Environment Canada Environnement Canada

INTERIM ABANDONMENT & RESTORATION PLAN

- Eureka High Arctic Weather Station –

In support of the
Nunavut Water Board License
No. 3BC-EUR0611

Prepared by Environment Canada
Assets, Contracting and Environmental Management Directorate (ACEMD)

December 2010

Canada

CONTROL PAGE

On receipt of revisions and/or amendments, the Assets, Contracting and Environmental Management Directorate (ACEMD) shall complete this control page to ensure that the Interim Abandonment & Restoration Plan is always current and consistently reflects the operations and activities taking place on site.

Revision Number	Date Inserted	Description	Signature
1	Dec. 2010	Modified closure planning timelines and included temporary closure SOPs	

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ACRONYMS AND SYMBOLS

ACEMB	Assets, Contracting and Environmental Management Directorate
CCME	Canadian Council of Ministers of the Environment
EA	Environmental Assessment
EC	Environment Canada
NRC	National Research Council Canada
ODS	Oxygen Depleting Substances
PCB	Polychlorinated Biphenyls
PHC	Petroleum Hydrocarbons
POL	Petroleum, Oil, Liquids
PWGSC	Public Works Government Services Canada
SOP	Standard Operating Procedure

PART I: INTRODUCTION:

BACKGROUND:

All facilities must eventually cease their activities, either temporarily or permanently. When such operations cease, the owner and operator must close the facility in a way that ensures it will not pose a future threat to human health and the environment. Therefore, an Abandonment and Restoration Plan is used to achieve "clean closure."

PURPOSE:

The purpose of this interim Abandonment and Restoration Plan (the Plan) is to provide:

- Conceptual detail on the reclamation of the components of the Eureka site which will not be closed until near the end of its useful life; and
- Operational detail for components which are to be progressively reclaimed now or in the near future.

APPROACH TO PLAN:

The approach taken to develop this Plan is underpinned by the Environment Canada's (EC) commitment to the following global objectives:

- Physical Stability: remaining items will be constructed or modified at closure to be physically stable such that they do not erode, subside or move from their intended location.

- Chemically Stability: remaining items will be chemically stable; the remaining chemical constituents should not endanger public, wildlife or environmental health and safety.

- Future Use and Aesthetics: the site will be compatible with the surrounding lands once abandonment activities have been completed.

The specific actions of the Plan to remediate each of the facility components are, in turn, based on more detailed objectives formulated to achieve the above global intentions. The Plan is an evolutionary document and thus reclamation activities will be more fully described as new information is made available from progressive restoration activities (and associated studies), associated environmental assessments and monitoring results of the aforementioned restoration activities.

The following considerations were considered in the development, evolution and implementation of Eureka's Abandonment and Restoration Plan:

- Respect all historical agreements and obligations in a fair manner;
- Ensure consistency with federal guidelines for the management of contaminated sites;
- Apply simple, practical remedial solutions wherever possible, with flexibility as necessary to adjust to site-specific conditions when they become evident;
- Take into account the warming of the Arctic; and
- Directions from the Nunavut Water Board and inspection reports provided by the Department of Indian and Northern Affairs.

PART II: SITE DESCRIPTION

The Eureka High Arctic Weather Station (HAWS) is located on the north side of Slidre Fjord, at the northwestern tip of Fosheim Peninsula, Ellesmere Island, Nunavut at site coordinates 79°59'41"N and 85°48'48"W.

The total area of the occupied Site is approximately 2.23 ha.

BIOPHYSICAL ENVIRONMENT

PHYSIOGRAPHIC DESCRIPTION:

It is located in the Eureka Hills Eco-region, within the Northern Arctic Ecozone and the topography of the area is rolling and ridged, reaching altitudes of no more than 1000 m above sea level.

Soils in the Site area are primarily a sand/gravel fill underlain by silty, sandy clays.

Permafrost is present with an active layer ranging between 0.6 and 1.2 m in thickness.

CLIMATE

The climate is cold and dry; mean annual temperatures range from -30°C in winter to 0.5°C in summer. Annual precipitation ranges between 50 to 150 mm.

FAUNA

Fauna include must, oxen, Arctic wolves, Arctic foxes, Arctic hares, and lemmings. In addition, summer nesting geese, ducks, owls, loons, ravens, gulls and many other smaller birds nest, raise their young and return south in August.

CURRENT ENVIRONMENTAL CONDITIONS

A Study conducted in 2006 (NRC) provided a list of sites with the highest contamination levels and/or sites which had 100% of their respective samples test above CCME guideline criteria. These sites were:

- North Airstrip Apron
- Sewage Lagoon
- Barrel Dump

A 2007 Environmental Site Assessment (EA) identified the following at Eureka:

- 16 areas of potential environmental concern
- Potentially contaminated environmental media identified at
    - Fuel tank farm (old and new)
    - Powerhouse
    - DND warehouse fuel tank vicinity
    - Bulky debris landfill east of airstrip

A 2009 Environmental Site Assessment (Phase III) identified the following at Eureka:

- 16 initial areas of potential environmental concern have been reduced to 6 Environmental Areas of Concern (AEC) which require further work and/or investigation including:
    - AEC A-7 Ex-Situ Biotreatment Cell
    - AEC B-1 Fuel Tank Farm
    - AEC B-2 In-Situ Landfarm
    - AEC D-1 Powerhouse
    - AEC E-1 Hydrogen Building

CURRENT PERMITS, LICENCES HELD

- Nunavut Water Board Licence No. 3BC-EUR0611 (See Appendix)

PART III: THE PLAN

The Plan consists of the following elements:

1. specific abandonment and restoration objectives and actions to be taken to achieve those objectives for each of the facility components for both temporary and permanent closure;
2. details of measures to be employed for progressive restoration;
3. monitoring program to be employed in recording the success of on-going restoration activities;
4. description of the final landscape and how aesthetic concerns will be factored into the restoration process; and
5. post-closure treatment potentially required for drainage water that is not acceptable for discharge.

TEMPORARY CLOSURE

In the context of Eureka, temporary closure refers to the shutting down operations for a period of time with the intention of resuming operations in the future. The period of shutdown could be for a week or longer and would be a function of political, economic, environmental or social.

To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.

The political (sovereignty) and environmental (climate) roles played by Eureka make it unlikely that Eureka will ever be abandoned. Notwithstanding, the basic abandonment and restoration objective would be to ensure that the various components of the Eureka site do not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods. Environment Canada will ensure that the following general conditions are met:

- Sufficient staff are on-site to protect the health and safety of humans, wildlife and the environment and the expertise is made available to care for the site and any potential problems that may arise;
- Sufficient equipment and supplies are left on site for any maintenance or reclamation activities that may need to be implemented;
- Access to the site, buildings and other structures will be secured and restricted to authorized personnel only;
- All legislated requirements (eg. Provisions of water licence) will be complied; and
- Warning signs continue to be posted where appropriate.

TEMPORARY CLOSURE PLAN - EUREKA		
Site Component	**Specific Abandonment and Restoration Objective**	**Actions to be taken to achieve Objective**
• Operations & Barracks Buildings • Maintenance garage • Warehouses • Shops & other buildings • Pumphouse • Electrical, plumbing & carpentry facilities • Powerhouse	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.	• Implement the Standard Operating Procedures (SOP) for temporary closure of building • See Appendix A for Building Temporary Closure SOP
• Water reservoir • Water diversion area	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.	• Implement the Standard Operating Procedure (SOP) for Temporary Closure of the water reservoir in order to ensure that water diversion area is closed before any temporary closure of the site. • See Appendix A for Lagoon and Earthen Manure Storage Structure Temporary Closure SOP
• Contaminated (oil, fuel, chemicals) sites	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.	• Identify all open conduits in and around the contaminated sites • Implement the Standard Operating Procedure (SOP) for contaminated sites and ensure that any open conduits (monitoring wells, open pits, etc.) are closed and secure. • See Appendix A for Contaminated Sites Temporary Closure SOP
• Infrastructure (eg. airstrip, electrical power supply	• To ensure that this component of the Eureka	• Implement the Standard Operating Procedures (SOP) for temporary closure of infrastructure

TEMPORARY CLOSURE PLAN - EUREKA		
Site Component	**Specific Abandonment and Restoration Objective**	**Actions to be taken to achieve Objective**
systems, culverts, barge landings, and associated infrastructure)	site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.	• See Appendix A for Infrastructure Temporary Closure SOP
• Hazardous materials (eg. POL Fluids, PCB containing material, ODS containing equipment, batteries, asbestos; compressed gas cylinders; lead-based paint)	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.	• Determine temporary storage requirements of all hazardous materials • Implement Temporary Storage Plan for hazardous materials • See Appendix A Temporary Storage Plan for Hazardous Materials
• Sewage lagoon	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.	• Identify all influent channels into sewage lagoon • Implement Sewage Lagoon Temporary Closure Standard Operating Procedure (SOP) and ensure that all influent channels are closed during temporary closure periods • See Appendix A for Lagoon and Earthen Manure Storage Structure Temporary Closure SOP
• Incinerator	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans	• Determine temporary storage requirements for incinerator • Implement SOP for temporary shut-down and storage of incinerator • See Appendix A for Incinerator Temporary Closure SOP

TEMPORARY CLOSURE PLAN - EUREKA		
Site Component	**Specific Abandonment and Restoration Objective**	**Actions to be taken to achieve Objective**
	during temporary closure periods.	
• Solid Waste Landfill Sites	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.	• Identify all open conduits in and around the contaminated sites • Implement the Standard Operating Procedure (SOP) for temporary closure of the solid waste landfill sites and to ensure that any open conduits (monitoring wells, open pits, etc.) are closed and secure • See Appendix A for Solid Waste Landfill Site Temporary Closure SOP
• Barrels	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.	• Apply general health and safety principles to ensure barrels do not pose a threat

PERMANENT CLOSURE AND RECLAMATION

The following Permanent Closure and Reclamation Plan outlines specific abandonment and restoration objectives and actions to be taken to achieve those objectives for each of the facility components for permanent closure. Actions currently being undertaken to remediate some site components (progressive restoration) are indicated by dates contained within brackets.

