




Clyde River Small Craft Harbour Development

Regulatory Compliance and Environmental Management Plan

Final Report



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Contents

Chapter 1 Introduction	1
1.1 Background	1
1.2 Purpose	1
Chapter 2 Legislative Framework	2
2.1 Land Use and Ownership	2
2.2 Permits and Approvals	2
Chapter 3 EMP Roles and Responsibilities	3
3.1 DFO Management Responsibilities	3
3.2 Canadrill-CBCL Responsibilities	3
3.3 Environmental Training and Orientation	3
3.4 Distribution List	4
Chapter 4 Project Description	5
4.1 Project Activities	5
4.2 Project Schedule	5
4.3 Project Personnel and Equipment	5
Chapter 5 Baseline Site Conditions	7
5.1 Onshore Harbour Area	7
5.2 Intertidal Harbour Area	7
5.3 Subtidal Harbour Area	7
5.1 Species at Risk and Species of Conservation Concern	8
Chapter 6 Potential Environmental Effects	10
6.1 Disturbance or Injury Due to Underwater Sound	10
6.2 Sediment and Water Quality	10
6.3 Fish Mortality	11
6.4 Alteration and Destruction of Fish Habitat	11
6.5 Waste Generation	11
6.6 Risk of Spills and Environmental Pollution	11
6.7 Disruption of Traditional Use	11
Chapter 7 Environmental Management	12

7.1	Guidelines and Best Management Practices.....	12
7.2	Mitigation and Protection Measures.....	12
7.2.1	General	12
7.2.2	Fish and Fish Habitat	12
7.2.3	Wildlife Mitigation and Management Plan.....	13
7.2.4	Water Quality Management.....	13
7.2.5	Air Quality Control	14
7.2.6	Fueling and Hazardous Material Storage, Handling, and Spill Prevention	14
7.2.7	Waste Management Plan	15
7.2.8	Disruption of Traditional Use.....	15
7.3	Spill Response Plan.....	16
7.4	Emergency Contacts.....	16
7.5	Monitoring and Communication	17
7.5.1	Monitoring.....	17
7.5.2	Reporting and Record Keeping.....	18
	References.....	19

Tables

Table 2.1:	Permit and approval requirements.....	2
Table 3.1:	Project EMP Distribution List	4
Table 5.1:	SAR/SoCC with the potential to occur in the Project Area (Source: Advisian, 2020)	8
Table 7.1:	Emergency Contact List	16

Appendices

- A NewZan Material Safety Data Sheet
- B NT-NU Spill Form

Chapter 1 Introduction

1.1 Background

Canadrill-CBCL Joint Venture (Canadrill-CBCL) has been retained by Public Services and Procurement Canada (PSPC) to design a new Fisheries and Oceans Canada (DFO) small craft harbour (SCH) in Clyde River, Nunavut. To support the design, on behalf of DFO-SCH, Canadrill-CBCL is undertaking a geotechnical investigation and environmental assessment field program (the Project) in March/April 2021 to assess areas of interest in the onshore and nearshore harbour area in Clyde River.

1.2 Purpose

This document describes the environmental management plan (EMP) that is being executed for the Project, so that it is completed in accordance with legislative requirements and in a safe and an environmentally responsible manner. DFO is committed to adhering to systems, procedures, practices and materials that provide the necessary framework required to establish that the Project is undertaken in a manner that protects the environment and facilitates the safety of all who work at the site.

The purpose of an EMP is to describe the environmental protection requirements and mitigation measures that will be adhered to on a project site and to provide a framework for the development and implementation of safe and environmentally responsible practices to reduce environmental effects associated with a project. The overall objective of this EMP is to provide a strategy for compliance with relevant environmental legislation, policies, and the requirements outlined in permits and approvals.

This document describes the environmental management procedures that will be executed during the Project. Specifically, this EMP includes the following:

- Legislative Framework (Chapter 2)
- EMP Roles and Responsibilities (Chapter 3)
- Project Activities and Schedule (Chapter 4)
- Baseline Site Conditions (Chapter 5)
- Potential Environmental Effects (Chapter 6)
- Environmental Management (Chapter 7)

Chapter 2 Legislative Framework

2.1 Land Use and Ownership

Land use and ownership play an important role in the regulatory requirements and authorities relevant to the Project. The field program will be carried out in the Qikiqtaaluk Region, in the North Baffin Planning Region. The land in the location where the field program will be carried out is on the shore and seabed of Patricia Bay. The seabed is federal Crown land under the administration and control of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC). The shore is territorial Crown land (Commissioner's land) under the administration and control of the Nunavut Department of Community and Government Services. The administration and control of these properties is currently in the process of being transferred from the Government of Nunavut and CIRNAC to DFO.

2.2 Permits and Approvals

A list of permits and approvals required for the proposed geotechnical program are identified in Table 2.1. Further information on these regulatory requirements, authorities and overarching legislation is provided in sections 2.3 to 2.5.

