following plans:

   a. *Sewage Treatment Facility Operation and Maintenance Plan*;
   b. *Sewage Sludge Management Plan*;
   c. *Landfill Operation and Maintenance Plan*;
   d. *Incineration Management Plan containing:*
      i. Best management practices for ash disposal; and
      ii. Testing protocol and criteria should ash be disposed of in the Landfill.
   e. *Landfarm Facility Operation and Maintenance Plan; and*
   f. *Monitoring Program Quality Assurance/Quality Control Plan (QA/QC Plan).*

2. An inspection of all engineered facilities related to the management of water and waste shall be carried out annually in July or August by a Geotechnical Engineer. The engineer's report shall be submitted to the Board within sixty (60) days of the inspection, including a covering letter from the Licensee outlining an implementation plan addressing the Engineer's recommendations.

3. The Licensee shall perform more frequent inspections of the engineered facilities at the request of an Inspector.

PART I: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION OR TEMPORARY CLOSING

1. The Licensee shall submit to the Board for approval in writing, within six (6) months of Licence issuance, an Abandonment and Restoration Plan for the Battery Dump, Barrel Dump and other on-site facilities no longer in use and areas where debris has been identified as requiring restoration. The Plan shall be prepared in accordance with applicable sections of the *Guidelines for Abandonment and Restoration Planning for Mines in the Northwest Territories* (1990).

2. The Licensee shall submit to the Board for approval in writing, six (6) months prior to the abandonment of the CFS-Eureka site, an Abandonment and Restoration Plan prepared in accordance with applicable sections of the *Guidelines for Abandonment and Restoration Planning for Mines in the Northwest Territories* (1990).

3. The Licensee shall revise the Plans referred to in Part G, Item 1 and Part G, Item 2 if not approved, and submit to the Board for approval in writing within thirty (30) days of receiving notification of the Board's decision.

4. The Licensee shall complete the restoration work within the time schedule specified in the Plan, or as subsequently revised and approved by the Board in writing.

5. The Licensee shall restore all areas that have been contaminated by hydrocarbons, reclaimed to meet objectives as outlined in the Government of Nunavut's Environmental Guideline for Site Remediation, January 2002. The use of reclaimed soils from the Soil Remediation Facility may be carried out only upon consultation and approval by the Government of Nunavut, Department of Environment and an Inspector.

PART J: CONDITIONS APPLYING TO THE MONITORING PROGRAM

1. The Licensee shall maintain Monitoring Stations at the following locations:

Monitoring Program Station Number	Description	Status
ERK-1	Final Discharge Point of the Sewage Treatment Facility	Active (Quality)
ERK-2	Final Discharge Point of the Landfarm Facility	Active (Quality)
ERK-3	Runoff and leachate from the Landfill	Active (Quality)
ERK-4	Runoff and leachate from the Battery Dump	Active (Quality)
ERK-5	Runoff and leachate from the Barrel Dump	Active (Quality)

2. The Licensee shall determine, in consultation with the Inspector, the GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) of all locations where wastes associated with operations and maintenance are deposited and have been deposited. Locations shall be reported in the Annual Report.

3. The Licensee shall analyze samples, prior to the release of Effluent from the Sewage Treatment Facility at ERK-1 for the purpose of demonstrating compliance with the parameters listed under Part D, Item 10.

4. The Licensee shall analyze samples, prior to the release of effluent from the Landfarm Facility at ERK-2 for the purpose of demonstrating compliance with the parameters listed under Part D, Item 11.

5. The Licensee shall sample at Monitoring Program Station ERK-3, 4 and 5 monthly during periods of runoff or seepage. Samples shall be analyzed for the following parameters:

TPH (Total Petroleum Hydrocarbons)
PAH (Polycyclic Aromatic Hydrocarbons)
BTEX (Benzene, Toluene, Ethylbenzene, Xylene)

BOD_5	Fecal Coliforms
pH	Conductivity
Total Suspended Solids	Oil and Grease
Nitrate-Nitrite	Ammonia Nitrogen
Total Phenols	Total Alkalinity
Total Hardness	Calcium
Magnesium	Potassium
Sodium	Sulphate
Total Arsenic	Total Cadmium
Total Copper	Total Chromium
Total Iron	Total Lead
Total Mercury	Total Nickel

6. All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of *Standard Methods for the Examination of Water and Wastewater*, or by such other methods approved by the Board in writing.

7. All analyses shall be performed in a laboratory accredited according to ISO/IEC Standard 17025. The accreditation shall be current and in good standing.

8. The Licensee shall, within ninety (90) days following issuance of the Licence, submit to the Board a Quality Assurance/Quality Control (QA/QC) Plan. The Plan shall include up-to-date field sampling methods to all applicable standards, acceptable to an accredited laboratory as required by Part J, Item 6 and Part J, Item 7. The Plan shall include an approval letter from the accredited laboratory confirming acceptance of the Plan for analyses to be performed under this Licence

9. The Licensee shall annually review the QA/QC plan submitted under Part J, Item 8 and modify accordingly as required by changes in operation and/or technology. Revisions to the Plans are to be submitted to the NWB in the form of an Addendum, complete with an approval letter from an accredited lab that meets standards set in Part J, Item 6 and, Item 7, to be included with the Annual Report.

10. The Licensee shall include in the Annual Report required under Part B, Item 1 all data, monitoring results and information required by this Part.

Appendix C: CFS Alert – Hazardous Materials Management Plan

CFS ALERT

HAZARDOUS MATERIAL MANAGEMENT PLAN

SEPTEMBER 2010

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CFS ALERT HAZARDOUS MATERIAL MANAGEMENT PLAN

INTRODUCTION

1. This Hazardous Material Management Plan details the policies, guidelines and procedures of CFS Alert Hazardous Material (HazMat) Management Program and applies to all CFS Alert units, both integral and lodger and all contractors and sub-contractors. This plan is in compliance with both federal and provincial government policies, and it reflects the intent of Canadian Forces Policy documents and the Department's Sustainable Development Strategy (SDS 2000).

PURPOSE

2. The purpose of the Hazardous Material Management Plan is to define "cradle-to-grave" HazMat management and provide direction to all personnel at CFS Alert.

POLICY

As stated in the SDS 2000, the department will "Develop and implement hazardous material management plans at all Bases/Wings by 31 March 2004… Hazardous material management plans facilitate the proper procurement, storage, transportation, use and disposal of hazardous materials. Plans should give due consideration to pollution prevention to ensure responsible management of hazardous materials." Units are responsible to meet the applicable federal legislation, regulations and guidelines, and strive to meet or exceed any applicable provincial and municipal legislation, regulations and guidelines which are more stringent, with respect to the management of hazardous materials. International agreements such as those entered into with the International Civil Aviation Organization (ICAO), International Maritime Organization (IMO), and the North Atlantic Treaty Organization (NATO) Standards Agreements (STANAGs) will also be adhered to, subject to operational requirements, as approved by 1 Canadian Air Division.

APPLICABILITY

3. Annex A states the Department of National Defence Code of Environmental Stewardship. These principles shall be adhered to by all personnel at CFS Alert.

SCOPE

4. This plan is organized in a manner which reflects the complete life cycle of HazMat. The life cycle of HazMat includes: identification of the requirements, acquisition, replacement trails, distribution, use in the workplace, storage, waste collection, and finally disposal, including all the transportation and handling

activities that take place between the various phases. The order in which the following information is presented should not be construed as an order of priority.

5. Background. Over 70,000 chemicals are now available in the market place, either as raw materials or manufactured into products. Over 100 new chemicals are added to the list each year. We are challenged to safely manage these products through their entire life cycle. To meet this challenge, this HazMat management plan must be followed to maintain the health and safety of personnel, protect property and preserve the environment.

6. Civil Legal Liabilities. A person who causes damage to the environment and/or contravenes federal, provincial or municipal law endangers human health, is liable on conviction in court to a fine, imprisonment or both. It is the responsibility of all personnel to meet or exceed all legislated requirements and exercise due diligence in managing HazMat in a responsible manner.

8. Definitions. Several common terms are used throughout this instruction. A list of definitions is provided in Annex B.

HAZMAT MANAGEMENT ORGANIZATION

9. Every supervisor, whether DND or service provider, is responsible for the HazMat used by their employees.

TOTAL QUALITY HAZMAT MANAGEMENT

10. This portion of the Plan is segregated into the key elements of the life cycle management (LCM) of HazMat. The objective of the overall program is to achieve Total Quality HazMat Management (TQHM). The four “R” concept (reduce, reuse, recycle, rethink) of environmental management will be monitored throughout the plan. Each sub-heading will include a specific objective and desired result.

11. Identification of Requirement. Requirements planning is the first element in the TQHM process. Users must identify the desired products, quantity and desired delivery date. Users shall review their product inventory, increase the frequency of ordering and decrease the quantity per order.

12. HazMat Replacement Trials. Users are encouraged to conduct a continuous review of the products in use. The review process should identify products which may be eliminated or replaced with products less harmful to human health or to the environment. The goal of every user is to hold an inventory with a minimum number of total line items and to continuously seek out replacement products which have a reduced potential negative effect on human health and/or the environment.

13. Alternative products which are less harmful to human health and the environment and potentially meet job specifications shall be subjected to a trial by a user and, if found suitable, adopted for use.

14. HazMat replacement trials must be conducted in a controlled, orderly manner. The protocol to track the replacement of "environmentally friendly products" will include:

    a. identification of product intended to be replaced;

    b. identification of possible replacement products;

    c. research of other trials previously conducted by others;

    d. results of the trial and plans for future application of the new products; and,

    e. a report of the final results.

15. Distribution. The TQHM distribution phase addresses both the safe movement of the HazMat and the distribution of Material Safety Data Sheets (MSDS) to the users.

16. It is the user's responsibility to ensure that they receive a MSDS for each line item demanded before they accept it. If there is any doubt as to whether a user has a copy of a MSDS, another copy shall be issued. Updated and received copies of MSDS’s shall be distributed with the next shipment delivered to the user or by mail, whichever is faster.

17. All material delivered to a user site must be adequately packaged to prevent an uncontrolled release in the event of a spill. Any vehicle which is used to transport HazMat must be equipped with:

    a. equipment to secure the shipment;

    b. a transportation of Dangerous Goods qualified vehicle operator trained in spill response procedures; and,

    c. mobile communication capability.

18. Serviceable Product Storage. The following rules apply to serviceable HazMat storage:
    a. Flammable HazMat (indoors) must be stored in an approved flammable storage cabinet or in a manner approved by the Station Fire Safety and Prevention Section;

b. Refillable compressed gas cylinders must be secured in an upright position;

c. HazMat must be labelled in accordance with the Workplace Hazardous Materials Information System (WHMIS) guidelines;

d. Incompatible classes of hazardous materials must be physically separated. Compatibility charts should be posted in HazMat storage areas.

e. All HazMat storage areas are subject to siting approval by the Station Fire Chief. (Annex C).

19. The secondary containment standard is 110% of the volume of the largest container plus 10% of aggregated capacity of all other containers within the storage area. The goal is to prevent the uncontrolled release of HazMat into the environment.

20. All containers less than 200 liters in volume must be protected from the weather to maintain container integrity.

21. Storage Site Registration. All HazMat storage sites at CFS Alert must be registered. The registration procedure requirements include: completing the form provided at Annex D; obtaining siting recommendations from 8 Wing Env O; siting approval from the Station Fire Chief and the 8 Wing Env O.

22. The HazMat registration program identifies the location of each storage site, storage standards in effect and the responsible person in charge of the HazMat storage area. A HazMat inventory form will be used to record stock numbers (if applicable), properties and quantities of HazMat stored. The inventory must be reviewed and updated regularly by the unit supervisor.

23. Application/Use. The Workplace Hazardous Material Information System (WHMIS) was developed to ensure that employees are aware of the hazardous products used in their workplace. Supervisors must ensure that employees are adequately trained in the use of products and the personal protective equipment (PPE).

24. All employees retain the right to know about the hazardous material used in their workplace and it is the supervisor's responsibility to ensure that they know. Every employee shall have direct access to the MSDS's for the products in their immediate work area.

25. The appropriate PPE must be worn during the handling, application or clean up of HazMat. Directions supplied by the manufacturer for safe product use and spill response/clean up must be adhered to.

26. HazMat Waste Segregation and Identification. Hazardous wastes, as defined in Annex B, must not be allowed to enter a sanitary sewer, storm drain, or be disposed of in general refuse containers. DND, CBO or contractor generated HazMat waste must be identified, collected and disposed of through the CBO HazMat Coordinator.

27. HazMat wastes must be accurately segregated and identified.

28. All HazMat waste will be labelled in accordance with the Transportation of Dangerous Goods Regulations. In addition to TDGR labelling requirements, a complete DSRO-100(7-90) Hazardous Waste Label, NSN 7690-21-907-5618, shall be applied to any containers used for waste collection at the time of the initial use of the container. A sample DSRO-100 label is provided at Annex F.

29. Wastes that are not regulated by TDGR but meet the definition of hazardous waste in Annex B, only require a completed DSRO-100 Hazardous Waste Label.

30. The goal of waste segregation and identification is to reduce or eliminate disposal costs. If properly segregated, several HazMat waste commodities are recyclable and may have resale or credit value. The cost to identify and dispose of mixed or unknown hazardous waste often exceeds the value of the original product.

31. Empty HazMat Containers Disposal.

All empty Hazmat containers must meet the "empty container" definition at Annex B.

32. Waste Storage. A minimum quantity of HazMat waste shall be stored at the registered storage sites.

a. Batteries – All old zinc HADCS batteries have been neutralized and incinerated. The ash from the incineration is currently sealed in 45-gallon drums, identified and placed in the HazMat Barrel Farm until the suitable landfill mentioned above is constructed.
All other batteries – These are to be properly packaged, sorted and shipped south as they have expended their lifetime. These include the new lead acid gel HADCS batteries.

b. Glycol – Used and expired Glycol will be burnt in the incinerator. All glycol contained entrapped in spent absorbent material is currently incinerated. Glycol includes all vehicle anti-freeze, SRl from HRS and aircraft de-icing fluid.

c. Waste Oil – Used oil is burnt in the used oil burner located in the SE corner of the Maintenance building (B17). Once empty, BFurnO notifies CBO HazMat Co-ordinator of the drum waste number so that the HazMat Register can be updated and CBO Trashman can pick up the waste drum for disposal.

d. PCB's – Any PCB's found on the station will be reported to 8Wing Environment once they are put into the PCB Storage Building and then again when they are shipped to 8 Wing Supply in Trenton.

e. Fuel – Waste fuel (waste DF8 and gasoline) is used by CBO personnel to light the burn pit, any bone fires and the incinerator. These locations are permanent to limit any possible contamination from burns.

f. Aerosol Cans – Trashman disposes of these cans. They are punctured then incinerated, to remove residual and then disposed of in the Millionaire's dump. Only Trashman can perform this task as he maintains the proper environmentally friendly disposal unit and has the proper training. Aerosols that are unsafe to dispose of on site are shipped to 8 Wing Supply in Trenton for proper disposal.

g. Waste Glycol and Fuel Drum Disposal – Waste glycol and fuel drums should be opened using a manual drum deheader (barrel opener) and drained completely. They may then be crushed and disposed of at Millionaire's dump.

h. If the proper deheader tool is used, the drums will not require venting or incinerating after being opened and emptied. Absorbent pads should be placed in the bottom of the crusher during the process. The pads may then be incinerated.

i. Waste Oil Drum Disposal – Waste oil drums must be drained, incinerated and crushed before placing them into the Millionaires dump.

j. Paint – Waste paint must be sent south for disposal. Whenever possible, consolidate load by pouring paint into 45 gallon drums. The paint crusher is located at the Incinerator Bldg (B29).

k. Oil Rags, Absorbent Pads & Absorbal – These materials are incinerated with miscellaneous burns and/or dry garbage.

l. Miscellaneous Hazardous Materials – Proper disposal of all items will be under the advice and direction of the CBO HazMat Co-ordinator. All materials that cannot be disposed of locally will be shipped to 8 Wing Supply for proper disposal.

