

Nalcor Energy – Lower Churchill Project



LCP Strait of Belle Isle Marine Crossing

Environmental Protection Plan

Nalcor Doc. No. ILK-PT-MD-8110-EV-PL-0001-01

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1 INTRODUCTION

Environmental Protection Plans (EPPs) are of critical importance to large construction projects. This LCP Strait of Belle Isle (SOBI) Marine Crossing EPP will ensure a high level of environmental protection in all of the Projects' work areas during construction and commissioning. This EPP is a working document for use at Site by Personnel and Contractors. It will help ensure conformance with the Project policy statements. It will also serve as a tool for Project participants to monitor regulatory compliance and to improve on environmental performance.

This EPP contains standard environmental protection procedures, or mitigation measures, for activities commonly associated with large projects of this type. The objectives of this EPP are to:

- a) anticipate potential negative environmental effects associated with construction; and
- b) implement appropriate mitigation measures to minimize or avoid negative effects where practical.

Negative effects include impacts to air quality and climate, groundwater and surface water resources, soil, biota and their habitats, human health and communities, and natural and historic resources.

Reference documentation, including publically available Federal and Provincial reference documents, guidelines, fact sheets and operational statements for information detailed in the EPP, is located in Reference Material Document for Project Wide Environmental Protection Plan (GV-003-01) (LCP-PT-MD-0000-EV-SD-0001-01).

2 PURPOSE

The purpose of this EPP is to establish work practices and assign roles and responsibilities that all Project participants shall follow to mitigate negative environmental effects associated with construction and commissioning of the Strait of Belle Isle Marine Crossing. Specifically the purpose of this EPP is to:

- a) Document the conditions and requirements of Environmental Assessment (EA) release;
- b) Outline the LCP's commitments to minimize potential environmental effects, including commitments made in the Environmental Impact Statement (Nalcor, 2012);
- c) Provide concise and clear instructions to LCP participants regarding procedures for protecting the environment and minimizing potential impacts to the environment;

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- d) Provide direction to LCP participants regarding issues and concerns of stakeholder groups, including aboriginal peoples, fisheries groups, landowner groups and the public;
- e) Provide a reference document for LCP participants to use when planning and/or conducting specific construction and commissioning activities;
- f) Provide direction for environmental orientation programs for LCP participants;
- g) Document changes to the SOBI EPP originating through the interactive revision process;
- h) Provide a reference to applicable legislative requirements and guidelines; and
- i) Provide a detailed summary of environmental issues and protection measures to be implemented during construction.

3 SCOPE

The scope of this SOBI Marine Crossings EPP applies to the engineering, procurement, construction, and commissioning phase of the SOBI Marine Crossings component of the Project. Construction activities include Horizontal Directional Drilling (HDD), submarine cable installation, subsea rock installation, access road construction and trenching for cable installation to the transition compound.

Contract-Specific Environmental Protection Plans (C-SEPPs) will also be required. More detailed C-SEPPs will be prepared by all Contractors for all construction contracts to ensure that effects on the environment are minimized to the extent practical. These C-SEPPs will provide sufficient detail on the Contractor's:

- a) Scope of work;
- b) Methods of construction;
- c) Sequence of activities;
- d) List of resources (i.e., equipment and Site workforce);
- e) Temporary and permanent installations;
- f) Environmental protection procedures and alternative procedures, if required; and
- g) Environmental contingency measures.

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The SOBI EPP will serve as a resource to Contractors as they prepare C-SEPPs. C-SEPPs are expected to be consistent with the SOBI EPP and will include more detailed Site specific mitigation measures. Contract packages will include C-SEPP templates with specific instructions on how these templates are to be properly completed. All C-SEPPs will require approval by the LCP prior to the Contractor's mobilization to Site.

4 PROJECT DESCRIPTION

The SOBI Marine Crossings comprises a 350 kV, 900 megawatt (MW) submarine cable system that extends from Forteau Point, Labrador to Shoal Cove, Newfoundland, across the SOBI (Figure 4.1). This component of the project can be broken down into onshore and offshore components, further described below.

4.1 ONSHORE COMPONENT

The onshore component consists of six (6) HDD bore holes, three (3) on each side of the SOBI, all lined with conduits that penetrate the seabed at 60 - 80 meters water depth. Three (3) steel conduits will each house one submarine HVdc Mass Impregnated (MI) cable from the transition from sea to land.

A transition from submarine to land HVdc MI cable occurs at the HDD conduit land entry location. The land HVdc MI cable will be trenched approximately 2 metres underground to the respective transition compound located approximately 1 kilometer from the steel conduit land entry location. (Note: Construction activities related to the transmission compounds are covered by a separate EPP).

Three (3) boreholes (one per cable) will be drilled in sequence for the shore approaches at Forteau Point and Shoal Cove. Up to two (2) drill rigs will operate concurrently, at Forteau Point and at Shoal Cove. It is expected that the HDD process will take place twenty-four (24) hours a day, seven (7) days a week and it is expected to take approximately two-and-half (2.5) years to drill and prepare all boreholes for cable installation. The land cables will be transported on road transportable reels that will be shipped from the manufacturing facility to SOBI. Once on Site, the land cable will be installed in the prepared land trench via rollers and cranes. There may be a requirement for a land cable to land cable joint due to the road transportable reels allowable length. This requirement is dependent on the location of the transition compounds and the diameter of the land cable. This would also require an additional jointing bay along the land cable route. The land cable will be installed through the allotted locations at the base of the transition compound for termination following the installation of the land cable into the trench. The completed land cable installation and termination will allow for the submarine

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system to be tested through to the termination once the transition joint between submarine and land cable is completed.

Cable installation will commence subsequent to the completion of critical path onshore activities:

- a) Transition compound construction
- b) HDD borehole conduit completion
- c) Land cable trench
- d) Land cable installation
- e) Land cable termination in transition compound

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Figure 4-1 - Strait of Belle Isle Submarine Cable Crossing



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4.2 OFFSHORE COMPONENT

The offshore component consists of three (3) submarine MI cables. Each cable will be installed on the seafloor with approximately 150 meters separation within a 500 meter wide and 34 kilometer long corridor. The water depths along the corridor, outside of the drill exit locations, range between 65 m and 112 m, with 9 km of the route lying in depths greater than 100 m. Unconsolidated sediments rest directly on bedrock in the approaches to Forteau Point and Shoal Cove as well as in the route corridor with minor exposures of bedrock.

MI cables have been selected as the preferred cable technology for the SOBI Marine Crossings. The cables will have a copper or aluminum conductor, and will be protected with two (2) layers of armoring for tensile loading and rock impact protection.

The outer surface of the HVdc cable will consist of a double layer of polypropylene yarn for the submarine portions. HDD conduit sections and land cables will consist of an extruded sheathing of high density polyethylene. The envisaged installation process is initiated by the transpooling of the cables from the manufacturing plant onto a barge for transportation, and then transpoiled from the barge to the Cable Installation Vessel (CIV) prior to transiting to site. At SOBI, each of the submarine cables will be installed by the CIV. Pull in operations will also be executed with the CIV leading the operation.

The cables will utilize a transition joint between submarine and land cables. The land cables will terminate at insulating fluid filled terminations located within the transition compound. Overvoltage protection for the cables will be provided by surge arresters installed adjacent to the terminations.

Each of the three (3) submarine cables will be protected by rock berms constructed using a fallpipe vessel. The fallpipe vessel will make multiple passes to build the berm mass. Rock will be loaded onto the fallpipe vessel at a port, the vessel will then travel to the submarine cable corridor, verify the location for rock placement, then place the rock. Rock berm placement will then be surveyed by the fallpipe Remotely Operated Vehicle (ROV), and the protection installation vessel will return to port, re-load, and return to the field to repeat the rock placement process.

Successive passes will involve the adjustment of rock volume required for achieving the desired berm profile. It is expected that approximately one (1) million tonnes of graded rock will be used for the berm. There are currently operational quarries and port sites in the province. The quarry(s) and port(s), to be used for the rock berm, will be determined by the rock supply and installation Contractor.

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4.3 CONSTRUCTION SCHEDULE

Construction activities associated with the submarine cable installation and protection will span four (4) years. Construction activities began during the fall of 2013 and will continue until 2016. Cable installation and berm construction will be conducted during the ice-free season of 2016.

5 DEFINITIONS

Authorized Escort – A Contractor or Subcontractor representative who has completed Site orientation, is fully aware of the Site’s emergency response and evacuation procedures, and has the authority to accompany Site Visitors.

Contractor - Any Contractor engaged by Nalcor or any Subcontractor engaged by Nalcor, or engaged on behalf of Nalcor, or any Subcontractor engaged by a Contractor.

Employee - All Employees employed by Nalcor and consultants engaged by Nalcor to work at any of the Sites, either through third-party agencies or consultants hired or contracted by Nalcor directly. This includes, but is not limited to full time, part time, casual, term, intermittent or occasional Employees, and seconded Employees who are either directly employed by or under assignment to Nalcor.

Personnel - Nalcor Employees, Contractors, Subcontractors and their respective Employees.

Site(s) - Muskrat Falls Power Generating Facility, Labrador Island Link, Labrador Transmission Access, Strait of Belle Isle, direct current (dc) Specialties, and other ancillary Sites and staging areas.

Site Access - Obtaining a Site Pass issued as per the Worker Site Access Standard, Nalcor Doc. No. LCP-PT-MD-0000-HS-SD-0003-01 or Nalcor authorization required to access the various Sites.

Visitor Any person(s) visiting the Sites, including, but not limited to, vendors, couriers, delivery personnel, regulatory personnel, consultants, engineering representatives, stakeholders, and other personnel not assigned to the Site.

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6 ABBREVIATIONS AND ACRONYMS

C-SEPP	Contract-Specific Environmental Protection Plan
CCG	Canadian Coast Guard
CCME	Canadian Council of Ministers of the Environment
CIV	Cable Installation Vessel
DFO	Department of Fisheries and Oceans Canada
DNR	Department of Natural Resources
EA	Environmental Assessment
EEMP	Environmental Effects Monitoring Plan
ERC	Environment and Regulatory Compliance
ERP	Emergency Response Plan
EPP	Environmental Protection Plan
FSL	Full Supply Level
GAP	Storage and Handling of Gasoline and Associated Products Regulations (NL)
H&S	Health and Safety
HDD	Horizontal Directional Drilling
HVac	High Voltage Alternating Current
HVdc	High Voltage Direct Current
kVac	Kilovolt Alternating Current
kVdc	Kilovolt Direct Current
LCP	Lower Churchill Project
LSL	Low Supply Level
MCTS	Marine Communication and Traffic Services
MI	Mass Impregnated

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MSDS	Material Safety Data Sheets
MSRP	Master Spill Response Plan
MW	Megawatt
NLDOEC	Newfoundland and Labrador Department of Environment and Conservation
NWPA	Navigable Waters Protection Act
OSEM	On-Site Environmental Monitor
PAO	Provincial Archeology Office
PDT	Project Delivery Team
RCC	Roller Compacted Concrete
RCP	Regulatory Compliance Plan
RFP	Request for Proposals
RRF	Revision Request Form
RP	Rehabilitation Plan
ROV	Remotely Operated Vehicle
RRIF	Revision Request Initiation Form
SOP	Standard Operating Procedures
SOBI	Strait of Belle Isle
TC	Transport Canada
TSS	Total Suspended Solid
VTMP	Vessel Traffic Management Plan
WHMIS	Workplace Hazardous Materials Information System
WMP	Waste Management Plan

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7 ROLES AND RESPONSIBILITIES

7.1 ENVIRONMENT AND REGULATORY COMPLIANCE TEAM

7.1.1 Auditing Function

The purpose of the auditing function shall be to evaluate compliance and effectiveness of the SOBI EPP and to identify opportunities for continual improvement. Auditing shall consist of daily field reports, risk based environmental compliance audit reports and annual performance reviews.

The daily field reports shall be completed by the On-Site Environmental Monitor (OSEM), who reviews daily activities of the Contractors. The risk based environmental compliance audit reports will be completed by a member of the ERC team. The reports will document all incidents of non-compliance with the EPP and their causes. The ERC team will distribute the environmental compliance audit reports to relevant Project participants.

The annual performance review shall be completed by the key members of the Environmental and Construction teams. This audit shall include a review of all work activities that relate to environmental concerns, issues and/or mitigations and shall include a review of environmental audits carried out by the ERC team during the year. The review process shall give all parties an opportunity to evaluate overall environmental performance and compliance with government regulations, permits, this EPP, and C-SEPPs.

7.1.2 Individual Responsibilities

Marine Crossings Project Manager: The MCT Project Manager is responsible for ensuring that the project design reflects Nalcor Energy's Environmental Policy and Guiding Principles. The MCT Project Manager will also ensure that environmental management design philosophy is incorporated into project design, ensuring the approach reflects the requirements and commitments made as part of aboriginal agreements and requirements of EA as communicated by the Environment and Regulatory Compliance Team. The MCT Project Manager will communicate design modifications or additions to the Environmental Engineering Coordinator, through the established Project Change Management (PCM) process. The Project Manager is also expected to review the EPP and review revision requests on an as needed basis.

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7.2 MARINE CROSSINGS AREA MANAGERS

The MCT Area Managers will be responsible for the design of environmental mitigation measures and rehabilitation, ensuring that technical specifications:

- a) Include environmental mitigation and rehabilitation which will form part of the tender packages issued to Contractors;
- b) Meet the requirements of EA release, authorizations, aboriginal agreements, project commitments and permitting conditions, with the support of the Environment and Regulatory Compliance Team; and
- c) Review and accept the SOBI EPP.

7.3 ENVIRONMENTAL ENGINEERING COORDINATOR

The Environmental Engineering Coordinator will:

- a) Develop, implement and maintain a SOBI Marine Crossings EPP;
- b) Review and accept site specific environmental protection plans developed by contractors;
- c) Ensure that the procedures, plans and work methods proposed by Contractors are consistent with requirements provided the Environment and Regulatory Compliance Team;
- d) Ensure revisions are distributed to EPP holders;
- e) Review daily field reports;
- f) Lead risk based environmental audits;
- g) Monitor the site for environmental compliance; and
- h) Manage Opportunities for Improvements, Non-conformances and Corrective Action registries.

7.4 ON SITE ENVIRONMENTAL MONITOR

The LCP will have an On Site Environmental Monitor (OSEM) for the SOBI marine crossing. The SOBI OSEM will:

- a) Monitor on site Project activities;
- b) Interact with Contractors on environmental procedures and requirements;
- c) Participate in Project team meetings, toolbox meetings, conduct environmental reviews of drawings;

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- d) Evaluate the Contractor's environmental performance with respect to requirements established in the EPP and C-SEPP;
- e) Evaluate the performance of designed/constructed environmental mitigation systems through sampling and testing programs;
- f) Track on Site compliance with regulatory requirements and conditions of all permits and approvals;
- g) Produce daily field reports as part of environmental compliance monitoring;
- h) Provide support for managing the non-conformance registry; and
- i) Assist in the revision and update of the EPP and C-SEPP as necessary.

The OSEM will also be responsible for ensuring Employees, Visitors and Contractors to the Site receive the appropriate orientation and training before going on Site (refer to Nalcor Document, " Worker Site Access Standard" - LCP-PT-MD-0000-HS-SD-0003-01)

7.5 REGULATORY COMPLIANCE LEAD

The Regulatory Compliance Lead will:

- a) Develop, implement and maintain an EEMP and Regulatory Compliance Plan;
- b) Review and ensure commitments and requirements of the EA release are included in the SOBI EPP;
- c) Ensure legislative and permit conditions are reflected in this EPP;
- d) Communicate the results of the EEMP to the ERC group; and
- e) Coordinate all regulatory correspondence and coordination.