Table 2.1: Permit and approval requirements

Permit / Licence / Authorization	Regulatory Authority	Associated Project Component/Activity
Scientific Research License 02 061 20R-M	Nunavut Research Institute (NRI)	Required for scientific data collection (geotechnical and environmental sampling)
Land Use Review & Conformity Determination 149159	Nunavut Planning Commission (NPC)	Required to carry out project in planning region (North Baffin Planning Region)
Screening Decision (File No. 19YN031)	Nunavut Impact Review Board (NIRB)	Required for geotechnical drilling in nearshore or offshore areas of the harbour
Class A Land Use Permit	CIRNAC	Required for equipment use and drilling on federal Crown land (i.e., Patricia Bay below the high water mark)
Land Use Permit	Government of Nunavut (GN)	Required for equipment use and drilling on Commissioner's land (i.e., onshore above the high water mark)

Chapter 3 EMP Roles and Responsibilities

3.1 DFO Management Responsibilities

As the proponent of the Project, DFO is ultimately responsible for the management and implementation of the EMP; however, all Project personnel will share the responsibility of conducting Project activities in accordance with this EMP and agreed upon standards and protocols. DFO is committed to the following environmental principles:

- The protection of the environment is the responsibility of each individual involved with the undertaking
- All activities undertaken by DFO and its representatives will be executed in compliance with applicable environmental laws and regulations

3.2 Canadrill-CBCL Responsibilities

Canadrill-CBCL is responsible for compliance with all requirements described in this document prior to the start of any work. Canadrill-CBCL is responsible for adherence to the EMP and site-specific details on the specific mitigation measures, processes, procedures and contingency planning that will be implemented in this EMP. Canadrill-CBCL is responsible for the Project site and the provision of environmental protection in accordance with the requirements the Project EMP, Project specifications, and in accordance with applicable regulatory requirements.

Canadrill-CBCL will assign the role of Environmental Monitor to onsite staff during the Project. The Environmental Monitor will be in direct charge of the onsite work and will have overall responsibility for the environmental management and the onsite implementation of the EMP for the Project. The Environmental Monitor will monitor compliance with relevant regulations, authorizations and approvals. The Environmental Monitor will be available to address environmental concerns including equipment inspections and monitoring, and to maintain onsite environmental protection measures.

3.3 Environmental Training and Orientation

Environmental training and orientation will be mandatory for staff to be employed onsite. Canadrill-CBCL will provide a mandatory environmental training and orientation session for onsite personnel prior to the start of work. Topics to be discussed include but are not limited to an overview of environmental risks and mitigation, accidental spill response, waste management, and contingency plans.

In general, training and orientation include a review of the EMP, Project conditions of approval, applicable environmental legislation, and standard practices and procedures.

3.4 Distribution List

Copies of this document will be distributed to the individuals listed in Table 3.1. These individuals will receive revised copies of this document, as available. The distribution list will be updated to reflect the addition or deletion of individuals and/or the issuing of revised documents.

Table 3.1: Project EMP Distribution List

Name	Organization	Position
Eleanor McEwan	DFO	Senior Project Engineer
Kenton Thiessen	PSPC	Project Manager, PSPC
Jeremy Fraser	CIRNAC	Land Administrator Specialist
Jason Smith	Canadrill	Project Manager, Canadrill
Lee Fougere	Canadrill	Environmental Monitor, Canadrill
Kevin Bezanson	CBCL	Project Manager, CBCL
Natasha Corrin	CBCL	Project Coordinator, CBCL

Chapter 4 Project Description

4.1 Project Activities

The geotechnical investigation and environmental assessment sampling will be carried out using a diamond rotary drill mobilized specifically for the Project. Boreholes will be located onshore and nearshore in the vicinity of the proposed SCH. Each nearshore borehole will be advanced to 12 to 20 metres (m) below the ground surface or 3 m into bedrock. Nearshore drilling will be conducted atop the established ice-sheet in the harbour. An ice specialist will be consulted as required to determine whether ice thicknesses and working procedures are in accordance with best practices and carried out safely at all times while drilling the near-shore borehole locations. The onshore boreholes will be advanced to a depth of approximately 2 m to characterize soil in the active layer (above permafrost) and install monitoring wells in two of the boreholes.

The diamond rotary drilling will occur from within a heated shack setup onsite over each borehole location. The drill will be capable of performing standard penetration tests and bedrock coring. The drill and drill shack will be mounted on skids and dragged to each of the drill locations using a front-end loader, which will also be used to move the drill set-up to and from each borehole location.

4.2 Project Schedule

The field program is scheduled to be carried out over approximately 15 days in March-April 2021. Completion of the field program is dependent on suitable weather conditions with sufficient ice thickness to support personnel and equipment to drill through the ice in the nearshore area. The field program will include 24-hour drilling operations and will be supervised by an engineer on a full-time basis (two 12-hour shifts for efficiency). It is anticipated that the program will include nine days of 24-hour diamond drilling nearshore at 18 boreholes (Figure 2.1).

4.3 Project Personnel and Equipment

The field team for the geotechnical and environmental assessment program will consist of approximately 11 field personnel. The team will consist of personnel from Canadrill-CBCL along with local support. The following equipment and materials will be used and stored on-site during the field program:

- Central Mine Equipment (CME) 55 Drill Rig on skids
- Portable drill shack
- Front-end loader
- Diesel power generators

- Herman nelson diesel fired heaters
- Diesel fuel waterline coil heaters
- Diesel fuel (approximately 200 litres)
- Propane (2 x 100 lb cylinders)
- NewZan D Viscosifier Drill Additive

Marine water will be pumped from the harbour and used for the geotechnical drilling program. It is estimated between 6,000 to 10,000 gallons of marine water will be extracted per day from Patricia Bay at or near the borehole location and will be recycled back to the bay.

Chapter 5 Baseline Site Conditions

The geotechnical investigation is set to occur along the onshore and nearshore areas of the existing harbour in Clyde River. The borehole locations are located in the intertidal marine beach area, as well as the shallow subtidal marine foreshore of Patricia Bay. The baseline site conditions in these areas are described in the following subsections.

5.1 Onshore Harbour Area

The onshore harbour area is part of the terrestrial environment and consists of a relatively flat, compacted sand parking area for the existing community sealift and boat launch. The parking area also functions as a temporary storage and stockpiling location for equipment, building supplies, and shipping containers. Terrestrial fauna observed during field surveys in the parking area consisted of common Arctic bird species (seagulls, ravens, etc.) which temporarily occupied the area while foraging. Terrestrial mammals likely migrate through the open parking area; however, they were not observed during field surveys. Terrestrial mammals and birds are not anticipated to be present in the area at the time of the survey. Terrestrial flora is absent from the area.