33. Waste Disposal Documentation. All shipments of HazMat waste destined for CBO's waste collection sites shall be accompanied by a MSDS and a Hazardous Waste Certification (Annex E) signed by the originator. This form must be completed accurately and in accordance with the TDGR.

34. Manifests for off-base shipments of HazMat waste must conform with TDGR, federal, provincial and municipal regulations. CFS Alert Traffic is responsible for shipping hazardous material.

35. Waste Transportation. The HazMat technician (TrashMan) will ensure that the waste collection process is completed in a safe, efficient manner and in compliance with all applicable regulations. The Hazmat technician is responsible for the waste collection process as well as vehicle operations which include securing the cargo and trailer for safe movement.

HAZMAT WASTE DISPOSAL

36. Waste Transfer Site Management. All HazMat stored at the user level, shall be stored in accordance with DND document A-LM-187-004/JS-001. The primary function of each storage site is to provide safe, temporary storage of HazMat waste. A balance between economical disposal and frequently inventory turn-over is the desire goal.

37. Hazmat waste shall be consolidated to achieve an economy of scale and conform to industry disposal standards and accepted practice. As hazardous material becomes available, CBO will dispose of it as it is identified. A list of barrels at CFS Alert is located in the end month Site Managers report which is located on the S:\Drive.

38. Waste Holding Sites:

    a. HAZMAT Barrel Compound: located approximately 500 m east of the Worm Farm C-Span (B-65). At no time are unauthorized personnel permitted at this location. For access, contact CBO HazMat Coordinator. The only waste allowed at this site is battery ash, decommissioned fuel tanks awaiting destruction, and the newer drummed waste lead acid gel HADCS batteries which were brought to Alert from the IDA site (these must be in overpacks.

b. Flammable Storage Containers: These two sea containers are located between the HAPS (B-125) and Incinerator Building (B-29). At no time are unauthorized personnel permitted to place waste into these buildings. For access, contact the CBO HazMat coordinator.

c. Incinerator Building (B-29): The loading dock located immediately north of this building contains barrels that are being prepared for incineration in the near future. They are processed and controlled by the CBO HazMat Coordinator.

d. PCB Storage Unit: This sea container is located NE of the Worm Farm (B-65) and is controlled by CBO. Access to this building is strictly prohibited for health and safety concerns. Only personnel familiar with PCB handling and storage will be permitted to enter under the direction of the CBO HazMat coordinator. This building is also registered with Environment Canada and plotted on their database with GPS grids and at no time is to be moved without the consent of the 8Wing Env O.

SPILL RESPONSE PLANNING

39. Planning for a Potential Spill. A chemical spill requires immediate and decisive action. Any user which stores, handles, or uses HazMat requires a spill plan. The spill planning process shall consist of both spill prevention and spill reaction planning.

40. The objective of spill prevention planning is to review current or new work practices. HazMat spills are preventable through detailed work design and education. High risk work practices must be identified and re-designed and have a well defined reaction plan in place to minimize the impact of an uncontrolled release.

41. Reporting Format.

a. All spills are to be reported immediately to the Site Manager, Smokey (Fire Chief), H20, HazMat Coordinator, SWO and CO through normal Chain of Command.

b. HazMat Coordinator is to fill out CFS Alert Spill Report for all spills regardless of quantity and forward to Site manager for review then furtherance to CO.

c. Site Manager so ensure CFS Alert Spill Report is completed accurately and forwarded by e-mail within 24 hours to KovanenDL@CFBTrenton WEnv@Trenton

d. Site Manager ensures Spill Report is signed by the CO

e. Spills must be reported to ensure that the appropriate site clean-up is initiated. Spill reports provide an opportunity to learn from the incident and plan to prevent further occurrences.

AUDIT/SELF INSPECTION PROGRAM

42. To ensure that this plan is successfully implemented, elements of this plan must be incorporated into "established inspection checklists". People living or working at CFS Alert must comply with this plan to maintain the health and safety of personnel, protection of property, and the preservation of the environment.

CONCLUSION

43 It is important that personnel responsible for the management of the program monitor progress systematically and conduct spot checks. It is especially important for managers to ensure that existing and new personnel involved in the handling of hazardous materials are fully trained and explicitly briefed on the systems in place at CFS Alert. The program stresses feedback from personnel handling hazardous materials. Increased emphasis must be placed on holding regular work site meetings, and a forum for feedback must be provided concerning the safe handling and disposal of hazardous materials. As hazardous material becomes available, CBO will dispose of them as they are identified.

ANNEX A

CODE OF ENVIRONMENTAL STEWARDSHIP

The Canadian Forces, and the Department of National Defence, commit to:

Integrate environmental concerns with operational, financial, safety, health, economic development and other relevant concerns in decision making;

Meet or exceed the letter and spirit of all applicable federal environmental laws and where appropriate, to be compatible with provincial and international standards;

Improve the level of awareness within the Canadian Forces and the Department of National Defence for the environmental and health benefits and risks of operational decisions, and to encourage and recognize the actions of personnel;

Apply environmentally responsible management practices to hazardous material used in operations, including biological products with specified regard for acquisition, handling, storage, safety in use, transportation and disposal of such material;

Ensure that environmental considerations are integrated into procurement policies and practices;

Seek cost effective methods of reducing the consumption of raw material, toxic substances, energy, water and other resources, and reducing the generation of waste and noise associated with day-to-day operations; and,

Acquire, manage and dispose of lands in a manner that is environmentally sound, including the protection of ecologically significant areas.

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ANNEX B

DEFINITIONS

Act
The Transportation of Dangerous Goods Act (TDGA 1992).

Bulk or In Bulk

Dangerous goods confined only by a large container (more than 454 liters) or a transport unit without intermediate containment or packaging.

Carrier

Any person who engages in transporting dangerous goods, whether or not for pay or reward.

Compatibility Chart

Identifies the classes of hazardous materials that can be transported and stored together without significantly increasing either the probability of an accident or, for a given quantity, the magnitude of the effects of such an accident.

Consignment

Dangerous goods transported in a transport unit from one consignor at one location to one consignee at another location.

Consignee

The person to whom a consignment is being, or is intended to be, transported to usually requiring consignee’s signature.

Consignor

The person who offers the shipment for transport (normally the shipper).

Container
Any portable device less than 454 liters in volume in which Hazmat is stored.

Dangerous Good

Materials regulated by TDGA 1992 which may be any of the chemicals identified by name in Schedule II of the TDG regulations or may have chemical properties such that they fall within one of the nine TDG classes.

Documents

The form meeting the requirements of Part IV of the Regulations, describing the dangerous goods contained in a consignment.

Empty Container

A container that contains less than 2.5 centimeters of residue remaining at the bottom of the container or less than 1% of the original contents, whichever is the lesser amount.

HazMat

The abbreviation for hazardous materials, which includes dangerous substances, dangerous goods, hazardous commodities and hazardous products such as poisons, pesticides, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or any other material that can, if not handled properly, endanger human health/well-being, property or the environment.

HazMat Classifications

There are two sets of classifications within the general definition of HazMat, one under the TDGA 1992, which in turn led to the development of the Workplace Hazardous Materials Information System, 1998, (WHMIS). Although similar in many ways, the differences in definition, application and labelling between these two systems and associated classifications must be understood:

1. TDGA 1992 has nine classes numbered 1 to 9 inclusive, with numbered divisions, eg. Class 3, Division 2 would be listed as 3.2. In shipping and storage (eg. 2nd and 3rd line handling) the TDG class and labelling system is used; and

2. Hazardous Product Act (and WHMIS) has six classes alphabetically identified from A to F inclusive, with numbered divisions, e.g. Class D, Division 1 would be listed as D1. Distribution to users and workplace activities (e.g. first line handling) will use the WHMIS class and labelling system.

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Hazardous Wastes

Includes those wastes which are potentially hazardous to human health, property and/or the environment due to their nature and quantity, and which require "special" disposal techniques. They are usually hazardous materials which have no further use or they may be derived from a hazardous material which has become contaminated. The term "special waste" may be used in some provincial and territorial jurisdictions in place of hazardous or HazMat waste and may dictate "special" handling or disposal procedures.

Labels

Small diamond-shaped safety marks placed on packages and small containers to identify the nature of the hazard associated with the product or material.

Lists

List I and List II in Schedule II of the Regulations, listing the proper shipping names and classifications of dangerous goods.

NA

"North American" prefix used in conjunction with a four digit number to identify dangerous goods. NA numbers are in the 9000 series.

Net Explosive Quantity (NEQ)

The actual amount of explosives contained in an explosive device, less the packing.

Material Safety Data Sheet (MSDS):

The MSDS is a supplier-produced document providing detailed technical, hazard and precautionary information with respect to a hazardous (controlled) product and which describes potential health effects of exposure to the product, recommended personal protection for workers, hazard evaluations related to use, storage and handling techniques, first aid and emergency procedures.

Packing Group

Indicates the degree of danger of a product or substance. Group I, greater danger; Group II, moderate danger; Group III, minor danger and Group X, the packing procedures which should be carried out in the interest of the physical or chemical properties of dangerous goods.

Packaging

The appropriate dunnage or container to ensure that dangerous goods can be safely transported.

Placard

Large diamond-shaped safety markers used on a vehicle or large container to identify the hazard associated with dangerous goods.

Plan
Refers to the HazMat Management Plan which is a wing user guide on Hazmat, developed in accordance with ACO 36-55.

Primary Function

The premier classification of a dangerous good that takes precedence over any other classification.

Product Identification Number

A four-digit United Nations or North American number used to identify dangerous goods.

Residue

The film or sludge remaining in a storage or transportation container when hazardous or other material has been removed to the maximum extent possible.

Shelf Life Controlled Product

A product with specific storage standards or limitations (ie light, temperature, time) that demand special storage and has a limited lifetime within which the product maintains its optimum effectiveness for which it was designed.

Shipping Name

The name for a regulated dangerous good as it appears in Lists I and List II of Schedule II of the TDGA 1992 Regulations. It is usually selected by the manufacturer, using the classification process.

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Special Provisions

Special provisions listed in Schedule III of the TDGA 1992 Regulations that must be followed when transporting the specific item.

Subsidiary Classification

Other classifications that identify the secondary or tertiary of dangerous goods.

Transportation of Dangerous Goods Act

TDGA 1992 provides extensive guidelines for labelling, packing, shipping, preparation of shipping documents and manifests, emergency response planning, training and certification to anyone who handles, ships or offers for shipment dangerous goods by road, rail, air or marine modes of transport.

UN Number

The "United Nations" product identification prefix used in conjunction with a four-digit number to identify dangerous goods.

Un-rinsed Empty Container

An empty container that has not been rinsed three times using, for each rinse, a clean solvent that is in an amount equal to 10% of the container volume and that is capable of removing the contained HazMat.

Weatherproof Container

A container affixed to the outside of a transport unit, intended to hold dangerous goods documentation if the unit contains dangerous goods and is parked in an unattended area with the tractor removed.

Waste

Any product included in the List II of Schedule II of the TDGA 1992 regulations that is intended to be discarded.

Workplace Hazardous Materials Information System (WHMIS)

Essentially the "worker's right to know" legislation WHMIS is a system of identification of controlled (hazardous) products and delivery of hazard information to every workplace where controlled products are in use. WHMIS specifically requires that suppliers classify their products according to standardized hazard classes and that they provide a Material

Safety Data Sheet (MSDS) for every controlled product sold or imported into a Canadian workplace. In turn, employers are responsible for ensuring that HazMat used at their workplace(s) is properly identified, labelled and accompanied by a MSDS. Employers are also responsible for workers fully understand WHMIS labels and MSDS's and can apply this information to their work practices. Workers must comply with training requirements.

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ANNEX C (APPENDIX 1)

INSPECTION AND THE SAFE STORAGE AND HANDLING OF HAZARDOUS MATERIALS

Ref: A-LM-187-004/JS-001

YES	NO	ITEM	COMMENT
		Material Safety Data Sheets (MSDSs) in place and valid?	
		Employees are hazardous trained in handling substances?	
		Emergency procedures known and practiced?	
		Adequate Personal Protective Equipment available and used?	
		Employees familiar with equipment used?	
		Accidents and spills reported promptly?	
		Emergency showers and eye wash facilities available?	
		Section's Standard Operating Procedures (SOPs) in place?	
		Emergency Response Kits with absorbent material, mops, etc., available within the section?	
HOUSEKEEPING			
		Floors and stairways are free from spills (water, oil, chemicals, etc.)?	
		Treads on stairs or floor mats are still effective?	
		Tripping hazards reported or corrected?	

YES	No	ITEM	COMMENT
		Cleanliness and order maintained in the storage areas at all times?	
		Proper disposal of unlabeled, contaminated or used hazardous materials?	
		Hazardous materials and containers inspected on regular basis for defects and leakage?	
		Inspection logs being maintained?	
		Packaging material and empty containers immediately removed from storage area?	
		Waste receptacles properly marked and easily located?	
STORAGE AREAS			
		Storage areas well lit with two clearly marked exits?	
		Hazardous storage areas well ventilated?	
		Hazardous materials that require cool/dehumidified conditions are stored under such conditions?	
		Open flame, smoking or any type of localized heat prohibited in the hazardous area?	
		Mixing or transfer of hazardous materials done outside the storage areas and in authorized "recouping" areas?	
		Authorized specification containers being used?	
		Containers inspected for rust, corrosion and leakage?	
		Damaged containers removed immediately or repackaged properly?	
		Safe tracking heights being observed?	
LABELING OF CONTAINERS			
		Approved hazard labels and identification system used for labelling all hazardous materials?	