7.6 CONTRACTORS

Prime Contractors and their Subcontractors will be responsible for executing the work within the scope of their contract packages in full compliance with all Project requirements, and within all laws. Their responsibility includes cooperating with Nalcor's Environmental Management team, particularly with respect to timely preparation and submission of permit applications that are their responsibility.

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The Contractors will be responsible for implementing environmental protection procedures as outlined in the EPP and Agreements, as well as developing, implementing, and maintaining their own C-SEPP, as applicable.

Contractors will ensure EPP conditions have been reflected in their proposals and bids and will comply with all relevant regulations, guidelines, permits, approvals and authorizations. The Contractor may be consulted, as required, during aspects of environmental compliance monitoring and environmental effects monitoring.

All permit documentation (e.g., copies of permit applications, correspondence with regulatory agencies, permits) will be provided to Nalcor, which will track all permit conditions. Based on accepted C-SEPPs, Contractors will be responsible for environmental mitigation and complete rehabilitation of the sites.

Contractors will be responsible for holding toolbox meetings at the start of each shift to discuss HSE issues and will be responsible for developing their own orientation and training package to deliver to Personnel entering the Sites on their behalf, in addition to the project training noted above. When conducting Risk Assessments, environmental issues are to be considered.

Individual project Personnel, including Contractors and Subcontractors, will:

- a) familiarize themselves with the SOBI EPP and any revisions;
- b) be knowledgeable of reporting procedures; and
- c) initiate changes to improve the quality of the plan.

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8 REFERENCES

LCP-PT-ED-0000-EA-SY-0002-01	Environmental Impact Statement and Supporting Documentation for the Labrador-Island Transmission Link
LCP-PT-ED-000-EN-PH-0031-01	Design Philosophy for Environmental Rehabilitation
LCP-PT-ED-0000-EN-PH-0007-01	Design Philosophy for Environmental Mitigation
LCP-PT-MD-0000-HS-PL-0001-01	LCP Health and Safety Management Plan
LCP-PT-MD-000-RT-PL-00001-01	LCP Integrated Regulatory Compliance Plan
LCP-PT-MD-0000-EV-PL-0001-01	LCP Integrated Environmental Management Plan
LCP-PT-MD-0000-HS-PL-0004-01	LCP Project-Wide Emergency Response Plan
MFA-PT-MD-0000-EV-PL-0002-01	LCP Master Spill Response Plan
LCP-PT-MD-0000-EV-SD-0001-01	Reference Materials Document for Project Wide Environmental Protection Plan (GV-003-01)
ILK-PT-MD-0000-EV-PL-0010-01	Frac-Out Response Plan

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8.1 OTHER REFERENCE DOCUMENTS

Information and documents referenced in this EPP are publically available documents and can be found at the LCP Project Office in St. John's. A listing of key reference material along with internet links is provided below:

8.1.1 Provincial Government Guidelines (Water Resources Division, DOEC)

- a) [Environmental Guidelines for Watercourse Crossings;](#)
- b) [Environmental Guidelines for Stream Crossings by All-Terrain Vehicles;](#)
- c) [Environmental Guidelines for Bridges;](#)
- d) [Environmental Guidelines for Culverts;](#)
- e) [Environmental Guidelines for Fording;](#)
- f) [Environmental Guidelines for Diversions, New Channels, Major Alterations;](#)
- g) [Environmental Guidelines for Pipe Crossings; and](#)
- h) [Environmental Guidelines for General Construction Practices.](#)

8.1.2 DFO Operational Statements

- a) [Aquatic Vegetation Removal in Freshwater Systems Operational Statement;](#)
- b) [Beaver Dam Removal Operational Statement;](#)
- c) [Bridge Maintenance Operational Statement;](#)
- d) [Clear Span Bridges Operational Statement;](#)
- e) [Culvert Maintenance Operational Statement;](#)
- f) [Dock and Boathouse Construction Operational Statement;](#)
- g) [High Pressure Directional Drilling Statement;](#)
- h) [Ice Bridges and Snow fills Operational Statement;](#)

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8.1.3 DFO Fact Sheets

- a) [Fact Sheet on Effects of Silt on Fish and Fish Habitat;](#)
- b) [Fact Sheet on Blasting – Fish and Fish Habitat Protection;](#)
- c) [Fact Sheet on Ditching;](#)
- d) [Fact Sheet on Temporary Fording Sites;](#)
- e) [Fact Sheet on Forwarder Trails;](#)
- f) [Fact Sheet on Filter Fabric;](#)
- g) [Fact Sheet on Rock Check Dam;](#)
- h) [Fact Sheet on Temporary Bridges;](#)
- i) [Fact Sheet on Resource Road Construction;](#)
- j) [Fact Sheet on Instream Work in the Dry – Cofferdams;](#)
- k) [Fact Sheet on Streambank Stabilization;](#)
- l) [Fact Sheet on Instream Work in the Dry – Temporary Diversion;](#)
- m) [Fact Sheet on Instream Work in the Dry – Elevated Pipes;](#)
- n) [Fact Sheet on Culvert Stabilization;](#)
- o) [Fact Sheet on Storm Drain Outlets;](#)
- p) [Fact Sheet on Temporary Settling Basins;](#)
- q) [Fact Sheet on Bridge Construction/Demolition;](#)
- r) [Fact Sheet on Freshwater Salmon Habitat Requirements;](#)
- s) [Fact Sheet on Stream Clean-up;](#)
- t) [Fact Sheet on Timber Crib;](#)
- u) [Fact Sheet on Water and Sewer Installation – Stream Crossings;](#)
- v) [Fact Sheet on Culvert Installation; and](#)
- w) [Fact Sheet on ATV's, Fish Habitat and You](#)

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- x) [Fact Sheet on Highway Construction/Upgrading – Infilling, Stabilization and No-Grub Zones;](#)
- y) [Fact Sheet on Freshwater Intake End-of-Pipe Fish Screen;](#)

8.1.4 Other Pertinent Federal Documents

- a) [Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters, Wright and Hopky, 1998;](#)
- b) [Freshwater Intake End-of-Pipe Fish Screen Guidelines, Fisheries and Oceans Canada, 1995;](#)
- c) [Guidelines for Protection of Freshwater Fish Habitat in Newfoundland and Labrador. Fisheries and Oceans Canada, St. John's, NF, Gosse, M.M., et. al. 1998;](#)
- d) [Standard Methods Guide for the Classification/Quantification of Lacustrine Habitat in Newfoundland and Labrador, Bradbury C., et. Al. 2001;](#)
- e) Forestry Guidelines for the Protection of Fish Habitat in Newfoundland and Labrador, Scruton, D.A., et. al. 1997; and [Standard Methods Guide for Freshwater Fish and Fish Habitat Surveys in Newfoundland and Labrador Rivers & Streams, Sooley, Darrin R. 1998.](#)
- f) [The Leach's Storm-Petrel: General information and handling instructions, Williams & Chardine: Canadian Wildlife Service.](#)

8.1.5 Other Pertinent Provincial Documents

- a) [Environmental Policy for Infilling Bodies of Water W.R. 91-1 \(Water Resources Act, DOEC\);](#)
- b) [Environmental Policy for Land and Water Developments W.R. 95-01 \(Water Resources Act, DOEC\);](#)
- c) [Environmental Policy for Development in Shore Water Zones W.R. 97-1 \(Water Resources Act, DOEC\);](#)
- d) [Environmental Policy for Development in Wetlands W.R. 97-2 \(Water Resources Act, DOEC\);](#)
- e) [Newfoundland and Labrador Species at Risk Data Sheets; and](#)
- f) [Motorized Snow Vehicles and All-Terrain Vehicles Regulations \(NL Department of Natural Resources\).](#)
- g) Planning ahead to reduce risks to migratory bird nests”
(PDF: <http://www.ec.gc.ca/Publications/default.asp?lang=En&xml=50C4FE11-801E-4FE3-8019-B2D8537D76CF>)

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9 MAINTENANCE OF THE ENVIRONMENTAL PROTECTION PLAN (EPP)

This EPP will at times require updating in response to changes in the Project, Contractor work methods, group structure, or technological advancements that provide higher level of environmental protection. The subsections below indicate the process with respect to maintenance and implementation of the EPP.

Initiating Revisions

This EPP is a controlled document and revisions may only be processed by the Environment and Regulatory Compliance (ERC) Manager. It is anticipated that most of the revisions to this EPP will be initiated by the Environment and Regulatory Compliance Team at the work fronts or at the Lower Churchill Project office in St. John's.

Project Delivery Team (PDT) staff will request revisions through document control. EPP holders and readers/reviewers (within the PDT, government agencies, contracting firms, other stakeholders, etc.) may request revisions by forwarding a completed Revision Request Form (RRF), to the ERC Manager. These revision requests will be screened and reviewed by the ERC Manager and forwarded to the Project Manager for approval.

Compliance Instructions

Revision requests that have been accepted by the Project Manager will be sent to ERC Manager for distribution to key Project participants as "Compliance Instructions". These instructions will be signed off by key holders of the EPP and returned within two (2) days of receipt. A log of compliance instructions will be maintained by the Environmental Engineering Coordinators, and these will be incorporated periodically into a revised edition of the EPP.

Revision Procedures

Revisions to the EPP will be made annually, or as required, in accordance with Project document control procedures. The ERC Manager will issue the accepted revisions of the EPP to key holders, Contractors, and readers/reviewers. Each revision will be accompanied by a Revision Control Record that:

- Identifies all compliance instructions that have been issued since the last revision; and

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- Lists the sections being superseded.

Within two (2) working days of receiving a revised Plan, EPP holders will:

- Familiarize themselves with revised sections of the EPP;
- Incorporate all revisions into their areas of responsibility, as appropriate;
- Ensure that all Personnel are familiar with the revisions; and

Acknowledge receipt of the revised EPP by forwarding via fax, email, or mail a signed and dated Acknowledgement Form to the ERC Manager.

10 PROJECT ENVIRONMENTAL AWARENESS

The LCP is committed to engaging field workers in an active environmental orientation and ongoing environmental awareness program. All Project Personnel undertaking activities in the field must receive environmental orientation training prior to initiating work. The orientation will focus on LCP environmental policies, and the environmental protection procedures associated with the field work that will be completed.

10.1 EMPLOYEE ORIENTATION

A Project HSE orientation will be presented to all Personnel that arrive at a Project Site. The orientation is considered a prerequisite to entering any of the LCP Sites. The environmental component of the orientation will include elements of this EPP such as: environmental protection procedures; proper storage and handling of materials; encounters with wildlife, rare/endangered species, historic resources, waste management and emergency response.

The project HSE orientation will include a review of the following:

- Environmental policies;
- Environmental components of concern;
- Environmental protection measures;
- Non-compliance and corrective actions procedures;
- Environmental contingency measures;
- Incident reporting requirements;

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- f) Regulatory requirements; and
- g) Construction site rules and regulations.

All Personnel who attend the Project HSE Orientation session will be required to sign an attendance sheet.

10.2 VISITOR ORIENTATION

A temporary orientation will be provided to those persons who have arrived at the Project, but will not be completing any field construction work (meetings, office work, deliveries, etc.). The Visitor orientation will cover relevant environmental protection measures, project emergency procedures, environmental incident reporting requirements, and other general project environmental requirements.

Any person, who has not taken the full orientation program will be supervised by a designated, fully Authorized Escort at all times, and will abide by the EPP.

10.3 CONTRACTOR ORIENTATION

Contractors may develop and deliver additional environmental orientations to their workforces, Visitors, consultants and inspectors on the details of their C-SEPP, and/or corporate requirements. The Contractor orientations are subject to review and approval by the Regulatory Compliance Lead.

10.4 TOOLBOX MEETINGS

Toolbox meetings (informal task overviews) will be held by Contractors with their field crews and supervisors at the beginning of each work shift. The toolbox meeting will involve discussion of work task assignments for the day and any associated safety hazards, and shall be documented and signed by all attendees. These meetings will also provide the opportunity to discuss environmental concerns and applicable mitigation measures that apply.

11 RELEVANT LEGISLATION

There are provincial, federal and municipal regulatory requirements that apply to the design and construction of the Project. Compliance will be facilitated through a program of environmental compliance monitoring, primarily implemented by the OSEM. The Project has adopted Nalcor Energy's Corporate Environmental Policy and Guiding Principles and its Environmental Management System meets the requirements of ISO 14001:2004

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(Environment). The environmental protection measures and mitigation associated with this Project will meet the same high corporate standard.

All work undertaken during the design, construction and commissioning phases of this Project will be in accordance with current environmental regulatory requirements. These include, but are not limited to, the federal and provincial regulatory requirements provided below. In the case of conflicting requirements, the more onerous will apply.

11.1 FEDERAL

- a) Canadian Environmental Assessment Act (CEAA)
- b) Canadian Environmental Protection Act (CEPA)
- c) Species at Risk Act (SARA)
- d) Navigable Waters Protection Act (NWP)
- e) Transportation of Dangerous Goods Act, 1992
- f) Oceans Act
- g) Canada Shipping Act
- h) Migratory Birds Convention Act
- i) Fisheries Act

11.2 PROVINCIAL

The following provincial acts and regulations apply to one or more aspects of the Project:

- a) Dangerous Goods Transportation Act
- b) Endangered Species Act
- c) Historic Resources Act
- d) Lands Act
- e) Environmental Protection Act (EPA)
 - i) Air Pollution Control Regulations, 2004

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- ii) Gasoline Volatility Control Regulations, 2003
- iii) Pesticides Control Regulations, 2003
- iv) Storage and Handling of Gasoline and Associated Products Regulations, 2003
- v) Used Oil Control Regulations, 2002
- vi) Waste Diversion Regulations, 2005
- vii) Waste Management Regulations, 2003
- viii) Waste Material Disposal Areas, 1996
- f) Wild Life Act
- g) Water Resources Act, 2003
- h) Health and Community Services Act, 1997

11.3 PERMITS AND APPROVALS

Necessary government approvals, permits, licenses and authorizations must be obtained before any field work is initiated. An assessment should be completed of all required permits and approvals, and copies of permit applications and permits must be provided to the Regulatory Compliance Lead prior to work being initiated. Project Personnel will comply with all conditions of such approvals, permits, licenses or authorizations.

For a detailed discussion of the regulatory requirements for the Project see the Regulatory Compliance Plan (RCP) (LCP-PT-MD-0000-RT-PL-0001-01). The RCP also provides additional information on roles and responsibilities for the acquisition of the necessary regulatory approvals.

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12 ENVIRONMENTAL PROTECTION PROCEDURES

Appropriate environmental protection measures will be incorporated into all phases of the Project. Mitigation shall be consistent with applicable standards, codes, acts and regulations. The following environmental protection procedures shall be used as guidance during the construction phase.

12.1 GENERAL PROCEDURES

12.1.1 Equipment Operation and Movement

A variety of equipment will be used on Site during construction. This is a potential source of noise, air emissions, and potential leaks or spills.

Environmental Concerns

Noises associated with equipment operation and movement may negatively affect humans and wildlife. Air emissions may have air quality implications. Accidental leaks or spills of fuel or other hazardous materials may affect soils, water, fish, vegetation and wildlife. Tracked equipment has the potential to disturb the ground around/at the Site.