5.2 Intertidal Harbour Area

The intertidal shoreline is part of the marine environment and primarily consists of a shallow sloped sandy beach with occasional patches of mixed gravel, cobble, and boulders in the Project area. The upper and mid-intertidal zones consist primarily of coarse sand and limited algal wrack, whereas substrate in the lower intertidal and shallow subtidal areas are coarse sand with patches and narrow bands of gravel, cobble and boulder. A low boulder wall runs parallel to shore along the beach from west to east through the lower intertidal zone. Infrastructure constructed in the intertidal shoreline is limited and consists of the existing community sealift and boat launch, as a small sheltered area for landing boats. Marine flora and fauna are largely absent from the intertidal and foreshore harbour area during the winter period.

5.3 Subtidal Harbour Area

Benthic substrate in the subtidal Project area is generally flat with little relief and primarily consisted of sand with small, patchy clusters of gravel, cobble and boulders in the area. Boulders are also present in a low wall running parallel to shore through the lower intertidal / shallow subtidal zone. Clusters of boulders provide a limited amount of hard substrate for the recruitment and attachment of flora and fauna in the area. Limited infrastructure exists in the subtidal area. The existing community sealift and boat launch

extend into the subtidal harbour area, and a small sheltered area for anchoring / tying up boats is located adjacent to the east side of the community sealift.

The shallow nearshore area is also likely within the ice scour zone, therefore flora and motile fauna are anticipated to be largely absent from the area. Infauna, such as the truncate softshell clam (*Mya truncata*), may be present below the surface of fine sediment in the subtidal portion of the harbour.

5.1 Species at Risk and Species of Conservation Concern

Species listed as Threatened, Endangered, or Extirpated under Schedule 1 of the *Species at Risk Act* (SARA) are considered federally protected species at risk (SAR). Those not listed under Schedule 1 of SARA, but which are designated by COSEWIC or listed as S3 or higher in Nunavut, are considered species of conservation concern (SoCC).

Threatened or Endangered species may occur within the Project area, but were not identified during field studies conducted in 2019 or 2020 (Advisian, 2020; CBCL, 2020b). A list of wildlife, marine and migratory birds, marine fish, and marine mammals that may occur in the SCH, and their likelihood of occurrence, were identified as part of the SCH feasibility study produced by Advisian (2020) and are outlined in Table 5.1, along with their likelihood of occurrence during the March/April field program.

Table 5.1: SAR/SoCC with the potential to occur in the Project Area (Source: Advisian, 2020)

Species Name	Scientific Name	COSEWIC	SARA	Nunavut Rank ¹	Likelihood of Occurrence in March / April
Migratory Birds					
Buff-breasted Sandpiper	<i>Calidris subruficollis</i>	Special Concern	Special Concern	S3	Unlikely
Ivory Gull	<i>Pagophila eburnean</i>	Endangered	Endangered	S1	Unlikely
Peregrine Falcon	<i>Falco peregrinus</i>	Not at Risk	Special Concern	S4	Unlikely
Red Knot rufa subspecies	<i>Calidris canutus rufa</i>	Endangered	Endangered	S2	Unlikely
Red-necked Phalarope	<i>Phalaropus lobatus</i>	Special Concern	Special Concern	S3	Unlikely
Ross's Gull	<i>Rhodostethia rosea</i>	Threatened	Threatened	S1	Unlikely

Species Name	Scientific Name	COSEWIC	SARA	Nunavut Rank ¹	Likelihood of Occurrence in March / April
Marine Fish					
Lumpfish	<i>Cyclopterus lumpus</i>	Threatened	No Status (under consideration)	NR	Unlikely
Northern Wolffish	<i>Anarhichas denticulatus</i>	Threatened	Threatened	NR	Unlikely
Spotted Wolffish	<i>Anarhichas minor</i>	Threatened	Threatened	NR	Unlikely
Thorny Skate	<i>Amblyraja radiata</i>	Special Concern	No Status (under consideration)	NR	Unlikely
Marine Mammals					
Atlantic Walrus (Central/Low Arctic population)	<i>Odobenus rosmarus</i>	Special Concern	No Status (under consideration)	S3	Unlikely (present during open water season)
Beluga Whale (Eastern High Arctic/Baffin Bay population)	<i>Delphinapterus leucas</i>	Special Concern	No Status	NR	Unlikely (present during open water season)
Bowhead Whale (Eastern Canada-West Greenland population)	<i>Balaena mysticetus</i>	Special Concern	No Status (under consideration)	NR	Unlikely (present during open water season)
Killer Whale (Northwest Atlantic/Eastern Arctic population)	<i>Orcinus orca</i>	Special Concern	No Status (under consideration)	NR	Unlikely (present during open water season)
Narwhal	<i>Monodon monoceros</i>	Special Concern	No Status	NR	Unlikely (present during open water season)
Polar Bear	<i>Ursus maritimus</i>	Special Concern	Special Concern	S3	Possible (observed year-round)

¹ Nunavut Territorial Rank: S1=critically imperilled, S2=imperilled, S3=Vulnerable, S4=apparently secure, NR = not ranked

Chapter 6 Potential Environmental Effects

6.1 Disturbance or Injury Due to Underwater Sound

The use of an underwater borehole drill has the potential to temporarily increase underwater sound levels in the harbour for the duration of the Project. Underwater noise generated by geotechnical drilling can temporarily increase the risk of injury and behavioural changes in fish. Impacts to fish are generally short in duration, and related to temporary hearing loss in the immediate vicinity of the drill, and behavioural changes. Behavioural changes include area avoidance, reduced foraging success, altered predator-prey interactions, increased concentrations of stress hormones, and decreased growth rates (Wenger et al. 2017).