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YES	NO	ITEM	COMMENT
		All containers clearly and properly labelled as to their contents?	
		Labels firmly attached to the packages?	
GAS CYLINDERS			
		All gas cylinders secured against falling?	
		Gas cylinders stored away from direct localized heat, open flames and sparks?	
		Gas cylinders stored in a cool, dry place away from corrosive materials or highly flammable substances?	
		Empty cylinders marked "empty" and stored separately from full cylinders?	
		Valves of empty cylinders closed?	
		Valves caps securely in place to protect the valve stem and the valve when storing or moving cylinders?	
		Hand truck available or accessible for transporting gas cylinders?	
FIRST AID AND SAFETY EQUIPMENT			
		Adequate eye wash stations available, stocked and inspected?	
		Adequate safety showers available and functional?	
		Adequate spill control equipment available and serviceable?	
		Fire extinguishers at the fire points with properly dated inspection tags?	
		Smoke/fire sensors, automatic alarms and vapour alarms available, working, and properly inspected?	
		Adequate ventilation equipment available and functional?	
		First Aid kits available, stocked and inspected?	

YES	NO	ITEM	COMMENT
		Emergency response numbers posted, telephone location(s) known and telephone(s) working?	
		Hand washing facilities readily available?	
HAZARDOUS MATERIALS STORAGE			
		Hazardous materials stored to prevent exposure to direct sunlight or localized heat?	
		Hazardous materials stored by hazard class?	
		Incompatible materials physically separated from each in accordance with the applicable regulations?	
		MSDS's information on incompatibility of materials available for consultation for safe storage arrangement?	
		Compatibility charts posted?	
ACIDS			
		Large bottles of acid stored on a low shelf or in approved cabinets?	
		Oxidizing acids segregated from organic acids, flammable and combustible materials?	
		Acids kept separate from base and alkaline metals such as sodium or potassium?	
		Spill control plans and equipment available for acid spills?	
BASES			
		Bases stored away from acids?	
		Solutions of inorganic hydroxides stored in polyethylene containers?	
		Spill control plans and equipment available for caustic spills?	

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YES	NO	ITEM	COMMENT
OXIDIZERS			
		Oxidizers stored away from flammable and combustible materials and reducing agents such as zinc, alkaline metals and formic acid.	
WATER REACTIVE MATERIALS			
		Dry chemical fire extinguisher system used?	
		Materials kept in a cool, dry place?	
FLAMMABLES			
		All flammable liquids kept in approved storage areas in approved containers?	
		Flammables kept away from any source of ignition, flames, heat or spark?	
		All electrical service equipment explosion-proof?	
		Fire fighting equipment readily available?	
		A static bonding line used to connect the drum and receptacle (decanting) when dispensing flammable liquids into a metal container?	
		All storage containers greater than 5 gallons properly grounded to an approved grounding point?	
		Toxic material, carcinogens and teratogens kept in a secure area accessible only to authorized personnel?	
		Emergency response actions posted?	
SPECIAL IN HOUSE PROBLEMS			
		Identify protective requirements and add to this list?	
MATERIAL HANDLING EQUIPMENT (MHE)			

		Material handling equipment grounded?	
		Material handling equipment checked daily for defective operation?	

YES	NO	ITEM	COMMENT
		The right type of material handling equipment being used around hazardous materials?	
		Moving (electrical) parts guarded?	
		Wiring, switches and fuses free of defects?	
STORAGE AREA			
		Hazardous storage areas properly and prominently marked or identified?	
		Hazardous areas secured at all times when not in use, with access only to authorized personnel	
		Emergency response drills known and practiced by all?	

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ANNEX C
HAZMAT STORAGE SITE REGISTRATION PROGRAM

1. Each HazMat storage site must be registered with the Environmental Officer (EnvO). The following information on this form must be completed and all guidelines for safe storage of HazMat must be met.

2. After meeting the pre-approval requirements, the supervisor must request an inspection by the Fire Safety and Prevention Section.

3. A copy of the completed form, together with the Fire Inspector's approval, will be forwarded to the CBO Hazardous Materials Coordinator. A site visit will be arranged to inspect the storage facility. If all storage conditions are met, the form will be forwarded to the EnvO to receive an approval signature on the registration certificate. A sample registration certificate is provided below.

Section Contact
Squadron/Section/Unit:_____

Primary Contact Name:_____ Telephone:_____

Alternate Contact Name:_____ Telephone:_____

Location of Serviceable/Waste HazMat Storage Areas
Serviceable HazMat Storage: The location of each serviceable HazMat storage unit(s) must be shown on an appropriate floor plan of a scale showing required detail.

Waste HazMat Storage: All waste HazMat site(s) must also be identified on a similar drawing.

Inspection Certification and Recommendation (signatures)

Section Contact:_____ Date: _____

CBO Fire Inspector:_____ Date:_____

CBO HazMat Coordinator: _____ Date:_____

Registration Approval

WEnvO:_____ Date:_____

ANNEX D

RETURN OF HAZARDOUS MATERIAL/WASTE FOR DISPOSAL

The following outlines details and procedures for preparation and return of hazardous material/waste for disposal.

Prior to collection for disposal of hazardous material/waste the generator will ensure:

- that each container is clearly labelled or marked to identify contents and if requested, a current Material Data Safety Sheet (MSDS) be made available. If wastes are unknown, the generator will make every attempt possible to identify waste such as questioning others in the workplace, checking the outside of container for any descriptive markings, manufacture name, stock no., etc.

- that containers used are in good condition with proper lids, caps, bungs, etc., and do not leak.

- that containers/drums, when filled, allow a space equal to 5% of the container volume to allow for expansion.

- ensure that containers are in a secure location away from high traffic areas to prevent damage to containers causing accidental spills.

PROCEDURES FOR RETURN AND DISPOSAL OF HAZARDOUS MATERIAL/WASTE

Once wastes are ready for return, as outlined above, the generator will contact the CBO Hazardous Material Coordinator with the following information:

- section or unit and building number
- contact person and telephone number
- waste description
- volume of container
- number of containers

They will then coordinate a pick up or drop off time and if necessary, a special purpose vehicle (SPV), e.g. forklift. The contact person must be available at pick up to certify waste and answer any questions which might arise prior to removal of the HazMat.

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ANNEX D
MINIMUM INFORMATION REQUIRED RECORD KEEPING WASTE TRANSFERS

IT IS HEREBY CERTIFIED THAT CONTAINER SERIAL NO._____ CONTAINS:

DESCRIPTION:_____

STATE:_____

CLASS:_____

PIN (UN or NA): _____

NO. OF CONTAINERS: _____

CONTAINER VOLUME: _____

TOTAL VOLUME: _____

NAME: _____

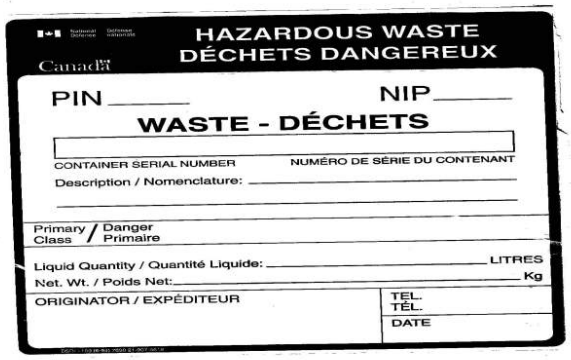
POSITION:_____

UNIT:_____

DATE:_____

SIGNATURE:_____

ANNEX E



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ANNEX F

CFS ALERT
WEEKLY SAFETY & HAZMAT CHECKLIST

Section :

Date :

ITEM	REMARKS / ACTION TAKEN
GENERAL WORK PLACE CONDITIONS	
FLOORS(SURFACES)	
WORK AREA(CLEANLINESS)	
AISLES/PASSAGEWAYS	
PLATFORMS/SCAFFOLDING	
LADDERS	
STAIRS	
EXITS/EGRESS	
ROADWAYS	
ENVIRONMENTAL	
VENTILATION	
LIGHTING	
NOISE CONTROL	
ERGONOMICS	
FUMES/DUST	
TEMPERATURE	
RESTROOM FACILITIES	
EQUIPMENT	
HAND/PORTABLE TOOLS	
MACHINE TOOLS/GUARDING	
MOBILE EQUIPMENT	
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INSPECTOR'S SIGNATURE:

SECTION HEAD'S SIGNATURE _____

Appendix D: Spill Contingency Plan, CFS Eureka, Nunavut

Defence Construction Canada
Construction de Défense Canada

Spill Contingency Plan
Canadian Forces Station Eureka, Nunavut

In support of the
Nunavut Water Board Licence
No. 3BC-ERK1015

November 2010
Version 2.0

Prepared for:
1 Canadian Air Division,
Department of National Defence

Revised by:
Environmental Services
Defence Construction Canada

Revision Control Page

Revision No.	Revised By	Date	Issue/Revision Description
1.2	FSC Architects & Engineers	November 2009	Final
2.0	Defence Construction Canada	November 2010	Updated Final Report to address deficiencies identified in the NWB Licence.

Acronyms

1 CAD	1 Canadian Air Division
8 Wing	8 Wing Trenton
AES	Atmospheric Environment Services
CARF	Consignment Authorization and Receipt Form
CFS	Canadian Forces Station
DND	Department of National Defence
EME	Electrical and Mechanical Engineering
HazMat	Hazardous Materials
HazWaste	Hazardous Waste
HAWS	High Arctic Weather Station
INAC	Indian and Northern Affairs Canada
KIA	Kitikmeot Inuit Association
MSDS	Material Safety Data Sheet
NT-NU	Northwest Territories- Nunavut
NWB	Nunavut Water Board
O&M	Operation and Maintenance Plan
POL	Petroleum Oil and Lubricants
W Env O	Wing Environmental Officer

Table of Contents

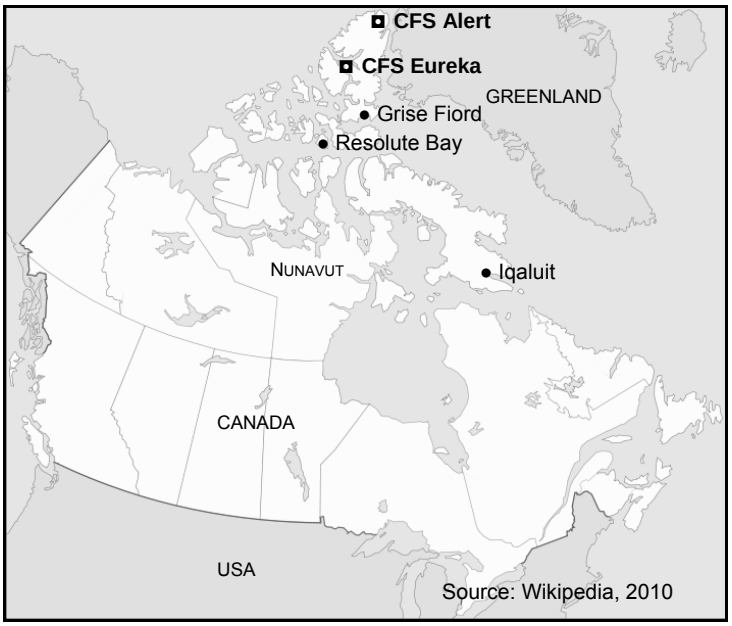
1 Introduction

This Spill Contingency Plan for Canadian Forces Station (CFS) Eureka has been created to address the requirements of the Nunavut Water Board (NWB) under Licence number 3BC-ERK1015, issued to the Department of National Defence (DND) on June 18, 2010.

Eureka is located near Slidre Fiord on the west coast of Ellesmere Island within the Qikiqtani Region of Nunavut (Latitude 79°59'20"N/ Longitude 85°56'30"W). The adjacent map illustrates the location of Eureka in relation to CFS Alert.

Eureka was first established on Ellesmere Island in 1947 as the High Arctic Weather Station (HAWS) for the Atmospheric Environment Services (AES) of Environment Canada. In 1982 the Department of National Defence (DND) installed a series of relay towers between Eureka and CFS Alert to improve the communications.

Eureka was established as the military quarters for personnel maintaining the communications equipment supporting CFS Alert and is the military quarters for training missions to the North.



Map illustrating location of CFS Eureka.

1.1 LICENCEE INFORMATION

Col. R.C. Baker
Director A4 Construction Engineering
1 Canadian Air Division Headquarters
Department of National Defence
PO Box 17000 Stn Forces
Winnipeg, Manitoba, R3J 3Y5

1.2 INFORMATION OF 24 HOUR CONTACT

Alert Commanding Officer or Wing Commander 8 Wing

1.3 GENERAL DESCRIPTION OF PROPERTY

The primary facilities at Eureka are located at the Main Camp, located approximately 2 km from the HAWS, and adjacent to the airstrip. DND infrastructure includes the Accommodations Building, a vehicle maintenance garage, aircraft refuelling apron, fuel storage tanks and bladders, the sewage lagoon and three landfills (refer to Figure 1, Appendix A).

Potable water for the station is obtained from Environment Canada's water system, which acquires its water from Station Creek. The water collected for the Environment Canada site is pumped from Station Creek over a period of approximately one month during the spring melt, allowing continuous flow of water within the creek. The water is collected within a reservoir where it is retained for use for the remainder of the year. Water use for Eureka is withdrawn from the reservoir and trucked to a cistern located at the military quarters building. The water is then passed through a reverse osmosis filtration system and is chlorinated prior to use for drinking or food preparation.

Photo 1. CFS Eureka, Nunavut.

Table 1. CFS Eureka water and sewer system.

Building	Water	Bleeder	Sewer	Status
CFS Euerka	Cistern	No	Yes	Operational

2 Project Facility Description

2.1 DOMESTIC GREYWATER SEWAGE

A new grey water and sewage outfall pipe extends approximately 75 m south, starting from the new accommodations building where it is connected to the bioreactor, and discharging into an unlined lagoon that collects the waste water. The land in the area of the accommodations building is flat. The local topography shows a moderate slope proximate to the lagoon, then a slight slope toward the fjord located approximately 0.5 to 1 km south.

2.2 SOLID WASTE

All combustible garbage is incinerated before disposal. The ash and remaining non-combustible refuse is transported to the East Airstrip Landfill for disposal. The landfill currently in use was partly remediated in 1995, when a granular/soil mixture was placed over portions of the landfill. Further assessments of the landfill were conducted in 1998, 1999, and 2006 indicating that little migration of any metals or hydrocarbons from the landfill has occurred. The landfill area was subsequently completely covered in 2008.