Environmental Protection Procedures

- a) All approvals, authorizations and permits for Project activities shall be followed;
- b) Noise control procedures shall be followed during construction (refer to Section “Noise Control”);
- c) All equipment shall have exhaust systems regularly inspected and mufflers shall be operating in accordance with manufacturer’s recommendations;
- d) Contractor shall inspect equipment required for construction before use, to reduce the potential for non-native and invasive plant species (i.e., plants not native to Newfoundland and Labrador, or to the local area) upon arrival at site. There should be no visible sign of plants or soil found in the tracks of the equipment. Equipment found to have soil attached will be cleaned (e.g., pressure washed) to remove this potential seed source;
- e) All equipment (e.g., diesel generators, etc.) shall meet the requirements of the NL Air Pollution Control Regulations under the *Environmental Protection Act* (O.C 2004-232), as required. Diesel generators shall be registered with NLDOEC, as required. Refer to the guidance document for Approval of Diesel

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Generators (GD-PPD-061) for the registration form and guidance on completion. Generators built to Tier 4 Final emission standards may be exempt from NLDOEC Certificate for Approval;

- f) Contractor shall visually inspect all equipment for leaks in all lines and connecting joints on the equipment upon arrival at Site;
- g) All equipment used during construction shall follow the environmental protection procedures outlined in this EPP. In the case of an accidental event resulting from the use of equipment (e.g., a fuel spill). Refer to the “Contingency Plans” Section of this document; For Land Based Operations biodegradable lubricants and hydraulic fluids will be used when working in or near water-bodies (within 20 m) provided;
- h) For Land Based Operations biodegradable lubrications and hydraulic fluids will be used when working in or near waterbodies within 20 m;
- i) For Marine Based Operations biodegradable lubricants and hydraulic fluids will be used where a leak would result in a direct loss to a water course (i.e., an uncontained area);
- j) Biodegradable lubricants and hydraulic fluids shall be used as noted above unless demonstrated by the Contractor and accepted that it is not feasible because of:
 - o Technical or performance constraints;
 - o Negative impacts on equipment warranties;
 - o Cost constraints; and/or
 - o Unavailability of biodegradable oils and lubricants.
- k) The Contractor shall document the consideration of this issue providing, as a minimum, the following information:
 - o Cost differential in using biodegradable and non-biodegradable oils and lubricants;
 - o Life cycle cost differential for equipment maintenance and operation;
 - o Product specifications indicating the product meets the definition of “biodegradable” when tested in accordance with the OECD 301b ready biodegradability test procedure; or
 - o Reasons (e.g. Technical, market availability, equipment warranty provisions, etc.) for not using biodegradable fluids, should that option be proposed.

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- l) Heavy equipment must operate from the dry above the water level. Equipment shall enter the water course/water bodies only during fording and in accordance with terms and conditions of fording approvals and regulator guidance documents; and
- m) Contractor shall regularly maintain and inspect all equipment. If problems are identified the equipment shall be taken out of service and repaired to prevent release of hydrocarbons into the environment.

12.1.2 Storage, Handling, Use and Disposal of Fuel and Other Hazardous Materials

Environmental Concerns

A variety of fuels and potentially hazardous materials will be used during Project construction activities. Gasoline, diesel fuel, grease, motor oil and hydraulic fluids are all needed for equipment. The primary concern regarding the use of fuel and hazardous materials is their uncontrolled release to the environment through spillage, and the subsequent adverse effects on human health and safety, terrestrial, aquatic and marine habitat and species, soil, and groundwater quality.

Environmental Protection Procedures

12.1.2.1 Storage, Handling and Disposal

- a) All fuel, hazardous and controlled product storage areas, including temporary and permanent fuelling and fuel storage facilities shall be designed in accordance with applicable codes and regulations, including the Storage and Handling of Gasoline and Associated Products Regulations, 2003 (referred to as the GAP Regulations);
- b) Only trained, qualified persons shall handle fuels and other hazardous materials. The Workplace Hazardous Materials Information System (WHMIS) shall be implemented to ensure proper handling and storage is achieved. Operators shall be in attendance for the duration of all fuelling operations;
- c) Extra precautions should be taken when fuelling during times of high winds and inclement weather to ensure spills are not encountered;
- d) Waste/used oil less than 205 L shall be stored in accordance with NLR 82/02, Used Oil Control Regulations;

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- e) Contractor shall inspect used oil tanks on a regular basis as per Section 24 of the Used Oil Control Regulation (NLR 82/02) and Sections 20 and 21 of the GAP Regulations. This includes, but is not limited to, gauging or dipping and the keeping of reconciliation records for the duration of the program.
- f) Waste/used oils shall be reused, recycled or disposed of at an approved, licensed waste management facility in accordance with regulatory requirements (Used Oil Control Regulations) by the Contractor;
- g) Storage areas shall be equipped with firefighting equipment, in accordance with approvals;
- h) Smoking shall be prohibited within 50 m of a fuel storage area; and
- i) Diesel fuel and gasoline to be used for refueling purposes shall be stored in appropriate containers. Containers shall be clearly identified stating container contents.

In general, the GAP Regulations apply to all stationary storage tanks and storage tank systems except in the following cases:

- i. Tanks with capacities of 2500 L or less that are connected to a heating appliance;
- ii. Tanks that are designed, constructed and utilized in the inherent operation of a piece of equipment. In this case, the tanks must be physically secured and dedicated to the equipment requiring the fuel for its operation; and
- iii. “Mobile” tanks (e.g., tank trucks and tank truck trailers) used for temporary stationary storage. In this case storage period must not exceed fourteen (14) days and no additional fuel can be added to the tank.

12.1.2.2 Fueling and Lubrication

- a) In all cases, qualified Personnel shall attend the transfer to storage tanks for the duration of the operation. This person shall be trained in proper fuel handling procedures to minimize the risk of a spill. The attendant shall be trained in the requirements of the fuel suppliers approved Spill Contingency Plan, Master Spill Response Plan (MSRP) and WHMIS;
- b) Hoses or pipes used for fuel transfer shall be equipped with properly functioning and approved check valves, spaced to prevent backflow of fuel in the case of failures;
- c) All tanks shall be dipped to measure fuel volume before and after filling;

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- d) Fuel transfers between ship and shore or between ships shall be conducted in accordance with the Canada Shipping Act, Oil Pollution Prevention Regulations;
- e) Exposed pipelines shall be protected from vehicular collision damage by the installation of guardrails or other suitable barrier;
- f) Exposed “ship to shore” fuel transfer lines shall be clearly flagged from the shoreline to the receiving fuel tank to prevent traffic collision during transfer operations;
- g) Fuelling and lubrication of equipment shall occur in such a manner as to minimize the possibility of contamination to soil or water. When refueling equipment, operators shall:
 - i) Use leak-free containers and reinforced rip and puncture-proof hoses and nozzles;
 - ii) Be in attendance for the duration of the operation; and
 - iii) Seal all storage container outlets except the outlet currently in use.
- h) Fuelling (>25 L) or servicing of mobile equipment on land shall not be allowed within 30 m of watercourses or waterbodies.

12.1.2.3 Hazardous Materials

- a) Hazardous materials shall 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. WHMIS and the provisions of the *Transportation of Dangerous Goods Act* shall be implemented throughout the job site. All Employees involved with hazardous materials shall be appropriately trained;
- b) All hazardous wastes shall be stored, removed and disposed of in accordance with regulatory requirements;
- c) Material Safety Data Sheets (MSDS) must be available on site prior to receipt of any hazardous materials;
- d) A hazardous waste storage area shall be available and properly marked; and
- e) Hazardous waste shall not be permitted to be poured down drains, oil/water separators, septic systems or discharged into the environment in any form.

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12.1.2.4 Spill Kits

- a) Contractors shall at all times maintain in good condition at least one spill kit dedicated to each piece of mobile heavy equipment. Each spill kit shall be located on the equipment and stored in a weather-proof container, and each spill kit shall have an absorption capacity of no less than 23 L.
- b) In addition to equipment-dedicated spill kits, each drilling location shall have emergency spill response equipment that shall have sufficient absorption capacity for 1000 L of fuel or hazardous liquids
- c) Each marine vessel shall have at least one spill kit with appropriate equipment for response to a spill reflecting vessel size and function. It is expected that the C-SEPP shall prescribe specific equipment lists for each vessel, in accordance with appropriate regulations.

12.1.2.5 Spills and Leaks of Fuel and Hazardous Materials

- a) All necessary precautions shall be implemented to prevent the spillage and leakage of fuels and other hazardous materials;
- b) All spills of fuel and hazardous materials shall be reported immediately to the OSEM. In the event of a spill refer to the MSRP;
- c) Any soil contaminated by small leaks of fuel, oil or grease from equipment (including hydraulic hose ruptures and loss of fluid) shall be disposed of in accordance with provincial regulations; and
- d) A copy of the MSRP shall be present on site or on board of each marine vessel. In the event of a spill the outlined procedures shall be followed.

12.1.2.6 Fuel Storage Requirements

- a) Fuel storage tanks shall comply with GAP Regulations and shall be equipped with vacuum gauges and vent pipes, as applicable.
- b) Waste oil storage tanks shall comply with the Used Oil Control Regulations, 2002;
- c) All bulk fuel and waste oil storage (> 2000 L) shall be in tanks with suitable secondary containment (i.e. double walled, self dyked, lined, earthen dyke etc.);

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- d) Diesel fuel and gasoline to be used for refueling purposes shall be stored in appropriate 20 L containers (i.e. yellow containers for diesel, red containers for gasoline). Containers shall be clearly identified stating container contents;
- e) A letter of consent shall be obtained from designated officials of the Service NL for fuel caches of 10 or more 205 L drums (including helicopter fuel caches). A letter of consent is not required for fuel caches under ten (10) drums;
- f) A marker stake or flag shall be required for a petroleum products storage site of less than 10 x 205 L drums;
- g) Boundary poles or posts with colorful flags or a painted marker shall be required for temporary petroleum product sites of 10 to 100 x 205 L drums;
- h) Fuels stored inside dykes or self-dyked units shall be clearly marked to ensure they are not damaged by moving vehicles and are visible under all weather conditions. Dykes and barriers shall be designed and constructed in accordance with the GAP Regulations;
- i) Used oil shall be stored in an appropriate storage tank meeting the requirement of Sections 18 and 21 of the Used Oil Control Regulations;
- j) Used oil can be stored in a 205 L drum as long as the drum is:
 - i. clearly marked "used oil";
 - ii. made of 18 gauge steel;
 - iii. stored in an area providing secondary containment;
 - iv. equipped with sufficient size openings to prevent spillage during filling or emptying;
 - v. equipped with venting if they are intended to be vacuumed out; and
 - vi. in compliance with CAN/GSSB-43.150-95 if they are to be transported by road.
- k) All used oil tanks shall be inspected on a regular basis as per Section 24 of the Used Oil Control regulation. All fuel storage tank systems shall be inspected on a regular basis as per Sections 20 and 21 of the GAP Regulations. This involves, but is not limited to, gauging or dipping and the keeping of reconciliation records for the duration of the program.

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12.1.2.7 Fuel Transfer

The following procedures shall apply to the transfer of fuel or hazardous material:

- a) In all cases, a qualified person shall attend the transfer to storage tanks, for the duration of the operation. This person shall be trained in proper fuel handling procedures to minimize the risk of a spill. The attendant shall be trained in the requirements of the fuel suppliers approved Spill Contingency Plan, MSRP and WHMIS;
- b) Hoses or pipes used for fuel transfer shall be equipped with properly functioning and approved check valves, spaced to prevent backflow of fuel in the case of failures;
- c) All tanks shall be dipped before and after filling;
- d) Fuel transfers between ship and shore or between ships shall be conducted in accordance with the *Canada Shipping Act*, Oil Pollution Prevention Regulations;
- e) Exposed pipelines shall be protected from vehicular collision damage by the installation of guardrails; and
- f) Exposed “ship to shore” fuel transfer lines shall be clearly flagged from the shoreline to the receiving fuel tank to prevent traffic collision during transfer operations.

12.1.3 Solid Waste Management

Environmental Concerns

Solid waste if not properly controlled and disposed of, can be unsightly, may cause human safety and health concerns, and could negatively affect wildlife.

Environmental Protection Procedures

- a) Solid waste (non-hazardous) produced by Project Personnel and operations shall be collected and removed from the worksite for disposal at an approved waste disposal facility or for deposit at an appropriate reuse or recycling facility;
- b) Waste material generated on Site shall be collected in a proper container so that it does not pose an environmental, safety or health hazard, or cause conflict with wildlife or land users;
- c) No waste material shall be deposited in a body of water;

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- d) Waste material shall not be deposited anywhere except at a facility or site approved to accept that specific type of waste;
- e) Waste reduction measures shall be encouraged;
- f) All recyclable and reusable materials shall be collected and transported to appropriate facilities for recycling or reuse on a regular basis;
- g) Project Personnel should be aware of the Waste Management Plan (WMP).

12.1.4 Sewage Disposal

Environmental Concerns

The accidental release of untreated sewage is a concern to human health, drinking water quality, and freshwater and marine ecosystems. All sewage disposal activities shall comply with Newfoundland and Labrador's *Health and Community Services Act*, 1997 and the Environmental Control Water and Sewage Regulations, 2003 under the *Water Resources Act*, 2003.

Environmental Protection Procedures

- a) Portable washrooms and toilets shall be routinely inspected and properly maintained. Sewage sludge removed from the facilities shall be transported off site for approved treatment and disposal. All human sanitary waste must be contained and disposed in a manner that meets all environmental and health requirements;
- b) Sanitary facilities shall be provided and maintained by a reputable vendor in an appropriate manner, suitable for use. Regular maintenance (or swap out) system shall be provided; and
- c) Any concerns must be brought to the immediate attention of the OSEM.

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12.1.5 Noise Control

Environmental Concerns

A variety of noises associated with the Project (e.g., drilling, cable laying vessels, and road construction) can adversely affect wildlife and fish and can affect human safety and health. These activities may occur twenty-four (24) hours a day over the duration of the Project.

Environmental Protection Procedures

- a) Contractor to provide a Blasting Plan which would include such material as a Table of Contents sample, communication plan, mitigation measures such as limited size charges in sensitive areas (e.g., schools, residences [residents within 1 km shall be notified in advance of blasting to minimize disturbance], medical facilities, retirement homes and places of spiritual importance);
- b) Measures shall be implemented wherever possible to minimize potential effects arising from a variety of noise sources, including adherence to all applicable permits, approvals and municipal by-laws;
- c) Frequent and open communication will be conducted with nearby residents to identify and address any noise complaints. Complaints will be addressed on a case by case basis and mitigation options investigated (i.e., enclosing noisy equipment and constructing temporary noise-reducing berms);
- d) During drilling activity at Forteau Point and Shoal Cove, Nalcor shall evaluate and apply appropriate mitigation with respect to noise control;
- e) A complaints resolution process shall be employed to address the generation of excessive noise. Nalcor shall confirm the validity of the complaint and implement corrective actions as warranted and appropriate.
- f) High noise-producing equipment shall be strategically placed as far away as practical from receptors;
- g) All equipment shall have appropriate mufflers and shall be well maintained;
- h) Blasting mats shall be used in environmentally sensitive areas, as well as sound barriers or berms to minimize sound pressure levels, if warranted.

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12.1.6 Air Quality

Environmental Concerns

The environmental concerns associated with air emissions (emissions from vessels, vehicles, equipment and dust) include effects on human health and aquatic ecosystems, waterfowl and vegetation.

Environmental Protection Procedures

- a) Contractors shall maintain and operate equipment, vehicles and vessels with an aim to minimize exhaust emissions;
- b) All equipment (e.g., diesel generators, etc.) shall meet the requirements of the NL Air Pollution Control Regulations under the *Environmental Protection Act*.
- c) Mobile diesel generators shall be registered DOEC. A Certificate of Approval is required for generating facilities having a total installed capacity greater than 100 kW and which operate or are anticipated to operate more than 500 hours per year. Generators built to Tier 4 Final emission standards may be exempt from NLDOEC Certificate for Approval;
- d) Dust from construction activities may be controlled using frequent applications of water. Waste oil shall not be used for dust control; and
- e) Bulk fuel reconciliations (diesel and gasoline) shall be reported to the OSEM on a monthly basis.