PERMANENT CLOSURE AND RECLAMATION PLAN		
Site Component	**Specific Abandonment and Restoration Objective**	**Actions to be taken to achieve Objective**
• Operations & Barracks Buildings • Maintenance garage • Warehouses • Shops & other buildings • Pumphouse • Electrical, plumbing & carpentry facilities • Powerhouse	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods. • To return area to its original state	• Federal Heritage Building Review of following Eureka buildings (2009) o Older Operations Complex (1963) o Old Garage (1963) o Hydrogen Building (1963) o Transient Barracks (1947) o Plumbing Building (1947) o Bunkhouse (1947) o Carpentry Shop (1947) o Greenhouse (1947) o Electrical Storage Building 9 (1947) o CWS Storage Building 19 (1947) o Eureka International (Strip Shack) (1947) • Conduct inventory of contents and building construction materials (2009) • Consult with stakeholders to determine their storage requirements (2009) • Decide which buildings can be declared surplus (2010) • Retain the services of a qualified engineer to produce a Demolition Waste Disposal Plan (2011) • Conduct an Environmental Assessment (2012) • Obtain any necessary approvals [eg. new landfill site(s)] (2013)

PERMANENT CLOSURE AND RECLAMATION PLAN		
Site Component	**Specific Abandonment and Restoration Objective**	**Actions to be taken to achieve Objective**
		• Develop tender documents for the decommissioning of the buildings (2013) • Determine successful candidate to implement Demolition Waste Disposal Plan (2013) • Begin implementation of Demolition Waste Disposal Plan (2014) • Conduct site grading
• Water reservoir • Water diversion area	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods. • To return area to its original state	• Prepare decommissioning plan • Conduct an Environmental Assessment • Conduct site grading
• Contaminated (oil, fuel, chemicals) sites	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods. • To restore in such a fashion as to facilitate the natural use by wildlife	• Site Assessment; listing and geographical extent of contamination based on EA Phase I and Geophysical Study; completed • Reconnaissance Testing Program; performed on all sites identified in EA Phase I Study to confirm nature and extent of contamination and any leachate issues; (2009) • Risk-Based Analysis to determine which specific contaminated sites should be subjected to detailed and systematic testing; (2009) • Detailed Testing Program on specific sites identified in the Risk-Based Analysis to accurately determine nature, extent and rate of movement of contamination; (2010) • Risk-Based Analysis to prioritize sites for remediation; (2010) • Development of a Remediation Plan; (2011)

PERMANENT CLOSURE AND RECLAMATION PLAN		
Site Component	**Specific Abandonment and Restoration Objective**	**Actions to be taken to achieve Objective**
		• Conduct and Environmental Assessment, (2011) • Request for federal funding; 2011 • Begin implementation of Remediation Plan; (2012) • Post Remediation Monitoring (location and frequency based on recommendations flowing from detailed testing program and risk-based analysis)
• Infrastructure (eg. airstrip, electrical power supply systems, culverts, barge landings, sewage lagoon piping, water supply piping and associated infrastructure)	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods. • To recycle and reuse • To restore natural drainage patterns where surface infrastructure has been removed • To restore in such a fashion as to facilitate the natural use by wildlife	• Conduct inventory of materials • Consult with stakeholders to determine their storage requirements • Decide which infrastructure can be declared surplus • Retain the services of a qualified engineer to produce a Demolition Waste Disposal Plan • Conduct an Environmental Assessment • Obtain any necessary approvals [eg. new landfill site(s)] • Develop tender documents for the decommissioning of the infrastructure • Determine successful candidate to implement Demolition Waste Disposal Plan • Begin implementation of Demolition Waste Disposal Plan • Conduct site grading
• Hazardous materials (eg. POL Fluids, PCB containing material, ODS containing equipment, batteries, asbestos; compressed gas cylinders; lead-based	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans	• Conduct inventory of contents materials • Consult with stakeholders to determine their storage requirements • Decide which materials can be declared surplus • Determine waste disposal approach • Obtain any necessary approvals [eg. new landfill site(s)] • Develop tender documents for landfilling/hauling of hazardous waste

PERMANENT CLOSURE AND RECLAMATION PLAN		
Site Component	**Specific Abandonment and Restoration Objective**	**Actions to be taken to achieve Objective**
paint)	during temporary closure periods. • To recycle and reuse	• Determine successful candidate to implement hazardous waste cleanup • Begin implementation
• Sewage lagoon	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods. • To return area to its original state by grading it to match local topography and to facilitate re-vegetation where appropriate	• Conduct options analysis for sewage treatment & disposal at Eureka (2009) • EC decision on preferred option (2009) • If, on the basis of the preceding preferred option, it is decided to: o close the existing lagoon; or o remove the existing sludge, the services of a qualified engineer will be obtained to determine whether the lagoon is/is not highly contaminated and to recommend a remediation option(s) which may include the following: o the lagoon may be backfilled and shaped to blend in with existing contours provided that measures are applied for leachate control; o the sludge may be de-watered (eg. evaporation allowed to take place) and the dried residue removed and disposed of on-site in an engineered land fill; or o the de-watered sludge may be containerized and land filled to preclude contact with the Arctic ecosystem. • Award consultant contract to provide information for drafting the design build performance documents for new sewage treatment system (eg. water/wastewater mass balance report) (2011) • Draft and complete design build performance documents, including sludge treatment plan (2011) • Develop tender documents for the Design-Build contract (2011)

PERMANENT CLOSURE AND RECLAMATION PLAN		
Site Component	**Specific Abandonment and Restoration Objective**	**Actions to be taken to achieve Objective**
		• Close Design-Build contract (2011) • Conduct Environmental Assessment (2011) • Award Design-Build Contract (2012) • Sewage Treatment System constructed at Eureka (2012-2013) • Remediate existing lagoon (2013-2014) • Post monitoring [location of monitoring sites and frequency of monitoring will be based on engineers recommendations (above)]
• Incinerator	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods. • To recycle and reuse	• Removed from the site and re-used
• Solid Waste Landfill Sites	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods. • To return area to its original state	• Site Assessment; listing and geographical extent of contamination based on EA Phase I and Geophysical Study; completed • Reconnaissance Testing Program; performed on all sites identified in EA Phase I Study to confirm nature and extent of contamination and any leachate issues; (2009) • Risk-Based Analysis to determine which specific contaminated sites should be subjected to detailed and systematic testing; (2009) • Detailed Testing Program on specific sites identified in the Risk-Based Analysis to accurately determine nature, extent and rate of movement of contamination; (2010) • Risk-Based Analysis to prioritize sites for remediation; (2010) • Development of a Holistic Remedial Action Plan (RAP); (2011)

PERMANENT CLOSURE AND RECLAMATION PLAN		
Site Component	**Specific Abandonment and Restoration Objective**	**Actions to be taken to achieve Objective**
		• Request for federal funding; 2011 • Implement RAP (free product first, purchase and mobilize any needed equipment – 2 year plan); 2012 • Implement RAP (free product, mobilize any other equipment, begin construction); 2013 • Remediation during summer seasons (2014-2019) • Post Remediation Monitoring (location and frequency based on recommendations flowing from detailed testing program and risk-based analysis);2020
• Barrels	• To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.	• empty barrels will be crushed and disposed in an on-site engineered landfill • filled or partially filled barrels will be inspected and tested if necessary and disposed of appropriately (off-site or incineration). The empty barrels will be rinsed, crushed and disposed on-site in an engineered landfill. The spent rinse liquid will be treated with absorbent material and disposed as hazardous material • buried empty barrels will be inspected to determine if any of the barrels contain material. If the barrels are found to be empty, the area will be stabilized through compaction to crush any corroded barrels. A cover of borrow material will be placed over the area and compacted.

MONITORING OF ON-GOING RESTORATION ACTIVITIES

A monitoring program will be carried out to record the progress of progressive restoration activities. Monitoring activities may include visual inspection to determine if:

- water is ponding on the landfill cover
- the landfill cover is eroding
- frost action is occurring
- the permafrost is developing within the landfill consistent with the design

Monitoring of the contaminated sites will follow a pre-established program and will occur at regular intervals following closure of the site. Contaminated areas that have been excavated will be confirmed clean by field screening methods and samples taken for laboratory confirmation. Once it has been demonstrated that the site is physically and chemically stable, the frequency of monitoring will be reduced. Physical stability will be established as a minimum through visual inspection and may include instrumentation for thermal monitoring. Chemical stability will be confirmed through the collection of suitable samples from around the site.

The details of the pre-established monitoring program (the location of monitoring stations and frequency and duration of monitoring) will be a function of the recommendations of the engineer and will be outlined in subsequent revisions to this document following Detailed Testing Program and the Risk-Based Analyses of the sites (eg. proximity to sensitive receptors) in question.

FINAL LANDSCAPE: SITE GRADING & AESTHETICS

Disturbed areas will be graded and shaped to blend in with the natural contours and to eliminate potential hazards for wildlife, humans accessing the site in the future.

To facilitate physical stability improve the aesthetics of sites subjected to progressive restoration, EC will begin re-vegetation efforts, where appropriate, immediately following such restoration. Consideration will be given to:

- Seeding areas with native seed mixes
- Applying stockpiled soil or growth medium to a depth sufficient to maintain root growth and nutrient requirements
- Incorporation of organic materials based upon local soil assessment
- Establishing temporary or permanent windbreaks
- Transplanting vegetation will be lost to progressive restoration activities
- Placing gravel on sites to discourage vegetation growth where desired.

TREATMENT OF UNACCEPTABLE DISCHARGE FOLLOWING PROGRESSIVE RESTORATION/CLOSURE

In the event that drainage water from any reclaimed facility is not acceptable for discharge, EC would retain the services of a qualified engineer to recommend measures, based on a risk-based analysis, to ensure that human and environmental safety were not jeopardized.

REFERENCES

1. Mine Site Reclamation Guidelines for the Northwest Territories, Indian and Northern Affairs Canada, Yellowknife, NWT, January 2006
2. Abandoned Military Site Remediation Protocol, Indian and Northern Affairs Canada, March 2005
3. Phase I Environmental Site Assessment Eureka High Arctic Weather Station, Eureka, Nunavut, Public Works and Government Services Canada, February 2007
4. Eureka High Arctic Weather Station Geophysical Investigation, Eureka, NU, EBA Engineering Consultants, Edmonton, AB, May 2008
5. Contaminated Sites Remediation Framework, Environment Canada

APPENDIX A: EUREKA WATER LICENCE

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

DECISION

LICENCE NUMBER: 3BC-EUR0611 -Type "B"

This is the decision of the Nunavut Water Board (NWB) with respect to an application for a renewal of Licence dated February 21, 2005 made by:

ENVIRONMENT CANADA

to allow for the use of water, disposal of waste and the handing or storage of petroleum products or hazardous materials for the Eureka Weather Station located within the North Baffin Region, Nunavut (latitude 80°00'N and longitude 85°56'W).

DECISION

After having been satisfied that the application was exempt from the requirement for screening by the Nunavut Impact Review Board in accordance with Schedule 12.1, Paragraph 5 of the *Nunavut Land Claim Agreement* (NLCA), 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 *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 representations made by interested persons, 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*, decided to waive the requirement to hold a public hearing and furthermore to delegate its authority to approve the application to the Chief Administrative Officer pursuant to S. 13.7.5 of the *NLCA* and S. 49(a) of the *NWNSRTA* and determined that:

Licence Number 3BC-EUR0611 -Type "B" be issued subject to the terms and conditions contained therein. (Motion #: 2005-31)

SIGNED this 6th day of February, 2006 at Gjoa Haven, NU.