2.3 FUEL STORAGE

Eureka has four 30,000L JP8 tanks located on the north side of the Petroleum Oil and Lubricants (POL) shed across the airfield from the accommodation building. The four aboveground storage tanks are horizontal in configuration and are double-walled. Fuel is brought in to Eureka by Canadian Forces Transport Aircraft and then transferred to the bulk fuel station.

2.4 CHEMICALS AND HOUSEHOLD DETERGENTS

The only chemicals used on the station are typical household cleaners and detergents; as a result wastewater from Eureka is non-hazardous in nature.

2.5 MATERIAL SAFETY DATA SHEETS

MSDSs for all hazardous materials are maintained at the HazMat lockers. As required, the MSDSs are available for consultation and are reviewed on an annual basis to ensure that they are updated prior to their three year expiration date. A copy of the MSDS for JP8 Fuel is enclosed in Appendix B.

3 Type and Amount of Contaminants Stored at Site

3.1 DOMESTIC SEWAGE

Domestic sewage is not stored on site. The sewage flows under gravity to the discharge point. There are no lift stations where sewage may accumulate. The only sewage generated at Eureka by DND is from the accommodation building during the summer months due to the fact that the camp is only seasonally active.

3.2 SOLID WASTE

All combustible garbage is incinerated before disposal at the landfill.

3.3 FUEL

Eureka has four 30,000L storage tanks containing JP8 fuel located on the north side of the POL shed.

3.4 CHEMICALS AND HOUSEHOLD DETERGENTS

All products are purchased in Canada, and where required, registered in accordance with the applicable legislation.

3.5 RADIOACTIVE MATERIALS

No known radiation sources are stored onsite, unless as part of telecommunication systems. They are all removed to the support base for storage or disposal if/when required.

4 Spill Prevention Measures

4.1 DOMESTIC SEWAGE

Domestic sewer lines at Eureka are only used in the summer season as the station is only seasonally active. The system is checked each year on the initial start-up to ensure there are no leaks in the system.

4.2 SOLID WASTE

All combustible garbage is incinerated in proper facilities.

4.3 FUEL STORAGE

The four 30,000 JP8 tanks are double-walled to ensure no leaking occurs from the tanks. When the tanks are in use they are inspected regularly to ensure that all couplings are tight and there are no leaks.

When transferring fuels, only trained personnel operate and supervise the transferring process (i.e., aircraft to tanks). Sumps and fuel storage tanks are located at a distance greater than 31 m from any water body high watermark and are inspected regularly. Maintenance and servicing of equipment is to be conducted only in designated areas. Secondary containments such as drip pans are to be used to managed vehicle fluids and contain potential spills.

4.4 CHEMICALS AND HOUSEHOLD DETERGENTS

All chemical and household detergents are stored within a proper fire-proof and spill-proof storage unit. Care is taken when using or transferring these materials. Only containers in good condition and free of defects/damage shall be used.

4.5 HAZARDOUS WASTE

Hazardous waste is shipped from Eureka to 8 Wing Trenton (i.e., Supply-HazWaste Facility) in DND transport aircraft and is tracked using DND's Manifest Tracking System. Hazardous waste is shipped only once the Consignment Authorization and Receipt Form (CARF) is completed identifying if the cargo is a dangerous good. CARFs (i.e., manifests) are kept on file at the 8 Wing Trenton Supply–HazWaste Facility. This facility receives and properly disposes of hazardous waste through contractors. Refer to Appendix C for the CARF template; form reference number DND 690(5-94), 7530-21-903-1515.

5 Spills

5.1 IN THE CASE OF A SPILL

5.1.1 Initial Response

The initial response and containment of a spill is the responsibility of the unit/persons experiencing the incident. All spills of fuel or hazardous materials, regardless of size, must be immediately reported to the Senior Officer at Eureka. Eureka must notify the Environmental Officer (at (613) 392-2811 x3930) or Environmental Assistant (at (613) 392-2811 x3997) at 8 Wing Trenton of the spill as soon as possible. The Senior Officer at Eureka, at the time of the incident, is the proper authority for directing and ensuring that the clean-up and handling of any hazardous materials is carried out in a safe and responsible manner. The Senior Officer will assign one of his personnel to oversee the handling of the incident and its associated clean-up. In addition, units are to appoint a Spill Response Coordinator whose role will be to:

1) Contain the spill.
2) Immediately contact the Senior Officer.
3) Secure area until the Senior Officer or his representative arrives.
4) Assist in containing and cleaning-up of the spilled materials.
5) Insure that the Senior Officer's representative has all of the information required to complete a Hazardous Material Incident Report Form upon resolution of the incident.

The Hazardous Materials Incident Report must be completed and submitted to the 8 Wing Trenton WEnvO within 24 hours of occurrence.

5.1.2 Methods of Containment

The main objective of containment shall be to limit the area affected by the spill and to prevent its spread to adjoining waterways or surface drainage systems.

1. **Containment dikes or berms** – constructed of impermeable or absorbing materials will be the main method of containing spills on land.

2. **Trenches or storage pits** – used for temporary storage of spilled liquids and as intercepting channels for large spills. This can be used when the spill zone has a significant slope.

3. **Small spills** – to be cleaned with absorbent material in granular or blanket form to immobilize and absorb the spilled fluid.

4. **Spills in winter** – frozen ground is much less permeable to fluids, and therefore spilled material will flow differently in winter than in summer. These spills will be contained when possible with berms of snow. When the entire spill is absorbed with snow, the snow will be deposited within a containment area. Cold temperatures will inhibit the flow of most liquids, but de-icing fluids and most jet fuels will resist freezing. Spill on or in ice-covered streams and ponds require special techniques depending on whether the spilled material sinks, floats or dissolves.

5. **Spills on water** – spills that reach the watercourses will spread quickly, so speed of action is essential for containment. Only floating substances are amendable to containment, those that sink or dissolve are not likely to be controlled once they reach a watercourse. A containment boom is the method of containment if the spilled material floats.

5.1.3 Initial Incident Reporting

All spills are immediately reported to the Senior Officer.

Major fuel spills are to be reported by message using a Significant Incident Report. All HazMat spills that require a Significant Incident Report shall have an Air Command Hazardous Material Incident Report completed and forwarded to Command within 14 days. Refer to http://admfincs.mil.ca/admfincs/subjects/daod/2008/3_e.asp for more information on SIRs. Refer to Appendix D for the Incident Report forms.

5.1.4 Decontamination Action

1. Ensure the spill has been stopped and contained;
2. Remove all contaminates to designated area;
3. If the spill happens in the winter mark the extent of the contamination to provide a guide for the inspector in the summer months;
4. During summer season a site inspector will take soil samples as necessary and submit the appropriate analysis to determine course of remediation action, if any.

5.1.5 Site Inspection

A site inspection will be completed by qualified site inspector during the summer months following a spill. The inspector will take soil samples and submit them for appropriate analysis, where necessary. The site inspector, in conjunction with the WEnvO, will develop a remediation plan, where necessary on how best to remediate any contamination.

5.1.6 Reporting Action

In the event of a spill:

1. The Spill Contingency Plan will be employed by all station personnel.
2. The Senior Officer at Eureka or representative will complete the Eureka Spill Report for all spills regardless of size, and submit the Spill Report to 8 Wing Trenton Environmental Management within 24 hours by fax/e-mail.
3. 8 Wing Trenton Environmental Management is responsible for reporting to required legislative authorities to prevent any potential financial or disciplinary penalties. Eureka does not report to outside departments/agencies, as such, 8 Wing will:
    - Report the spill immediately to the Northwest Territories- Nunavut (NT-NU) 24-Hour Spill Line (867-920-8130), that exceeds the guidelines in Table 2 (below).
    - Report the spill immediately to Indian and Northern Affairs Canada (INAC) Field Operations Manager (867-975-4295).
    - Complete and submit the Northwest Territories-Nunavut (NT-NU) Spill Response Form to the Inspector within 30 days after initially reporting the event (refer to Appendix D for spill report form).
    - Complete the 1 Canadian Air Division (1 CAD) Hazardous Materials Incident Report Form for SpillNet (refer to Appendix D for spill report form).
4. The Site Manager will ensure the Spill Report is signed by the Commanding Officer (CO) or delegated authority.
5. Spills must be reported to ensure that the appropriate site clean-up is initiated. Should any remediation for a spill be undertaken onsite a qualified site inspector shall fill out a daily process report.

Table 2. 8 Wing will report all spills to the NT-NU Spill Line that exceed the below guidelines.

Classification	Hazard	Reportable Quantity
1	Explosives	All
2.1	Compressed Gas (flammable)	100 L
2.2	Compressed Gas	100 L
2.3	Compressed Gas (toxic)	All
2.4	Compressed Gas (corrosive)	All
3	Flammable Liquids	50 L
4	Flammable Solids	1 kg
5.1 PG I & II	Oxidizer	1 kg or 1 L
PG III	Oxidizer	50 kg or 50 L
5.2	Organic Peroxide	1 kg or 1 L
6.1 PG I	Acute Toxic	1 kg or 1 L
PG II & III	Acute Toxic	5 kg or 5 L
6.2	Infectious	All
7	Radioactive	Any discharge or radiation level exceeding 10 mSv/h at the package surface and 200 uSv/h at 1 m from the package surface
8	Corrosive	5 kg or 5 L
9.1	Miscellaneous (except PCB mixtures)	50 kg
9.1	PCB Mixtures	500 g
9.2	Aquatic Toxic	1 kg or 1 L
9.3	Wastes (chronic toxic)	5 kg or 5 L

5.2 SPILL RESPONSE TRAINING

Due to the remote location, designated employees deployed to Eureka will be trained in the following in order to be able to contain and assist in the clean-up of a spill:

1. Spill awareness & prevention
2. Methods of detection
3. Types of spills & seasonal conditions
4. Report procedures & Initial responses
5. Spill response kit
6. Clean-up & site remediation
7. Occupational health & safety, protective equipment & selection
8. Safe operation of Machinery & tools
9. Construction of a containment berm using soil or snow & plastic liner

5.3 SPILL KITS

There are three spill kits located at Eureka for use in case of a spill (refer to Appendix A). The spill kits are located in the following locations:

- POL shed near the runway
- Mechanical room of the main building
- Electrical Mechanical Engineering (EME) garage

Spill kits are to be kept and maintained at the specified locations at all times, and should contain (at a minimum):

- 360 L polyethylene over pack drum
- Oil sorbent booms
- Oil sorbent sheets
- Drain cover
- Caution tape
- Plugging compound
- Nitril gloves
- Safety goggles
- Tyvek coveralls
- Disposal bags
- Shovels
- Water proof package containing the Emergency Response Plan and report form

Additional supplies for the Spill Kits are stored in the warehouse.

5.4 EXTERNAL EMERGENCY CONTACTS

NT-NU 24-Hour Spill Report Line (867) 920-8130

INAC Field Operations Manager (867) 975-4295

Government Nunavut Department of Environment, Iqaluit (867) 979-7800

Environment Canada (867) 975-4644

Kitikmeot Inuit Association (KIA) (867) 983-2458

For more information see the 1Cdn Air Div Uniform Spill Protocol @ http://winnipeg.mil.ca/a4env/subjects/spills/Uniform%20Spill%20Reporting%20Protocol_Revised_Jan_07.pdf

Appendix A: Figure

Defence Construction Canada
Construction de Défense Canada

Title:
CFS Eureka Site Overview

Project:
Spill Contingency Plan, CFS Eureka

Client:
Department of National Defence

Date:
November 2010

Figure:
Figure 1

LEGEND

ERK-1	Sewage Treatment Facility
ERK-2	Landfarm Facility
ERK-3	Landfill
ERK-4	Battery Dump
ERK-5	Barrel Dump
■	Spill Kits

N
W E
S

Appendix B: MSDS Sheet (JP8 Fuel)

Material Safety Data Sheet

SECTION 1 PRODUCT IDENTIFICATION

JP-8

Product Use: Fuel
Product Number(s): CPS243791
Synonyms: AVTUR

SECTION 2 COMPOSITION/ INFORMATION ON INGREDIENTS

COMPONENTS	CAS NUMBER	AMOUNT
Kerosene	8008-20-6	> 99 %weight
Diethylene glycol monomethyl ether	111-77-3	< 1 %weight

SECTION 3 HAZARDS IDENTIFICATION

****

EMERGENCY OVERVIEW

Clear to light yellow liquid with petroleum odor.

- COMBUSTIBLE LIQUID AND VAPOR
- HARMFUL OR FATAL IF SWALLOWED - CAN ENTER LUNGS AND CAUSE DAMAGE
- MAY CAUSE RESPIRATORY TRACT IRRITATION IF INHALED
- CAUSES SKIN IRRITATION
- TOXIC TO AQUATIC ORGANISMS

****

IMMEDIATE HEALTH EFFECTS

Eye: Not expected to cause prolonged or significant eye irritation.

Skin: Contact with the skin causes irritation. Symptoms may include pain, itching, discoloration, swelling, and blistering. Contact with the skin is not expected to cause an allergic skin response. Not expected to be harmful to internal organs if absorbed through the skin.

Ingestion: Because of its low viscosity, this material can directly enter the lungs, if swallowed, or if subsequently vomited. Once in the lungs it is very difficult to remove and can cause severe injury or death. May be irritating to mouth, throat, and stomach. Symptoms may include nausea, vomiting, and diarrhea.

Inhalation: Breathing this material at concentrations above the recommended exposure limits may cause central nervous system effects. Central nervous system effects may include headache, dizziness, nausea, vomiting, weakness, loss of coordination, blurred vision, drowsiness, confusion, or disorientation. At extreme exposures, central nervous system effects may include respiratory depression, tremors or convulsions, loss of consciousness, coma or death. Mists of this material may cause respiratory irritation. Symptoms of respiratory irritation may include coughing and difficulty breathing.

SECTION 4 FIRST AID MEASURES

Eye: No specific first aid measures are required because this material is not expected to cause eye irritation. As a precaution, remove contact lenses, if worn, and flush eyes with water.
Skin: Wash skin with water immediately and remove contaminated clothing and shoes. Get medical attention if any symptoms develop. To remove the material from skin, use soap and water. Discard contaminated clothing and shoes or thoroughly clean before reuse.
Ingestion: If swallowed, do not induce vomiting. Give the person a glass of water or milk to drink and get immediate medical attention. Never give anything by mouth to an unconscious person.
Inhalation: Move the exposed person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if breathing difficulties continue.
Note to Physicians: Ingestion of this product or subsequent vomiting may result in aspiration of light hydrocarbon liquid, which may cause pneumonitis.

SECTION 5 FIRE FIGHTING MEASURES

See Section 7 for proper handling and storage.

FIRE CLASSIFICATION:
OSHA Classification (29 CFR 1910.1200): Combustible liquid.