12.1.7 Helicopter Traffic

Environmental Concerns

Helicopter use at the Project site during construction may be required. Noise from the aircraft may disturb wildlife. Collisions with wildlife could result in mortality for both wildlife and humans and fuelling of helicopters may result in spills.

Environmental Protection Procedures

- a) All aircraft shall maintain an altitude of no less than 500 m from concentrations of birds or other wildlife;
- b) Flights for wildlife viewing or photography are not permitted, except when conducting wildlife surveys;
- c) The OSEM shall inform all charter pilots of the EPP requirements;

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- d) All aircraft shall inform the contractor of their expected arrival and departure times;
- e) Helicopters moving through waterfowl staging areas (typically May or September) shall maintain a minimum altitude of 500 m from concentrations of waterfowl; and
- f) Helicopters should maintain a 300 m buffer from known raptor nests from May 15 to August 15 in Labrador and May 1 to August 15 on the island.

12.1.8 Construction Entrance

Environmental Concerns

Construction entrances typically consist of a gated right-of-way and a security building, where possible. Environmental concerns include the vegetation clearing that may be required for the construction of these features and tracking of dirt and mud from the site onto public roads and streets.

Environmental Protection Procedures

Measures to remove mud and dirt from vehicles, heavy equipment and pedestrians shall be required. Measures include rumble racks, tire washes and sediment traps.

- a) All cleaning activities should occur on a gravel pad with runoff running through a sediment trapping device prior to discharge;
- b) The gravel pad should be designed for the heaviest vehicle anticipated on Site;
- c) Ensure proper cleaning of machinery/vehicles to prevent potential spread of invasive species;
- d) Ensure all site traffic use the facility and ensure the sediment trapping device is cleaned and maintained regularly;
- e) Temporary erosion control measures shall be applied as required in the area of vegetation clearing for any gate areas or entrance buildings ; and
- f) Machinery/vehicles shall be properly cleaned to prevent potential spread of invasive species.

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12.2 ONSHORE PROCEDURES

12.2.1 Horizontal Directional Drilling

Environmental Concerns

The environmental concerns associated with HDD include surface disturbances, disposal of drilling fluids and cuttings, frac-outs, management of fuel or other hazardous materials, generation of dust, noise, and potential effects on terrestrial and marine environment.

Environmental Protection Procedures

- a) Drilling sites shall be cleared of vegetation following the procedures detailed in Section, "Clearing of Vegetation";
- b) Drill paths shall be designed to an appropriate depth below the seabed to minimize the risk of frac-out and to a depth to prevent the line from becoming exposed due to natural scouring of the seabed (refer to Section, "Frac-Out" within this document for description of frac-out and associated response procedures);
- c) Machinery shall arrive on Site in a clean condition and is to be maintained free of fluid leaks;
- d) Drilling equipment shall have appropriate muffled exhaust to minimize noise;
- e) All fuel, lubricants and other hydrocarbons shall be stored, handled and transported according to Section, "Storage, Handling, Use and Disposal of Fuel and Other Hazardous Materials" within this document. All shall be stored with secondary containment. Only necessary quantities shall be stored at the drill rig at any time;
- f) Drill mud shall be recovered from the boreholes and conduit to the extent possible. Where possible, drill muds that are not recovered will not be released into the environment;
- g) Appropriate storage capacity shall be located at the drilling Site to contain drilling mud to prevent sediment and other substances from entering the marine environment;
- h) Drill mud shall be recycled and the cuttings shall be disposed of in accordance with Service NL approval. If the water content of drill cuttings exceeds limits allowed for disposal as a solid waste, than it shall be mixed with sawdust or other suitable inert mixing agent, so that it meets the requirements for landfill disposal;

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- i) Turbidity from the release of drill water shall be localized to the area of the drill Site and shall cease after drilling is complete. Release of suspended solids shall be frequently monitored by the OSEM. Turbidity shall not be released into natural water bodies/ water courses;
- j) Marine environment shall be monitored to observe signs of surface migration (frac-out) of drilling mud during all phases of construction;
- k) All drill workers shall be familiar with oil spill response procedures and frac-out plan. All fuel spills shall be handled in accordance with the MSRP. Frac-out response procedures are discussed in Section, “Frac-Out”;
- l) In the event of a spill, all drilling activity shall cease until cleanup is performed;
- m) If water withdrawal is required for drilling, a notification may need to be sent to Department of Fisheries and Oceans (DFO) for review. A NLDOEC Water Use License is also required;
- n) Drilling mud, together with drilling cutting and return water, shall be treated using a polydrill filter box or suitable alternative. Solids collected shall be disposed of in accordance with Service NL approval. All treated water shall be discharged on land to the environment in a manner that will promote infiltration into overburden soils and will not enter or impair water bodies. If drilling mud is required, biodegradable products such as clear-bore or an approved equivalent shall be used. The type shall be documented and MSDS provided and kept on file;
- o) Water extraction rates shall be established, under approval of the NLDOEC, to address concerns for drawdown or potential effects on the water table, and to ensure withdrawal from surface water bodies does not affect the natural flow regime and fish/fish habitat; and
- p) Applicable reference documents included Freshwater Intake End-of Pipe Fish Screen Guidelines, 1995, Freshwater Intake End-of-Pipe Fish Screen Fact Sheet, Guidelines for the Protection of Freshwater Fish Habitat in Newfoundland and Labrador, 1998, and the Environmental Policy for Allocation of Water Use (NLDOEC).

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12.2.2 Trenching

Environmental Concerns

The land cables will be trenched approximately 2 meters underground to the two (2) transition compounds located approximately 1 kilometer from the steel conduit land entry location. Environmental concerns include runoff of sediment-laden water that could result in effects on marine or freshwater fish and fish habitat and water quality during construction. Sedimentation control systems shall be implemented.

DFO and NLDOEC shall be made aware of any watercourses to be crossed, as well as methods for crossing.

Environmental Protection Procedures

The following measures shall be implemented to minimize the potential effects of trenching:

- a) Topsoil and excavated overburden and bedrock shall be stored in separate stockpiles for later use during rehabilitation if practical;
- b) Any unsuitable material shall be disposed of in a disposal area to be confirmed by the OSEM;
- c) Dewatering of trenches, if required, shall make use of filtration or other suitable measures such as settling ponds, silt fences and dikes, for sediment removal and turbidity reduction before discharging. Final discharge of water shall be to a well vegetated area.

12.2.3 Excavation, Backfilling and Grading

Excavation, backfilling and grading of common rock and other materials may be required at various locations within the Project Site.

Environmental Concerns

The principal environmental concerns associated with excavation, backfilling and grading are potential effects on water quality and fish and fish habitat due to run-off of sediment laden water. Potential disturbance listed plant species and habitat and archaeological resources must also be taken into account.

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Environmental Protection Procedures

All work shall be conducted in a manner that ensures the minimum amount of disturbance necessary and controls potential sedimentation of watercourses and waterbodies in or adjacent to the work areas as outlined in the following procedures:

- a) Excavation, backfilling and grading shall be done only after grubbing and stripping is completed. Where engineering requirements do not require grubbing and stripping (e.g., within the buffer zone of a stream crossing), filling shall occur without any disturbance of the vegetation mat or the upper soil horizons;
- b) Excavation, backfilling and grading in the vicinity of stream crossings shall be done in a manner that minimizes erosion and sedimentation of watercourses and water bodies; and
- c) A buffer zone of undisturbed vegetation shall be maintained between construction areas and all watercourses, waterbodies and ecologically sensitive areas (refer to Section, "Construction Buffer Zones").

12.2.4 Road Construction

Environmental Concerns

Environmental concerns associated with access road construction include potential effects associated with sedimentation/erosion and the loss of vegetation and effects to fish/wildlife habitat.

Environmental Protection Procedures

- a) Aggregate (fill) materials for construction purposes shall not be removed from any stream;
- b) Sedimentation control measures shall be implemented as determined on Site by Contractor Personnel and accepted by the OSEM. Solids that accumulate in a settling pond or behind a sediment trap shall be removed on a regular basis to ensure such systems remain effective;
- c) Work shall not be undertaken on easily erodible materials, during or immediately following heavy rainfalls without approved protection measures in place;
- d) Buffer zones shall be flagged prior to any disturbance activities, as required;
- e) Natural vegetation shall be left in place where possible. Rights-of-way, particularly in areas of dense vegetation, shall be as narrow as practicable; loss of ground vegetation shall be kept to a minimum;

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- f) Roads shall be adequately ditched to allow for good drainage. Where possible, ditches shall be kept at the same gradient as the road;
- g) Drainage from areas of exposed fill shall be controlled by grade or ditching and directed to vegetated areas away from all watercourses and at least 30 m from stream crossings. These drainage areas shall be determined in consultation with the OSEM;
- h) Surface water shall be directed away from work areas by ditching. Runoff from these areas shall have sediment removed by filtration or other suitable methods as outlined in the following Section, "Erosion Prevention and Sedimentation Control";
- i) Check dams shall be used as required to reduce runoff from work areas with exposed soil; and
- j) In areas where natural vegetation must be removed, the topsoil layer shall be separately stored from grubbed material for rehabilitation.

12.2.5 Erosion Prevention and Sedimentation Control

Environmental Concerns

The potential for erosion and resulting effects to water quality, fish and fish habitat is an important environmental concern associated with construction activities.

Environmental Protection Procedures

Erosion prevention and sedimentation control shall be a main objective in all work areas where soil may be transported by water, wind, or ice. Erosion and sedimentation control measures shall be prepared and submitted by the Contractor as part of the C-SEPP for land based activities, and approved by Nalcor prior to the start of site activities.

All work to be carried out shall be conducted according to the conditions set out in the permits and/or approvals and authorizations.

- a) Vehicle and equipment movement shall be restricted on the Project site to approved roadways and designated construction areas. Appropriate drainage and erosion control techniques shall be implemented;

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- b) All work shall be performed in such a manner that deleterious substances including, but not limited to, materials such as sediment, fuel, and oil do not enter water bodies adjacent to the development site.
- c) Erosion control techniques and devices shall be used to stabilize easily eroded areas.
- d) Topsoil and excavated overburden shall be stored in separate stockpiles for later use.
- e) Runoff of sediment-laden water during grubbing shall be minimized by using measures such as settling ponds, ditch blocks, interception ditches and filter fabrics. Erosion control measures such as rip-rap, filter fabrics, drainage channels, and gravel or wood chip mulches shall be implemented in areas prone to soil loss.
- f) All discharges of run-off from Construction activities shall conform to the Environmental Control Water and Sewage Regulations, 2003 under the *Water Resources Act* (O.C. 2003-231).
- g) Siltation control structures (i.e., silt curtains, cofferdams, and/or sediment fences) shall be constructed prior to beginning any activities involving disturbance of the soil, work along the shoreline or near areas of high runoff potential. Construction activities shall be coordinated to avoid periods of extreme precipitation and not coincide with sensitive periods for fish as identified by DFO.
- h) Where terrain stabilization measures are required to protect marine and freshwater habitat from sedimentation, appropriate erosion control techniques shall be implemented to mitigate the problem and provide siltation control ;
- i) Further mitigation measures shall be implemented if an environmental inspection reveals that silt is entering a water body. These include measures such as temporary drainage ditches, siltation settling ponds, ditch blocks/check dams or sediment dam traps, to intercept runoff or grading surfaces to remove erosion channels. The necessary and appropriate measures shall be determined on site.
- j) All work and marshalling and storage areas shall be monitored for erosion and appropriate repair action taken as necessary.
- k) Siltation control structures shall be monitored by the Site Environmental Coordinators for excessive accumulation of sediment. Accumulated sediment shall be removed from control structures to maintain the effectiveness of the systems.
- l) Excess water shall be removed from siltation control systems prior to excavation of sediment.

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12.2.6 Dewatering Work Areas

Environmental Concerns

The major concerns associated with dewatering are sedimentation and direct fish mortality and/or habitat destruction for freshwater and marine fish species.

Environmental Protection Procedures

- a) Prior to undertaking any site dewatering the Contractor shall provide to the OSEM, a dewatering protocol, including specific discharge management procedures.
- b) Filtration or other suitable measures, such as settling ponds, silt fences and dykes, shall be implemented for sediment removal and turbidity reduction of water pumped from work areas before discharging (Refer to Section “ Erosion Prevention and Sedimentation Control” within this document).
- c) Where possible, clean water shall be discharged to vegetated areas to further reduce any potential effects on watercourses. Additionally, mechanisms for energy dissipation shall be implemented to prevent scouring and erosion of the discharge location (impervious geotextile mats, perforated end of pipe, discharge to small settling sump, etc.).
- d) The size of sedimentation ponds shall be designed to accommodate the anticipated volume of collected water and meet discharge criteria for water quality.
- e) Discharged water shall be encouraged to follow natural surface drainage patterns.
- f) Measures shall be employed to prevent the alteration, disruption and destruction of fish habitat.
- g) Any water directed out of the Project site shall be tested for Total Suspended Solids (TSS) and hydrocarbons (only if there are visible signs of hydrocarbon contamination) before being discharged to any watercourse, water body or other ecological sensitive area.
- h) Prior to periods of anticipated high rainfall, settling ponds shall be lowered to the extent possible, and erosion and sediment management measures shall be checked for adequacy and to make sure they are all properly secured.
- i) Where pump discharges are to a vegetated areas to trap sediment, these discharge locations shall be checked during periods of high flow and adjusted or stopped if they are not effective.

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- j) Adequate materials, including silt fencing, hay bales, riprap, and filter fabric shall be available to maintain silt control measures under adverse weather conditions.

12.2.7 Construction Buffer Zones

Environmental Concerns

The potential negative effects from erosion, sedimentation and spills are a key environmental concern associated with construction activities. Buffer zones of natural vegetation or undisturbed areas that separate these environmental receptors from construction activities are needed to mitigate adverse environmental effects. These undisturbed areas may also provide wildlife habitat and/or travel corridors near work areas and Project features.

Due to the many buffer zones referenced in various government documents and others that may be stated in regulatory permits yet to be obtained, the appropriate buffer zone to use in a specific area may vary. Therefore, the OSEM shall be the only site-based Personnel to determine which buffer is applicable, and Contractors shall be required to consult with the individual prior to establishing buffers. For general guidance, however, the following procedures shall define the minimum requirements during construction.

Table 12-1 below illustrates buffer zones recommended for various activities.

Environmental Protection Procedures

- a) A minimum buffer zone of natural vegetation 20 m (20 m + 1.5% slope) from the high water mark of waterbodies, watercourses and ecologically sensitive areas will be maintained around work areas where available space poses a constraint, except where specified otherwise. If the available space allows, then wider buffer zones of 100 m shall be maintained between construction areas and watercourses, waterbodies and ecologically sensitive areas.
- b) Sediment control devices shall be constructed outside buffer zones as required under the supervision of the OSEM. This is required to control runoff from areas of exposed soils and prevent transport of sediments towards water bodies. Section, "Erosion Prevention and Sediment Control" within this document outlines all acceptable sediment control measures. All sediment control measures shall require removal of sediment as it accumulates and inspection and repair as required (refer to DFO Fact Sheet on Filter Fabric);

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- c) A minimum buffer zone of 100 m from the high water mark of water bodies, watercourses and ecologically sensitive areas shall be maintained for use of any bulk fuel storage activities (See Table 12-1);
- d) The typical buffer zone for quarries and borrow pits in relation to a water body is 100 m. In some instances the development of quarries and borrow pits shall be allowed within this 100 m buffer zone, however applicable permits from regulators shall be required, as well as consultation with the OSEM and;
- e) A minimum buffer of 50 m shall be maintained around any archaeological site. Site specific mitigative measures for known historic resources in the Project area are addressed within Section, “Discovery of Historic and Archaeological Resources” within this document.