Philippe di Pizzo
Chief Administrative Officer

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I. INTRODUCTION

On February 21, 2005 a water licence application was filed with the Nunavut Water Board by Public Works and Government Services Canada's Environmental Services group on behalf of Environment Canada, for water use, waste disposal activities and the handing or storage of petroleum products or hazardous materials associated with Environment Canada's Eureka High Arctic Weather Station (HAWS) located within the North Baffin Region, Nunavut (latitude 80°00'N and longitude 85°56'W). After having been satisfied that the application was exempt from the requirement for screening by the Nunavut Impact Review Board in accordance with Schedule 12.1, Paragraph 5 of the *Nunavut Land Claim Agreement (NLCA)*, 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 *NLCA*, public notice of the application was given and interested persons were invited to make representations to the NWB. No public concerns were expressed, and after reviewing the submission of the Applicant and representations made by interested persons, 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*, decided to waive the requirement to hold a public hearing and furthermore to delegate its authority to approve the application to the Chief Administrative Officer pursuant to S.13.7.5 of the *NLCA* and S.49(a) of the *NWNSRTA*.

II. GENERAL CONSIDERATIONS

A. Term of the 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. The Applicant has indicated that the project is ongoing with an unknown completion date. The NWB believes that a term of five years is appropriate. The licence term will allow the Licensee to properly carry out the terms and conditions of the licence and will ensure that sufficient time is given to permit the Licensee to develop, submit and implement the plans, (eg. The Operations and Maintenance Plan), to the satisfaction of the NWB.

B. Annual Report

The requirements imposed on the Licensee in this licence are for the purpose of ensuring that the NWB has an accurate annual update of water use and depositions of waste during a calendar year. This information is maintained on the public registry and is available to any interested parties upon request. The Annual Report shall be submitted by the Licensee as per Part B, Item 2.

C. Water Use

Environment Canada commissioned a study in 1999 to address concerns with respect to the water supply and wastewater disposal systems. The study concluded that the water system has been used to capacity in the past and an increase in water availability was needed. System changes included the use of methods to increase the water availability and water conservation methods within the facilities. Tanks for the storage of potable water were incorporated into the system.

The Facility currently acquires its water from Station Creek, via pump and intake, to the facility storage on a seasonal basis during the summer. The water supply and storage was investigated in July, 1999 and recommendations were provided to the NWB for an alternative method of seasonally obtaining water to replenish the fresh water reservoir. Water is pumped to the reservoir over an approximate one month period and allows for continuous flow within the creek and eliminates the use of the diversion dam method previously used to re-charge the reservoir. The associated potential for degradation of the diversion and silting of the reservoir no longer exists. Potable water for the facility is passed through a reverse osmosis system and chlorinated prior to use for drinking and food preparation

D. Deposit of Waste

i. Sewage

The Eureka HAWS facility is considered a moderate to heavy use facility based on the recommendations of the Northern Remote Site Protocols, 1999, developed for the Nunavut Impact Review Board. The full time residents of the facility are low, below 20, however the year round staffing brings the annual person days above 5,000. Taking this criteria into consideration, the facility is required to meet secondary treatment standards, eliminating the use of pit privies and honey bag systems. The HAWS facility utilizes a single stage sewage lagoon system for treatment. The "Study of the Wastewater and Water Supply Systems at the Eureka Weather Station, 1999" indicated that the effluent from the lagoon is of high quality, although could be improved by the addition of primary cell at the front end of the system and the removal of sludge from the existing storage cell. The concern with the sudden discharge of effluent being released in a matter of hours has been partially addressed through the use of a pump system to the Slidre Fiord over a period of days. The Licensee is encouraged to continue investigation into minimizing the effects of the discharge of effluent by extending the release period and reducing the daily flow volume. Further to the study, in 2003 a sump area was excavated within the existing lagoon to accommodate the pump intake and reduce the amount of sedimentation (Total Suspended Solids) that is released from the lagoon during pumping. Where sewage sludge or solids are removed from the facility for disposal, the Licensee shall dispose of the sludge as approved in the Sludge Disposal Plan required in Part D, Item 9.

ii. Sewage Effluent Quality Parameters

Discharges from the sewage lagoon must comply with the "Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories, 1992", prepared for the N.W.T. Water Board. Limits have been imposed for Biochemical Oxygen Demand (BOD) and Suspended Solids (TSS) and the Licensee must comply with these limits. Monitoring for fecal coliform bacteria has not been included as is indicated in Table 4.1 and Note (g) of the above Guideline, where discharge is into a Bay or Fjord and there is no direct effect upon a fishery or water contact recreation.

The HAWS is a Federal facility and as such, the Licensee is encouraged to achieve the recommendations set out in the Environment Canada document *"An Approach for Assessing and Managing Wastewater Effluent Quality for Federal Facilities - Final Report, June 1, 2000"* prepared for the Federal Committee on Environmental Management Systems / Wastewater Working Group, Environmental Quality Branch, Environment Canada. These guidelines are presented in Table 1 of Document's Appendix A. The Additional monitoring requirements have been included in this Licence to assist in the characterization and evaluation of the effluent quality.

The applicant has indicated in the application that the darkroom facility has been decommissioned and the possibility of discharging silver with the treated sewage effluent has been eliminated. Therefore, the requirement for monitoring and meeting effluent quality for silver has been removed.

iii. Solid Waste

Solid waste is currently disposed of at a facility located within a small valley on the southeast side of the runway, and approximately 1.4 km from Slidre Fiord. The landfill is operated on a "cell by cell" basis. New cells have been identified adjacent to the existing cell that will become operational as existing cells become filled. The Licensee, in the application questionnaire, indicated that a new "Landfill Strategy" has been implemented with the Plan forthcoming. This item is to be addressed through the Facility's Operations and Maintenance Plan complete with a schedule for implementation.

iv. Operations and Maintenance Plan

Licence NWB4EUR9904 was issued with conditions under Part G pertaining to the submission of a Plan for the "Operation and Maintenance of the Sewage and Solid Waste Disposal Facilities" (O&M Plan). This Plan had not been received by the NWB during the Licence term April 1, 1999 through to April 1, 2004. Having been given adequate time in which to submit the Plan, the NWB requests that the Licensee prepare and submit the required Plan as per Part G, Item 1 of this Licence.

The O&M Plan should also address the design specifications for the water and waste facilities, including the operational freeboard requirements for all containment structures. The Application Questionnaire indicated that the design freeboard for the wastewater lagoon was 0.5 metres. The Licensee is required to maintain a minimum freeboard of 1.0 metre, as per Part D, Item 6, unless otherwise recommended by a qualified geotechnical engineer and approved by the Board.

E. Modifications and Construction

The Application's supporting documents indicated that there was construction of new facilities that have taken place during the previous Licence term as well as the presence of a "treatment cell" on site evidenced by the results provided for hydrocarbon analyses. The NWB reminds the Licensee, in accordance with Part F, Item 4, that notification of modifications or construction is required in writing to the Board, should the Licensee propose modifications to the facility.

During the review of the Application, there were a number of discrepancies identified with respect to the water storage capacity, fresh water volumes required for transfer and water consumption of the facility, as well as the treated effluent volume and capacity of the sewage lagoon system. As there are currently no records on file with the NWB and no engineered drawings or plans were submitted with the application, the NWB requests that this information be provided to the Board as per Part F, Item 7.

F. Spill Contingency Planning

The Board generally requires that all Licensees prepare a comprehensive Spill Contingency Plan to establish a state of readiness to ensure a prompt and effective response to possible spills or system failure events.

The fuel storage facility at the Eureka High Arctic Weather Station has a capacity of approximately 1.3 million litres within the fuel tank farm (installed in 1992) and an additional 270,000 litres in three 90,000 litre fuel storage bladders present from the previous fuel storage system. Approximately 550,000 litres of fuel is delivered annually by sealift, typically in early September and delivered to the facility via pipeline from the barge. Other miscellaneous piping services the Facility. Five 9,000 litre Enviro-Safe tanks were purchased to replace the current day tanks located around the site, for emergency and backup use only.

The site-specific spill contingency plan will assist the Licensee in responding to emergencies such that the impacts to water in particular and the environment and public health in general are minimized. The Plan submitted by the Licensee has been approved by the Board, with the requirement that additional information be submitted as an addendum to the approved Plan as per Part H, Item 1 of this license.

G. Abandonment and Restoration (A&R)

To ensure that all facilities are reclaimed in an appropriate manner upon abandonment, the NWB requires Licensees to prepare and submit an Abandonment and Restoration Plan. This requirement applies to the existing and abandoned facilities that are or were operated by the Licensee.

The Abandonment and Restoration Plan for the West Airstrip Landfill was submitted along with the Annual Report for the year 2000, by letter dated October 3, 2001. The Plan has been reviewed and is acceptable to the NWB. The NWB requests that a final report of restoration activities under the Plan be submitted under Part I, Item 7. In the event that additional work remains, an addendum to the Plan is to be submitted that includes a work schedule for completion of the planned restoration.

In addition, the NWB requests that an Interim Abandonment and Restoration Plan be submitted that will conceptually address the final abandonment of the facility. This Plan is to be prepared and submitted to the NWB for approval as per Part I, Item 1 of this Licence.

H. Monitoring Program

The Monitoring Program is established to collect data on water quality to assess the effectiveness of treatment for protection of public health and to assess potential impacts to the environment associated with the waste disposal facilities. Parameters in addition to those that are regulated under Part D are included in the Monitoring Program in order to assist in the characterization and evaluation of treatment and potential impacts to the receiving environment.

LICENCE 3BC-EUR0611 –Type "B"

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

ENVIRONMENT CANADA
(Licensee)

of

9345-49th STREET, EDMONTON, ALBERTA T6B 2L8
for EUREKA WEATHER STATION, EUREKA NU, X0A 0G0
(Mailing Address)

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

Licence Number **3BC-EUR0611 - Type "B"**

Water Management Area **NUNAVUT 04**

Location **EUREKA WEATHER STATION, QIKIQTANI REGION, NUNAVUT**

Purpose **WATER USE, WASTE DISPOSAL AND PETROLEUM STORAGE**

Classification of Undertaking **MUNICIPAL UNDERTAKING – Weather Station**

Quantity of Water Not to Exceed **10,000 CUBIC METRES ANNUALLY**

Date of Licence **FEBRUARY 6, 2006**

Expiry Date of Licence **JANUARY 30, 2011**

Dated this 6th day of February 2006 at Gjoa Haven, NU.

Philippe di Pizzo
Chief Administrative Officer

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PART A: SCOPE, DEFINITIONS AND ENFORCEMENT

1. Scope

This Licence allows for the use of water, the disposal of waste and handing or storage of petroleum products or hazardous materials for an undertaking classified as a Municipal undertaking at the Eureka High Arctic Weather Station, located approximately 425 km north northwest of Grise Fiord, within the Qikiqtani Region, Nunavut (latitude 80°N and longitude 85°56'W);

i. 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;

ii. 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

In this Licence: **3BC-EUR0611 -Type "B"**

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

"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 waters 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;*

"Chief Administrative Officer" means the Executive Director of the Nunavut Water Board;

"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*;

"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;

"Sewage" means all toilet wastes and greywater;

"Sewage Disposal Facilities" means the area comprised of the engineered structures designed to contain and treat sewage and provide controlled release of treated effluent as described in the application submitted February 21, 2005;

"Solid Waste Disposal Facilities" comprises the area and associated structures designed to contain solid, non-hazardous, non-combustible waste as described in the application submitted February 21, 2005;

"Spill Contingency Plan" means a Plan developed to deal with unforeseen petroleum and chemical 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;

"Water Supply Facilities" means the area and associated intake infrastructure at Station Creek, the reservoir, storage tanks and piping as described in the application submitted February 21, 2005;

3. Enforcement

i. 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*;

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

iii. 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 Water use fee is not required in accordance with the Act.