NFPA RATINGS: Health: 0 Flammability: 2 Reactivity: 0

FLAMMABLE PROPERTIES:
Flashpoint: (Tagliabue Closed Cup) 100 °F (38 C) (Min)
Auto ignition: 410°F (210°C)
Flammability (Explosive) Limits (% by volume in air): Lower: 0.7 Upper: 5

EXTINGUISHING MEDIA: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish flames.

PROTECTION OF FIRE FIGHTERS:
Fire Fighting Instructions: For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment, including self-contained breathing apparatus.
Combustion Products: Highly dependent on combustion conditions. A complex mixture of airborne solids, liquids, and gases including carbon monoxide, carbon dioxide, and unidentified organic compounds will be evolved when this material undergoes combustion.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Protective Measures: Eliminate all sources of ignition in the vicinity of the spill or released vapor. If this material is released into the work area, evacuate the area immediately. Monitor area with combustible gas indicator.
Spill Management: Stop the source of the release if you can do it without risk. Contain release to prevent further contamination of soil, surface water or groundwater. Clean up spill as soon as possible, observing precautions in Exposure Controls/Personal Protection. Use appropriate techniques such as applying non-combustible absorbent materials or pumping. All equipment used when handling the product must be grounded. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Where feasible and appropriate, remove contaminated soil. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations.
Reporting: Report spills to local authorities and/or the U.S. Coast Guard's National Response Center at (800) 424-8802 as appropriate or required.

SECTION 7 HANDLING AND STORAGE

Precautionary Measures: Liquid evaporates and forms vapor (fumes) which can catch fire and burn with

explosive force. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Fire hazard is greater as liquid temperature rises above 85F. Do not get in eyes, on skin, or on clothing. Do not breathe vapor or fumes. Do not breathe mist. Do not taste or swallow. Wash thoroughly after handling.

Do not use as a portable heater or appliance fuel. Toxic fumes may accumulate and cause death.

General Handling Information: Avoid contaminating soil or releasing this material into sewage and drainage systems and bodies of water.
Static Hazard: Electrostatic charge may accumulate and create a hazardous condition when handling this material. To minimize this hazard, bonding and grounding may be necessary but may not, by themselves, be sufficient. Review all operations which have the potential of generating an accumulation of electrostatic charge and/or a flammable atmosphere (including tank and container filling, splash filling, tank cleaning, sampling, gauging, switch loading, filtering, mixing, agitation, and vacuum truck operations) and use appropriate mitigating procedures. For more information, refer to OSHA Standard 29 CFR 1910.106, 'Flammable and Combustible Liquids', National Fire Protection Association (NFPA 77, 'Recommended Practice on Static Electricity', and/or the American Petroleum Institute (API) Recommended Practice 2003, 'Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents'.
General Storage Information: DO NOT USE OR STORE near heat, sparks or open flames. USE AND STORE ONLY IN WELL VENTILATED AREA. Keep container closed when not in use.
Container Warnings: Container is not designed to contain pressure. Do not use pressure to empty container or it may rupture with explosive force. Empty containers retain product residue (solid, liquid, and/or vapor) and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death. Empty containers should be completely drained, properly closed, and promptly returned to a drum reconditioner or disposed of properly.

SECTION 8 EXPOSURE CONTROLS/PERSONAL PROTECTION

GENERAL CONSIDERATIONS:
Consider the potential hazards of this material (see Section 3), applicable exposure limits, job activities, and other substances in the work place when designing engineering controls and selecting personal protective equipment. If engineering controls or work practices are not adequate to prevent exposure to harmful levels of this material, the personal protective equipment listed below is recommended. The user should read and understand all instructions and limitations supplied with the equipment since protection is usually provided for a limited time or under certain circumstances.

ENGINEERING CONTROLS:
Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below the recommended exposure limits.

PERSONAL PROTECTIVE EQUIPMENT
Eye/Face Protection: No special eye protection is normally required. Where splashing is possible, wear safety glasses with side shields as a good safety practice.
Skin Protection: Wear protective clothing to prevent skin contact. Selection of protective clothing may include gloves, apron, boots, and complete facial protection depending on operations conducted. Suggested materials for protective gloves include: 4H (PE/EVAL), Nitrile Rubber, Polyvinyl Alcohol (PVA) (Note: Avoid contact with water. PVA deteriorates in water.), Viton
Respiratory Protection: Determine if airborne concentrations are below the recommended exposure limits. If not, wear a NIOSH approved respirator that provides adequate protection from measured concentrations of this material, such as: Air-Purifying Respirator for Organic Vapors
Use a positive pressure, air-supplying respirator if there is potential for uncontrolled release, exposure levels are not known, or other circumstances where air-purifying respirators may not provide adequate protection.

Occupational Exposure Limits:

Component	Limit	TWA	STEL	Ceiling	Notation
Kerosene	CHEVRON	350 mg/m3	1000 mg/m3		

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: Clear to light yellow liquid with petroleum odor.
pH: NA
Vapor Pressure: 1 kPa (0.14 psi) @ 100 °F
Vapor Density (Air = 1): 5.7
Boiling Point: 160 - 300 °C (320 - 572 F)
Solubility: Low PPM range in water.
Freezing Point: -47 °C (-53 F) (Max)
Density: 0.755 - 0.84 g/ml @ 15 °C
Viscosity: 8 cSt @ -20 °C (Max)

SECTION 10 STABILITY AND REACTIVITY

Chemical Stability: This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.
Incompatibility With Other Materials: May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
Hazardous Decomposition Products: None known (None expected)
Hazardous Polymerization: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

IMMEDIATE HEALTH EFFECTS
Eye Irritation: The eye irritation hazard is based on evaluation of data for similar materials or product components.
Skin Irritation: The skin irritation hazard is based on evaluation of data for similar materials or product components.
Skin Sensitization: The skin sensitization hazard is based on evaluation of data for similar materials or product components.
Acute Dermal Toxicity: The acute dermal toxicity hazard is based on evaluation of data for similar materials or product components.
Acute Oral Toxicity: The acute oral toxicity hazard is based on evaluation of data for similar materials or product components.
Acute Inhalation Toxicity: The acute inhalation toxicity hazard is based on evaluation of data for similar materials or product components.

SECTION 12 ECOLOGICAL INFORMATION

ECOTOXICITY
This material is expected to be toxic to aquatic organisms.

ENVIRONMENTAL FATE
Ready Biodegradability:

This material is not expected to be readily biodegradable.

SECTION 13 DISPOSAL CONSIDERATIONS

Use material for its intended purpose or recycle if possible. This material, if it must be discarded, may meet the criteria of a hazardous waste as defined by US EPA under RCRA (40 CFR 261) or other State and local regulations. Measurement of certain physical properties and analysis for regulated components may be necessary to make a correct determination. If this material is classified as a hazardous waste, federal law requires disposal at a licensed hazardous waste disposal facility.

SECTION 14 TRANSPORT INFORMATION

The description shown may not apply to all shipping situations. Consult 49CFR, or appropriate Dangerous Goods Regulations, for additional description requirements (e.g., technical name) and mode-specific or quantity-specific shipping requirements.

DOT Shipping Name: FUEL, AVIATION, TURBINE ENGINE
DOT Hazard Class: 3 (Flammable Liquid)
DOT Identification Number: UN1863
DOT Packing Group: III

SECTION 15 REGULATORY INFORMATION

SARA 311/312 CATEGORIES:

1.	Immediate (Acute) Health Effects:	YES
2.	Delayed (Chronic) Health Effects:	NO
3.	Fire Hazard:	YES
4.	Sudden Release of Pressure Hazard:	NO
5.	Reactivity Hazard:	NO

REGULATORY LISTS SEARCHED:

4A=IARC Group 1	12=TSCA Section 8(a) PAIR	21=TSCA Section 5(a)
4B=IARC Group 2A	13=TSCA Section 8(d)	25=CAA Section 112 HAPs
4C=IARC Group 2B	15=SARA Section 313	26=CWA Section 311
05=NTP Carcinogen	16=CA Proposition 65	28=CWA Section 307
06=OSHA Carcinogen	17=MA RTK	30=RCRA Waste P-List
09=TSCA 12(b)	18=NJ RTK	31=RCRA Waste U-List
10=TSCA Section 4	19=DOT Marine Pollutant	32=RCRA Appendix VIII
11=TSCA Section 8(a) CAIR	20=PA RTK	

The following components of this material are found on the regulatory lists indicated.

Kerosene	17, 18, 20
Diethylene glycol monomethyl ether	17, 20, 25

CHEMICAL INVENTORIES:
UNITED STATES: All of the components of this material are on the Toxic Substances Control Act (TSCA) Chemical Inventory.
CANADA: All the components of this material are on the Canadian Domestic Substances List (DSL).
WHMIS CLASSIFICATION:
Class B, Division 3: Combustible Liquids
Class D, Division 2, Subdivision B: Toxic Material -
Skin or Eye Irritation

SECTION 16 OTHER INFORMATION

NFPA RATINGS: Health: 0 Flammability: 2 Reactivity: 0

(0-Least, 1-Slight, 2-Moderate, 3-High, 4-Extreme, PPE:- Personal Protection Equipment Index recommendation, *- Chronic Effect Indicator). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association (NFPA) or the National Paint and Coating Association (for HMIS ratings).

REVISION STATEMENT: REVISION STATEMENT: This document has been prepared using a new MSDS format and all 16 sections have been revised. Please read the entire document.

ABBREVIATIONS THAT MAY HAVE BEEN USED IN THIS DOCUMENT:

TLV	-	Threshold Limit Value	TWA	-	Time Weighted Average
STEL	-	Short-term Exposure Limit	PEL	-	Permissible Exposure Limit
			CAS	-	Chemical Abstract Service Number
NDA	-	No Data Available	NA	-	Not Applicable
<=	-	Less Than or Equal To	>=	-	Greater Than or Equal To

Prepared according to the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the ANSI MSDS Standard (Z400.1).

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

Appendix C: Manifest Tracking System Form-CARF

National Défense
Defence nationale

CONSIGNMENT AUTHORIZATION AND RECEIPT FORM (CARF)
FORMULE D'AUTORISATION ET REÇU D'EXPÉDITION (FARE)

1. TCN - NCT

SECTION 1: CONSIGNOR / DELIVERY - L'EXPÉDITEUR / LIVRAISON

2. PACKED BY - EMBALLÉ PAR — SIGNATURE — DATE

3. MPC - CPM

4. RDD - DLD — (JULIAN - JULIEN)

5. CARF CONTINUATION SHEETS ATTACHED / FEUILLES DE FARE PROLONGATION ATTACHÉES — TOTAL NUMBER - NOMBRE TOTAL

6A. UIC / SAC / PRI /SN - CIU / SAC / CIDP /NM

6B. SHIP/POSTAL - LIVRAISON/POSTE (S/P) ☐

7A. UIC / SAC / PRI / SN - CIU /SAC / CIDP / NM

7B. SHIP/POSTAL - LIVRAISON/POSTE (S/P) ☐

6C. FROM / CONSIGNOR - DE / L'EXPÉDITEUR

7C. TO / CONSIGNEE - À / DESTINATAIRE

8. DTA - ATD

9. ASSOCIATED TA NAME - NOM D'AT ASSOCIÉ

10. ☐ CFSS ISSUE DISTRIBUTION DU SAFC ☒ NEW PROCUREMENT NOUVEAU MATÉRIEL ☐ REPAIR & OVERHAUL RÉPARATION E RÉVISION ☐ MISC. DIVERS

☐ CUSTOMS ACTION DOUANES ☐ CGR - MCR ☐ IEM - EIM ☐ SL - PS

☐ SPECIAL HANDLING MANIPULATION SPÉCIAL ☐ OUTSIZE DIM. SUPÉR ☐ UAB - BNA

17. SPECIAL INSTRUCTIONS - INSTRUCTIONS SPÉCIALES

18. DANGEROUS GOODS / MARCHANDISES DANGEREUSES
☐ AMMUNITION MUNITION ☐ OTHERS AUTRES ☐ NO NON

11. PIECES ARTICLES (PID) (IDA)	12. TYPE GENRE (CODE)	13. DESCRIPTION	14A. WEIGHT IN LB POIDS EN LB	14B. CUBE IN F3 PIED CUBIQUE	14C. WEIGHT IN KG POIDS EN KG	14D. CUBE IN M3 MÈTRE CUBIQUE	15. DOCUMENT COUNT NOMBRE DE DOCUMENTS
			IMPERIAL / IMPÉRIAL		METRIC / MÉTRIQUE		
TOTAL			TOTAL	TOTAL	TOTAL	TOTAL	TOTAL

SECTION 2: ORIGIN TRANSPORTATION AGENT - AGENT DE TRANSPORT AU LIEU D'ORIGINE

CODING BLOCK - BLOC DE CODAGE

FUNDS RES RÉS DE FONDS	FUNDS RESERVATION LINE Ligne réservation de fonds	WBS ELEMENT - ELEMENT WBS	FUNDS CENTRE CENTRE DE FONDS	COST CENTRE CENTRE DE COÛT	FUND FONDS	GENERAL LEDGER GRAND LIVRE GÉNÉRAL	INTERNAL ORDER ORDRE INTERNE

21. ACCEPTED FOR SHIPMENT - ACCEPTÉ POUR EXPÉDITION — DATE

23. WSBL NO. - Nº FEUILLE DE FECS

SECTION 3: DESTINATION TRANSPORTATION AGENT - AGENT DE TRANSPORT A DESTINATION

24. DATE REC'D - DATE REÇU

25. CARRIER / CARRIER SERVICE - TRANSPORTEUR / SERVICE DU TRANSPORTEUR

26. DESCRIPTION OF LOSS / DAMAGE / DESCRIPTION DE LA PERTE / DOMMAGE

27. INCOMING OFF CONTRACT - RÉCEPTION DU CONTRAT
CONTRACTOR CONTRACTEUR ▶
NAME - NOM ▶
ADDRESS ADRESSE ▶

28. FOB POINT - FRANCO POINT

29. ISN # (DEPOT ONLY) ISN # (DÉPÔT SEULEMENT)

SECTION 4: DELIVERY / CONSIGNEE - LIVRAISON / DESTINATAIRE

30. DELIVERY SERVICE - LIVRAISON — SIGNATURE — DATE

31. CONSIGNEE - DESTINATAIRE — SIGNATURE — DATE

32. COMMENTS - COMMENTAIRES

DND 690 (5-94)
7530-21-903-1515

CODING BLOCK FOR 12 - BLOC DE CODAGE 12

TYPE GENRE	BALE BALLE	BUNDLE BALLOT	CARTON CAISSE	CASE BOITE	CONTAINER RECIPENT	CRATE-CAISSE CLAIRE-VOIE	ENVELOPE ENVELOPPE	PALLET PALETTE	TRI-WALL CAISSE CARTON TRIPLE	OTHER AUTRE
CODE	BAL	BUN	CTN	CSE	CTR	CRT	ENV	PAL	T/W	OTH