Sculpin are the most likely fish species to be present in the area during the drilling program. Sculpin do not have swim bladders and are less likely to be affected than species that have swim bladders for hearing, such as Arctic Char (Scott and Scott, 1988). If present, sculpin are anticipated to relocate to other available habitats in the harbour area for the duration of the field program. Arctic char, an important species to the community, are not expected to be present in the area during the winter when the field program will be carried out. Arctic char migrate from freshwater to marine water for a relatively short foraging period (approximately 20 to 45 days), beginning in mid-July when the harbour ice breaks and ending by September (Advisian, 2020). As the harbour will be frozen at the time of the field program, there is little risk to Arctic char, since they will be overwintering in freshwater.

Underwater noise generated by the borehole drill is not expected to reach levels that are likely to disturb marine mammals. Further, the Project is being carried out in late winter when the harbour is ice-covered, therefore air breathing marine mammals are not expected to be present in the vicinity of the drill.

6.2 Sediment and Water Quality

Borehole drilling has the potential to temporarily resuspend a minute quantity of marine sediment into the water column near the borehole, which could potentially affect water quality and temporarily increase suspended sediment near the boreholes during the Project. Marine water will be pumped into the borehole and later returned to the harbour, and contains a moderate quantity of suspended sediment. Temporary impacts associated with increased levels of suspended sediments in the water column may include decreased visibility, avoidance of the Project Area, gill abrasion and potential stress increases, and accidental mortality (Cairns, 2002).

Suspended sediment has the potential to contain contaminants; however, none of the sediment collected and analyzed from the harbour as part of the 2019 and 2020 field programs had concentrations that exceeded the Canadian Council of Ministers of the Environment (CCME) probable effect levels (PEL) for marine sediment (Advisian, 2020; CBCL, 2020a; CCME, 2014).

6.3 Fish Mortality

Fish could be drawn into water intakes while pumping water from Patricia Bay for use during drilling. Fish mortality in the harbour may temporarily increase during the Project if fish that become impinged on water intake screens or entrained in the water pumping system. Motile species are expected to temporarily relocate to other areas in the harbour and nearby suitable habitats. These species are expected to return to the Project area soon after completion of the Project.

6.4 Alteration and Destruction of Fish Habitat

Disruption of fish habitat can occur through direct alteration of the seabed, increased turbidity, or accidental spills. The alteration of the seabed due to borehole drilling is temporary and limited to the small area occupied by each borehole. A low magnitude increase in suspended sediment will be temporary and limited to the area surrounding each in-water borehole.

6.5 Waste Generation

No waste materials are anticipated to be generated during the geotechnical drilling program. However, if drill cuttings are generated during the program, excess cuttings will be returned to the borehole. Waste materials are otherwise limited to packaging materials and domestic waste, which will be appropriately sorted and bagged on-site, and disposed of at the Clyde River municipal waste disposal facility.

6.6 Risk of Spills and Environmental Pollution

Hazardous materials such as diesel fuel, oil, and lubricants are common on geotechnical worksites as part of the operation and maintenance of drilling equipment. Proper transportation, storage, and handling of these materials must conform to territorial regulations and guidelines. Suppliers of these materials have recommendations for the appropriate transportation, storage, and handling of these materials, and these will be used in conjunction with best management practices.

6.7 Disruption of Traditional Use

Traditional use of the Project area is not anticipated to be affected during the completion of the Project.

Chapter 7 Environmental Management

7.1 Guidelines and Best Management Practices

Applicable guidelines and Best Management Practices (BMPs) for the Environmental Management Plan include, but are not limited to, the following:

- Northern Land Use Guidelines (Indigenous and Northern Affairs Canada, 2011)
- Contingency Planning and Spill Reporting in Nunavut. A Guide to the Regulations. (Government of Nunavut, n.d.)
- Workplace Hazardous Materials Information System (WHMIS) (Health Canada, 2015)
- A Best Practices Guide to Solid Waste Reduction (Canadian Construction Association, 2001)
- Guidelines for Spill Contingency Planning (Indigenous and Northern Affairs Canada, 2007)
- Environmental Guideline for the General Management of Hazardous Waste (Government of Nunavut, 2010)
- National Oil Spill Preparedness and Response Regime (Transport Canada, 2019)
- Interim code of practice: end-of-pipe fish protection screens for small water intakes in freshwater (DFO, 2020)

7.2 Mitigation and Protection Measures

7.2.1 General

Some of the general measures to protect the environment during construction include:

- Project activities will be coordinated around seasonal constraints and weather. If inclement weather affects the safety of field personnel, equipment, or the environment, the Project will be shut-down until conditions on site are deemed safe.
- Before entering the Project area, equipment and machines will be visually inspected and any visible material (e.g., soil or vegetation debris) that could harbour invasive species will be removed, packaged in a sealed container, and shipped south for proper disposal.
- Equipment that will enter the aquatic environment (e.g., drill) will be washed down with a phosphate-free cleaning solution before entering the Project area to prevent potential spreading of invasive species.