2. Licensee shall file an Annual Report on the appurtenant undertaking with the Board not later than March 31st of the year following the calendar year being reported which shall contain, but not be limited to the following information:

i. A summary report of water use and waste disposal activities;
ii. Tabular summaries of all data generated under the Monitoring Program;
iii. Monthly and annual quantities in cubic metres of fresh water obtained from all sources;
iv. The monthly and annual quantities in cubic metres of each and all waste discharged;
v. A summary of modifications and/or major maintenance work carried out on the Water Supply and Waste Disposal Facilities, including all associated structures and facilities;

vi. A list of unauthorized discharges and a summary of follow-up actions taken;
vii. A summary of any abandonment and restoration work completed during the year and an outline of any work anticipated for the next year;
viii. A summary of all on-site facilities, past, present and proposed for the future, the current use of these facilities and any future plans for remediation and removal of facilities;
ix. A summary of any studies requested by the Board that related to waste disposal, water use or reclamation, and a brief description of any future studies planned;
x. Revisions to Manuals and Plans submitted under the Licence, including the Operations and Maintenance Manual, Spill Contingency Plan and the Abandonment and Restoration Plan; and
xi. Any other details on water use or waste disposal requested by the Board by November 1 of the year being reported.

3. 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.

4. The Licensee shall install flow meters or other such devices, or implement suitable methods required for the measuring of water volumes and wastes discharged, to be operated and maintained to the satisfaction of an Inspector.

5. The Licensee shall have posted the necessary signs, where possible, to identify the stations of the "Monitoring Program" and to inform the public of the location of the Water Supply and Waste Disposal Facilities. All postings shall be located and maintained to the satisfaction of an Inspector.

6. If the Licensee contemplates the renewal of Licence No. 3BC-EUR0611, 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. The NWB recommends that an application for the renewal of Licence No. 3BC-EUR0611 be filed at least three months before the Licence expiry date.

7. If Licence No. 3BC-EUR0611 requires an amendment, a public hearing may be required. 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 may vary depending on the scope of the amendment requested.

8. This Licence is not assignable except as provided in Section 44 of the *Act*.

9. The Licensee shall ensure a copy of this Licence is maintained at the site of operations at

all times. Any communication with respect to this Licence shall be made in writing to the attention of:

(i) **Chief Administrative Officer:**
Executive Director
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0
Telephone: (867) 360-6338
Fax: (867) 360-6369

(ii) **Inspector Contact:**
Water Resources Officer
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0
Telephone: (867) 975-4298
Fax: (867) 979-6445

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

PART C: CONDITIONS APPLYING TO WATER USE

1. The Licensee shall obtain all water for domestic purposes using the Water Supply Facilities, up to a maximum of 10,000 cubic metres annually.

2. The Licensee shall equip all water intake hoses with a screen of an appropriate mesh size to ensure that there is no entrainment of fish and shall withdraw water at a rate such that fish do not become impinged on the screen.

3. The Licensee shall maintain the Water Supply Facilities to the satisfaction of the Inspector.

4. A freeboard of 1.0 metre, or as recommended by a qualified geotechnical engineer and as approved by the Board, shall be maintained at all dykes and earthfill structures associated with the Water Supply Facilities.

5. The Licensee shall not remove any material from below the ordinary high water mark of any water body.

6. The Licensee shall not do anything that will cause erosion to the banks of any body of water and shall provide necessary controls to prevent such erosion.

7. Sediment and erosion control measures shall be implemented prior to and maintained during the operation to prevent entry of sediment into water.

PART D: CONDITIONS APPLYING TO WASTE DISPOSAL

1. The Licensee shall locate areas designated for waste disposal at least thirty (30) metres above the ordinary high water mark of any water body such that the quality, quantity or flow of water is not impaired, unless otherwise authorized by the Board.

2. No open burning of domestic waste is permitted.

3. The Licensee shall incinerate all combustible waste, and shall ensure that all hazardous wastes, waste oil generated through the course of the operation are backhauled and disposed of at an approved waste disposal site.

4. The Licensee shall dispose of and contain all non-combustible solid wastes at the Solid Waste Disposal Facilities or as otherwise approved by the Board.

5. The Licensee shall direct all Sewage to the Sewage Disposal Facilities or as otherwise approved by the Board.

6. All sewage effluent discharged from the Sewage Disposal Facilities at "Monitoring Program" Station Number EUR-3 shall meet the following effluent quality standards:

Parameter	MAC-Maximum Average Concentration (mg/L)
Biochemical Oxygen Demand (BOD_5)	100
Total Suspended Solids (TSS)	120
The waste discharged shall have a pH between 6 and 9, and no visible sheen of oil and grease.	

Reference: Guidelines for the Discharge of Treated Municipal Wastes, 1992; Table 4.1

7. A freeboard of 1.0 metre, or as recommended by a qualified geotechnical engineer and as approved by the Board, shall be maintained at all dykes and earthfill structures associated with the Water Supply Facilities.

8. The Licensee shall advise the Inspector at least ten (10) days prior to initiating decant of the sewage lagoon.

9. The Licensee shall maintain the Sewage Disposal Facilities to the satisfaction of the Inspector and operated in such a manner as to prevent structural failure.

10. Should the Licensee require the removal and disposal of sludge from the Sewage Disposal Facilities, a Sludge Disposal Plan shall be submitted to the Board for approval, at least ninety (90) days prior to commencing the work.

11. If the Plan referred to in Part D, Item 9 is not approved, the Licensee shall make the necessary revisions and resubmit the Plan within sixty (60) days following notification from the Board.

12. The Licensee shall annually review the approved Plan referred to in Part D, Item 9 and if needed, modify the Plan to reflect changes in operation and/or technology. Revisions shall be submitted with the Annual Report as an addendum to the Plan for the approval of the Board in accordance with Part B, Item 2(x).

PART E: CONDITIONS APPLYING TO INFRASTRUCTURES, ACCESS AND OPERATIONS

1. The Licensee shall not erect infrastructure or store material on the surface of frozen streams or lakes except what is for immediate use. All infrastructure shall be located such as to minimize impacts on surface drainage.

2. The Licensee shall not conduct any land based activity within thirty (30) metres of the ordinary high water mark of any water body, unless otherwise approved by the Board.

3. 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.

4. Winter lake and stream crossings, including ice bridges, shall be constructed entirely of water, ice or snow; stream crossings shall be removed or notched prior to spring break-up.

5. With respect to access road, pad construction or other earthworks, the deposition of debris or sediment into any water body is prohibited. These materials shall be disposed of above 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. Prior to construction or modification of any dams, dykes or structures intended to contain, withhold, divert or retain water or wastes, the Licensee shall submit to the Board for approval design drawings stamped by a qualified Engineer.

2. The Licensee may, without written consent from the Board, carry out construction referred to in Part F, Item 1, provided that such construction is consistent with the terms of this License and the following requirements are met:

   i. the Licensee has notified the Board in writing of such proposed construction at least sixty (60) days prior to commencing construction;

   ii. such construction does not place the Licensee in contravention of the License or the *Act*;

   iii. the Board has not, during the sixty (60) days following notification of the proposed construction, informed the Licensee that review of the proposal will require more than sixty (60) days; and

   iv. the Board has not rejected the proposed construction.

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

4. The Licensee may, without written consent from the Board, carry out modifications to the Water Supply Facilities and Waste Disposal Facilities provided that such modifications are consistent with the terms of this License and the following requirements are met:

   i. the Licensee has notified the Board in writing of such proposed modifications at least sixty (60) days prior to beginning the Modifications;

   ii. such Modifications do not place the Licensee in contravention of the License or the *Act*;

   iii. 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

   iv. the Board has not rejected the proposed modifications.

5. Modifications, for which all of the conditions referred to in Part F, Item 4 have not been

met, can be carried out only with written approval from the Board.

6. The Licensee shall provide as-built plans and drawings of the construction and/or modifications referred to in this Part within ninety (90) days of completion of the construction or modification. These plans and drawings shall be stamped by an Engineer.

7. The Licensee shall submit, within six (6) months of issuance of this Licence, historical as-built plans and drawings for the existing Water Supply Facilities, the Sewage Treatment Facilities, the Petroleum, Oil, and Lubricant Storage Facilities.

PART G: CONDITIONS APPLYING TO OPERATION AND MAINTENANCE

1. The Licensee shall, within sixty (60) days of the issuance of this Licence, submit to the Board for approval, an Operation and Maintenance Manual in accordance with the "Guidelines for Preparing an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities", October 1996. The scope of the Plan shall be expanded to include the operation and maintenance of the Water Supply Facilities.

2. If the Plan referred to in Part G, Item 1 is not approved, the Licensee shall make the necessary revisions and resubmit the Manual within sixty (60) days following notification from the Board.

3. The Licensee shall annually review the approved Manual referred to in Part G, Item 1 and if needed, modify the Manual to reflect changes in operation and/or technology. Revisions shall be submitted with the Annual Report as an addendum to the Manual for the approval of the Board in accordance with Part B, Item 2(x).

4. The Licensee shall annually review the approved Operation and Maintenance Plan for the Sewage and Solid Waste Disposal Facilities and modify as necessary to reflect changes in personnel, operations and/or technology. Any proposed modifications shall be submitted to the Board as an addendum to the original plan in accordance with Part B, Item 2(x).

5. The Licensee shall undertake a geotechnical inspection, to be completed within twenty four (24) months of issuance of this Licence, of all facilities that are intended to contain water, fuel or waste, by a qualified geotechnical engineer during the summer. The Geotechnical Engineer's report shall be filed with the NWB within sixty (60) days of completing the inspection and be accompanied by a cover letter from the Licensee outlining an implementation plan to respond to the engineer's recommendations.

