Defence Construction Canada
Construction de Défense Canada

Abandonment and Restoration Plan
Battery and Barrel Dumps
CFS Eureka (ERK), Nunavut

In support of the
Nunavut Water Board Licence
No. 8BC-ERK1621

April 22, 2011
Version 1.0
Revised August 2021

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

Prepared by:
Defence Construction Canada

Canada

Revision Control Page

Revision No.	Revised By	Date	Issue/Revision Description
1.0	Defence Construction Canada	April 2011	Draft
2.0	Department of National Defence	August 2021	Update Water Licence Title and references.

Table of Contents

LIST OF FIGURES

ACRONYMS

CFS	Canadian Forces Station
DND	Department of National Defence
EC	Environment Canada
ERK	Eureka
Eureka	CFS Eureka
HAWS	High Arctic Weather Station
NWB	Nunavut Water Board
O&M	Operation and Maintenance
PHC	Petroleum Hydrocarbon
PPE	Personal Protective Equipment
QA	Quality Assurance
QC	Quality Control
SNP	Surveillance Network Program

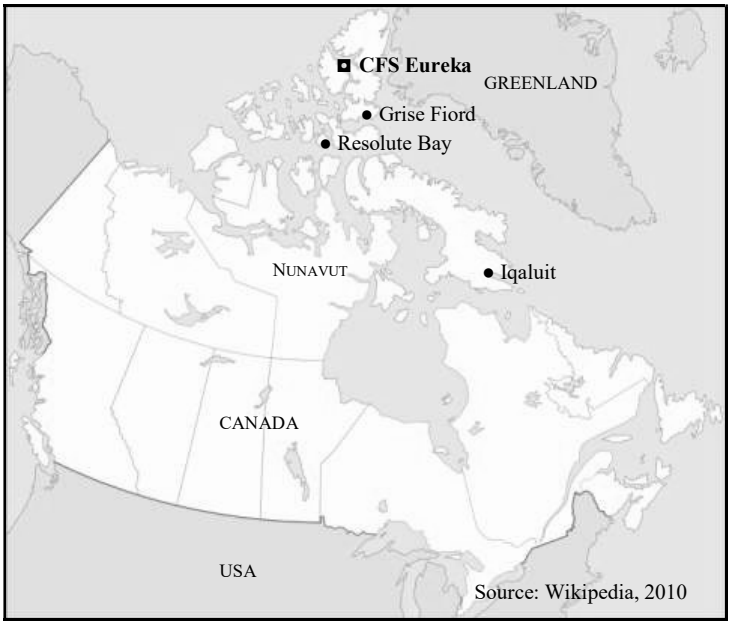
1. INTRODUCTION

1.1. Purpose of an Abandonment and Reclamation Plan

This document was prepared in response to the requirements of the Nunavut Water Board (NWB) for the submission of an Abandonment and Restoration (A&R) Plan, under Licence number 3BC-ERK1015, issued to the Department of National Defence (DND) on June 18, 2010. This plan has since been updated under Licence 8BC-ERK1621 in anticipation of a new water licence. This Plan has been prepared in the spirit of the *Mine Site Reclamation Guidelines for the Northwest Territories*, published in January 2007.

1.2. History of Site

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



1.3. Location of Waste Facilities addressed in this Plan

This Abandonment and Restoration Plan is focussed on two waste facilities located at CFS Eureka, specifically the Barrel Dump (79° 59' 42.29"N, 85° 49' 34.99W) and the Battery Dump (79° 59' 43.8"N, 85° 45' 31.8W). Please refer to Figure 1 for the location of these waste facilities, labelled ERK-4 (Battery Dump) and ERK-5 (Barrel Dump). Refer to Figure 1, Site Overview and Sampling Locations.

1.4. Historical Function of Waste Facilities

The Battery Dump was historically used to dispose of batteries from the High Arctic Data Communications System relay towers (between CFS Alert and CFS Eureka), and batteries from commercial vehicles used on the site. The practice of disposing batteries at this site was discontinued before 2007. All used batteries are now currently backhauled to CFB Trenton and disposed.

The Barrel Dump was historically used to dispose of crushed and flattened 45-gallon drums. The practice was discontinued before 2007. The barrels that were buried in this area contained aviation fuel that was used by the Department of National Defence (DND), the Polar Continental Shelf Project (PCSP), Bradley Air and Kenn Borek Air.

2. ABANDONMENT AND RESTORATION PLAN

2.1. Reclamation Goal

The overall goal of the eventual station closure, remediation and reclamation will be to return the CFS Eureka site to a viable, self-sustaining ecosystem to the extent possible, and preventing the release of physical debris and contaminants into the environment.

2.2. Statement of Reclamation Objectives

The specific objectives for the Battery and Barrel Dumps, prior to the full Station closure, are to minimize and/or prevent the migration of contaminants outside of the existing boundaries of facilities.