7.2.2 Fish and Fish Habitat

Field personnel will implement the following mitigation measures to reduce impacts to marine fish and fish habitat in the Project area:

- The geotechnical drill head will be advanced slowly through the ice into any open water to allow any mobile species, if present, to escape and avoid harm.
- Fish protection screens will be utilized to prevent fish from becoming entrained in the water pumping system used to draw marine water from Patricia Bay. Guidance outlined in DFO's Interim code of practice: end-of-pipe fish protection screens for small water intakes in freshwater (DFO, 2020) will be adhered to, where applicable.
- Hazardous materials stored on site (primarily diesel fuel) will be stored on-site in new double walled fuel tanks to prevent the entry of hazardous materials into the marine environment.
- During refueling, diesel will be transferred from a double walled storage tank in the bed of a pickup truck to the double-walled fuel tank at the drill rig. Portable containment will be used during the transfer to catch potential leaks or spills.
- Portable hazardous material spill kits will be available on site at all times, including at the drill rig shack and in the pickup truck.
- The Environmental Monitor will inspect and monitor the secondary containment equipment daily for the duration of the Project.

7.2.3 Wildlife Mitigation and Management Plan

Field personnel will implement the following mitigation measures to reduce impacts to wildlife and their habitat:

- Waste materials generated on site will be properly stored to avoid generating odours and attracting wildlife.
- All domestic waste materials will be regularly disposed of in the Clyde River municipal waste disposal facility to avoid attracting wildlife.
- Any fuel or hazardous materials (petroleum, oil, lubricants, paint, solvents) will be kept in appropriate storage containers to prevent wildlife exposure.
- A wildlife monitor from the hamlet will be present on site during the day to monitor for terrestrial or marine mammals.
- If marine mammals are observed within 500 metres of the drilling location, drilling activities will cease until the marine mammal has left the area.
- Field personnel will be required to adhere to any applicable conditions outlined in permits and approvals issued for the Project.

In addition, community members that hunt and trap in and around Clyde River will be consulted prior to the start of the field program to determine if a wildlife monitor from the hamlet should be present on site at all times (i.e., 24 hours per day) to monitor for terrestrial or marine mammals.

7.2.4 Water Quality Management

The following measures will be in place to reduce potential negative effects to water quality:

- Quantities of marine water withdrawn will be limited to the volume necessary to complete the borehole drilling and sampling.

- No waste or refuse will be disposed in the harbour through the borehole or water withdrawal location.
- Non-toxic, biodegradable viscosifier additive (NewZan D) will be utilized during the drilling process, if required (see Material Safety Data Sheet in Appendix A).

7.2.5 Air Quality Control

The following mitigatory measures will be implemented to reduce potential negative affects to air quality:

- Odours from equipment emissions will be monitored using olfactory observations by the Environmental Monitor and field personnel on-site.
- If complaints concerning odours from the site are received, the and Canadrill-CBCL Project Managers will investigate options to reduce the impact, in consultation with DFO and PSPC.

7.2.6 Fueling and Hazardous Material Storage, Handling, and Spill Prevention

Proper transportation, storage, and handling of hazardous materials such as diesel fuel, gasoline, oil, and greases will conform to territorial regulations and guidelines. Suppliers of these materials have recommendations for the appropriate transportation, storage, and handling of these materials, and these will be used in conjunction with territorial standards. To reduce potential negative effects associated with fueling and chemical storage, the following mitigation measures will be adhered to for the duration of the Project:

- Hazardous materials will be used only by personnel who are trained and qualified in the handling of these materials and only in accordance with manufacturers' instructions and government regulations.
- The Workplace Hazardous Materials Information System (WHMIS) 2015 program will be implemented in accordance with the federal Occupational Health and Safety Act.
- Material Safety Data Sheets (MSDS) will be readily available onsite for all hazardous materials in use or stored onsite.
- All hazardous materials will be labelled and stored according to applicable MSDS protocols and the WHMIS 2015 under the Nunavut Occupational Health and Safety Regulations.
- The transfer, fuelling and lubrication of equipment on the site will occur in such a manner as to minimize the possibility of introducing contaminants to the marine environment.
- A limited amount of fuel will be stored onsite at the drill and will be contained in a new double-walled storage tank.
- A second new double-walled storage tank will be installed in the bed of a pickup truck and used to ferry fuel from the Hamlet's fueling station to the storage tank at the drill rig.
- Portable containment equipment will be positioned to capture potential fuel spills due to overfilling during refuelling.

- Portable hazardous material spill kits will be available on site at all times, including at the drill rig shack and in the pickup truck.
- Personnel must remain in attendance during refuelling to monitor for leaks or spills.
- The Environmental Monitor and field personnel will inspect, and monitor equipment used in the storage and transportation of petroleum products to ensure they are in good working condition in accordance with applicable regulations.
- Field personnel will not utilize any storage tanks deemed unsafe or in poor working condition.

7.2.7 Waste Management and Restoration Plan

The following guidelines will be followed regarding waste management onsite:

- Waste containers will be provided onsite.
- Domestic waste is to be regularly removed from site and disposed of at the municipal landfill or an appropriate disposal facility.
- No burning of refuse or waste materials will be permitted onsite.
- Portable washrooms will be located at or near the drill shack. If these are not available at the time of the program, a nearby washroom will be designated for use by field personnel.
- Sanitary waste generated will be disposed of at the municipal facility through a contract with the municipal services.
- Food waste will be stored in a manner that does not attract wildlife
- Used oil filters, grease cartridge containers and other products associated with equipment maintenance will be collected, stored in sealed containers and shipped south for disposal in accordance with applicable regulations
- Used petroleum and chemical products will be stored in appropriate tanks, sealed and placed into containers, and shipped south for disposal of in compliance with applicable regulations
- Excess cuttings will be returned to the borehole, if possible.
- All boreholes on land in the onshore harbour area will be backfilled and capped with soil.
- All equipment and material will be removed from the site at the completion of the program.

7.2.8 Disruption of Traditional Use

The community will be consulted and advised of the field program prior to arrival of the field team. The geotechnical field program is not anticipated to interfere with traditional use of the area by local people. In the event that the field program interferes with traditional use of the harbour area or complaints concerning the Project are received, the field supervisor will communicate with the Canadrill-CBCL and DFO Project Managers, who will investigate options to reduce or eliminate the impact, in consultation with relevant regulatory authorities.