PART H: CONDITIONS APPLYING TO SPILL CONTINGENCY PLANNING

1. The Licensee shall, within sixty (60) days of issuance of this licence, submit to the Board an addendum to the approved Spill Contingency Plan that is to include the following:

   i. The preparation date of the Plan, revisions and when the effective period of the Plan should be indicated. An active, expanded Table of Contents with page numbering assists in locating information;

   ii. The main contact name, position and phone number of the overall person in charge at the facility (ie Station Officer in Charge) and the name and contact number for the person responsible (ie Regional Manager, Atmospheric Environment Branch);

   iii. Although it is stated that the Canadian Coast Guard will be responsible for any spills that may occur on water during re-supply, the Plan should include information and responses to spills on land that may enter nearby water bodies (ie Station Creek);

   iv. The Plan requires a topographical map of suitable scale that indicates the components of the site, facility locations (not limited to buildings, water and sewer services, electrical power generation, fuel storage, emergency response equipment and spill kit storage) and surrounding sensitive habitat and surface flow direction to aid in spill management;

   v. Section 6.0 Response Organization and 9.0 Response Activities, appears to indicate that in the case of a larger spill incident, the Government of Nunavut, Department of Sustainable Development would be called to provide the appropriate expertise and assume the lead role in the clean-up efforts with the facility assisting the DSD. This role should be clarified/confirmed;

   vi. Section 9.0 is to be expanded to include spills on land that have the potential to, or become spills into water, as the site is located within close proximity to both inland fresh waters and marine environments. Also, discussion on possible spills resulting from the refueling of equipment or of the many emergency tanks located around the site needs to be addressed;

   vii. Consistency in Section and subsection numbering is required; Section 9.0 does not have a system consistent with the document;

   viii. Section 10.0 to include the notification of the DIAND Water Resources Inspector at (867) 975-4298 following the occurrence of any spill of chemicals, petroleum products or waste associated with the project;

ix. Include Nunavut contact information for Environment Canada, Iqaluit – 867-975-4644; Environment Canada Emergency – 867-920-5131, 24hr pager staffed by EC Emergencies enforcement personnel, DIAND Water Resources Inspector – 867-975-4298. Others include Department of Fisheries and Oceans, Iqaluit; local or Regional health (Environmental Health Officer, Iqaluit – 867-975-4815) and RCMP;

x. Appendix "A" requires spill scenarios that include spills that may occur onto land, snow, ice and water and demonstrate the ability to effectively control, contain and clean-up potential spills associated with the operation of the facility; and

xi. Section 9.0, under Product Knowledge, indicates that the necessary MSDS's are available to the personnel. To complete the Spill Contingency Plan, up-to-date MSDS information for petroleum and chemical products stored on site should be made available in an appendix.

2. If the addendum referred to in Part H, Item 1 is not accepted, the Licensee shall make the necessary changes and resubmit the addendum within thirty (30) days following notification from the Board.

3. The Licensee shall annually review the approved Spill Contingency Plan and modify as necessary to reflect changes in personnel, operations and/or technology. Any proposed modifications shall be submitted to the Board as an addendum to the original plan in accordance with Part B, Item 2(x).

4. The Licensee shall ensure that any chemicals, petroleum products or wastes associated with the project do not enter water. All sumps and fuel caches shall be located a minimum of thirty (30) metres above the ordinary high water mark of any adjacent water body and inspected on a regular basis. The Licensee is encouraged to use some form of secondary containment.

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

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

i. Employ the Spill Contingency Plan;

ii. Report the spill immediately to the 24-Hour Spill Line at (867) 920-8130 and to the DIAND Water Resources Inspector at (867) 975-4298; and

iii. Submit to the DIAND Water Resources Inspector on each occurrence, a detailed

report including the GPS location, no later than thirty (30) days after initially reporting the event.

PART I: CONDITIONS APPLYING TO ABANDONMENT AND RESTORATION

1. The Licensee shall submit to the Board for approval, within nine (9) months of issuance of this Licence, an **Interim Abandonment and Restoration Plan,** which shall include but not be limited to the following:

   a) Specific abandonment and restoration objectives for each site component as follows:

      i. Operations and Barracks Buildings, old and new;

      ii. Maintenance Garage;

      iii. Warehouses;

      iv. Shops and other outbuildings;

      v. Water Diversion areas, water reservoir, pumphouse and associated water storage tank areas and piping;

      vi. Electrical, plumbing and carpentry facilities (storage);

      vii. All petroleum product and chemical storage areas including the main fuel tank farm, fuel bladders, fuel pipelines and associated sea-lift infrastructure;

      viii. Airstrip;

      ix. Any other areas potentially contaminated with hazardous materials including the used battery storage area, fueling stations and smaller fuel storage locations (buildings, emergency etc);

      x. Powerhouse;

      xi. Sewage Lagoon and associated infrastructure and piping;

      xii. Incinerator;

      xiii. Solid Waste landfill sites; major, minor and abandoned; and

xiv. Any other facilities not described above.

b) A description of remediation objectives and measures or actions to be taken to achieve the objectives for each of the facility components.

c) A detailed description of the final desired landscape, with emphasis on the restoration of stream banks and surface drainage over the restored components;

d) A description of the process to be employed for progressive restoration, and the details of restoration scheduling and procedures for coordinating restoration activities with the overall closure sequence;

e) A description of any post-closure treatment potentially required for drainage water that is not acceptable for discharge from any of the reclaimed facility components;

f) A description of the monitoring program to be employed in recording the progress of activities as they relate to on-going restoration needs. Sampling and testing protocols for determining the success of restoration measures undertaken should be documented. The program shall include, but not be limited to, the following;

i. Methods, timing and details respecting the replacement of materials removed due to contamination and general re-contouring of the project area;

ii. Stability of surface drainage channel(s) over reclaimed surfaces;

iii. Monitoring of surface water quality and runoff from the project area under a water management plan; and

iv. Success of applying restoration research results.

g) Details of closure measures proposed in the event of a premature or temporary shutdown at any time during the term of the Licence

h) An explanation of how aesthetic concerns will play a role in restoration;

2. The Licensee shall annually review the approved Plan referred to in Part I, Item 1 and if needed, modify the Plan to reflect changes in operation and/or technology. Revisions shall be submitted with the Annual Report as an addendum to the Plan for the approval of the Board in accordance with per Part B, Item 2(x);

3. At least three (3) years prior to final abandonment, the Licensee shall submit to the Board for approval, a Final Abandonment and Restoration Plan. The Plan shall include in addition to the content of the Interim Plan, but not be limited to the following:

   a) A description of contaminated soils identified at the site through a completed Phase II Environmental Assessment and the procedures to mitigate the contamination;

   b) A summary of existing data for background levels of metals in the area, and identification of needs for verification of data;

   c) A description of restoration activities outlined in the "Interim" Abandonment and Restoration Plan;

   d) An implementation schedule for the completion of restoration; and

   e) A detailed monitoring program.

4. If the Plans referred to in Part I, Item 1 and Part I, Item 3 are not approved by the Board, the Licensee shall revise the individual Plan and resubmit within sixty (60) days following notification from the Board.

5. The Licensee shall implement the Final Abandonment and Restoration Plan as approved by the Board.

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

7. The Licensee shall submit, within nine (9) months of the issuance of this Licence, a Final Report on the Reclamation of the West Airstrip Landfill. This report shall detail the activities that have been completed, an overview of current monitoring, a summary analysis of the results to date and an outline of long term monitoring needs.

8. The Licensee shall endeavor to carry out progressive reclamation for any components of the project no longer required for the Licensee's operations.

9. All disturbed areas shall be stabilized and re-vegetated as required, upon completion of work, and restored to a pre-disturbed state.

10. The Licensee shall notify the Board of its intention to proceed with final abandonment of the undertaking at least six (6) months prior to the planned dates of closure.

PART J: CONDITIONS APPLYING TO THE MONITORING PROGRAM

1. The Licensee shall measure and record, in cubic metres, the daily quantities of water pumped from Station Creek during the annual recharge of the Eureka water reservoir.

2. The Licensee shall measure and record in cubic metres the monthly quantities of water utilized for facility operations, for all purposes.

3. The Licensee shall measure and record in cubic metres the daily quantities of effluent pumped from the Sewage Disposal Facility (Lagoon) during release to the environment.

4. The Licensee shall determine the GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) of all locations where sources of water are utilized for all purposes.

5. The Licensee shall determine the GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) of all locations where wastes associated with camp operations are deposited.

6. The Licensee shall have posted and maintain the necessary signs, where possible, to identify the stations of the "Monitoring Program". All postings shall be located and maintained to the satisfaction of an Inspector.

7. The Licensee shall submit to the Board for approval, within three (3) months of the issuance of this Licence, a Quality Assurance/Quality Control (QA/QC) Plan, based on the principals of the INAC "QA/QC Guidelines for Licensees", that addresses the field and laboratory procedures and requirements needed to carry out the monitoring program.

8. If the Plan referred to in Part J, Item 7 is not approved by the Board, the Licensee shall revise and resubmit the Plan within sixty (60) days following notification from the Board.

9. The Licensee shall annually review the approved QA/QC Plan and modify the Plan as necessary. Proposed changes shall be submitted as an addendum, to be included within the Annual Report as per Part B, Item 2(x).

10. The Licensee shall implement the Plan referred to in Part J, Item 7 as approved by the Board.

11. Sampling and analyses shall be performed as outlined in the requirements of Table No.1, or as otherwise approved by the Board.

12. The Licensee shall submit to the Board within ninety (90) days of issuance of this Licence, a proposal for revisions to the monitoring program outlined in Table 1. The proposal shall address additional monitoring requirements for any on-site facilities, active

or remediated, not listed in Table 1. This proposal will include verification of landfarming hydrocarbon contaminated materials at the facility.

13. 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.

14. All analyses shall be performed in a laboratory approved by the Board.

15. Additional sampling and analysis may be requested by an Inspector.

16. The Licensee shall include all of the data and information required by the "Monitoring Program" in the Licensee's Annual Report, as required per Part B, Item 2.

17. Modifications to the Monitoring Program may be made only upon written approval of the Chief Administrative Officer.

Table No.1 Monitoring Program Stations and Requirements

Station	Description	Analysis Requirements	Frequency	Flow Measurement	Other
EUR-1	Raw Water Supply Prior to Treatment	Not applicable	M	✓	
EUR-2	Runoff from the Solid Waste Disposal Facilities	Suspended Solids; pH and Conductivity; Major Cations; Nutrients; sulphate; O&G; Total Phenols; ; Total Metals; Total Mercury;	F		
EUR-3	Discharge from Sewage Lagoon, prior to entering the ocean	Wastewater; conductivity; Major Cations; Nutrients; Sulphate; O&G; Total Phenols	F2	✓	
		Quantity in cubic metres of sewage solids removed from the sewage disposal facility			

Frequency: M=Monthly; F=During periods of Flow; F2=During periods of Flow near the beginning and end of discharge;

Analytical Parameters

Individual Parameters = pH, Conductivity, Total Suspended Solids; Sulphate
Major Cations = calcium, magnesium, potassium, sodium
Nutrients = Ammonia-Nitrogen, Nitrate/Nitrite, Phosphorus
Total Metals – ICP Metal Scan (minimum 20 element scan to include Arsenic, cadmium, chromium, copper, iron, lead, nickel, zinc),
Total Mercury (minimum detection of 0.2 ppb)
Oil and Grease (O&G)
Phenolic Compounds in Water = Total Phenols
WasteWater = pH, Total Suspended Solids, Biochemical Oxygen Demand

APPENDIX B: EUREKA TEMPORARY CLOSURE SOPs & CHECKLIST

	Standard Operating Procedure	Page: 1 of 4
Environment Canada	Version: 1	Date: Dec. 1, 2010
Location: Eureka	Title: Building Temporary Closure	Prepared by Carl Carroll

1. Purpose

To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.