2.3. Current Condition

The site conditions at CFS Eureka, and those of the two former waste facilities in particular, have characteristics that minimize the risk of groundwater contamination. The terrain is relatively flat, precipitation is low, and the average depth to permafrost is approximately 80 cm. Soils are generally gravelly and underlain by silty and clayey soils.

The Battery Dump is approximately 34m x 20 m and is located at the east end of the airstrip. The batteries were buried in a layer approximately 70 cm thick, and the area has been capped with approximately 30 cm of clay soil. The Battery Dump has been completely backfilled and is

no longer used. Presently there is no visual evidence of the dump; however a sign is posted identifying it as the *Department of National Defence Battery Disposal Area*.

The Barrel Dump is approximately 30m x 20m, and is located at south-west side of the airstrip. The facility, which contains empty crushed barrels, has been capped with approximately 10 cm of clay soil.

2.4. Assessment of Temporary Closure

2.4.1. Risks to Containment

2.4.1.1. Rainfall during summer months

Rainfall through contaminated soils can potentially result in leaching of contaminants out of the soils to the surrounding area. This risk is considered low due to the fact that the climate at CFS Eureka is considered a polar desert (average annual precipitation being less than 6mm per month). Furthermore, the areas where the two facilities are located are fairly flat, and both have been capped with a layer of clay-enriched soil.

2.4.1.2. Spring melt

The annual spring melt in some areas can potentially result in significant volumes of water flowing over an area, leading to leaching of contaminants out of the soils into the surrounding area via overland flow. This risk is considered low at CFS Eureka due to relatively low annual snowfall (polar desert) and the flat topography.

2.4.1.3. Wind

Areas of open deposition and high winds can result in aerial distribution of fine to medium grained contaminated soil particles. This risk is considered low at the battery and barrel facilities at CFS Eureka due to the fact that both have been capped with clay-enriched soils.

2.4.1.4. Continued deposition

Continued deposition or uncontrolled deposition of material could create conditions that could result in contamination. This risk is considered low at CFS Eureka at both facilities. Deposition ceased prior to 2007, and both areas have been backfilled and capped.

2.4.2. Monitoring Activities and Plan

2.4.2.1. Previous Monitoring Activities

Battery Dump

Identified as Site S-150 on ECONET as a Federal Contaminated Site, subsurface soil sampling and analysis of samples in and around the Battery Dump was conducted during the CFS Eureka contaminated sites characterization campaigns of 2006/2007 and 2007/2008. The results from the soil sampling campaigns indicated no

compounds and metals exceeded the CCME (Canadian Council of Ministers of the Environment) guideline criteria, and there were no leaching or migration of the battery content occurring. Therefore no remediation action was triggered, unless new information based on continual monitoring indicates otherwise.

Barrel Dump
Identified as Site S-10525 on ECONET as a Federal Contaminated Site, subsurface soil sampling at the permafrost and analysis of samples in and down gradient to the Barrel Dump area was conducted during the CFS Eureka contaminated sites characterization campaigns of 2006/2007 and 2007/2008. The results from the soil sampling campaigns indicated no compounds and metals were over the CCME guideline criteria, and there were no leaching or migration of the barrel contents occurring. Therefore no remediation action was triggered, unless new information based on continual monitoring indicates otherwise.

2.4.2.2. Planned Monitoring Activities

The Eureka Monitoring Program is scheduled to commence in June 2011 as the station is only seasonally active. The Surveillance Network Program (SNP) at Eureka includes the following monitoring stations:

Station No.	Monitoring Station	Monitor	Frequency of Sampling
ERK-4	Runoff / leachate from the Battery Dump	Quality	Monthly during periods of runoff or seepage
ERK-5	Runoff / leachate from the Barrel Dump	Quality	Monthly during periods of runoff or seepage

Sampling procedures for the leachate are provided in the QA/QC Plan (refer to Appendix E). Sampling stations have been identified to monitor contaminants in the leachate from the former facilities. Results are to be reported annually to the NWB in the Annual Report.

2.4.2.3. Emergency Response Plan

In the event that the monitoring program identifies contamination above CCME guidelines and/or background concentrations outside the boundaries of the two facilities, additional monitoring will take place to either confirm the initial finding, and/or to determine the direction and rate of movement of the contamination. A risk assessment will be conducted at that time to determine the best course of action, which may include but is not limited to excavation, containment systems, or interception ditches.

3. FINAL CLOSURE PLANS

3.1. Abandonment and Restoration Plan (Also known as Final CRP)

In the event the decision is made to close the station, a Final Abandonment and Restoration Plan (referred to as Final Closure and Reclamation Plan – Final CRP) will be prepared and submitted to the NWB for approval 6 months prior to the abandonment of the station.