7.3 Spill Response Plan

Spills of hazardous materials will be contained as quickly as possible and reported to the appropriate regulatory authorities. In the unlikely event of a fuel or hazardous material spill, the following actions will be taken:

- Immediately stop work activities and assess the hazard to persons and the environment.
- If possible and safe to do so, stop the source of the spill.
- Shut down sources of ignition.
- Deploy spill kits to contain spills.
- Identify spilled material and consult MSDS to appropriate containment and clean-up procedures.
- Determine if additional, external clean-up support is required.
- Spilled hazardous material, such as fuels or lubricants, will be contained and transferred into an appropriate container; remaining residues would be mixed with unconsolidated absorbent materials and transferred into appropriate containers. Containers with spilled material will be sealed and transported south for disposal in accordance with applicable regulations following the Waste Management Plan (see section 7.2.8).
- Reportable spills will be reported to the Nunavut Department of Environment 24-hour spill report line (1-867-920-8130). A NT-NU spill form will be submitted within 24-hours of any significant spill of hazardous materials. An NT-NU spill report form is appended to this EMP (Appendix B). The form will either be faxed (1-867-873-6924) or emailed (spills@gov.nt.ca) to the Nunavut Department of Environment.

7.4 Emergency Contacts

Responses to emergencies onsite will include the immediate notification of key response personnel and the instigation of onsite remedial actions to control the emergency.

Emergency organizations that may be contacted are listed in Table 7.1.

Table 7.1: Emergency Contact List

Organization	Address	Contact Name/ Service	Phone Number
Fire Department	P.O Box 89 Clyde River NU X0A 0E0	Clyde River Fire Services	867-924-6223
Police Department	P.O. Box 10 Clyde River NU X0A 0E0	Royal Canadian Mounted Police (RCMP)	1 : 867-924-1111 2 : 867-924-0123
Ambulance		Clyde River Medevac Ambulance Services (Fire Services)	867-924-6223

Organization	Address	Contact Name/ Service	Phone Number
Hospital	Clyde River, NU X0A 0E0 (Coordinate X 78, Coordinate Y 43)	Clyde River Health Centre	867-924-6377
Poison Control	Ontario Poison Centre (for Nunavut)	Emergency Response	1-800-268-9017
Canadian Transport Emergency Centre (CANUTEC), Transportation of Dangerous Good Directorate, Transport Canada	330 Sparks Street Ottawa, ON K1A 0N5	Dangerous Goods Emergencies	888-226-8832 or 613-996-6666 (collect) *666 (cellular)
Nunavut Emergency Management	Department Community and Government Services Government of Nunavut P.O. Box 1000 Station 700 Iqaluit, Nunavut; X0A 0H0	Emergency Measures (24 hour) Emergency Services Response (24 hours)	1-800-693-1666 1-867-979-6262
The Northwest Territories and Nunavut Workers' Safety and Compensation Commission	Qamutiq Building, 2nd Floor 630 Queen Elizabeth II Way Box 669, Iqaluit, NU X0A 0H0	General Inquiries Incident & Injury Reporting	(877) 404-4407 (800) 661-0792

7.5 Monitoring and Communication

7.5.1 Notification

The proponent, or their designate, will notify the community, CIRNAC, and the Nunavut Department of Community and Government Services as follows:

- Notification of the project at least 48 hours prior to commencement
 - Hamlet of Clyde River – Chief Administrative Officer by phone at 867-924-6220 or email at cao@clyderiver.ca
 - CIRNAC – Land Administration by phone at 867-975-4517 or email landsmining@aandc.gc.ca
 - Nunavut Department of Community and Government Services – Land Administrator by phone at 867-975-5344 or email PAMD.general.inquiries@gov.nu.ca
- Notification to a CIRNAC Land Use Inspector at least 10 days prior to the completion of the work to confirm plans for completion of reclamation

7.5.2 Monitoring

The role of the Environmental Monitor includes:

- Field surveillance of environmental conditions
- Implementation of environmental protection measures
- Ensuring compliance with environmental commitments

- Work with DFO and Canadrill-CBCL Project Managers to determine if any necessary procedural modifications or schedule changes arising from environmental conditions
- Monitoring the storage and handling of hazardous materials
- Reporting any spills in accordance with federal and/or territorial regulations and advising on the clean-up and disposal of spilled material
- Documenting site environmental conditions and concerns
- Reviewing environmental concerns with workers, Project Managers, and applicable regulators, as necessary

7.5.3 Reporting and Record Keeping

The Environmental Monitor will be responsible for reporting and record keeping for the duration of the Project. In the event of an accident or incident, a brief will be prepared and submitted to DFO and Canadrill-CBCL Project Managers. The Project Managers will review the brief and deliver the report to applicable regulatory agencies. Information contained in the brief will include at a minimum a detailed description of the incident, as well as the time, date, location. Field personnel involved in the incident will be required to provide accurate and detailed information about the circumstances of the incident, as well as any remedial action taken. The Project Managers, in coordination with regulatory agencies, will determine whether additional mitigations are required to prevent a recurrence of the incident.

The Environmental Monitor is responsible for onsite maintenance of a record of incidents, accidents, near-misses, and non-compliances of applicable laws and regulations. The monitor must provide their records in electronic form; however, records may be recorded on paper (i.e., hard copy) and later digitized.