2. Scope

To notify all relevant stakeholders of the anticipated temporary building closures as well as to give instruction to site personnel for the proper procedures to be undertaken when it is required to temporarily close buildings at the Eureka Facility. These procedures are to include the external and internal building systems, related to all buildings, which need to be addressed in order to close said buildings and maintain an adequate loss control program until such time as the buildings can be re-opened for resumed operations.

3. Authority

The authority for issuing the Temporary building closure will be held by the Station Program Manager (SPM) which is either John MacIver, Rai LeCotey, or Al Gaudet. The intentions of such closure are to be communicated in advance, to all relevant stakeholders including Environment Canada personnel, DND personnel, CANDAC personnel, Nunavut Water Board personnel, Airport Authority personnel, all research organizations occupying Eureka facilities, and all relevant Public Company personnel that use or intend to use the Eureka Facilities.

4. Requirements

Environment Canada will ensure that the following general conditions are met:

- Sufficient staff are on-site to protect the health and safety of humans, wildlife and the environment and the expertise is made available to care for the site and any potential problems that may arise;
- Sufficient and proper equipment and supplies are left on site for any maintenance or reclamation activities that may need to be implemented;
- Access to the site, buildings and other structures will be secured and restricted to authorized personnel only;
- Warning signs continue to be posted where appropriate

5. Procedures

5.1 *Building Exterior*

- Clear roof and wall vents.
- Check the roof for possible damages and repair as necessary.
- Review building additions or new roof equipment that may increase snow drifting during winter months. Areas where snowdrifts are likely to occur include: intersections of low and high roofs; valleys between two peaked roofs; and intersections of roof and roof-mounted equipment. Excessive snowdrifts increase the weight applied to roof structures and may cause collapse.
- Check roof flashings for leaks.
- Check all roof equipment (exhaust and intake fans/vents, antennas, signs, etc.) mounts are secure against damage during heavy winds.
- Check that all windows are properly closed, sealed, and locked.
- Check all building openings to ensure they are weather-tight so that they will not admit cold air that could cause building systems to freeze or allow entry routes for pests.
- Verify the proper functioning of all exterior lighting
- Check the remaining portions of the exterior of the building, securing anything that could blow around in high winds and cause damage.
- Upon completion of temporary building closure procedures, verify that all buildings are secured and locked.

5.2 Building Interior

5.2.1 General

- Maintain an indoor temperature above 5ºC for currently heated buildings
- Ensure circulation of indoor air is sufficient to maintain adequate temperatures near outer walls
- Remove and safely dispose of unnecessary combustible refuse material
- Remove flammable residues from work areas (ie. Hoods, ducts, ovens, floors, etc.)
- Have all flammable liquids and products properly sealed and stored in appropriate flammable storage cabinets
- Ensure passageways are clear of obstacles and/or debris
- Ensure there is an 18 inch clear space between sprinklers and structural members and storage materials where applicable(pay particular attention in storage areas)
- Ensure that fire doors are unblocked and operating freely
- Remove accumulated dust from overhead piping, machinery etc. where necessary in order to minimize fire hazards

5.2.2 Heating Equipment

- Inspect heating coils, unit heater, air-handling units, and space heaters for proper operation (see EOC Mechanical Preventative Maintenance Packages for details)
- Store combustibles safely away from heating equipment
- Inspect and test safety shutoff valves and cut-off switches on combustion equipment
- Ensure there is an adequate supply of fuel for heating equipment. Fill up above ground storage tanks when/where necessary.
- Inspect heat generation equipment (ie. Generators, stand-by boiler etc.), heat transfer systems, pumps, piping (external Utilidor and internal building), and related safety controls for proper operation (see EOC Mechanical Preventative Maintenance Packages for details)

5.2.3 Mechanical Equipment

- For water cooled equipment, provide adequate heat, locate in heated enclosure, or provide the proper antifreeze solution
- Remove low points and dead ends from piping where possible; other-wise elevate low points and provide drain valves
- Drain all unnecessary pipes and toilets. S-traps and toilet bowl can be filled with plumber's antifreeze to prevent possible freezing.
- Check pressure vessel vents, relief valves, and safety valves to assure that moving parts are protected from water accumulation or freezing of vapour.
- If water is to be shut off to a particular building, shut off the switch to the pump, drain water from all the faucets and from the pump itself, turn off any hot water heater(s) and drain tanks.
- Provide heat tracing and insulation on water-filled instrumentation and control lines, and inspect this equipment.
- Drain and close all exposed water pipes and valves that would be susceptible to freezing.
- Inspect all Water Tanks and supporting equipment for proper operation and absence of leakages. (See PM work package M15100A for specific details)
- Hydraulic power equipment (ie. vehicle lifts etc.) are to be cleaned, drained of oil, and locked out as required

5.2.4 Electrical Equipment

- Ensure lights are clear of combustible materials
- Ensure that all temporary wiring has been removed
- Disconnect and lock-out all unnecessary circuits at main switchboards
- Ensure power is available for emergency systems
- Ensure that unnecessary transformers have been de-energized
- Ensure that dirt and grease have been cleaned from equipment that is necessary to remain operating

5.2.5 Life Safety Equipment

- Inspect and maintain all fire suppression and life safety systems in proper operating order (see Life Safety Systems preventative maintenance packages for details)
- For sprinklered buildings where heat will or cannot be maintained at or above 5ºC;
    - Close all affected sprinkler valves and all fire-pump water valves
    - Drain fire-pump motor jacket(s), sprinklers, domestic water pipes, instrument pipes, boilers, toilet water closets, heaters, and coolers
    - Close domestic water valves and water valve to equipment lines
    - Heat trace (with electric wire) pipes that cannot be drained
    - As soon as sufficient building heat is restored, reactivate fire protection systems
- Check that portable fire extinguishers located in areas subject to freezing are suitable for such locations.
- Drain all fixed eyewash stations and store all portable stations accordingly

5.2.6 Special Equipment

- Verify that proper storage for equipment requiring special protection such as computers, micro-processors, delicate electronics, etc., have been provided
- Verify that all unnecessary mobile equipment for facilities support has been locked and stored appropriately (drain fuel tanks, remove batteries, secure ignition keys, etc.)

5.3 Monitoring

- Implement a regular monitoring program that includes the visual inspection of all exterior and interior building areas for items requiring attention and are to include but not limited to;
    - Ensure the building exits are not impeded and the doors are operating properly
    - The entryways are clear of ice/debris and are safe (no tripping hazards).
    - That the building is secure, no doors open and left unattended
    - That security lights are working - yard and building fixtures
    - That the building hallways are not impeded and that there are no tripping hazards.
    - That there are no obvious building items that pose a hazard i.e. light lenses loose, ceiling tiles loose, broken electrical switches or receptacles, broken glass/windows, etc.
    - Verification of alarm panel and life safety systems to ensure no trouble alarms have been activated

- All findings and observations noted during these monitoring rounds will be assessed and the appropriate group/individual will be contacted for appropriate action if necessary. Actions taken to address deficiencies are to be noted in a log book. Pages are to be consecutively numbered, and the date shown at the top of the page. Pages are not to be removed, and pages are not to include more than one day's activity.

Approval

Name, Title of Authority date

Name, Title of Authority date

Name, Title of Authority date

	Standard Operating Procedure	Page: 1 of 3
Environment Canada	Version: 1	Date: Dec. 1, 2010
Location: Eureka	Title: Lagoon and Earthen Manure Storage Structures Temporary Closure	Prepared by Carl Carroll

6. Purpose

To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.

7. Scope

To notify all relevant stakeholders of the anticipated temporary Lagoon and Earthen Manure Storage Structure closures as well as to give instruction to site personnel for the proper procedures to be undertaken when it is required to temporarily close such structures at the Eureka Facility. These procedures are to include the necessary measures required to be undertaken to temporarily close said structures and maintain an adequate monitoring program until such time as the structures can be re-opened for resumed operations.

8. Authority

The authority for issuing the temporary closure will be held by the Station Program Manager (SPM) which is either John MacIver, Rai LeCotey, or Al Gaudet. The intentions of such closure are to be communicated in advance, to all relevant stakeholders including Environment Canada personnel, DND personnel, CANDAC personnel, Nunavut Water Board personnel, Airport Authority personnel, all research organizations occupying Eureka facilities, and all relevant Public Company personnel that use or intend to use the Eureka Facilities.

9. Requirements

Environment Canada will ensure that the following general conditions are met:

- Sufficient staff are on-site to protect the health and safety of humans, wildlife and the environment and the expertise is made available to care for the site and any potential problems that may arise;
- Sufficient and proper equipment and supplies are left on site for any maintenance or reclamation activities that may need to be implemented;
- Access to the site, buildings and other structures will be secured and restricted to authorized personnel only;
- Warning signs continue to be posted where appropriate

10. Procedures

10.1 *Initial inspections*

- Identify all possible source of runoff that may be directed toward the lagoon.
- Inspect lagoon containment wall conditions and identify possible weak points where seepage could possibly occur
- Identify all possible entry points to lagoons
- Sample and analyze contents of lagoons to use as baseline indicator
- Identify current lagoon levels and amount of freeboard
- Record all findings

5.2 Closure Period

5.2.1 Summer closure period (when lagoons may be discharged and/or refilled)

- Divert possible surface water runoff away from lagoons where necessary.
- Erect and Maintain fences and post warning signs around lagoons and uncovered structures
- Reinforce containment structure walls with the addition of soil and/or compaction with heavy machinery where necessary
- For the Sewage lagoon;
    - perform yearly drainage and testing of effluent according to yearly procedures outlined in the SUMMARY OF OPERATIONS AND MAINTENANCE PROCEDURES FOR DRINKING WATER, SEWAGE, SOLID WASTE DISPOSAL AND WASTE TREATMENT FACILITIES
    - Monitor and maintain the appropriate freeboard levels for the sewage lagoon.
- For the Water Lagoon;
    - Pump water from lagoon in order to fill the domestic water holding tanks to ensure availability of water required upon re-opening of facilities.
    - Refill water lagoon to capacity as per the procedures outlined in the SUMMARY OF OPERATIONS AND MAINTENANCE PROCEDURES FOR DRINKING WATER, SEWAGE, SOLID WASTE DISPOSAL AND WASTE TREATMENT FACILITIES.
    - Monitor and maintain the appropriate freeboard levels for the Water Lagoon
- Repair where necessary, and maintain, all pumping and piping infrastructure related to Lagoons

5.2.2 Other Than Summer Closure Period (no discharge/refill possible)

- Divert possible surface water runoff away from lagoons where necessary.
- Erect and Maintain fences and post warning signs around lagoons and uncovered structures
- Reinforce containment structure walls with the addition of soil and/or compaction with heavy machinery where necessary (if not already frozen)
- Monitor and maintain the appropriate freeboard levels for the Lagoons
- Maintain water source opening at Water Lagoon to ensure access to water upon re-opening of facility
- Repair where necessary, and maintain, all pumping and piping infrastructure related to Lagoons

6. Monitoring

Implement a regular monitoring program that includes the visual inspection of all lagoon areas, surface water runoff areas, and drainage areas that may require attention.
This monitoring program can be included with that of other Temporary Closure SOPs if these closures occur simultaneously.
As a general rule, all findings and observations noted during these monitoring rounds will be assessed and the appropriate group/individual will be contacted for appropriate action if necessary. Actions taken to address deficiencies are to be noted in a log book. Pages are to be consecutively numbered, and the date shown at the top of the page. Pages are not to be removed, and pages are not to include more than one day's activity.