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Table 12-1 - Recommended Buffer Strips for Various Activities

Activity	Environmental Receptor	Recommended Width (m) of Buffer Strip
Handling, use and storage of bulk fuels	Waterbody	100 m
Storage and handling of small quantities (<2000L) of fuel in appropriately contained areas and with adequate spill response.	Waterbody	30 m
Handling and use of fuels (including transfer and fuelling of equipment). No bulk fuel storage, however storage of fuel in containers ≤25 L is permitted.	Waterbody	15 m
Clearing of Vegetation	Waterbody	20 m + 1.5% slope
Aircraft Activities	Waterfowl concentrations	500 m vertical distance
Quarrying and aggregate Removal from Borrow Areas	Waterbody	100 m
All activities	Archaeological sites	50 m
Cutting	Waterbody occupied by a beaver	30 m

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12.2.8 Watercourse Crossings

Environmental Concerns

The environmental concerns associated with alterations to a body of water include direct disturbance to fish, loss of fish habitat caused by sedimentation and removal of substrate, and disturbance to stream bank vegetation. Specific erosion stabilization methods and effective sedimentation control practices shall be developed on a Site-specific basis.

Environmental Protection Procedures

Erosion stabilization methods and effective sedimentation control practices shall be implemented when required and these shall conform to requirements, guidelines, and principles contained in NLDOEC Environmental Guidelines, and specific requirements of regulatory permits and approvals.

All watercourse crossings (fording, culvert installation and bridge crossings) shall comply with permits issued by NLDOEC. In addition, a notification form or a request for project review to DFO is required. If a letter of advice is issued for Works and Undertakings Affecting Fish Habitat from DFO, all conditions shall be followed. As required by provincial authorities, Nalcor shall undertake a survey of the watercourse crossing (including collecting information on the stream's morphology, substrate, water velocity, depth, and bank slope at the proposed crossing location).

The following measures shall be implemented to minimize negative effects of watercourse crossings:

- a) All stream crossings for fish-bearing waters shall be designed and constructed to allow fish passage and to preserve aquatic habitat. All permanent culvert installations shall be sized for the 1:100 year flood.
- b) Attention shall be given to scheduling in order to minimize the time the watercourse is disturbed and therefore minimize the sediment entering the watercourse. The ideal time for construction is during low flow and low rainfall period;
- c) Any alterations to a body of water which may affect navigation shall require a Navigable Waters Permit Application under *Navigable Waters Protection Act (NWPA)* request for project review under *NWPA* from TC. If a *NWPA* authorization is issued, the conditions shall be adhered to;
- d) Any alterations to a body of water which may affect water quality shall require a NLDOEC permit(s) under the *Water Resources Act*;

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- e) Where possible, all in water works will be completed inside the appropriate fisheries timing windows (June 1 – September 30 on the Island; June 15 – September 15 in Labrador) – work outside the fisheries timing windows will be done in consultation with DFO;
- f) Watercourse crossing construction activities, in areas of fish habitat, shall be undertaken in accordance with DFO requirements and under the direct guidance of the OSEM;
- g) All water courses and bodies of water shall be surveyed by the OSEM or Subcontractors on a Site-specific basis in order to evaluate each watercourse crossing (including upstream and downstream);
- h) Work shall be performed in such a way as to ensure that materials such as sediment, fuel and oil do not enter watercourses and water bodies;
- i) The banks and flood plains of watercourses must be adequately protected from erosion using an applicable erosion prevention method;
- j) Unless otherwise indicated, all work shall take place in dry conditions, either by the use of cofferdams or by diverting the stream with pumps and hoses. All work involving major alterations to stream channels shall be carried out at a time of low flow, in a manner that prevents downstream sedimentation. Stream diversion (pumps/diversion channels) shall be provided for fish passage for projects of longer duration – DFO regulations for instream works shall be adhered to;
- k) The natural low flow regime of the watercourse shall not be altered; culverts shall not disrupt flow of water or cause ponding at the upstream side of the installation;
- l) The use of heavy equipment in watercourses is restricted; any work that must occur near watercourses shall be minimized, and work to occur at a stream crossing shall be conducted in the driest conditions possible;
- m) As required, cofferdams of non-erodible material shall be installed above and below work areas to separate them from the watercourse when excavating for culverts and footings.
- n) Cofferdams shall be removed upon completion of construction and the streambed returned as closely as possible to its original condition;
- o) Water pumped from work areas or other runoff must have sediment and turbidity removed by settling ponds, filtration, or other suitable means before discharging to a water body; and

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- p) The release of sediment laden water into a waterbed, watercourse or ecologically sensitive area, due to construction activities, shall comply with applicable discharge guidelines as presented in the Newfoundland and Labrador Environmental Control Water and Sewage Regulations, 2003 under the *Water Resources Act*;

12.2.8.1 Fording

When fording any watercourse, the NLDOEC Environmental Guidelines for Fording and the DFO fact sheet for Temporary Fording sites shall be followed in conjunction with the following:

- a) Areas of known or suspected spawning habitat shall be avoided;
- b) Where feasible, crossings shall be restricted to a single location and made at right angles to the watercourse;
- c) Equipment activity within the watercourse shall be minimized by limiting the number of crossings. Equipment shall only be in the watercourse during fording;
- d) All equipment shall be clean and mechanically sound to avoid the introduction of oil, gasoline, and hydraulic fluids to waterbodies;
- e) No servicing or washing of heavy equipment shall occur adjacent to a watercourse, waterbody, or ecologically sensitive area;
- f) Where the ford area is not natural bedrock or is easily disturbed by fording, the entire fording area shall be stabilized using vegetation mats, corduroy roads or coarse material (125 mm diameter or greater) when such material is available from a close location within the right-of-way; when the substrate of the ford area is not subject to easy disturbance by fording or coarse material is not easily available within the right-of-way, fording under existing substrate conditions may occur under the guidance of the OSEM;
- g) Fording activities shall not decrease the depth of the watercourses to less than 20 cm. Where the existing depth is less than 20 cm, that depth shall be maintained;
- h) Photos of all ford sites shall be taken prior to and after the fording has been completed. The OSEM shall be responsible for collecting and submitting these photographs to the Environmental Engineering Coordinator;

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- i) Waterbodies shall not be forded during high flow periods;
- j) All bank sections, which contain erodible materials, shall be stabilized or avoided if possible; if banks must be sloped for stabilization, no material shall be deposited within the watercourse; sloping shall be accomplished by back-blading and the material shall be deposited above the high water mark of the watercourse; and
- k) Proposed fording activities on waterbodies or water courses visible on 1:50,000 scale maps shall require a permit from DOEC.

12.2.8.2 Culverts

In those locations where installations or upgrading of existing culverts are required, permits are required from NLDOEC. In addition a request for project review to DFO may be required. If a letter of advice is issued from DFO, all conditions shall be followed.

The culverts used shall be sized to handle the 1-in-100 year return period flood (however design criteria may vary depending on site-specific conditions and the length of time a culvert will be used (i.e. temporary vs. permanent)) and shall be constructed in accordance with the NLDOEC Environmental Guidelines for Watercourse Crossings and Culverts and the DFO operational statement for Culvert Maintenance as well as the DFO fact sheets for Culvert Installations.

The following measures shall also be implemented:

Installation of Culverts

- a) Install culvert(s) in accordance with good engineering and environmental practice;
- b) Proposed culvert installations on water courses visible on a 1:50,000 scale map shall require a permit from NLDOEC;
- c) Unless otherwise indicated, all work shall take place in dry conditions, either by the use of cofferdams or by diverting the stream with pumps and hoses. All work involving major alterations to stream channels shall be carried out at a time of low flow, in a manner that prevents downstream sedimentation. In fish-bearing waters, all work shall be carried out in dry conditions;
- d) Cylindrical culverts shall be counter sunk when installed in fish habitat (as recommended by DFO) such that the culvert bottom is one-third the diameter below the streambed in the case of culverts less than

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750 mm outside diameter, and for culverts greater than 750 mm outside diameter, the culvert bottom shall be installed a minimum of 300 mm below the streambed;

- e) If two (2) culverts are to be installed at one location, one (1) culvert shall be installed at an elevation lower than the other one. A maximum of two (2) culverts are allowed at one (1) location;
- f) The natural low flow regime of the watercourse shall not be altered; culverts shall not disrupt flow of water or cause ponding at the upstream side of the installation;
- g) A culvert shall not be installed before site-specific information such as localized stream gradient, fish habitat type and species present have been evaluated, as required;
- h) When rock energy dissipaters are utilized at culvert outlets, proper fish passage shall be ensured. Both upstream and downstream fish passage shall be provided and maintained post-construction;
- i) Photographs of all culvert installations shall be taken prior to and after the installation has been completed. The OSEM shall be responsible for collecting these photographs;
- j) Inlet and outlet areas shall be adequately protected from erosion by installing erosion prevention structures; Culverts shall be of sufficient length to extend a short distance beyond the toe of the fill material;
- k) Backfill material shall be of texture that shall support the culvert and limit seepage and subsequent washing out;
- l) Culverts shall be aligned such that the original direction of stream flow is not significantly altered and the gradient at the culvert follows the stream channel gradient to the extent possible. Infilling or reduction of the natural cross-sectional area of the watercourse shall not be permitted;
- m) Fill and construction debris shall be removed from the culvert area to a location above the peak flow level to prevent its entry into the watercourse;
- n) Construction activity shall be confined to the immediate area of the culvert;
- o) Fill material shall not be removed from streambeds or banks except when removal of material is necessary to ensure a flat foundation for installing a culvert;
- p) The use of heavy equipment in watercourses or bodies of water shall not be permitted;
- q) Culverts shall be marked to indicate their position under the snow;

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- r) As required, cofferdams of non-erodible material shall be installed above and below work areas to separate them from the watercourse when excavating for culverts and footings. All sandbags used in construction must be accounted for and removed after work is completed. Where pumping is used to bypass flow, pumps shall have sufficient capacity to prevent washout of the cofferdams. Refer to DFOs fact sheet for In stream Work in the Dry – Cofferdams;
- s) Cofferdams shall be removed upon completion of construction and the streambed returned as closely as possible to its original condition;
- t) Water pumped from work areas or other runoff must have sediment and turbidity removed by settling ponds, filtration, or other suitable means before discharging to a waterbody;
- u) The release of sediment laden water into a waterbody, watercourse or ecologically sensitive area, due to construction activities, shall comply with applicable discharge guidelines as represented in the Newfoundland and Labrador Environmental Control Water and Sewage Regulations, 2003 under *the Water Resources Act*;
- v) With respect to maintenance of water quality within receiving waterbodies on and around the site, the Canadian Council of Ministers of the Environment (CCME) *Canadian Water Quality Guidelines for the Protection of Aquatic Life* shall be used; and
- w) Culvert installations shall not require a DFO review when the following conditions are met (unless the culvert installations are within fish habitat):
 - i. the work does not include realigning the watercourse, installing a culvert liner or support struts, replacing damaged or destroyed bevels ends, or extending/replacing the existing culvert;
 - ii. explosives are not used to remove debris; and
 - iii. the work does not include any dredging, infilling (e.g., filling scour pools) or excavation of the channel upstream or downstream of the culvert.

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12.2.8.3 Culvert Upgrading/Maintenance

Culvert maintenance includes the removal of accumulated debris (e.g. logs, boulders, garbage, and ice build-up) that prevents the efficient passage of water and fish through the structure, as well as reinforcement of eroding inlets and outlets. The following measures shall be implemented when upgrading/maintaining culverts:

- a) In locations where upgrading and/or alterations are required for existing culvert at the Site, the mitigation measures listed above for installation of a culvert shall be reviewed and followed, as applicable;
- b) Culverts shall be inspected regularly so that immediate action can be taken to clear blockages caused by ice or debris and to identify any apparent problems, such as erosion, which may require remedial action; and
- c) An inspection of culverts shall be made during and after major floods to observe the culvert operation and record high water marks. Conditions which require corrective maintenance shall be noted, including debris accumulations, sedimentation, erosion, piping, scour, and structural damage and reported if applicable.
- d) Access for maintenance shall be provided, especially where debris control structures are installed. Such access shall not disrupt the Site rehabilitation efforts.

12.2.9 Surveying

Surveying activities may include: vegetation removal; traversing; establishing targets, permanent benchmarks and transponder stations.

Environmental Concerns

Surveying activities may disturb vegetation, wildlife, and historic resources.

Environmental Protection Procedures

12.2.9.1 Vegetation Removal

- a) Width of survey lines shall be limited to that which is absolutely necessary for line of sight and unobstructed passage;
- b) Whenever possible, cutting lines to the edge of open areas shall be avoided;

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- c) Trees and shrubs shall be cut flush with the ground wherever possible with stumps not to exceed 15 cm;
- d) Cutting of survey lines shall be kept to a minimum;
- e) All survey tape used at the Site shall be made of biodegradable material;
- f) All trees not exactly on transit lines shall be left standing and trees partly on line should be notched (notch not to exceed 1/3 tree's diameter) instead of removed, to allow sighting;
- g) Discretion shall be used when large trees are encountered. For example, trees 30 cm at Diameter Breast Height (DBH) or larger should, whenever possible, not be cut. On grid lines, trees of 30 cm diameter or larger shall be left intact and shall be traversed to continue the line;
- h) There shall be no cutting in areas designated as sensitive without notification of the OSEM; and
- i) Survey crews shall have a briefing from the OSEM on the recognition of historic resources prior to commencing work.

12.2.9.2 Traversing

- a) All-Terrain Vehicles (ATVs) and snowmobiles shall not be allowed off the right-of-way except where acceptable to the OSEM. ATV and snowmobile use shall comply with the Motorized Snow Vehicles and All-Terrain Vehicle Regulations, 1996, the Environmental Guidelines for Stream Crossings by ATV, 1994 and the DFO Fact Sheet ATVs, Fish Habitat and You;
- b) No motorized vehicles shall enter the areas designated as sensitive without approval by the OSEM;
- c) Activity within sensitive areas shall be minimized; and
- d) Walking in sensitive areas shall be restricted to established walking paths, where available.

12.2.9.3 Establishing Targets, Permanent Benchmarks and Transponder Locations

- a) A driven T-bar, embedded to readily identify each benchmark location, shall be used;
- b) Access to sensitive areas shall be under the guidance of the OSEM;
- c) Standard iron bars and sledgehammers shall be used to establish benchmarks; and
- d) Heavy equipment shall not be used to access sensitive areas.

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12.2.10 Clearing of Vegetation

Environmental Concerns

Vegetation clearing (e.g., trees and shrubs) shall be required during site preparation of drilling locations. Environmental concerns include loss of habitat, wildlife disturbance, sedimentation and disturbance or destruction of historic resources.

Environmental Protection Procedures

The following measures shall be implemented to reduce the potential effects of vegetation clearing:

12.2.10.1 General

- a) Clearing activities shall be limited to those areas that are required for roads, drilling operations, cable land trench and associated infrastructure.
- b) Workers shall not destroy or disturb any features that are indicative of a historic or archaeological Site. Any such findings shall be reported immediately to the OSEM;
- c) Disposal of cleared non-merchantable timber, slash and cuttings from cleared areas shall take place through mulching and/or piling to minimize the amount of slash. Burning of materials is not permitted;
- d) If slash piles are to be used, they shall be piled so as not to cause unnecessary damage to vegetation outside the right-of-way. A 6.5 m break in slash piles shall be made every 200 m to allow for drainage and animal access. The maximum height of the piles shall not exceed 3 m;
- e) Limits of clearing shall be shown on all drawings issued for construction. Only those areas designated on drawings shall be cleared. Trees shall be blazed/flagged at intervals in advance of clearing to demarcate the limits of the work. Blazed trees shall not be felled. Clearing activities shall not remove any trees outside the authorized clearing limits;
- f) Slash and any timber shall not be permitted to enter any watercourse and shall be piled above spring flood levels;
- g) Firefighting tools and water delivery systems must be available, as required, by the operating permit for the activity;
- h) A buffer zone of undisturbed vegetation shall be maintained between construction areas and all waterbodies, watercourses and ecologically sensitive areas (refer to Section, "Construction Buffer

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Zones” within this document), unless otherwise authorized. Buffer zone features shall be key elements of the environmental review of drawings prior to construction;

- i) Where possible, timber shall be felled inward toward the work area to avoid damaging any standing trees within the immediate work area;
- j) Clearing activities between May 1 and August 15 shall be in compliance with the Avifauna Management Plan;
- k) All salvaged timber shall be piled at right angles to rights-of way so as not to obstruct the access or work of others, damage vegetation or be placed within buffer zones of critical habitat; and
- l) Slash and debris is to be disposed of as per items c) and d).