Appendix D: Spill Report Forms

1 CAD - Hazardous Materials Incident Report Spreadsheet

Ref: 1 CAD HQ Uniform Spill Reporting Protocol 1262-1 (A4 Env 3) 6 July 98

1. Spill reported by:	**Name & Initials:**	**Phone #:**	**Unit:**
2. Spill Occurrence - Date:		**Time:**	
3. Source of Spill:		**Location of Spill -**	
4. a. Hazardous Material Spilled:		**b. Quantity Spilled (Litres):**	
c. Quantity Recovered (Litres):			
5. **Aircraft Fuel Jettisons** **a. Tail # and Call Sign:**			
b. Type of fuel		c. Quantity jettisoned (lbs):	
d. Altitude of jettisoning (m):		e. Ground temperature during jettisoning (°C):	
f. Duration of fuel jettison (min):		g. Aircraft velocity during jettisoning (Kt/hr):	
h. average wind speed between ground level and jettisoning altitude (kt/hr):		i. Wind orientation (relative to aircraft) during jettisoning (parallel/not parallel):	
6. Cause of Spill (be brief):			
7. Effect(s) of Spill (be brief):			
8. Distance (in metres) from point of release to nearest:			
a. Water Well:		**c. Catch Basin or Drain:**	
b. Property Boundary:		**d. Surface water course (ie creek, Bay, etc):**	
9. Details of action, taken or proposed, to mitigate effects of spill:			
10. Off -Base agencies that responded to spill:			

NOTE: FORWARD THIS REPORT TO WENVO (FAX 3368) WITHIN 24 HOURS OF SPILL

For use by Wing Environmental Staff only

11. Off-Base agencies informed of spill - Env Can/MOEE (time/date):
MOE: 1 (800) 268-6060 When required: Env Can N.W.T. Phone: (867) 920-8130 Fax: (867) 873-6924
Env Can Ont: (416) 518-3221 Env Can Qc Phone: (514) 283-2333

12. **ACTION**	**FAX**	**HALOCARBON**	**POL/OTHER**
NDHQ/CFFM	182-846-1753	X	
NDHQ/DGAEPM	182-840-5236	X	
1 CAD HQ/AOC	182-257-2576	X	X
1 CAD HQ//A4 AE//A4 Env//	182-257-2566	X	X
INFO			
NDHQ//DGE//	182-842-9422	X	X
WCOMD	3944	X	X
W LOG O	3448	X	X
WCEO	2788	X	X
UNIT/SQN CO		X	X

FROM: 8 Wg Env Office Phone (613) 965-3930
FAX (613) 965-3368

Sent by: (Name)
(Time/Date)

Instructions for Completing the NT-NU Spill Report Form

This form can be filled out electronically and e-mailed as an attachment to spills@gov.nt.ca. Until further notice, please verify receipt of e-mail transmissions with a follow-up telephone call to the spill line. Forms can also be printed and faxed to the spill line at 867-873-6924. Spills can still be phoned in by calling collect at 867-920-8130.

A. Report Date/Time	The actual date and time that the spill was reported to the spill line. If the spill is phoned in, the Spill Line will fill this out. **Please do not fill in the Report Number**: the spill line will assign a number after the spill is reported.
B. Occurrence Date/Time	Indicate, to the best of your knowledge, the exact date and time that the spill occurred. Not to be confused with the report date and time (see above).
C. Land Use Permit Number /Water Licence Number	This only needs to be filled in if the activity has been licenced by the Nunavut Water Board and/or if a Land Use Permit has been issued. Applies primarily to mines and mineral exploration sites.
D. Geographic Place Name	In most cases, this will be the name of the city or town in which the spill occurred. For remote locations – outside of human habitations – identify the most prominent geographic feature, such as a lake or mountain and/or the distance and direction from the nearest population center. **You must include the geographic coordinates** (Refer to Section E).
E. Geographic Coordinates	This only needs to be filled out if the spill occurred outside of an established community such as a mine site. Please note that the location should be stated in degrees, minutes and seconds of Latitude and Longitude.
F. Responsible Party Or Vessel Name	This is the person who was in management/control/ownership of the substance at the time that it was spilled. In the case of a spill from a ship/vessel, include the name of the ship/vessel. Please include full address, telephone number and e-mail. Use box K if there is insufficient space. **Please note that, the owner of the spilled substance is ultimately responsible for any spills of that substance, regardless of who may have actually caused the spill.**
G. Contractor involved?	Were there any other parties/contractors involved? An example would be a construction company who is undertaking work on behalf of the owner of the spilled substance and who may have contributed to, or directly caused the spill and/or is responding to the spill.
H. Product Spilled	Identify the product spilled; most commonly, it is gasoline, diesel fuel or sewage. For other substances, avoid trade names. Wherever possible, use the chemical name of the substance and further, identify the product using the four digit UN number (eg: UN1203 for gasoline; UN1202 for diesel fuel; UN1863 for Jet A & B)
I. Spill Source	Identify the source of the spill: truck, ship, home heating fuel tank and, if known, the cause (eg: fuel tank overfill, leaking tank; ship ran aground; traffic accident, vandalism, storm, etc.). Provide an estimate of the extent of the contaminated/impacted area (eg: 10 m^2)
J. Factors Affecting Spill	Any factors which might make it difficult to clean up the spill: rough terrain, bad weather, remote location, lack of equipment. Do you require advice and/or assistance with the cleanup operation? Identify any hazards to persons, property or equipment: for example, a gasoline spill beside a daycare centre would pose a safety hazard to children. Use box K if there is insufficient space.
K. Additional Information	Provide any additional, pertinent details about the spill, such as any peculiar/unique hazards associated with the spilled material. State what action is being taken towards cleaning up the spill; disposal of spilled material; notification of affected parties. If necessary, append additional sheets to the spill report. Number the pages in the same format found in the lower right hand corner of the spill form: eg. “Page 1 of 2", “Page 2 of 2" etc. **Please number the pages to ensure that recipients can be certain that they received all pertinent documents.** If only the spill report form was filled out, number the form as “Page 1 of 1".
L. Reported to Spill Line by	Include your full name, employer, contact number and the location from which you are reporting the spill. Use box K if there is insufficient space.
M. Alternate Contact	Identify any alternate contacts. This information assists regulatory agencies to obtain additional information if they cannot reach the individual who reported the spill.
N. Report Line Use Only	**Leave Blank**. This box is for the **Spill Line’s use only**.

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR	REPORT TIME	☐ ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER _____-_____
B	OCCURRENCE DATE: MONTH – DAY – YEAR	OCCURRENCE TIME		

C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION	REGION ☐ NWT ☐ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS

F	RESPONSIBLE PARTY OR VESSEL NAME	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION	
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION	
H	PRODUCT SPILLED	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER
I	SPILL SOURCE	SPILL CAUSE	AREA OF CONTAMINATION IN SQUARE METRES
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS		

L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION STATION OPERATOR	EMPLOYER	LOCATION CALLED YELLOWKNIFE, NT	REPORT LINE NUMBER (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC

SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN

FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

Appendix E: Quality Assurance and Quality Control Plan, CFS Eureka, Nunavut

Defence Construction Canada
Construction de Défense Canada

Quality Assurance (QA) and Quality Control (QC) Plan
CFS Eureka (ERK), Nunavut

In support of the
Nunavut Water Board Licence
No. 3BC-ERK1015

September 2010

Prepared for:
1 Canadian Air Division,
Department of National Defence

Prepared by:
Environmental Services
Defence Construction Canada

Canada

Table of Contents

LIST OF APPENDICES

ACRONYMS

BOD	Biological Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CFS	Canadian Forces Station
ERK	CFS Eureka
HAWS	High Arctic Weather Station
NWB	Nunavut Water Board
PAH	Polycyclic Aromatic Hydrocarbons
pH	Measure of acidity and alkalinity
QA	Quality Assurance
QC	Quality Control
SNP	Surveillance Network Program
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids

1. INTRODUCTION

This document has been prepared in response to the requirements of the Nunavut Water Board (NWB) for the submission of a Quality Assurance (QA) and Quality Control (QC) Plan, under Licence number 3BC-ERK1015, issued to the Department of National Defence (DND) on June 18, 2010. This new Class B Water Licence issued allows for the disposal of waste during operation and maintenance of Canadian Forces Station (CFS) Eureka ("Eureka"). Eureka is located on Slidre Fiord on the west coast of Ellesmere Island within the Qikiqtani Region of Nunavut (latitude 79°59'20"N / longitude 85°56'30"W).

Eureka has been operational since 1947 and was originally established as a High Arctic Weather Station, and is currently a remote camp maintained by DND as a military detachment and training area. Eureka is located approximately 2 km from the Eureka High Arctic Weather Station (HAWS) operated by Environment Canada. This station is only seasonally active during the summer months, which include June, July and August in the Arctic, and is used by DND, Environment Canada and arctic research projects (Polar Continental Shelf Project and the Polar Environment Atmospheric Research Laboratory). During the summer months the peak population is 35 people, and on average ranges between 20 to 25 people.

This document has been prepared in accordance with the *QA/QC Guidelines for Use by Class "B" Licensees in Collecting Representative Water Sample in the Field and for Submission of a QA/QC Plan*, published in 1996 by the Department of Indian and Northern Affairs Canada Water Resources Division and the Northwest Territories Water Board. As outlined in the Licence, five (5) monitoring stations shall be maintained at Eureka at the following locations: Sewage Treatment Facility, Landfarm Facility, Landfill, Battery Dump and Barrel Dump, for the purpose of assessing water quality. Implementation of this QA/QC Plan at Eureka is scheduled to commence in June 2011, as this station is only seasonally active.

2. SAMPLE COLLECTION

2.1 Sampling Locations

As part of the NWB Licence, the Surveillance Network Program (SNP) consists of five water monitoring stations at Eureka, which include:

a) ERK-1: Final Discharge Point of the Sewage Treatment Facility
b) ERK-2: Final Discharge Point of the Landfarm Facility
c) ERK-3: Runoff/leachate from the Landfill
d) ERK-4: Runoff/leachate from the Battery Dump
e) ERK-5: Runoff/leachate from the Barrel Dump

To date water monitoring has not been conducted at Eureka. Sampling locations were established by the NWB and listed above and identified on Figure 1 (Appendix A). The exact sampling locations will be identified at the commencement of the sampling program in 2011, and if feasible with assistance from an Inspector. GPS coordinates and photographic records of the

sampling locations will be documented, and locations will be identified using markers for consistency and repeatability in subsequent months and years.

Timing of Sampling
Timing of the collection of the water samples at Eureka is outlined in the requirements of the NWB Licence, which specify:

- ERK-1 shall be sampled prior to the release of effluent from the Sewage Treatment Plant;
- ERK-2 shall be sampled prior to the release of effluent from the Landfarm Facility; and,
- ERK-3-4-5 shall be sampled monthly during periods of runoff or seepage from the Landfill, Battery Dump and Barrel Dump.

Documenting Non-Sampling Events
In the event that water samples are not successfully collected and submitted for analysis from the Landfarm (ERK-2), Landfill (ERK-3), Battery Dump (ERK-4) and/or the Barrel Dump (ERK-5) the following will be documented:

- Location(s) of the sampling attempts will be recorded (i.e., GPS coordinates, photographic records and the sampling locations will be identified on a map); and,
- Justification outlining why a sample was not successfully collected.

Attempted unsuccessful sampling event(s) and justification will be reported to the NWB in the Annual Report for Eureka.

2.2 Sampling Equipment

No specialized equipment will be required for the collection of water samples at Eureka. New sample bottles will be supplied by Taiga Environmental Laboratory (Taiga) and used for the collection of all water samples. Samples are not to be filtered.

The table below identifies the sample bottles necessary for each sampling round. Extra bottles will be requested for duplicate samples, field blanks and/or in case of breakage.

<table>
<tr><th>Sewage Treatment Facility (ERK-1)</th><th>Runoff/Leachate from Landfill/Dump (ERK-3-4-5)</th></tr>
<tr><td><u>4 Bottles</u>:
1 x routine (pH)
1 x nutrient (TSS)
1 x BOD (BOD)
1 x sterile (fecal coliforms)</td><td rowspan="2"><u>11 Bottles/Site</u>:
1 x 1L glass amber bottle (extractable HC for TPH)
1 x 1L glass amber bottle (PAHs)
1 x 1L glass amber bottle (Oil and Grease)
2 x 40 mL vials (F1, BTEX)
1 x BOD (BOD)
1 x routine (pH,NO2-N,NO3-N,Mg,Na,Ca,K, SO4,conductivity,alkalinity,hardness)
1 x nutrient (TSS, NH3)
1 x metals bottle (total As,Cu,Fe,Hg,Cd,Cr,Pb,Ni)
1 x 100 mL glass amber bottle (phenols)
1 x sterile (fecal coliform)</td></tr>
<tr><th>Landfarm Facility (ERK-2)</th></tr>
<tr><td><u>5 Bottles</u>:
2 x 40 mL vials (benzene,toluene,ethylbenzene)
1 x 300 mL metals bottle (lead)
1 x 1L glass amber bottle (Oil and Grease)
1 x 100 mL glass amber bottle (phenols)</td></tr>
</table>

2.3 Sampling Methods

Taiga provided the following methodology for the collection of the water samples:

Parameter	Instructions
Routine and Nutrients	1. Rinse bottle three (3) times with sample 2. Fill to top and cap bottle 3. Keep cool at 4°C
BOD	1. Rinse bottle three (3) times with sample 2. Fill to top and cap bottle 3. Keep cool at 4°C 4. Sample must be sent to laboratory within 24 hours
Microbiological (fecal coliforms)	**1. Do not rinse bottle** 2. Fill to top and cap bottle 3. Keep cool at 4°C 4. Sample must be sent to laboratory within 24 hours
Total Metals (including Lead)	1. Rinse bottle three (3) times with sample 2. Fill to near the top 3. Add contents of preservative vial (nitric acid) 4. Cap bottle and mix
Hexane Extractable Material (Oil and Grease)	**1. Do not rinse bottle** 2. Fill to shoulder of bottle 3. Add contents of preservative vial (sulphuric acid) 4. Cap bottle and mix
BTEX, THM and Purgeable Hydrocarbons	**1. Do not rinse bottle** 2. Fill bottle completely leaving **no** air bubbles 3. Keep cool at 4°C
Extractable Hydrocarbons (including PAH)	**1. Do not rinse bottle** 2. Fill to top and cap bottle 3. Keep cool at 4°C
Phenol	1. Rinse bottle three (3) times with sample 2. Fill to near top 3. Add contents of preservative vial (sulphuric acid) 4. Cap bottle and mix

Taiga Methodology: Date effective January 18, 2010

Refer to Table 1 (Appendix B) for additional laboratory considerations, including minimum sample size, rinsing, filtering and storage requirements for the parameters. Additionally, samples for ERK-1 and ERK-2 will be collected prior to the release of any effluent to demonstrate compliance with the criteria set out by the NWB (refer to Section 4.4B).