Approval

Name, Title of Authority date

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Name, Title of Authority date

	Standard Operating Procedure	Page: 1 of 3
Environment Canada	Version: 1	Date: Dec. 1, 2010
Location: Eureka	Title: Contaminated Sites Temporary Closure	Prepared by Carl Carroll

11. Purpose

To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.

12. Scope

To notify all relevant stakeholders of the anticipated temporary closure of the contaminated sites area as well as to give instruction to site personnel for the proper procedures to be undertaken when it is required to temporarily close this area at the Eureka Facility.

13. Authority

The authority for issuing the temporary closure will be held by the Station Program Manager (SPM) which is either John MacIver, Rai LeCotey or Al Gaudet. The intentions of such closure are to be communicated in advance, to all relevant stakeholders including Environment Canada personnel, DND personnel, CANDAC personnel, Nunavut Water Board personnel, Airport Authority personnel, all research organizations occupying Eureka facilities, and all relevant Public Company personnel that use or intend to use the Eureka Facilities.

14. Requirements

Environment Canada will ensure that the following general conditions are met:

- Sufficient staff are on-site to protect the health and safety of humans, wildlife and the environment and the expertise is made available to care for the site and any potential problems that may arise;
- Sufficient and proper equipment and supplies are left on site for any maintenance or reclamation activities that may need to be implemented;
- Access to the site, buildings and other structures will be secured and restricted to authorized personnel only;
- Warning signs continue to be posted where appropriate

15. Procedures

15.1 *Initial inspections*

- Identify all possible source of runoff that may be directed toward and/or away from the contaminated site areas.
- Inspect contaminated site areas perimeter fencing and warning signs, where applicable, for needed repairs.
- Identify all possible entry points to the contaminated site areas and cordon off where applicable.
- Identify, sample and analyze any leachate to use as baseline indicator
- Identify current conditions, photograph and record all findings

5.2 Temporary Closure Period

- Divert possible surface water runoff away from contaminated site areas where necessary.
- Erect and Maintain fences and post warning signs around contaminated site areas wherever possible
- Provide weighted cover materials for monitoring pits/wells surrounding contaminated site areas
- Where possible, apply additional layer of soil in order to cap contaminated surface soil in order to protect wildlife from contact exposure

6. Monitoring

- Implement a regular monitoring program that includes the visual inspection of all contaminated site areas and related confinement infrastructure, surface water runoff areas, and drainage ditches that may require attention.
- For extended periods of temporary closure, it may be necessary to resample, analyse, and record groundwater and/or surface water, where applicable, in order to identify any changes in function of the established confinement and control measure for the contaminated site areas.
- As a general rule, all findings and observations noted during these monitoring rounds will be assessed and the appropriate group/individual will be contacted for appropriate action if necessary. Actions taken to address deficiencies are to be noted in a log book. Pages are to be consecutively numbered, and the date shown at the top of the page. Pages are not to be removed, and pages are not to include more than one day's activity.

Approval

Name, Title of Authority date

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Name, Title of Authority date

	Standard Operating Procedure	Page: 1 of 4
Environment Canada	Version: 1	Date: Dec. 1, 2010
Location: Eureka	Title: Facility Infrastructure Temporary Closure	Prepared by Carl Carroll

16. Purpose

To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.

17. Scope

To notify all relevant stakeholders of the anticipated temporary closure at the Eureka Facility and to give instruction to site personnel for the proper procedures to be undertaken for the temporary closure of the related infrastructure until such time as the facility re-opens for operations.

18. Authority

The authority for issuing the temporary closure will be held by the Station Program Manager (SPM) which is either John MacIver, Rai LeCotey or Al Gaudet. The intentions of such closure are to be communicated in advance, to all relevant stakeholders including Environment Canada personnel, DND personnel, CANDAC personnel, Nunavut Water Board personnel, Airport Authority personnel, all research organizations occupying Eureka facilities, and all relevant Public Company personnel that use or intend to use the Eureka Facilities.

19. Requirements

Environment Canada will ensure that the following general conditions are met:

- Sufficient staff are on-site to protect the health and safety of humans, wildlife and the environment and the expertise is made available to care for the site and any potential problems that may arise;
- Sufficient and proper equipment and supplies are left on site for any maintenance or reclamation activities that may need to be implemented;
- Access to the site, buildings and other structures will be secured and restricted to authorized personnel only;
- Warning signs continue to be posted where appropriate

20. Procedures

20.1 *Pre-closure*

- Identify all non-essential infrastructure that requires temporary shutdown due to changes in operating conditions or circumstances
- Maintain all essential infrastructure in order to support remaining on-site staff required during the temporary closure period

5.2 Temporary Closure Period

5.2.1 Essential Roads

- Perform regularly scheduled surface reshaping or repair
- Perform regularly scheduled ditch and culvert cleaning, repair
- Perform regular snow thaw road check and repair when necessary
- Perform storm damage and pollution control structure check and repair
- Perform seasonal check of signs and notices

5.2.2 Non-Essential Roads

- Pre and post thaw season channel crossing and ditch maintenance prior to closure when applicable
- Storm damage and pollution control structure check and repair prior to temporary closure when applicable
- Perform surface reshaping or repair as necessary prior to temporary closure when applicable
- Periodic check of closure controls and signs where applicable prior to and during temporary closure period where applicable

5.2.3 Airstrip

- Perform surface reshaping or repair as necessary prior to closure
- Perform regular snow thaw checks and repair when necessary prior to closure
- Final inspection of runway lighting and correction of deficiencies when/where necessary prior to temporary closure
- De-energize power supply to runway lighting when not in use (other than essential or emergency use in support of on-site personnel during temporary closure period)
- Periodic check of closure controls and signs where applicable prior to and during temporary closure period when/where applicable

5.2.4 Electrical Power Supply

- Maintain essential power supply systems during temporary closure period (generators, essential electrical distribution lines, life safety systems, fuel pumping supply systems, Utilidor and heat transfer systems, etc)
- De-energize non-essential power supply systems and related transformers

5.2.5 Heat Transfer Systems

- Maintain essential heat transfer system (powerhouse) and utilidor supply to essential buildings during temporary closure period

- Shut off supply of heat supply piping to non-essential buildings, when/where applicable, during temporary closure period

5.2.6 Water Supply and Distribution System

- Maintain potable water distribution system in support of on-site staff during temporary closure period
- Maintain waste distribution system in support of on-site staff during temporary closure period

5.2.7 Barge landing area

- Storm damage and pollution control structure check and repair prior to temporary closure when applicable (ensure fuel transfer spill receptacle at shore pipeline connection is covered and secured)
- Perform surface reshaping or repair as necessary prior to temporary closure where applicable
- Periodic check of closure controls and signs where applicable prior to and during temporary closure period where applicable

5.2.8 Fuel Delivery systems

- Shut down fuel delivery systems/piping to non-essential buildings when/where applicable during temporary closure period
- Maintain fuel delivery systems to essential buildings and infrastructure that support on-site staff during temporary closure period
- Perform regularly scheduled inspections/verifications of the fuel tank farm, related fuel delivery piping & systems, and above ground storage tanks as per operations guidelines

6. Monitoring

- Implement a regular monitoring program that includes the visual inspection of the essential and non-essential infrastructure systems for integrity as well as the fuel delivery systems
- Report any spills immediately to the Nunavut Report line at (867) 920-8130
- As a general rule, all findings and observations noted during these monitoring rounds will be assessed and the appropriate group/individual will be contacted for appropriate action if necessary. Actions taken to address deficiencies are to be noted in a log book. Pages are to be consecutively numbered, and the date shown at the top of the page. Pages are not to be removed, and pages are not to include more than one day's activity.

Approval

Name, Title of Authority date

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Name, Title of Authority date

	Standard Operating Procedure	Page: 1 of 3
Environment Canada	Version: 1	Date: Dec. 1, 2010
Location: Eureka	Title: Temporary Storage Plan for Hazardous Materials	Prepared by Carl Carroll

21. Purpose

To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.

22. Scope

To notify all relevant stakeholders of the anticipated temporary closure at the Eureka Facility and to give instruction to site personnel for the proper procedures to be undertaken for the temporary storage of hazardous materials until such time as the facility re-opens for operations.

23. Authority

The authority for issuing the temporary closure will be held by the Station Program Manager (SPM) which is either John MacIver, Rai LeCotey, or Al Gaudet. The intentions of such closure are to be communicated in advance, to all relevant stakeholders including Environment Canada personnel, DND personnel, CANDAC personnel, Nunavut Water Board personnel, Airport Authority personnel, all research organizations occupying Eureka facilities, and all relevant Public Company personnel that use or intend to use the Eureka Facilities.

24. Requirements

Environment Canada will ensure that the following general conditions are met:

- Sufficient staff are on-site to protect the health and safety of humans, wildlife and the environment and the expertise is made available to care for the site and any potential problems that may arise;
- Sufficient and proper equipment and supplies are left on site for any maintenance or reclamation activities that may need to be implemented;
- Access to the site, buildings and other structures will be secured and restricted to authorized personnel only;
- Warning signs continue to be posted where appropriate

25. Procedures

25.1 *Initial inspections*

- Identify all possible sources and current site storage locations of hazardous materials including but not limited to small compounds near the tank farm, surrounding the DND warehouse, garages, and the Hydrogen Building.
- Identify possible locations to safely and centrally locate various types/classifications of hazardous materials for temporary storage
- Identify any requirements necessary to secure access to hazardous materials (lock buildings, storage cabinets, fence off outdoor areas etc.)

5.2 Temporary Closure Period

- When possible, package and ship off site any used and unwanted hazardous materials to appropriate disposal sites in order to reduce on site hazardous material inventory during temporary closure periods
- Ensure that all hazardous materials as sealed and stored in appropriate containers designed for such purposes
- Ensure the storage of hazardous materials according to the following guidelines:
    - Compatibility of wastes is respected (do not store together)
        - Acids & cyanides
        - Flammable/combustibles and oxidizers
        - Strong acids & strong alkalies
        - Acids & water
        - Solvents & corrosives
        - Flammable liquids & ignition sources
    - Segregation – wastes should be segregated based on final disposal options
    - Ventilation – Highly volatile organic hazards can present serious health risk. Waste should be stored outside in sheds which provide free air movement.
    - Climate/Environment – consideration must be given to freezing temperatures and precipitation when storing wastes.
- Erect and Maintain fences, where necessary, and post warning signs around outdoor hazardous material storage areas.
- Provide the appropriate WHMIS documentation at the storage site locations
- Provide the appropriate secondary containment and spill response kits for storage areas
- Ensure appropriate fire prevention measures are in place for the storage areas
- Ensure leak detection programs are in place for storage tanks
- Ensure chemical transport and storage procedures meet compliance standards outlined in the Canada Labour Code, Canadian Environmental Protection Act, National Building Code, National Fire Code of Canada, Transportation of Dangerous Goods Act, and The Government of Nunavut Environmental Protection Act, Territorial and Lands Act, and all other applicable statutes, regulations, standards, guidelines, and local by-laws.