12.2.11 Grubbing and Disposal of Related Debris

Environmental Concerns

The principal concerns associated with grubbing and disposal of related debris are the potential effects of erosion and sedimentation on marine and freshwater ecosystems and water quality.

Environmental Protection Procedures

All grubbing and disposal of related debris near watercourses shall adhere to relevant regulatory requirements, including the permits from NLDOEC and the formal “Letters of Advice”, “Operational Statements”, and/or Authorizations for Works or Undertakings Affecting Fish Habitat from the Fisheries and Oceans Canada.

Other specific measures to be undertaken to minimize potential effects on aquatic habitat and resources are as follows:

- a) Grubbing activities shall be limited to only those areas that are required for Project development;
- b) Grubbing of the organic vegetation mat and/or the upper soil horizons shall be minimized. These shall be left in place where possible. Limits of stripping and/or grubbing shall be shown on all drawings issued for construction;
- c) The organic vegetation mat and upper soil horizon material, which has been grubbed, shall be spread in a manner that attempts to cover exposed areas. Any surplus material shall be stored or stockpiled for site rehabilitation and re-vegetation purposes elsewhere in the Project area. Topsoil and peat shall be

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stockpiled separately from the overburden and separated by a buffer zone (refer to Section, “Construction Buffer Zones” within this document) from any waterbodies, watercourse or ecologically sensitive areas. The location of the stockpiles shall be shown on drawings issued for construction and accessible for future rehabilitation purposes;

- d) A minimum of 5 m should separate stockpiles of grubbed material from standing timber;
- e) Grubbed material and/or topsoil shall be stored in low piles to decrease the effect of compaction on structure. Stockpiles of topsoil should be seeded or otherwise protected using erosion control methods (as outlined in Section, “Erosion Prevention and Sediment Control” within this document) to prevent erosion and loss of nutrients. This is especially important if stockpiles are to remain in place for periods of a year or more;
- f) Overburden and topsoil from grubbing activities shall be stored, and stabilized, for the purpose of future rehabilitation;
- g) Erosion prevention and sediment control measures shall be installed to minimize and control runoff soil erosion and transport of sediment laden water during grubbing and the re-spreading and stockpiling of grubbed materials. Section, “Erosion Prevention and Sediment Control” within this document outlines all acceptable prevention and control methods (i.e. use of sediment ponds);
- h) Where grubbed materials are re-spread or stockpiled; as many stumps and roots as possible shall be left in place to maintain soil cohesion, to dissipate the energy of runoff, and promote natural re-vegetation;
- i) The length of time that grubbed areas are left exposed to the natural elements shall be minimized to prevent unnecessary erosion. These areas shall be monitored for erosion and such findings shall be reported to the OSEM;
- j) During grubbing, care shall be taken to ensure that grubbed material shall not be pushed into areas that are to be left undisturbed;
- k) Grubbing shall be avoided on steep slopes near watercourses. A buffer zone shall be maintained between grubbed areas and watercourses, waterbodies and ecologically sensitive areas (refer to Section, “Construction Buffer Zone”). Grubbing limits adjacent to watercourses shall be flagged in the field prior to undertaking grubbing/stripping activities;
- l) Grubbing and other debris shall not be permitted to enter any watercourse;

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- m) Bog and other wet material that is excavated from the site shall be piled and graded on well drained ground in low piles. The piles shall be seeded or otherwise protected using erosion control methods as outlined in Section, "Erosion Prevention and Sediment Control" within this document; and
- n) Where the piles are in the transmission line right-of-way they shall not impede access to the line for future maintenance or access.

12.2.12 Quarry and Aggregate Removal from Borrow Areas

Environmental Concerns

The principle concerns for quarry development and associated aggregate removal include the potential for impacts on aquatic systems, noise, dust, loss of terrestrial habitat and historic resources, potential quarry development/rehabilitation plans.

Environmental Protection Procedures

The following measures shall be implemented to minimize these effects:

- a) Permits to quarry shall be obtained from the NL Department of Natural Resources before quarries are established. Quarry activity shall be undertaken in compliance with these quarry permits and shall comply with all other relevant regulations;
- b) Noise control procedures shall be followed (refer to Section, "Noise Control" within this document);
- c) Quarries shall be located 100 m from a water body unless otherwise approved by the Department of Natural Resources. If approved, additional mitigation measures may be required;
- d) The development of quarry sites and rock excavations shall include measures to address the potential for Acid Rock Drainage (ARD) due to the presence of sulphide bearing rock. These measures will include visual inspection to identify indicators that sulphide bearing rock may be present. The OSEM shall visually inspect bedrock before, during, and after excavation work on a periodic basis. In the event that visible evidence of ARD is noted, the OSEM shall be notified immediately. Visible evidence of ARD is typically a yellowish colour of water or sediment called yellow boy. Should visible signs be present, laboratory testing will be required to confirm the presence of ARD.

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- e) Quarry areas shall be developed in a controlled manner so as to minimize potential environmental effects and quarry locations shall consider sensitive wildlife areas. The following protection procedures shall be implemented to minimize disturbance and facilitate rehabilitation:
- i) A buffer zone of undisturbed vegetation shall be maintained between borrow areas/quarries and watercourses, waterbodies and ecologically sensitive areas (refer to Section, “Construction Buffer Zones” within this document);
 - ii) The quarry area, stockpile area and limits of clearing shall be staked and/or flagged to prevent over-extension of the development, (corner posts at least 1 m high above ground shall be installed to mark the quarry area);
 - iii) The area to be excavated shall be clear cut of all vegetation prior to grubbing, excavation or removal of any material. Only the area necessary for one year’s production shall be cleared;
 - iv) All stumps, organic matter and topsoil shall be stripped from the area to be excavated and stockpiled at least 5 m from uncleared areas; stockpiles shall be kept at least 10 m from the area of excavation; separate overburden piles shall be developed where this material is present; topsoil and the underlying overburden shall not be mixed (refer to Section, “Grubbing and Disposal of Related Debris” within this document);
 - v) Stockpile areas are to be confirmed by the OSEM, prior to stripping; and
 - vi) For any sloping, the topsoil and any organic materials shall be re-spread over the disturbed area to promote natural re-vegetation by adjacent seed sources.
- f) In order to prevent sedimentation of waterbodies, watercourses and ecologically sensitive areas, sediment control measures (basins and traps) shall be established, if required, and cleaned on a regular basis, as required, to ensure that the retention capacity is maintained at all times. Refer to Section, “Erosion Prevention and Sediment Control” outlines all acceptable sediment control measures;
- g) The TSS content of construction-altered water that is released into a natural waterbody shall not exceed 30 milligrams per litre and be in compliance with Environmental Control Water and Sewage Regulations, 2003;
- h) With respect to maintenance of water quality within receiving waterbodies on and around the Site, the CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life shall be used;

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- i) The pH level of construction-altered water that is released into a natural waterbody shall be between 5.5 and 9 pH units and be in compliance with Environmental Control Water and Sewage Regulations, 2003. The Contractor's On-Site Monitor will be responsible for taking water samples of the construction-altered water being released, and shall provide the samples in a timely manner to a laboratory for analysis;
- j) Dust from aggregate processing, storage and handling shall be controlled with water as required during times when temperatures are above freezing. A water use license must be obtained from DOEC; and
- k) If crushing activities in the quarry require a water source. A Water use license is also required from the Water Resources Management Division; Quarry operations shall consider sensitive wildlife periods.

12.2.13 Pumps and Generators

Environmental Concerns

A variety of water pumps, hoses and generators shall be in use at both drilling locations. Environmental concerns are associated with any accidental spills or chronic leaks contaminating water bodies and soil. There may also be concerns with noise, as well as air emissions from generators on the Site.

Environmental Protection Procedures

- a) Drip pans shall be placed underneath pumps and generators. Absorbent material shall be kept at all Sites where pumps and generators are in use;
- b) Noise control procedures shall be followed (refer to Section, "Noise Control" within this document);
- c) Spill kits shall accompany all pumps and generators at the Site (refer to Section, "Noise Control");
- d) Pumps and generators shall be located as far as practical from all waterbodies. See Table 12-1 for required buffer zones for fuel and other hazardous materials storage and handling;
- e) Pumps and generators shall be located on a level, stable surface. All pumps used for freshwater supply shall have a fine mesh screen on the intake;
- f) Hoses and connections on equipment shall be inspected routinely for leaks and drips;
- g) A *Water Use License* from the NLDOEC shall be required for withdrawal of water from a waterbody;

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- h) All diesel generators on site shall meet the requirements of the Air Pollution Control Regulations, 2004 under the *EPA* as required. Generators built to Tier 4 Final emission standards may be exempt from NLDOEC Certificate of Approval; and
- i) All hydrocarbon or hazardous materials leaks shall be reported immediately to the OSEM. Upon detection of a leak, the equipment (e.g., pump, generator) shall be shut down immediately and corrective action taken to repair the leak and clean up any contaminated soil and/or water (Refer to the MSRP).

12.2.14 Working In/Around the Marine Environment

Environmental Concern

Environmental concerns from marine construction include the release of fines, hazardous liquids, and toxic substances to the water and substrate, and disturbance to fish and fish habitat. Marine construction activities can also disturb near shore terrestrial habitat and cause seabirds, waterfowl and marine mammals to avoid the area.

Environmental Protection Procedures

- a) Work in and around the marine environment shall require an “Alter a Body of Water” permit under the *Newfoundland and Labrador Water Resources Act*, and authorization under the *Federal Navigable Waters Protection Act*. In addition, a request for project review to DFO will be required for infilling. If a letter of advice is issued from DFO, all conditions shall be followed;
- b) All equipment shall have muffled exhausts to minimize noise;
- c) Applicable reference documents included Freshwater Intake End-of-Pipe Fish Screen Guidelines, 1995, Freshwater Intake End-of Pipe Fish Screen Fact Sheet, Guidelines for the Protection of Freshwater Fish Habitat in Newfoundland and Labrador, 1998, and the Environment Policy of Allocation of Water Use (NLDOEC);
- d) All vehicles shall be clean and in good repair. Regular mechanical inspections for leaks on all equipment shall be made and repairs undertaken immediately; and
- e) The MSRP and appropriate spill kits for equipment shall be available on Site.

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12.2.15 Site Rehabilitation

Environmental Concerns

The primary concern with environmental rehabilitation is site stabilization and erosion prevention. Sites should be returned to conditions as they were prior to project activities.

Environmental Protection Procedures

Environmental rehabilitation shall be consistent with all applicable standards, codes, acts and regulations and the conditions of EA release. General rehabilitation approaches are provided below.

- a) Rehabilitation shall be required for all temporary works, including roads, stream crossings, assembly yards, and borrow areas;
- b) No temporary buildings or structures associated with the work shall be left on Site upon completion of the work;
- c) All solid waste, including petroleum, oil and lubricant containers shall be removed from Site;
- d) Pre/Post occupation inspection shall be completed; and
- e) The OSEM shall prepare a report for all Sites documenting Site conditions prior to disturbance and upon Site abandonment and rehabilitation. Each report shall include a description of the condition of vegetation and other aspects of natural environment.

Site specific rehabilitation approaches shall also be developed by the Contractor in compliance with regulatory requirements and industry best practice and shall be completed on a site by site basis and included in the C-SEPP. The following outlines the general requirements for site rehabilitation (refer to Section, "Species of Special Conservation Concern" for specific information on the Shoal Cove Area):

- 1) Removing and stockpiling overburden and organic material for re-use;
- 2) Re-grading areas to control erosion and establish suitable drainage;
- 3) Replacing the overburden and organic material to produce conditions for re-growth; and
- 4) Encouraging natural re-vegetation, or re-planting with suitable vegetation.

Once the schedule of work at each construction area has been developed, a detailed schedule for carrying out rehabilitation work shall be developed in accordance with regulatory requirements, and shall also consider

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industry best practice for implementation of Site rehabilitation. The Site specific rehabilitation plan shall indicate timing of the rehabilitation works for each area to be rehabilitated. Factors that shall be considered in determining the rehabilitation approach include, but are not limited to:

- a) Site and public safety (including future access requirements);
- b) Sedimentation concerns and proximity to water bodies;
- c) The natural habitat of the area (i.e., vegetation, soil, hydrology, etc.);
- d) Wildlife habitat considerations;
- e) Overall cost of rehabilitation measures.

12.2.16 Working within 15 Meters of a Body of Water

Environmental Concerns

Working close to water bodies poses a risk of introducing contaminants into the aquatic ecosystem, affecting fish, fish habitat, and other receptors, and affecting the natural flow regime of the water body. Contaminants such as sediment, petroleum hydrocarbons, and other deleterious substances may impact fish, wildlife, plants, and human receptors. Proper protection plans are required to minimize or eliminate sedimentation and water pollution and maintain riparian habitat near water bodies.

Environmental Protection Procedures

Mitigation measures provided in various sections (e.g. Section, “Storage, Handling and Disposal of Fuel and Other Hazardous Material”, Section, “Erosion Prevention and Sediment Control”, Section, “Construction Buffer Zones”, etc.) shall be consulted to ensure that appropriate measures are understood and implemented during the course of construction. Work within 15 m of a body of water requires a permit under Section 48 of the *Water Resources Act*.

In addition, the following steps shall be taken to ensure protection of water bodies:

- a) A joint engineering and environmental reconnaissance of the Site shall be completed in the early planning stages to identify all nearby bodies of water and mitigation and protective measures shall be identified;

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- b) Where possible, the majority of construction works shall take place during low flow and low rainfall period;
- c) Any vehicles or equipment working near a body of water shall be clean and in good condition;
- d) Heavy equipment shall be kept outside the high water mark of all bodies of water, where possible; and
- e) All equipment on the Project Site shall use only oils/lubricants that classify as “biodegradable” where feasible (see Section, “Storage, Handling, Use and Disposal of Fuel and Other Hazardous Materials” within this document for additional information on the use of biodegradable oils/lubricants).

12.3 OFFSHORE PROCEDURES

12.3.1 Vessel Operation

Environmental Concerns

The inadvertent discharge of pollutants into the marine environment is a key environmental concern related to the operation of vessels in the SOBI. Potential waste discharges of concern include non-compliant ballast waters (which could introduce non-indigenous species or deleterious substances), solid waste and accidental releases of fuels or hazardous materials.