3. SAMPLE HANDLING

3.1 Preservation

Samples will be preserved in accordance with requirements identified by Taiga for the parameters to be analysed (refer to 2.3 Sampling Methods and Appendix B).

Preservatives nitric acid (HNO3) and sulphuric acid (H2SO4) are classified as Class 8 Dangerous Goods. Based on the quantity of preservative needed for sampling, these acids will be transported together in regular cargo as *dangerous goods in accepted quantities*. Nitric acid will be added to preserve lead and metals samples, and sulphuric acid will be added to preserve oil and grease, and phenols samples, immediately after the samples are collected.

Samples requiring analysis within 24 hours will be collected immediately prior to shipping. All samples will be stored on ice and kept cool at approximately 4°C prior to and during shipping.

3.2 Sample Identification

Samples collected will be labelled using consistent terminology, identifying the water monitoring station (corresponding to the facility), followed by the year, month and sample number. For example, ERK-1-2011-06-1 denotes a water sample collected for the Sewage Treatment Facility, in June 2011, and is the first sample collected for the month.

Similarly, blind duplicate samples collected will be labelled using consistent terminology, identifying the station, followed by the year, month and duplicate sample number. For example, ERK-2011-06-DUP1 denotes a blind duplicate water sample collected at Eureka, in June 2011, and is the first duplicated collected for the month. Trip and field blanks will be labelled as such.

At the time of collection, sample identification will be recorded in a field notebook for consistency in terminology, and to ensure the sample identifiers are unique. Sample labels will also include the following information: name of organization, time and date. Information provided on the sample labels will be clearly printed in permanent (i.e., waterproof) non-smear ink (marker or pen).

A Chain-of-Custody shall be completed for each sampling round and will accompany the samples to the laboratory.

3.3 Transportation

Samples will be packed appropriately (i.e., packed upright, immobile) in coolers, sealed and shipped to Yellowknife via 953731 NWT Limited air services. Samples are scheduled to be picked up on a scheduled basis (while the station is active), on the same flight as samples for the neighbouring Eureka HAWS.

Taiga will be immediately notified when the samples are in transit. Taiga will pick-up the shipment at the airport in order to start analysis as quickly as possible on samples with a maximum storage of 24 hours. A Chain-of-Custody will accompany the sample shipment and will clearly identify location of samples requiring immediate analysis.

4. LAB ANALYSIS

4.1 Lab Accreditation

Taiga (Yellowknife, NWT) and Exova (Calgary, AB) will analyze all samples collected in support of this licence. Taiga Environmental Laboratory is ISO/IEC 17025 accredited and is a member of the Canadian Association for Laboratory Accreditation Inc. (CALA). Taiga will subcontract TPH (extractable HC), PAHs, and phenols analysis to Exova. Exova is ISO/IEC 17025 accredited by the Standard Council of Canada. Refer to Appendix C for proof of laboratory accreditation to conduct analyses on each of the required sampling parameters.

4.2 Detection Limits

Laboratory detection limits for all parameters required by the NWB are identified in Table 1 (Appendix B). The laboratory shall report the detection limits of the methods used for the analysis of the samples.

4.3 Methodology

The laboratory sample analysis methodology will follow the methods outlined in the *Standard Methods for the Examination of Water and Wastewater* (2005) if not described below. Taiga and Exova provided the summaries below for the sample analysis methodologies to be used for BTEX, metals, oil and grease, phenols and PAH, and extractable hydrocarbons, differing from the *Standard Methods* (2005).

Metals in Water (EPA200.8) - Taiga
This method describes the multi-element determination of trace elements by Inductively Coupled Plasma Mass Spectroscopy (ICP-MS). Sample material in solution is introduced by pneumatic nebulization via a spray chamber into a radio frequency argon plasma. Desolvation, atomization, and ionization create predominately singly-charged cations which are separated on the basis of their mass-to-charge ratio and quantitated by the use of a quadrupole mass spectrometer.

Oil and Grease (EPA1664:A) -Taiga
The extraction of oil and grease (hexane extractable material) from aqueous samples is performed by using solid phase extraction disks (SPE). The HEM residue is measured gravimetrically.

BTEX in Water (EPA8260:B) - Taiga and Exova
The extraction of BTEX is performed with a Purge and Trap System. The Purge and Trap works on the principle of degassing volatiles within an enclosed system with an inert gas. The volatiles (BTEX) are carried into an absorbing column where they are absorbed. At the end of the purge and trap cycle, the trap is desorbed by heat and back-flushed with inert gas, the volatile compounds are transferred into a gas chromatograph for analysis by Mass Selective Detector.

Phenols in Water (APHA5530:D) - Exova
The water sample is spiked with surrogates and the pH is raised to between 8.8 and 9.2. The chlorophenolics are converted in situ to acetates by the addition of acetic anhydride. After acetylation, the solution is extracted, concentrated, and an instrument standard is added. The extract is then analyzed on a GC/MS to separate the individual isomers for quantitation and qualitation.

PAH in Water (EPA8270C) - Exova
The water sample is spiked with surrogates, extracted and then cleaned up if needed. The PAH extract is then injected with internal standard and analyzed on a GC/MS to separate the individual isomers for quantitation and qualitation.

Extractable Hydrocarbon in Water (A108.0, Alta. Env, Aug. 1988) - Exova
The water sample is extracted with hexane. The organic fraction is selectively removed and an aliquot is analyzed using gas chromotography/flame ionization detection. Chromotographic conditions are described which permit the separation and measurement of the petroleum hydrocarbon types.

4.4 Reporting Requirements

Duplicates and Blanks
Duplicate samples and blanks shall be submitted to and analysed by the accredited laboratory to provide an internal (i.e., laboratory) and external (i.e., at time of sampling, shipping) QA/QC check to verify the reliability of the sample results. Duplicates samples shall be collected for approximately 10 percent of the samples. A duplicate sample is a repeat sample collected and handled using the same methods and submitted blindly for analysis. Based on the analytical results the laboratory will match the blind duplicate to the corresponding sample.

Field blanks and travel blanks will also be analysed. Field blanks will consist of bottling distilled water during the sampling round, using the sampling methods used to collect the water samples, to ensure reliability of the sampling method. Travel blanks consist of distilled water and are provided by the laboratory to accompany a shipment of sample bottles roundtrip to confirm the integrity of the samples was maintained.

NWB Effluent Standards
Analytical results of effluent discharged from the Sewage Treatment Facility and the Landfarm Facility will be reported against the following effluent quality standards provided by the NWB:

Parameter	Maximum Concentration of any Grab Sample
Sewage Treatment Facility (ERK-1)	
BOD_5	80 mg/L
Total Suspended Solids	70 mg/L
Fecal Coliforms	1 X 10^6 CFU/100mL
Oil and Grease	No visible sheen
pH	between 6 and 9
Landfarm Facility (ERK-2)	
Benzene (µg/L)	370
Toluene (µg/L)	2
Ethylbenzene (µg/L)	90
Lead (µg/L)	1
Oil and Grease (mg/L)	15 and no visible sheen
Phenols (µg/L)	20

Effluent standards provided by the NWB are consistent with the *Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories* (1992), or are consistent with other municipal licences.

5. QA/QC PLAN REVIEW

This document, *QA/QC Plan for CFS Eureka*, shall be reviewed annually to ensure that this plan remains current and consistently reflects the operations, activities and technology at CFS Eureka. Any revisions required to this document shall be submitted to the NWB in the form of an Addendum with supporting letter of approval from Taiga, and subsequently implemented. Changes to this plan will also be reflected in the Annual Report.

6. REFERENCES

Department of Indian and Northern Affairs Canada Water Resources Division and the Northwest Territories Water Board. *Quality Assurance (QA) and Quality Control (QC) Guidelines for Use by Class "B" Licensees in Collecting Representative Water Samples in the Field and for Submission of a QA/QC Plan.* July 1996.

Eaton, A., Clesceri, L., Rice, E., and A. Greenberg. *Standard Methods for the Examination of Water and Wastewater – 21st Edition.* 2005.

Nunavut Water Board. *Letter, RE: NWB Licence No. 3BC-ERK1015*. June 18, 2010.

Appendix A: CFS Eureka Site Overview and Sampling Locations

Defence Construction Canada
Construction de Défense Canada

Title:
CFS Eureka Site Overview and Sampling Locations

Project:
QA/QC Plan for Canadian Forces Station Eureka

Client:
Department of National Defence

Date:
September 2010

Figure:
Figure 1

LEGEND

	Monitoring Station Locations
ERK-1	Sewage Treatment Facility
ERK-2	Landfarm Facility
ERK-3	Landfill
ERK-4	Battery Dump
ERK-5	Barrel Dump

N
W E
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Appendix B: Parameter Considerations

Table 1: Taiga Environmental Laboratory parameter considerations.

Parameter	Container	Minimum Amount	Rinse	Filter	Preservation	Maximum Storage Recommendation	Detection Limit	Method	Accredited
Sewage Treatment Facility (ERK-1)									
BOD5	300mL plastic	100mL	3 times	n/a	keep cool at 4°C	2 days	2 mg/L	SM5210:B	Yes
TSS	750mL plastic	50mL	3 times	n/a	keep cool at 4°C	7 days	3 mg/L	SM2540:D	Yes
Fecal Coliforms	500mL plastic	100mL	No	n/a	keep cool at 4°C	1 day	1 CFU/100mL	SM9222:D	Yes
pH	500mL plastic	50mL	3 times	n/a	keep cool at 4°C	1 day	n/a	SM4500-H:B	Yes
Landfarm Facility (ERK-2)									
Benzene	40mL glass vial	2x40mL	No	n/a	keep cool at 4°C	14 days	0.001 mg/L	EPA8260:B	Yes*
Toluene	40mL glass vial	2x40mL	No	n/a	keep cool at 4°C	14 days	0.001 mg/L	EPA8260:B	Yes*
Ethylbenzene	40mL glass vial	2x40mL	No	n/a	keep cool at 4°C	14 days	0.001 mg/L	EPA8260:B	Yes*
Lead	300mL plastic	50mL	3 times	n/a	5mL 1:3 HNO3	180 days after preservation	0.1 ug/L	EPA8200.8	Yes
Oil and Grease	1L amber glass	1000mL	No	n/a	4mL 1:3 H2SO4	28 days after preservation	2.0 mg/L	EPA1664:A	Yes
Phenols	100mL amber glass	20mL	No	n/a	1mL 50% H2SO4	28 days after preservation	0.001 mg/L	APHA5530:D	Yes*
Runoff and Leachate from Landfill (ERK-3), Battery Dump (ERK-4), Barrel Dump (ERK-5)									
TPH									
Extractable HC	1L amber	1000mL	No	n/a	keep cool at 4°C	14 days	0.2 mg/L	EPA8015B	Yes*
F1, BTEX	40mL glass vial	2x40mL	No	n/a	keep cool at 4°C	14 days	0.005 mg/L	EPA8260:B	Yes
PAH	1L amber glass	1000mL	No	n/a	keep cool at 4°C	7 days; 40 days extract	Refer to Table 2	EPA8270C	Yes*
BTEX	40mL glass vial	2x40mL	No	n/a	keep cool at 4°C	14 days	0.005 mg/L	EPA8260:B	Yes
BOD5	300mL plastic	100mL	3 times	n/a	keep cool at 4°C	2 days	2 mg/L	SM5210:B	Yes
pH	500mL plastic	50mL	3 times	n/a	keep cool at 4°C	1 day	n/a	SM4500-H:B	Yes
TSS	750mL plastic	50mL	3 times	n/a	keep cool at 4°C	7 days	3 mg/L	SM2540:D	Yes
Nitrate-Nitrite	500mL plastic	5mL	3 times	n/a	keep cool at 4°C	2 days	0.01 mg/L	SM4110:B	Yes
Total Phenols	100mL amber glass	20mL	No	n/a	1mL 50% H2SO4	28 days after preservation	0.001 mg/L	APHA5530:D	Yes*
Total Hardness	500mL plastic	5mL	3 times	n/a	keep cool at 4°C	7 days	0.7 mg/L	SM2340:B	Yes
Magnesium	500mL plastic	5mL	3 times	n/a	keep cool at 4°C	7 days	0.1 mg/L	SM4110:B	Yes
Sodium	500mL plastic	5mL	3 times	n/a	keep cool at 4°C	7 days	0.1 mg/L	SM4110:B	Yes
Total Arsenic	300mL plastic	50mL	3 times	n/a	5mL 1:3 HNO3	180 days after preservation	0.2 ug/L	EPA200.8	Yes
Total Copper	300mL plastic	50mL	3 times	n/a	5mL 1:3 HNO3	180 days after preservation	0.2 ug/L	EPA200.8	Yes
Total Iron	300mL plastic	50mL	3 times	n/a	5mL 1:3 HNO3	180 days after preservation	5 ug/L	EPA200.8	Yes
Total Mercury	300mL plastic	50mL	3 times	n/a	5mL 1:3 HNO3	180 days after preservation	0.01 ug/L	EPA200.8	Yes

Parameter	Container	Minimum Amount	Rinse	Filter	Preservation	Maximum Storage Recommendation	Detection Limit	Method	Accredited
Fecal Coliforms	500mL plastic	100mL	No	n/a	keep cool at 4°C	1 day	1 CFU/100mL	SM9222:D	Yes
Conductivity	500mL plastic	50mL	3 times	n/a	keep cool at 4°C	28 days	0.4 uS/cm	SM2510:B	Yes
Oil and Grease	1L amber glass	1000mL	No	n/a	4mL 1:3 H2SO4	28 days after preservation	2.0 mg/L	EPA1664:A	Yes
Ammonia Nitrogen	750mL plastic	90mL	3 times	n/a	keep cool at 4°C	28 days after lab preservation	0.01 mg/L	SM4500-NH3:G	Yes
Total Alkalinity	500mL plastic	50mL	3 times	n/a	keep cool at 4°C	1 day	0.4 mg/L	SM2320:B	Yes
Calcium	500mL plastic	5mL	3 times	n/a	keep cool at 4°C	7 days	0.1 mg/L	SM4110:B	Yes
Potassium	500mL plastic	5mL	3 times	n/a	keep cool at 4°C	7 days	0.1 mg/L	SM4110:B	Yes
Sulphate	500mL plastic	5mL	3 times	n/a	keep cool at 4°C	2 days	1 mg/L	SM4110:B	Yes
Total Cadium	300mL plastic	50mL	3 times	n/a	5mL 1:3 HNO3	180 days after preservation	0.05 ug/L	EPA200.8	Yes
Total Chromium	300mL plastic	50mL	3 times	n/a	5mL 1:3 HNO3	180 days after preservation	0.1 ug/L	EPA200.8	Yes
Total Lead	300mL plastic	50mL	3 times	n/a	5mL 1:3 HNO3	180 days after preservation	0.1 ug/L	EPA200.8	Yes
Total Nickel	300mL plastic	50mL	3 times	n/a	5mL 1:3 HNO3	180 days after preservation	0.1 ug/L	EPA200.8	Yes

NOTES: * Analysis subcontracted to Exova, Calgary laboratory accredited for Benzene, Toluene, Ethylbenzene, Phenols, TPH – Extractable HC, and PAH.