References

- [1] Advisian. 2020. Fisheries and Oceans Canada Clyde River Harbour Development Feasibility Study. Project No. 307071-01306-00-MA-REP-0001. 534 p.
- [2] Cairns, D.K. (E.D.). 2002. Effects of land use practices on fish, shellfish, and their habitats on Prince Edward Island. Can. Tech. Rep. Fish. Aquat. Sci. No. 2408. 157 pp.
- [3] Canadian Council of Ministers of the Environment (CCME). 2014. Canadian Environmental Quality Guidelines (CEQG) Summary Table. Water Quality Guidelines for the Protection of Aquatic Life: Freshwater and Marine.
- [4] Fisheries and Oceans Canada (DFO). 2020. Interim code of practice: End-of pipe fish protection screens for small water intakes in freshwater. <https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html> [Accessed 25 January 2021].
- [5] Government of Nunavut. n.d. Contingency Planning and Spill Response Reporting in Nunavut. A Guide to the Regulations. https://www.gov.nu.ca/sites/default/files/spill_planning_and_reporting_guide_0.pdf [Accessed 25 January 2021].
- [6] Government of Nunavut. 2010. Environmental Guideline for the General Management of Hazardous Waste. https://www.gov.nu.ca/sites/default/files/Guideline%20-%20General%20Management%20of%20Hazardous%20Waste%20%28revised%20Oct%202010%29_0.pdf [Accessed 25 January 2021].
- [7] Health Canada. 2015. Workplace Hazardous Materials Information System (WHMIS).
- [8] Indigenous and Northern Affairs Canada. 2007. Guidelines for Spill Contingency Planning. https://www.enr.gov.nt.ca/sites/enr/files/guidelines_for_spill_contingency_planning_2007.pdf [Accessed 25 January 2021].
- [9] Indigenous and Northern Affairs Canada. 2011. Northern Land Use Guidelines. http://publications.gc.ca/collections/collection_2011/ainc-inac/R2-226-6-2011-eng.pdf [Accessed 25 January 2021].
- [10] Scott, W.B., and Scott, M.G. 1988. Atlantic Fishes of Canada. University of Toronto Press. 730 p.
- [11] Transport Canada. 2019. National Oil Spill Preparedness and Response Regime. <https://tc.canada.ca/en/marine-transportation/marine-safety/national-oil-spill-preparedness-response-regime-0> [Accessed 25 January 2021].
- [12] Wenger, A.S., Harvey, E., Wilson, S., Rawson, C., Newman, S.J., Clarke, D., Saunders, B.J., Browne, N., Travers, M.J., McIlwain, J.L., Erftemeijer, P.L.A., Hobbs, J-P., A., McLean, D., Depczynski, M. and Evans, R.D. 2017. A critical analysis of the direct effects of dredging on fish. Fish and Fisheries. 18: 957-985.

APPENDIX A

NewZan Material Safety Data Sheet

MATERIAL SAFETY DATA SHEET

NewZan

MSDS No. NE1089

Date Created: 12/15/03

Revised: 00/00/00

SECTION 1. GENERAL PRODUCT INFORMATION

Trade Name: NewZan

Chemical Name: Xanthan Gum

Synonyms: DynaZan, DynaXan

NFPA Properties: Health: 1: Flammability: 0: Reactivity: 0

SECTION 2. COMPOSITION / INFORMATION ON INGREDIENTS

The ingredients of this product are on the TSCA Chemical Substance Inventory, the Canadian Domestic Substance List and are included in the European Inventory of Existing Commercial Chemical Substances (EINECS). This product is not toxic under SARA.

Component	CAS. No.	%	TWA/Ceiling	Reference
Xanthan Gum	11138-66-2	No Data Available	No Data Available	OSHA

SECTION 3. HAZARDS IDENTIFICATION

Skin & Eye: No harmful effects expected. May cause eye irritation.

Ingestion: No harmful effects expected. (Non-toxic)

Inhalation: Large quantities may cause respiratory tract irritation.

Effects of Overexposure: Prolonged contact with the dry powder may cause drying of the skin.

Unusual Fire & Explosion Hazards: Carbon dioxide and carbon monoxide gases may be generated.

SECTION 4. FIRST AID MEASURES

Ingestion: Wash mouth out with water.

Skin: Remove contaminated clothing and wash skin thoroughly with soap and water.

Inhalation: Remove to fresh air immediately. If necessary, administer CPR and oxygen. If cough or other symptoms appear, get medical attention.

Eyes: immediately flush with plenty of water for 15 minutes, occasionally lifting the upper and lower eyelids.

SECTION 5. FIRE FIGHTING MEASURES

Flash Point: Not Applicable

Fire Fighting Extinguishing Media: Dry chemical, foam, CO².

Fire Fighting Equipment: Wear appropriate personal protective equipment, including a NIOSH approved SCBA, if necessary. **Irritating and toxic gases may be generated. Material becomes slippery when wet**

SECTION 6. ACCIDENTAL RELEASE MEASURES

Accidental Release Measures: Contain the spill. Wear appropriate personal protective equipment, including NIOSH (or equivalent) approved SCBA (if necessary). Remove spilled material. Reuse the product or dispose of it in accordance with federal, state and local regulations. Flush contaminated area with water.

SECTION 7. HANDLING AND STORAGE

Handling: Wear chemical safety goggles or eyeglasses with side shields. Wash thoroughly after handling. Use adequate ventilation to minimize dust. Wear NIOSH approved mask if dust concentrations exceed TLV.