Environmental Protection Procedures

- a) All Project-related vessels shall comply with the Vessel Pollution and Dangerous Chemicals Regulations SOR/2012-69 and Vessel Traffic Service Zones Regulations SOR 89-98 as required under the *Canada Shipping Act*;
- b) No Project-related vessels shall discharge wastes (any material or substance generated by the owner or holder which does not naturally occur in that environment) into surrounding waters. The discharge of pollutants from ships into Canadian waters and the waters of the Fishing Zones of Canada is prohibited;
- c) All Project vessels shall meet TC Regulations and standards, under the *Canada Shipping Act* (including the Charts and Publications Regulations and the Eastern Canada Vessel Traffic Services Zone Regulations) as well as international regulations established by the International Maritime Organization (IMO);
- d) All Project-related vessels shall implement best management practices designed to achieve zero discharge of oily waste while at the site and along the shipping route;

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- e) All Project-related vessels shall comply with the Ballast Water Control and Management Regulations, under the *Canada Shipping Act* (TP 13617E);
- f) All Project-related vessels shall have onboard adequate oil spill response equipment to handle an accidental release of product into the environment;
- g) All Project-related vessels shall have an arrangement with a response organization (e.g., Eastern Canada Response Corporation) in respect of a quantity of oil that is at least equal to the total amount of oil that the vessel carries, both as cargo and as fuel, to a maximum quantity; and
- h) Project Personnel shall be aware of the MSRP in the event of a spill or leak.

12.3.2 Submarine Berm Construction – Rock Placement

Environmental Concerns

The construction of the submarine protective rock berm shall result in some direct loss of marine habitat in addition to the creation of new habitat. The rock shall be placed in the appropriate location using a fall pipe which shall be controlled by a ROV to achieve the desired distribution of rock on the seafloor. In addition to those procedures listed below, the C-SEPPs are expected to provide additional environmental protection procedures that reflect the specific vessels and respective equipment and technologies to be used for berm construction.

Environmental Protection Procedures

- a) Rock material shall be sourced from local quarries. Supplied rock material shall be free of contamination from hydrocarbons or chemicals, and shall be clean and free of visible mud/fines (to the extent practical) to minimize sedimentation in the water.
- b) Controlled rock placement with a fall pipe shall be employed to minimize the amount of natural habitat coverage;
- c) The fall pipe vessel shall be equipped with an ROV on the end of the fall pipe for accurate placement of the rocks over each of the cable; and
- d) Chemically-benign rock (that which is chemically non-reactive to seawater) shall be used for berm construction to minimize the effect on seawater and surficial sediment chemistry.

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13 RESOURCE SPECIFIC MITIGATION

Construction activities related to the SOBI Marine Crossing have the potential to affect a number of specific resources in the SOBI Region, including:

- a) Marine Fish and Fish Habitat;
- b) Marine Mammals and Sea Turtles;
- c) Seabirds;
- d) Species of Special Conservation Concern;
- e) Historic and Archaeological Resources;
- f) Commercial Fisheries; and
- g) Wildlife Protection.

13.1 MARINE FISH AND FISH HABITAT

Environmental Concerns

For the SOBI Marine Crossing, construction activities that are most relevant to Marine Fish and Fish Habitat include placement of the underwater rock berms to protect the submarine cables and noise created by a variety of Project Construction activities (e.g., marine vessels, drilling).

In the case of rock placement, the surface area and interstitial spaces of the berms shall function as fish habitat albeit habitat characterized by a bottom substrate class different from that of the natural habitat in some locations.

Environmental Protection Procedures

Environmental protection procedures include:

- a) vessels shall be outfitted, operated and maintained to limit the potential for inadvertent releases of contaminants (e.g., oil) and proper protocols shall be implemented to avoid accidental introduction of potentially deleterious substances to the marine environment including all applicable regulations to minimize effects on seawater;

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- b) controlled rock placement using a fall pipe shall be employed to minimize the amount of natural habitat disturbance;
- c) clean rock (i.e., no mud/fines visible) shall be used for berm construction to minimize the effect on seawater and surficial sediment chemistry;
- d) construction time shall be minimized to decrease the amount of exposure to vessel noise by invertebrates and fishes;
- e) drill mud shall be recovered from the boreholes and conduit to the extent practical;
- f) drill mud shall be recycled and the cuttings shall be disposed of on land;
- g) biodegradable lubricants and hydraulic fluids shall be used where practical, when working near waterbodies;
- h) spill kits and trained Personnel shall be present on-site at all times, allowing for prompt containment;
- i) a spill response team shall be formed and trained;
- j) spills shall be reported to the appropriate authority; and
- k) Project Personnel shall be familiar with the Emergency Response Plan and MSRP.

13.2 MARINE MAMMALS AND SEA TURTLES

Environmental Concerns

During the construction phase, the underwater noise produced by ships involved with cable laying and rock berm construction have the potential to affect Marine Mammals and Sea Turtles. Marine Mammals and Sea Turtles may also be affected by HDD. There is also potential for construction activities to cause changes in marine mammal and sea turtle health if there are accidental releases of small amounts of deleterious substances (e.g., hydrocarbons).

Environmental Protection Procedures

Environmental protection procedures that shall minimize effects on Marine Mammals and Sea Turtles include:

- a) Vessels shall be outfitted, operated and maintained to limit the potential for inadvertent releases of contaminants (e.g., oil) and proper protocols shall be implemented to avoid accidental introduction of

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potentially deleterious substances to the marine environment including all applicable regulations to minimize effects on seawater;

- b) Biodegradable lubricants and hydraulic fluids shall be used where practical, when working near waterbodies;
- c) Spill kits and trained Personnel shall be present on Site at all times, allowing for prompt containment;
- d) A spill response team shall be formed and trained;
- e) Spills shall be reported to the appropriate authority;
- f) Project Personnel shall be familiar with the ERP and MSRP.
- g) Project vessels will maintain constant course and speed to the extent practical;
- h) Project vessels will detour around Marine Mammals and Sea Turtles, if feasible;
- i) During cable installation and construction of rock berms, project vessels will maintain a constant course and slow speed (approximately 2 knots), where possible, to ensure risk to marine mammal vessel strike is low;
- j) In the event of a mammal-vessel strike, the OSEM will report the incident to DFO contact Whale Release and Strandings Newfoundland and Labrador at 1-888-895-3003. Information provided will include details as outlined in the Marine Mammal Observation program and time and location of the incident ; and
- k) Nalcor will incorporate a marine mammal observation program during the construction of the Strait of the Belle Isle marine cable crossing. Such a program will involve a marine mammal observer during daytime transit, and during daytime operations. Nighttime operation will not include a marine mammal observer due to the increased risk that artificial lighting onboard Project vessels may attract Leach's Storm-petrel or other seabird species, resulting in stranding or mortality. Information recorded by the marine mammal observation program may include, but not be limited to:
 - i) Date;
 - ii) Vessel name and activity;
 - iii) Watch start and end times;
 - iv) Observer name;
 - v) Vessel position;

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- vi) Sea State;
- vii) Weather and visibility;
- viii) For each mammal sighting: time of sighting, movement of the marine mammal, mammal behaviour and position of mammal to the vessel, including initial and final distances.

13.3 SEABIRDS

At the submarine cable landing sites, the presence of and noise from equipment and humans used to level and remove overburden for the drill rig, general equipment staging and work space, and from drilling and associated activities, have the potential to disturb shorebirds foraging or resting in the intertidal zone and coastal heathlands and pelagic and coastal waterbirds foraging inshore.

Construction and installation of the submarine cables may disturb seabirds through the presence and noise generated by Project vessels. Some seabird species with poor maneuverability, such as razorbills and eiders, may collide with vessels when visibility is poor. At night, artificial lighting onboard Project vessels may attract Leach's Storm-petrel or other seabird species, resulting in stranding or mortality.

Environmental Protection Procedures

13.3.1.1 General

- a) Project construction equipment shall be maintained to ensure that noise control devices such as engine mufflers are working to specification;
- b) Vessels shall be outfitted, operated and maintained to limit the potential for inadvertent releases of contaminants (e.g., oil), including proper protocols shall be implemented to avoid accidental introduction of potentially deleterious substances to the marine environment, as well as all applicable regulations to minimize effect on seawater;
- c) Biodegradable lubricants and hydraulic fluids shall be used where practical, when working near waterbodies;
- d) Spill kits and trained Personnel shall be present on site at all times, allowing for prompt containment;
- e) A spill response team shall be formed and trained;
- f) Spills shall be reported to the appropriate authority;

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- g) Daily monitoring shall be conducted of seabird stranding through searches of decks recovering and releasing stranded birds to the sea; and
- h) Lighting shall be reduced, and shielded from pointing skyward to reduce light attraction to the extent practical and feasible (i.e., without compromising work and vessel safety).

13.3.1.2 Stranded Seabirds

Seabirds such as Leach's Storm-petrels are attracted to lights on offshore platforms and vessels. Experience has shown that Storm-petrels may be confused by lights from ships and oil rigs, particularly on foggy nights, and will crash into lighted areas such as decks and portholes. Fortunately, this type of accident does not often result in mortality, however, once on deck the bird will sometimes seek a dark corner in which to hide. A permit must be obtained from the Canadian Wildlife Service to implement the Williams & Chardine protocol (see below).

13.3.1.3 Mitigation

If seabirds happen to collide and become stranded on a vessel, the following steps should be taken, as recommended by The Leach's Storm-petrel: General information and handling instructions, Williams & Chardine:

- a) Vessel decks should be patrolled to ensure that birds are picked up and boxed (see below) as soon as possible after they have collided with the vessel. After collision, birds will often "freeze" below lights on deck or seek dark areas underneath machinery and the like.
- b) Birds should be collected by hand and gently placed in small cardboard boxes. Care should be taken not to overcrowd the birds and a maximum of 10-15 birds should be placed in each box, depending upon its size. Personnel collecting the birds should wear gloves to protect hands;
- c) When the birds are placed in the box the cover should be put in place and the birds left to recover in a dark, cool, quiet place for about 5-10 minutes. The birds initially will be quite active in the box but will soon settle down.
- d) Following the recovery period, the box containing the birds should be brought to the bow of the boat or to some other area of the vessel that has minimal (if any) lighting. The cover should be opened and each bird individually removed by hand. The release is usually accomplished by letting the bird drop over the side of the vessel. There is no need to throw the bird up in the air at release time. If the birds are released at a well-lit part of the vessel they usually fly back towards the vessel and collide again.

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- e) If any of the birds are wet when they are captured (i.e., they drop into water on the deck) then they should be placed in a cardboard box and let dry. Once the bird is dry it can be released as per the previous instruction. Also, temporarily injured birds should be left for longer to recover in the cardboard box before release.
- f) Any birds contaminated with oil should be kept in a separate box and not mixed with clean birds. Contact Canadian Wildlife Service at (709) 772-5585 for instructions on how to deal with contaminated birds.
- g) In the event that some birds are captured near dawn and are not fully recovered before daylight, they should be kept until the next night for release. Storm-Petrels should not be released in daylight as at this time they are very vulnerable to predation by gulls. Birds should be kept in the cardboard box in a cool, quiet place for the day, and do not need to be fed.
- h) A tally of birds that have been captured and released should be maintained, and those that were found dead on deck. These notes should be kept with other information about the conditions on the night of the incident (e.g., moonlight, fog, weather).

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13.4 SPECIES OF SPECIAL CONSERVATION CONCERN

Twenty-one (21) Species of Special Conservation Concern (protected by federal and/or provincial legislation) were identified as part of the ongoing environmental assessment process for the Project. Of these, seventeen species have the potential to interact with SOBI Marine Crossing activities, as follows:

Plants

Long's Braya
Fernald's Braya

Avifauna

Red Crossbill
Common Nighthawk
Rusty Blackbird
Olive Sided Flycatcher
Harlequin Duck
Ivory Gull
Gray Cheeked Thrush
Short Eared Owl

Marine Mammals

Blue whale
Fin whale
Harbour Porpoise
Killer Whale
Leatherback Sea Turtle

Marine Fish

Atlantic Wolffish
Northern Wolffish
Spotted Wolffish
White Shark
American Eel

Environmental Protection Procedures

In addition to the general environmental protection procedures identified for marine fish, marine mammals and sea turtles identified above, the following mitigation measures shall be implemented with respect to endangered, threatened or vulnerable wildlife at Forteau Point, Shoal Cove and the SOBI:

- Critical habitats (where identified) shall be noted on site plans or plan profiles for roads, cable trench, drilling areas in the C-SEPP;
- All Site Personnel shall become aware of endangered, threatened or vulnerable species and their habitat by means of the HSE orientation, prior to the start of clearing, drilling, cable lying or any other project activities;

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- c) Through Site surveys, protected listed plant habitat shall be identified and mapped prior to the commencement of any site work. Based on this mapping, “no-go” zones shall be established to avoid sensitive areas;
- d) There shall be no intrusion into “no-go” zones without prior permission of the OSEM;
- e) Work plans shall be submitted in advance and shall be reviewed for potential conflicts, including listed plants, endangered species, critical habitat and other areas of concern (i.e., nesting sites);
- f) The OSEM shall ensure work crews are aware of concerns identified and work methods to be used;
- g) Crews shall not travel outside of marked work areas and trails. If markers are not clear or are missing, the OSEM shall be consulted prior to commencing or continuing with the work;
- h) The OSEM shall monitor work activity in sensitive sites and provide advice on access and travel requirements;
- i) The OSEM shall be informed of activities near sensitive areas;
- j) Notice of potential effects to listed species and their habitat at the job site shall be given to the OSEM for evaluation;
- k) Rare plant surveys will be conducted in areas of concern, in consultation with the NLDOEC-Wildlife Division. As per the Species at Risk Impacts Mitigation and Monitoring Plan (SAR IMMP), pre-construction surveys for rare plants will be conducted in areas of high concern in the area of the marine cable crossing landing (i.e., Shoal Cove). If rare plants are found, further mitigation will occur. Surveys will also be conducted for regionally uncommon plants, and where possible, construction will locate outside of areas of known occurrences.

13.5 HISTORIC AND ARCHAEOLOGICAL RESOURCES

Environmental Concerns

Locations at Shoal Cove and Forteau Point have been identified as Areas of Archaeological Potential. Four (4) archaeological sites have been identified in the vicinity of the Forteau Point work area. Construction activities have the potential to affect known and undiscovered archaeological resources.

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Environmental Protection Procedures

The following environmental protection procedures shall be implemented with respect to historic and archaeological resources:

- a) All persons on site shall be informed of the historic resources potential of the area, their responsibility to report any unusual findings, and the requirement to leave such findings undisturbed;
- b) An environmental awareness session shall be attended by all staff and Contractors to identify areas of high historic resources potential;
- c) Known archaeological sites shall be avoided by a 50 m buffer, or as otherwise approved by the PAO;
- d) The OSEM shall be immediately contacted if any historical resources are discovered during the course of the work. All work within 50 m of the discovery location shall stop and contingency plan procedures implemented;
- e) Regular monitoring shall be conducted by the OSEM to ensure that Site protection measures are adequate and that the terms and intent of the EPP requirements are being met; and
- f) Sites registered with the Provincial Archaeology Office (PAO) outside the immediate Project area shall be visited annually by the OSEM during periods when the sites are not snow covered to ensure they have been left undisturbed.

13.6 COMMERCIAL FISHERIES

The interaction of construction activities with commercial fisheries were identified as a key concern with the SOBI Marine Crossing. There are risks due to increase in vessel traffic including vessel collisions, which may lead to the accidental release of fuel and other hazardous materials to the marine environment. In addition, there are restrictions to fishing activity due to the presence of SOBI construction vessels.

Before the start of marine construction activities in the SOBI, Nalcor shall establish a Fisheries Liaison Committee (FLC) for the construction phase to facilitate its ongoing fisheries consultation and advisory process during construction. The FLC shall be the primary mechanism for facilitating information exchange and communications between the Project and fisheries representatives and for identifying and resolving any issues that arise.

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Nalcor shall also develop a Vessel Traffic Management Plan (VTMP) to promote the safe and efficient operation of Project construction-related marine traffic and fishing vessel operations near all construction activities and in other areas of the SOBI where Project vessels might be operating.