Table 2: Exova PAH detection limits.

Parameter	Detection Limit
Naphthalene	0.1 ug/L
Acenaphthylene	0.1 ug/L
Acenapthene	0.1 ug/L
Fluorene	0.1 ug/L
Phenanthrene	0.1 ug/L
Anthracene	0.005 ug/L
Pyrene	0.01 ug/L
Benzo(a)anthracene	0.01 ug/L
Chrysene	0.1 ug/L
Benzo(b)fluoranthene	0.1 ug/L
Benzo(k)fluoranthene	0.1 ug/L
Benzo(a)pyrene	0.008 ug/L
Indeno(123-cd)pyrene	0.05 ug/L
Dibenzo(ah)anthracene	0.05 ug/L
Benzo(ghi)perylene	0.05 ug/L

Appendix C: Proof of Laboratory Accreditation - Taiga Environmental Laboratory and Exova

CALA
Canadian Association for Laboratory Accreditation Inc.

CALA Directory of Laboratories

Membership Number: 2635
Laboratory Name: Taiga Environmental Laboratory
Parent Institution: Department of Indian and Northern Affairs Canada
Address: 4601 - 52nd Avenue Yellowknife NT X1A 2R3
Contact: Ms. Angelique Ruzindana
Phone: (867) 669-2781
Fax: (867) 669-2718
Email: angelique.ruzindana@inac-ainc.gc.ca

Standard: Conforms with requirements of ISO/IEC 17025
Clients Served: All Interested Parties
Revised On: September 8, 2010
Valid To: April 14, 2013

Scope of Accreditation

Solids (Inorganic)
Metals - Soil, Sediment (079)
TEL 061; based on EPA SW-846 METHOD 3050 A
ICP/MS

Aluminum	
Antimony	
Arsenic	
Barium	
Beryllium	
Boron	
Cadmium	
Calcium	
Chromium	
Cobalt	
Copper	
Iron	
Lead	
Lithium	((Parameter suspended on 9/8/2010))
Magnesium	
Manganese	
Mercury	
Molybdenum	
Nickel	
Potassium	

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Selenium ((Parameter suspended on 9/8/2010))
Sodium
Strontium
Tin
Titanium
Uranium
Vanadium
Zinc

Solids (Inorganic)
Moisture - Soil (030)
TEL007; CWS-PHC CCME Tier 1
GRAVIMETRIC
Moisture

Solids (Organic)
BTEX - Soil (072)
TEL 038; based on USEPA 5030 B, 602, 502.2
GC/MS - PURGE AND TRAP
Benzene
Ethylbenzene
m/p-xylene
o-xylene
Toluene

Solids (Organic)
Petroleum Hydrocarbons (PHC) - Soil (073)
TEL 057; based on USEPA SW 846 METHODS 3500 B, 3541, 3630 C, 8100, 8310
GC/FID - PURGE AND TRAP
F2: C10-C16
F3: C16-C34
F4: C34-C50

Solids (Organic)
Petroleum Hydrocarbons (PHC) - Soil (075)
TEL 046; based on US EPA SW-846 METHODS 5030, 8000, 8015, 8260 B
SOXTHERM EXTRACTION - GRAVIMETRIC
F4: Gravimetric

Solids (Organic)
Polycyclic Aromatic Hydrocarbons (PAH) - Soil (071)
TEL 047; based on USEPA SW 846 METHODS 3500 B, 3541, 3630 C, 8100, 8310
GC/MS - EXTRACTION
Acenaphthene
Acenaphthylene
Anthracene

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Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Chrysene
Dibenzo (a,h) anthracene
Fluoranthene
Fluorene
Indeno (1,2,3 - cd) pyrene
Naphthalene
Phenanthrene
Pyrene

Solids (Organic)
Purgeable Hydrocarbons- Soil (074)
TEL 056; CWS-PHC CCME TIER 1
GC/FID - PURGE AND TRAP
F1: C6-C10

Water (Inorganic)
Alkalinity - Water (066)
TEL 060:PC TITRATE; based on SM 2320 A, B
AUTO TITRIMETRIC
Alkalinity (pH 4.5)

Water (Inorganic)
Ammonia - Water (022)
TEL013; based on SM 4500-NH3 G
AUTO COLOR
Ammonia

Water (Inorganic)
Anions - Water (059)
TEL 055; based on SM 4110 B
ION CHROMATOGRAPHY
Chloride
Fluoride
Nitrate
Nitrite
Sulfate

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Water (Inorganic)
Biochemical Oxygen Demand (BOD) - Water (004)
TEL 019; based on SM 5210 A, B
D.O. METER
BOD (5 day)
CBOD (5 day)

Water (Inorganic)
Carbon - Water (029)
TEL033; based on SM 5310 B
INFRARED
Organic Carbon

Water (Inorganic)
Cations - Water (042)
TEL055; based on SM 4110 B
ION CHROMATOGRAPHY
Calcium
Magnesium
Potassium
Sodium

Water (Inorganic)
Chemical Oxygen Demand (COD) - Water (061)
TEL 016; based on SM 5220 D
REFLUX - COLORIMETRIC
COD

Water (Inorganic)
Chlorine - Water (078)
TEL049; based on SM 4500-Cl G
HACH
Free Chlorine
Total Chlorine

Water (Inorganic)
Colour - Water (063)
TEL 051; based on SM 2120 C
HACH - SPECTROPHOTOMETRIC
Apparent Color
True Color

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The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Water (Inorganic)
Colour - Water (083)
TEL 064; based on SM 2120 C
SPECTROPHOTOMETRIC - PC TITRATE
Apparent Colour
True Colour

Water (Inorganic)
Conductivity - Water (068)
TEL 059:PC TITRATE; based on SM 2510 B
AUTO CONDUCTIVITY METER
Conductivity (25°C)

Water (Inorganic)
Dissolved Metals - Water (013)
TEL035; based on US EPA 200.8
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Cesium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Manganese
Molybdenum
Nickel
Rubidium
Selenium
Silver
Strontium
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Water (Inorganic)
Hexane Extractable Material (Oil and Grease) - Water (060)
TEL 024: HEM AND SGT-HEM; based on US EPA 1664 A, REVISION A
SOLID PHASE EXTRACTION
Mineral Oil and Grease
Total Oil and Grease

Water (Inorganic)
Mercury - Water (080)
TEL 062; based on EPA 245.7
ATOMIC FLUORESCENCE MERCURY ANALYSIS SYSTEM
Mercury

Water (Inorganic)
pH - Water (067)
TEL 058:PC TITRATE; based on SM 4500-H+ A, B
AUTO - pH METER
pH

Water (Inorganic)
Phosphate - Water (040)
TEL015; based on SM 4500-P D
AUTO COLOR
Phosphate

Water (Inorganic)
Phosphorus - Water (009)
TEL015; based on SM 4500-P B, D
AUTO COLOR - DIGESTION
Dissolved Phosphorus
Total Phosphorus

Water (Inorganic)
Reactive Silica - Water (007)
TEL012; based on SM 4500-SiO2 F
AUTO COLOR
Reactive Silica

Water (Inorganic)
Solids - Water (011)
TEL008, TEL009; based on SM 2540 C, D
GRAVIMETRIC
Total Dissolved Solids
Total Suspended Solids

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The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Water (Inorganic)
Total and Dissolved Nitrogen - Water (086)
TEL 066; based on ISO/TR 11905:1997(E) and ASTM D 5176-91
PYROLYSIS AND CHEMILUMINESCENCE DETECTION
Dissolved Nitrogen
Total Nitrogen

Water (Inorganic)
Total Metals - Water (054)
TEL035; based on US EPA 200.8
ICP/MS
Aluminum
Arsenic
Barium
Beryllium
Boron
Cadmium
Cesium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Manganese
Mercury
Molybdenum
Nickel
Rubidium
Selenium
Silver
Strontium
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc

Water (Inorganic)
Turbidity - Water (028)
TEL006; based on SM 2130 B
NEPHELOMETRY
Turbidity

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Water (Inorganic)
Turbidity - Water (082)
TEL 065; based on SM 2130 B
NEPHELOMETRY - PC TITRATE
Turbidity (Parameter suspended on 5/18/2010)

Water (Microbiology)
Coliforms - Water (045)
TEL053; based on IDEXX QUANTI-TRAY
MOST PROBABLE NUMBER (QUANTI-TRAY)
Escherichia coli (E. coli)
Total Coliforms

Water (Microbiology)
Fecal Coliforms - Water (041)
TEL017; based on SM 9222 D
MEMBRANE FILTRATION (mFC)
Fecal (Thermotolerant) Coliforms

Water (Microbiology)
Fecal streptococcus - Water (055)
TEL053; based on IDEXX QUANTI-TRAY
MOST PROBABLE NUMBER (QUANTI-TRAY)
Fecal Streptococcus

Water (Organic)
BTEX - Water (070)
TEL 037 (BTEX); based on USEPA METHOD 5030 B, 602, 502.2
GC/MS - PURGE AND TRAP
Benzene
Ethylbenzene
m/p-xylene
o-xylene
Toluene

Water (Organic)
Trihalomethanes (THM) - Water (077)
TEL039 (THM); based on USEPA 5030 B, 602, 502.2
GC/MS - PURGE AND TRAP
Bromodichloromethane
Bromoform
Chlorodibromomethane
Chloroform

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The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Standards Council of Canada
Conseil canadien des normes
200-270, rue Albert St.
Ottawa, ON (Canada)
K1P 6N7
Canada

Tel.: +1 613 238 3222
Fax.: +1 613 569 7808
E-mail/Courriel : info@scc.ca
Internet: http://www.scc.ca

SCOPE OF ACCREDITATION

Exova Canada Inc.
CALGARY LABORATORY
Bay 5, 2712 - 37th Avenue N.E.
Calgary, AB
T1Y 5L3

Accredited Laboratory No. 272
(Conforms with requirements of CAN-P-1585, CAN-P-1587 , CAN-P-4E (ISO/IEC 17025:2005))

CONTACT:	Ms. Genevieve Denis
TEL:	(403) 291-2022
FAX:	(403) 291-2021
EMAIL:	genevieve.denis@exova.com
CLIENTS SERVED:	All interested parties.
FIELDS OF TESTING:	Biological, Chemical/Physical
PROGRAM SPECIALTY AREA:	AGRICULTURE INPUTS, FOOD, ANIMAL HEALTH AND PLANT PROTECTION , Environmental
ISSUED ON:	2010-05-17
VALID TO:	2014-07-02

(PAH - Water)

TM PAH001-50; based on EPA 3510 C/8270 C/3611B	Analysis of Polynuclear Aromatic Hydrocarbons (PAH's) in Water by GC/MS
	2-Methylnaphthalene
	Acenaphthene
	Acenaphthylene
	Acridine
	Anthracene
	Benzo (a) anthracene
	Benzo (a) pyrene
	Benzo (b) fluoranthene
	Benzo (g,h,i) perylene
	Benzo (j) fluoranthene
	Benzo (k) fluoranthene
	Chrysene
	Dibenzo (a,h) anthracene
	Fluoranthene
	Fluorene
	Indeno (1,2,3 - cd) pyrene
	Naphthalene
	Phenanthrene
	Pyrene
	Quinoline

(BTEX - Water)

TM BTX004-50; based on EPA 5035/8260B/8021B	B.T.E.X. and F1 in Water Samples by MSD/FID
	Benzene
	Ethylbenzene
	m/p-Xylene
	o-Xylene
	Toluene

(Petroleum Hydrocarbons (PHC) - Water)

TM CCME 003-50: Based on AENV A 108.0	CCME Petroleum Hydrocarbons in Water
	F2: (C10-C16)
	F3: (C16-C34)

(Phenols - Water)

TM PCP001-50; based on EPA 8041/1653/8270	Analysis of Chlorinated Phenolics in Water by In Situ Acetylation and GC/MS 2,3 Dichlorophenol 2,3,4 Trichlorophenol 2,3,4,5-Tetrachlorophenol 2,3,4,6-Tetrachlorophenol 2,3,5 Trichlorophenol 2,3,5,6-Tetrachlorophenol 2,3,6 Trichlorophenol 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol 2,4-Dichlorophenol 2,5&2,6 Dichlorophenol 2-Chlorophenol 3,4 Dichlorocatechol 3,4 Dichlorophenol 3,4,5 Trichlorocatechol 3,4,5 Trichloroguaiacol 3,4,5 Trichlorophenol 3,4-Dichloroguaiacol 3,5 Dichlorophenol 3-Chlorophenol 4-Chloro-3-methylphenol 4-Chlorocatechol 4-Chloroguaiacol 4-Chlorophenol Pentachlorophenol Tetrachlorocatechol Tetrachloroguaiacol

Appendix D: Confirmation of Laboratory Acceptance of QA/QC Plan

Indian and Northern Affairs Canada
www.inac.gc.ca

Affaires indiennes et du Nord Canada
www.ainc.gc.ca

P. O. Box 1500
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Your file - Votre référence

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Licence # 3BC-ERK1015

September 15, 2010

Alexis Johnson
Environmental Project Coordinator
Real Property and Environment/National Capital Region
Defence Construction Canada
161 Laurier Avenue, Suite 300
Ottawa, ON, K1P 5J2

Dear Ms Johnson :

Re: Quality Assurance and Quality Control (QA/QC) Plan
Nunavut Water Board "B" Type Water Licence No. 3BC-ERK1015
Slidre Fiord, Ellesmere Island
Qikiqtani, NUNAVUT

Submitted : September 13, 2010
Reviewed : September 15, 2010.

Thank you for the submission of the Quality Assurance and Quality Control Plan prepared by Defence Construction Canada, as per the SNP outlined in the Nunavut Water Board issued Water Use Licence 3BC-ERK1015 to Department of National Defence. The Water Monitoring stations located at Eureka Camp will be operational in 2011.

Upon review, it has been found that the plan is complete. Approval of the plan is hereby granted.
Should you require further information, please do not hesitate to contact me at (867) 669-2781.

Sincerely,

Angelique Ruzindana, M.Sc., Ph.D
Analyst Under the
Northwest Territories and Nunavut Waters Act

cc : Phyllis Beaulieu, Nunavut Water Board

Canada