Storage: Keep container tightly closed and store in a dry, well ventilated area.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls: Provide exhaust ventilation or other engineering controls to minimize dust. Ensure that eyewash stations and safety showers are near the work-station. Food, beverages and tobacco products should not be carried, stored or consumed where this material is in use. Before eating, drinking or smoking, wash face and hands with soap and water. Wear appropriate personal protective equipment. Where exposures are below the Permissible Exposure Limit (PEL), no respiratory protection is required. Where exposures

Newpark Drilling Fluids, LLC

1311 Broadfield, Suite 600, Houston TX 77084

24-Hour Health/Environmental Emergency Phone: 1-888-872-0050



exceed the PEL, use a respirator approved by NIOSH (or equivalent) for the material and level of exposure.
See "GUIDE TO INDUSTRIAL RESPIRATORY PROTECTION" (NIOSH)

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor: White to cream powder

Odor: slight, mild odor

Boiling Point: Not Applicable

Melting Point: Not Applicable

Vapor Pressure: Not Applicable

Bulk Density: 300-900 kg/m³

Vapor Density: Not Applicable

% Volatile (by wt.): Not Applicable

pH (1% solution): 6.0-8.0

Saturation in Air (% by Vol.): Not Applicable

Evaporation Rate: Not Applicable

Solubility in Water: Soluble

SECTION 10. STABILITY AND REACTIVITY

Stability: Stable

Hazardous polymerization: Will not occur

Decomposition Products: Carbon monoxide ; Carbon dioxide.

Incompatibility: Strong oxidants

SECTION 11. TOXICOLOGICAL INFORMATION

Toxicological Information: Aquatic Toxicity (96 hr. LC50: Mysid shrimp > 1,000,000 ppm

Microtox Toxicity: Photobacterium Phosphoreum = Non-Toxic

SECTION 12. ECOLOGICAL INFORMATION

Ecological Information: Non-Toxic and Biodegradable.

SECTION 13. DISPOSAL CONSIDERATIONS

Recycle: Newpark encourages the recycle, recovery and reuse of materials, where permitted, as alternate to disposal as a waste.

Waste Disposal Method: Disposal must be in accordance with federal, state and local regulations

SECTION 14. TRANSPORT INFORMATION

DOT Shipping Name: Not a DOT/IMO Hazardous Material

Transport Canada: Not Regulated

ICAO/IATA: Not Regulated

SECTION 15. REGULATORY INFORMATION

U.S. TSCA: All components of this product are included on the TSCA Inventory in compliance with the Toxic Substances Control Act, 15 U.S.C.2601 et. seq.

CANADA DSL: Components of this product have been reported to Environment Canada in accordance with subsection 25 of the Canadian Environmental Protection Act and are included on the Domestic Substances List.

EEC EINECS: All components of this product are included in the European Inventory of Existing Chemical Substances (EINECS) or are polymers of which the components are in EINECS, in compliance with Council Directive 67/548/EEC and its amendments.

Product Classification under Section 311 of SARA: Acute: No Chronic: No Fire: No Reactive: No Pressure: No

SECTION 16. OTHER INFORMATION

MSDS No: NE1089

Reason Issued: New Format

Prepared By: Product Safety Committee

Sections Modified: All Sections. Revised Format

Disclaimer: We believe the statements, technical information and recommendations contained herein are reliable, but they are given without warranty or guarantee of any kind, expressed or implied, and we assume no responsibility for any damage or expense.

APPENDIX B

NT-NU Spill Form

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND
OTHER HAZARDOUS MATERIALS



Canada



NT-NU 24-HOUR SPILL REPORT LINE

Tel: (867) 920-8130 • Fax: (867) 873-6924 • Email: spills@gov.nt.ca

REPORT LINE USE ONLY

A	Report Date:	MM	DD	YY	Report Time:	<input type="checkbox"/> Original Spill Report OR <input type="checkbox"/> Update # _____ to the Original Spill Report	Report Number:
	Occurrence Date:	MM	DD	YY	Occurrence Time:		
C	Land Use Permit Number (if applicable):				Water Licence Number (if applicable):		
D	Geographic Place Name or Distance and Direction from the Named Location:					Region: <input type="checkbox"/> NT <input type="checkbox"/> Nunavut <input type="checkbox"/> Adjacent Jurisdiction or Ocean	
E	Latitude:				Longitude:		
	_____ Degrees _____ Minutes _____ Seconds				_____ Degrees _____ Minutes _____ Seconds		
F	Responsible Party or Vessel Name:				Responsible Party Address or Office Location:		
G	Any Contractor Involved:				Contractor Address or Office Location:		
H	Product Spilled: <input type="checkbox"/> Potential Spill		Quantity in Litres, Kilograms or Cubic Metres:		U.N. Number:		
I	Spill Source:		Spill Cause:		Area of Contamination in Square Metres:		
J	Factors Affecting Spill or Recovery:		Describe Any Assistance Required:		Hazards to Persons, Property or Environment:		
K	Additional Information, Comments, Actions Proposed or Taken to Contain, Recover or Dispose of Spilled Product and Contaminated Materials:						
L	Reported to Spill Line by:		Position:	Employer:	Location Calling From:	Telephone:	
M	Any Alternate Contact:		Position:	Employer:	Alternate Contact Location:	Alternate Telephone:	

REPORT LINE USE ONLY

N	Received at Spill Line by:	Position:	Employer:	Location Called:	Report Line Number:
Lead Agency: <input type="checkbox"/> EC <input type="checkbox"/> CCG/TCMSS <input type="checkbox"/> GNWT <input type="checkbox"/> GN <input type="checkbox"/> ILA <input type="checkbox"/> AANDC <input type="checkbox"/> NEB <input type="checkbox"/> Other: _____			Significance: <input type="checkbox"/> Minor <input type="checkbox"/> Major <input type="checkbox"/> Unknown		File Status: <input type="checkbox"/> Open <input type="checkbox"/> Closed
Agency:		Contact Name:	Contact Time:	Remarks:	
Lead Agency:					
First Support Agency:					
Second Support Agency:					
Third Support Agency:					



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