In general, during the active remediation phase of the site, to be conducted following closure, existing facilities no longer required will be demolished. Demolition wastes will be segregated into hazardous and non-hazardous materials and disposed of appropriately. Any contaminated soils identified during the preceding field investigations will be excavated and properly disposed of in on-site engineered landfill(s) (to be designed and constructed in the future prior to any plans for the closure of the station). All soils characterized as hazardous will be shipped off-site if feasible and where non-hazardous wastes will be directed to the on-site engineered landfill. Scattered surface debris and partially buried debris will be collected and disposed of. Existing landfills at the site will be remediated as required. A detailed work program will be submitted at least 6 months prior to the stations eventual closure.

Following the closure and remediation, a completion report and performance assessment will be provided in the timeframe provided by the Final CRP.

4. REFERENCES

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

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

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

Nunavut Water Board (NWB). *NWB Licence No. 8BC-ERK1621*. November 25, 2016.

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

(Source: Wikipedia, 2010)

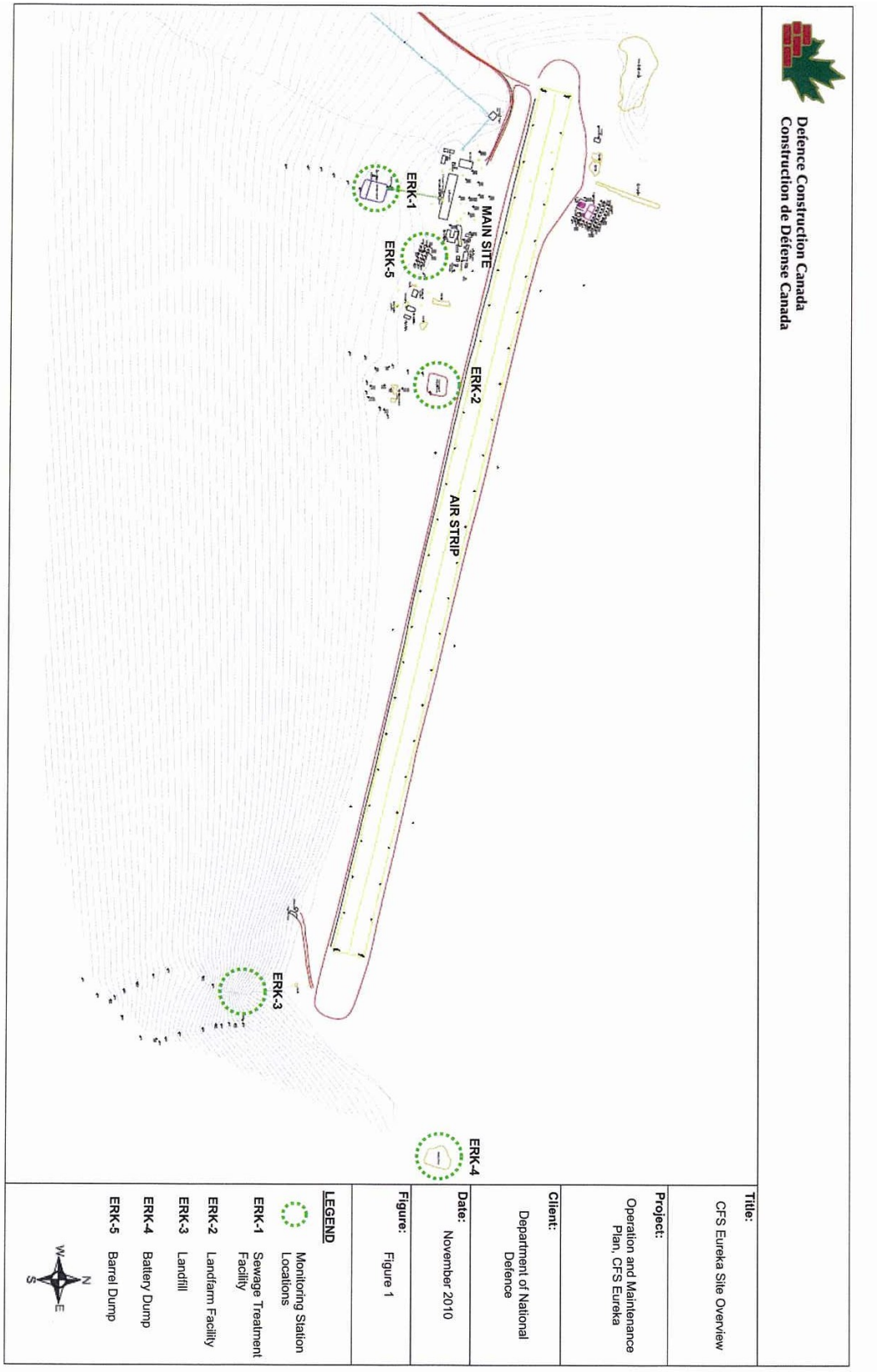


Figure 1. CFS Eureka Site Overview and Sampling Locations