6. Monitoring

- Implement a regular monitoring program that includes the visual inspection of the hazardous material storage areas and storage tank locations
- Report any spills immediately to the Nunavut Report line at (867) 920-8130
- As a general rule, all findings and observations noted during these monitoring rounds will be assessed and the appropriate group/individual will be contacted for appropriate action if necessary. Actions taken to address deficiencies are to be noted in a log book. Pages are to be consecutively numbered, and the date shown at the top of the page. Pages are not to be removed, and pages are not to include more than one day's activity.

Approval

Name, Title of Authority date

Name, Title of Authority date

Name, Title of Authority date

	Standard Operating Procedure	Page: 1 of 3
Environment Canada	Version: 1	Date: Dec. 1, 2010
Location: Eureka	Title: Solid Waste Landfill Site Temporary Closure	Prepared by Carl Carroll

26. Purpose

To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.

27. Scope

To notify all relevant stakeholders of the anticipated temporary closure of the solid waste landfill sites areas as well as to give instruction to site personnel for the proper procedures to be undertaken when it is required to temporarily close this area at the Eureka Facility.

28. Authority

The authority for issuing the temporary closure will be held by the Station Program Manager (SPM) which is either John MacIver, Rai LeCotey, or Al Gaudet. The intentions of such closure are to be communicated in advance, to all relevant stakeholders including Environment Canada personnel, DND personnel, CANDAC personnel, Nunavut Water Board personnel, Airport Authority personnel, all research organizations occupying Eureka facilities, and all relevant Public Company personnel that use or intend to use the Eureka Facilities.

29. Requirements

Environment Canada will ensure that the following general conditions are met:

- Sufficient staff are on-site to protect the health and safety of humans, wildlife and the environment and the expertise is made available to care for the site and any potential problems that may arise;
- Sufficient and proper equipment and supplies are left on site for any maintenance or reclamation activities that may need to be implemented;
- Access to the site, buildings and other structures will be secured and restricted to authorized personnel only;
- Warning signs continue to be posted where appropriate

30. Procedures

30.1 *Initial inspections*

- Identify all possible source of runoff that may be directed toward and/or away from the solid waste landfill site areas.
- Inspect solid waste landfill site areas and perimeter to identify capping requirements
- Identify all monitoring wells/pits for the solid waste landfill areas.
- Identify, sample and analyze leachate, if any, to use as baseline indicator
- Identify current conditions, photograph and record all findings

5.2 Temporary Closure Period

- Divert possible surface water runoff away from solid waste landfill site areas where necessary.
- Erect and Maintain fences and post warning signs around solid waste landfill monitoring wells/pits where applicable
- Provide weighted cover materials for monitoring pits/wells surrounding contaminated site areas
- Where possible, apply additional layer of soil in order to adequately cap solid waste landfill areas in order to protect wildlife from contact exposure and/or windblown debris

6. Monitoring

- Implement a regular monitoring program that includes the visual inspection of the solid waste landfill areas and related confinement infrastructure for monitoring wells/pits, surface water runoff areas, and drainage ditches that may require attention.
- For extended periods of temporary closure, it may be necessary to resample, analyse, and record groundwater and/or surface water, where applicable, in order to identify any changes in function of the established confinement and control measure for the solid waste landfill site areas.
- As a general rule, all findings and observations noted during these monitoring rounds will be assessed and the appropriate group/individual will be contacted for appropriate action if necessary. Actions taken to address deficiencies are to be noted in a log book. Pages are to be consecutively numbered, and the date shown at the top of the page. Pages are not to be removed, and pages are not to include more than one day's activity.

Approval

Name, Title of Authority date

Name, Title of Authority date

Name, Title of Authority date

	Standard Operating Procedure	Page: 1 of 3
Environment Canada	Version: 1	Date: Dec. 1, 2010
Location: Eureka	Title: Incinerator Temporary Closure	Prepared by Carl Carroll

31. Purpose

To ensure that this component of the Eureka site does not become a source of contamination or a safety hazard to wildlife and humans during temporary closure periods.

32. Scope

To notify all relevant stakeholders of the anticipated temporary closure at the Eureka Facility and to give instruction to site personnel for the proper procedures to be undertaken for the temporary closure of the incinerator until such time as the facility re-opens for operations.

33. Authority

The authority for issuing the temporary closure will be held by the Station Program Manager (SPM) which is either John MacIver, Rai LeCotey, or Al Gaudet. The intentions of such closure are to be communicated in advance, to all relevant stakeholders including Environment Canada personnel, DND personnel, CANDAC personnel, Nunavut Water Board personnel, Airport Authority personnel, all research organizations occupying Eureka facilities, and all relevant Public Company personnel that use or intend to use the Eureka Facilities.

34. Requirements

Environment Canada will ensure that the following general conditions are met:

- Sufficient staff are on-site to protect the health and safety of humans, wildlife and the environment and the expertise is made available to care for the site and any potential problems that may arise;
- Sufficient and proper equipment and supplies are left on site for any maintenance or reclamation activities that may need to be implemented;
- Access to the site, buildings and other structures will be secured and restricted to authorized personnel only;
- Warning signs continue to be posted where appropriate

35. Procedures

35.1 *Pre-closure*

- Identify and collect all possible sources of organic non-hazardous waste materials that require incineration prior to facility temporary closure.
- Incinerate all remaining wastes
- Allow the incinerator to cool sufficiently (approximately 6-8 hours) and dispose of ash accordingly

5.2 Temporary Closure Period

- Perform Routine incinerator shutdown inspection and maintenance including:
  - Lock out and tag out power to equipment as required
  - Check fuel lines for leaks and check connections
  - Close both fuel line shutoff valves (near tank and near burner)
  - Drain lines, inspect and change filter if necessary
  - Check spark arrestor to ensure no plugging
  - Inspect refractory for large cracks (not expansion cracks)
  - Check combustion air hole for plugging
  - Inspect door gaskets for damages
  - Inspect condition of chimney
- If applicable (pending timing of temporary closure with yearly maintenance crew arrival), have annual service performed by professional Technician as indicated in Westland Environmental Services Inc. Operations and Maintenance manual. (see burner section page 13)
- Disconnect and lock out power to incinerator
- Perform general interior cleaning of building as required
- Secure incinerator and ensure access is available only to authorized personnel for periodical monitoring

6. Monitoring

- Implement a regular monitoring program that includes the visual inspection of the interior and exterior of the incinerator building envelope for integrity as well as the associated above ground fuel storage tank and fuel lines.
- Report any spills immediately to the Nunavut Report line at (867) 920-8130
- As a general rule, all findings and observations noted during these monitoring rounds will be assessed and the appropriate group/individual will be contacted for appropriate action if necessary. Actions taken to address deficiencies are to be noted in a log book. Pages are to be consecutively numbered, and the date shown at the top of the page. Pages are not to be removed, and pages are not to include more than one day's activity.

Approval

Name, Title of Authority date

Name, Title of Authority date

Name, Title of Authority date

Monthly Temporary Closure Inspection Checklist

Property Management Division, District 3, Eureka

Facility: _____

Month: **Inspected by:**

- **READ CHECKLIST BEFORE VISUAL INSPECTION**
- **ALWAYS TAKE PICTURES OF THE DAMAGES OR THE ISSUE**
- **REPAIR AND DOCUMENT IN D3 FACILITY FILE**

	Y or N	Comments
Building Conditions		
Is the interior of the buildings in good order? Verify building hallways are not impeded and that there are no obvious building items that pose a hazard or are in need or repairs (check piping and critical systems in all areas) Ensure alarm panel and life safety systems & security lights are working properly etc.	☐ Yes ☐ No	
Is the exterior of the buildings in good order? Verify building entrance areas are not impeded, exterior doors are operating properly, and that there are no obvious building items that pose a hazard or are in need or repairs. Ensure exterior security lights are working etc.	☐ Yes ☐ No	
Has building been secured upon completion of inspection (door entrances locked, window coverings still in place, etc) ?	☐ Yes ☐ No	
Lagoon Conditions		
Is there any evidence of damage to or seepage from lagoon walls, record freeboard levels? (runoff diverted away from lagoons?)	☐ Yes ☐ No **Freeboard _____**	

Is the area clear of debris, fencing in good condition, is signage in place?	☐ Yes ☐ No	
Contaminated Site Conditions		
Is runoff diverted away from contaminated sites? Is the area secured? (check that area is clear of debris, fencing is in good condition, signage in place)	☐ Yes ☐ No	
Are all monitoring wells and pits covered and secured?	☐ Yes ☐ No	
Are drainage areas and ditches free of runoff and/or leachate? (If leachate present, photograph area, resample and have analyzed, record results)	☐ Yes ☐ No	
Facility Infrastructure Conditions		
Are essential roads, ditches, and signage in satisfactory condition? (clear & grade roads as required, clear ditches)	☐ Yes ☐ No	
Are non-essential roads, ditches, and signage in satisfactory condition? (verify that signage is still in place, note non-essential road deficiencies do be addressed upon re-opening of operations)	☐ Yes ☐ No	
Is the Airstrip and runway lighting in good condition? (clear & grade as required in event runway is temporarily required, turn on runway lighting and check for deficient lights & replace)	☐ Yes ☐ No	
Is the power supply and distribution system in good condition? (Perform inspections of generators, fuel supply, and related distribution systems)	☐ Yes ☐ No	
Is the heat supply and distribution system in good condition? (Inspect generators, heat exchangers, pumps, related piping)	☐ Yes ☐ No	

Is the water supply and distribution system in good condition? (Inspect water lagoon intake, storage tanks, filtration/chlorination/U.V. systems, and related external building and internal building related piping)	☐ Yes ☐ No	
Has weekly and monthly fuel supply and transfer systems been performed?	☐ Yes ☐ No	
Solid Waste Landfill Conditions		
Is runoff diverted away from landfill areas? Is the area secured and well capped? (check that area is clear of debris, fencing is in good condition, signage in place)	☐ Yes ☐ No	
Are all monitoring wells and pits covered and secured?	☐ Yes ☐ No	
Are drainage areas and ditches free of runoff and/or leachate? (If leachate present, photograph area, resample and have analyzed, record results)	☐ Yes ☐ No	
Hazardous Materials Storage Areas		
Are hazardous material storage areas in good conditions? (visual inspection for leaks, unusual odors, damage containers etc)	☐ Yes ☐ No	
Are spill kits, personal protective equipment, and WHMIS documentation easily accessible and fully stocked?	☐ Yes ☐ No	
Incinerator Building		
Is the Incinerator in good condition? (Verify interior for fuel leaks, interior/exterior envelope for integrity, entrances are cleared, exterior fuel supply/piping free of leaks etc.)	☐ Yes ☐ No	