The VTMP shall be developed in consultation with applicable agencies and organizations, including advice and guidance from experts with the Ship Safety Branch of Transport Canada and the Canadian Coast Guard (CCG). The purpose of the VTMP shall be to establish a safe and efficient working environment during marine construction activities and to minimize or avoid potential construction-related vessel traffic interference with established commercial fisheries harvesting operations.

The VTMP shall reference the “rules of the road” (e.g., those in the Collision Regulations for shared waterways and any special considerations related to the circumstances of the Project), vessel communications and contact information, reporting protocols, traffic / transit routes, and other relevant vessel traffic management procedures. This shall include the measures that Project-related vessels (including small service boats) shall follow when operating in the area, and that all fishing vessels should follow when they are involved in harvesting operations close to, or transiting, the general vicinity of Project activities.

Environmental Protection Procedures

The VTMP may include, but not be limited to, the following environmental protection measures:

- a) Working with the CCG’s Notices to Shipping and the Canadian Broadcasting Corporation’s Fisheries Broadcast, Nalcor shall ensure that all fishing vessels operating in the SOBI are given advance notice of planned construction work.
- b) All Project vessels shall meet TC Regulations and standards, under the *Canada Shipping Act* (including the Charts and Publications Regulations and the Eastern Canada Vessel Traffic Services Zone Regulations) as well as international regulations established by the IMO.
- c) All stationary hazards, such as moored platforms or vessels, shall be clearly marked according to the *Navigable Waters Protection Act* and/or Collision Regulations under the *Canada Shipping Act*.
- d) All commercial vessels 20 m or more in length entering SOBI must report to the Marine Communication and Traffic Services (MCTS) centre.

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- e) A 500 m radius Safety Zone shall be established around all active construction areas within the marine environment (specifically, vessels at construction locations within the SOBI). Except for any Project support and service vessels, no other marine craft shall be permitted within any Project vessel Safety Zone. The Safety Zone shall be in accordance with Rule 43 of the Collision Regulations under the *Canadian Shipping Act*.
- f) All vessels transiting the corridor, or operating in the general vicinity of the cable / rock laying vessels, shall be required to exercise caution and to abide by existing shipping regulations (such as those described in the Collision Regulations) as well as by any specific protocols that are established and included in the VTMP.
- g) The OSEM and the local public shall be advised of all particulars with regard to incoming/outgoing vessel traffic on a timely basis including updates regarding the estimated time of arrival/estimated time of departure, as advised by Vessel Masters.
- h) All crewmembers shall be familiar with emergency procedures for both life threatening and potentially polluting situations.

Project vessel masters shall observe the following basic rules:

- i) Demonstrate that they have a set of safety and emergency procedures on board;
- ii) Advise Nalcor of their time of departure from their port of origin and their estimated time of arrival at the worksite;
- iii) Notify Nalcor of their progress at sea or, if stopping at other ports en-route, update their Estimated Time of Arrival (ETA);
- iv) Prepare and distribute a Notification to Shipping to advise commercial and recreational marine operators of its schedule and activities; and
- v) Relevant Canadian Hydrographic Charts or electronic charting systems must be on board prior to leaving their port of origin; these charts must be kept on board at all times.

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13.7 WILDLIFE PROTECTION

The following mitigation measures shall be implemented for the protection of wildlife at the Site:

- a) Construction activities shall be scheduled considering any sensitive areas of fish and wildlife habitat and critical periods in fish and wildlife cycles, and considering additional mitigation measures that may be required. Annual timing of migration, spawning and calving in the vicinity of the site shall be considered at all times;
- b) Personal pets shall not be brought to the construction Site;
- c) Project Personnel are not permitted to hunt, harvest, trap or fish, while staying at Company provided accommodations or while on duty;
- d) Under no circumstances are wildlife to be fed and all measures (such as animal proof containers and awareness) shall be taken to avoid inadvertent feeding;
- e) Wildlife shall not be chased, caught, diverted, followed or otherwise harassed by project participants;
- f) Site and working areas shall be kept clean of food scraps and garbage;
- g) Animal proof disposal containers shall be used and be regularly emptied and transferred to an approved waste disposal site;
- h) Equipment and vehicles shall yield the right-of-way to wildlife and adhere to construction Site speed limits;
- i) Environmental awareness training, with regular briefings, shall be implemented for all Personnel;
- j) All persons on Site shall be made aware of the potential for encounters with black bears and instructed to report all sightings to the OSEM;
- k) Black bear deterrent measures may be used, and translocation of bears shall be undertaken before any lethal means are considered;
- l) Fire arms shall not be permitted on site, with exception of approved bear monitors;
- m) Black bear protection permits shall be obtained for each black bear monitor. Permits shall be signed by the individual that the permit is issued to;
- n) An Avifauna Management Plan shall be developed annually by Nalcor. This Plan includes:

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- i) Surveying for migratory bird nests prior to cutting during the nesting season;
 - ii) Surveying for sensitive habitat that typically support nests;
 - iii) Information regarding avoiding identified nests until fledged;
 - iv) Information regarding cutting in sensitive habitats during nesting season; and
 - v) Employing on-Site support of qualified members during construction, as required.
- o) Clearing activities between May 1 and August 15 shall be in compliance with the Avifauna Management Plan; and
- p) No one shall disturb, move or destroy migratory bird nests. If a nest or young birds are encountered, work shall cease in the immediate area of the nest. Work shall not continue in the area until the nest is no longer occupied, otherwise the work plan shall be modified to avoid nest sites by a minimum of 30 m.

14 ENVIRONMENTAL MONITORING AND FOLLOW-UP

14.1 ENVIRONMENTAL COMPLIANCE MONITORING

To ensure that appropriate and effective environmental mitigation measures are employed during construction, the project shall have an OSEM at construction Sites. These individuals shall continuously inspect worksites and activities for compliance with the EPP, C-SEPPs, engineered mitigation measures required by design; and compliance with government regulations and permits.

This EPP establishes the basis for environmental compliance monitoring at the Project site, i.e., monitoring for regulatory compliance to verify that conditions of all permits and approvals are satisfied, and that all environmental regulatory requirements are met. Refer to the Regulatory Compliance Plan (RCP) for further information on regulatory compliance for the LCP.

Non-conformance with this EPP and/or non-compliance with permits, approvals, and regulatory requirements shall be documented (as indicated in the following paragraphs and in the RCP), as well as be addressed with the Contractor responsible for mitigation measures. Corrective action shall be identified, target dates shall be agreed upon, and responsibilities shall be assigned to appropriate Personnel. This documentation shall be distributed to other members of the Project's environmental management team and written notice of agreed

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corrective action shall be forwarded to the Contractor so that issues are resolved to the satisfaction of the Project's environmental management team.

If non-conformance items are noted that require immediate attention, or if agreed corrective action is not implemented in a timely and effective manner, then appropriate resources shall be contracted by the Project to immediately undertake the required action. Daily field reports shall be prepared by the OSEM and distributed to the LCP, and the Contractor. These reports shall describe the work being undertaken by the Contractor, and document incidents of non-conformance with environmental requirements.

The Environmental Effects Monitoring / Environmental Assessment (EEM/EA) Coordinator, in consultation with Project staff and the Contractor, shall prepare a quarterly Environmental Compliance Audit Report. The report shall document all incidents of non-compliance and their causes. The EEM/EA Coordinator shall distribute the Environmental Compliance Audit Report to relevant Project participants. The EEM/EA Coordinator together with the Permits Coordinator shall be responsible for managing the Compliance Tracking Registry, including updating it regularly, and incorporating all conditions into the Registry to ensure compliance in a timely manner.

14.2 ENVIRONMENTAL EFFECTS MONITORING

The intent of EEM is to confirm predictions made as part of the EA. Residual effects are those that occur after planned mitigation measures are implemented. The EEM program, therefore, seeks to characterize the Project's actual residual effects on the environment to allow them to be compared with the predictions that were made.

Should actual residual effects deviate from predicted, the LCP shall determine the cause and appropriate action. Should this information be linked to work practices, the EPP shall be revised and updates shall be provided to Contractors and staff. It is noted that there may be additional requirements for approvals and communication with the regulators related to the EEM Plan and regulatory guidelines.

14.3 ANNUAL ENVIRONMENTAL PERFORMANCE REVIEW

At the end of each construction year the project shall convene an environmental performance workshop to review all work activities that relate to environmental concerns, issues and/or mitigations. This workshop shall include a review of environmental audits carried out by project staff during the year. The review process shall give all parties a chance to evaluate overall environmental performance and compliance with government regulations, permits, this EPP, and C-SEPPs.

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15 CONTINGENCY PLANS

The following unplanned occurrences and emergencies are briefly addressed in this section:

- a) Fuel and Hazardous Material Spills;
- b) Frac-out;
- c) Discovery of Archaeological Resources;
- d) Marine Vessel Accidents; and
- e) Wildlife Encounters.

The MSRP, C-SEPPs and Frac-out Response Plan will provide more detailed information on specific contingency plans.

15.1 FUEL AND HAZARDOUS MATERIALS SPILLS

To mitigate environmental effects of fuel and hazardous material spills and leaks, Contractors shall at all times maintain in good condition at least (1) one spill kit dedicated to each piece of fuel-powered equipment. Each spill kit shall be located on the equipment and stored in a weather-proof container. In addition to equipment-dedicated spill kits, the Contractor shall maintain in good condition the necessary spill response materials and equipment to respond to an accidental release of fuel or hazardous liquids (see Section, “Storage, Handling, Use and Disposal of Fuel and Other Hazardous Materials” within this document for more details on spill kits).

In case of a fuel or hazardous material spill project staff shall refer to the MSRP for detailed contingency measures. A Site specific fuel and hazardous materials response plan shall form part of the C-SEPP.

15.2 FRAC-OUT

The HDD procedure uses a bentonite slurry (a fine clay material) as a drilling lubricant. The bentonite is non-toxic but benthic invertebrates, aquatic plants and fish and their eggs can be smothered by the fine particles if bentonite were discharged to waterways or the marine environment. Frac-out could also affect listed plants and their habitat if a land release occurs.

The Contractor shall have in place a frac-out contingency plan, which provides measures for both terrestrial and seabed loss including:

- a) measures to provide for the timely detection of frac-outs;

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- b) protection of areas that are considered environmentally sensitive (streams, wetlands, other biological resources);
- c) organized, timely, and “minimum-impact” response in the event a frac-out and release of drilling mud occur; and
- d) notification procedures to be made to the OSEM and Environmental Engineering Coordinators.

15.2.1 Land Release

In the event that a release occurs on land while drilling, actions shall be taken to reduce, eliminate and/or control the release. Response actions may include:

- a) Cessation of drilling operations;
- b) Constructing a small pit or sand bag coffer around the release point, installing a section of silt fence or hay bales to trap sediment and usage of a pump hose to pump drilling fluid back to the bore site;
- c) Reducing drilling fluid pressures;
- d) Thickening drilling fluid mixture; and
- e) Adding pre-approved Lost Circulation Materials (LCMs) to the fluid mixture.

15.2.2 Seabed Release

If an underwater release occurs from the seabed via a bedrock fracture, reasonable actions shall be taken to reduce eliminate or control the release. These may include:

- a) Cessation of drilling operation;
- b) Reducing drilling fluid pressures;
- c) Thickening drilling fluid mixtures; and
- d) Adding pre-approved LCMs to the fluid mixture.

More details are provided on the prevention, monitoring, response and reporting protocols in the LCP Frac-Out Response Plan.

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15.3 DISCOVERY OF HISTORIC AND ARCHAEOLOGICAL RESOURCES

Historic resource material that is disturbed, destroyed or improperly removed from a site represents a potential cultural loss of information and history that could otherwise be handled and interpreted in an efficient and appropriate manner. In case of a suspected discovery of an archaeological site or artifact the following procedures shall apply:

- a) Archaeological materials encountered shall be reported initially to the OSEM. The OSEM shall report immediately to the Regulatory Compliance Lead and Provincial Archaeologist at PAO. The following information shall be provided:
 - i) Nature of activity;
 - ii) Nature of the material discovered; and
 - iii) Precise location of the find.
- b) Under the *Historic Resources Act* (RSNL 1990, c. H-4), all archaeological sites and artifacts shall be considered the property of the Crown, and shall not be disturbed. The Project shall take all reasonable precautions to prevent Employees or other persons from removing or damaging any such articles or sites and may be held liable for prosecution under Section 35.1 and 35.2 of the *Historic Resources Act* (RSNL 1990, c. H-4) for all contravention. Personnel working in the vicinity shall be advised of the find, including the OSEM. The site area shall be flagged for protection and avoidance;
- c) All work shall cease within 50 m of the discovery until the LCP advises the PAO of the discovery. The PAO, in consultation with the LCP shall provide direction regarding the discovery and may authorize a resumption of the work. If required, a full archaeological assessment shall be conducted of the site and immediate area; and
- d) The PAO shall assess the significance of the discovery and determine if mitigation is required.

15.4 MARINE VESSEL ACCIDENTS

There exists the potential that vessels involved during construction activities may run aground, become involved in collisions with structures or other vessels, or sink due to inclement weather or other reasons. Negative environmental effects may result if fuel, hazardous materials, or other physical/chemical substances are released to the environment during vessel accidents.

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- a) Project-related vessels shall be aware of the designated Safety Zones and use a safe shipping route to its port destination.
- b) Nalcor's VTMP shall have Marine Traffic Procedures in place that shall apply to all Project vessels.
- c) Vessel captains and crews shall comply with all requirements of the VTMP.

In the event of a marine vessel accident, the order of priority for action shall be for the protection of human life, prevention of pollution of the environment and prevention of shipping lane impediment. The following procedures shall be followed:

- a) The ship's captain shall immediately contact the CCG, Environmental Emergencies, through which the appropriate agencies shall be notified and specific action taken.
- b) All vessels shall deploy necessary safety and spill response equipment such as fire extinguishers, life rafts, etc.

A detailed marine emergency response plan shall form part of the C-SEPP.

15.5 WILDLIFE ENCOUNTERS

Wildlife encounters pose a potential risk of stress or injury to both the wildlife and Site Personnel. To reduce the risk and stress, control measures and environmental protection procedures have been put in place and are stated below. As a protection measure, hunting, trapping or fishing by Project Personnel is not permitted on the Sites. In the case of wildlife encounters the following shall be implemented:

- a) No attempt shall be made by any worker at the project site to chase, catch, divert, follow or otherwise harass wildlife by vehicle or on foot;
- b) Equipment and vehicles shall yield the right-of-way to wildlife;
- c) Any wildlife sightings or encounters shall be reported to the OSEM;
- d) The OSEM shall be responsible for all actions in response to nuisance animals;
- e) No one shall disturb, move or destroy migratory bird nests. If a nest or young birds are encountered, work shall cease in the immediate area of the nest. Work shall not continue in the area until the nest is

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no longer occupied, otherwise the work plan shall be modified to avoid nest sites by a minimum of 30 m; and

- f) Any incidents that result in the displacement or killing of wildlife shall be reported to the OSEM complete with details on the incident and the names (and contact information) of the persons involved.

16 CONTACT LIST

LCP General Information:

1-888-576-5454

lowerchurchill@nalcorenergy.com

DOEC Water Resources – St. John’s:

(709) 729-5713

DOEC Crown Lands - Happy Valley/Goose Bay:

(709) 896-2488

DOEC Wildlife Division:

(709) 637-2029

DFO: Habitat Management – Labrador:

709-896-6193

DNR Forestry Division:

(709) 497-8479

DNR Mines Division:

(709) 729-6447

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Service NL, GSC - Happy Valley/Goose Bay:

(709) 896-5471

Provincial Archaeology Office:

709-729-2462

Environment Canada Environmental Emergency Report Line:

709-772-2083 or 1-800-563-9089.

Town of Happy Valley Goose Bay:

709 896 3321