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15 FOLLOW-UP AND MONITORING

The follow-up and monitoring programs for this Project will be designed to meet several legislative and regulatory requirements, as well as internal corporate standards and requirements. Pursuant to the *Canadian Environmental Assessment Act* (CEAA), a follow-up program is mandatory for Projects requiring Comprehensive Studies with the purpose of “(a) *verifying the accuracy of the environmental assessment of a project, and (b) determining the effectiveness of any measures taken to mitigate the adverse environmental effects of the project.*” Follow-up programs serve as the primary means to determine and quantify change from routine operations on the receiving environment. While the Responsible Authority is responsible for the Follow-Up Program, it may also delegate any part of its design and delegation.

The Canada-Newfoundland and Labrador Offshore Petroleum Board’s (C-NLOPB) Development Plan Guidelines (C-NLOPB 2006) also requires an environmental assessment to include a follow-up monitoring program which it says “*may include, but not be limited to, implementation monitoring, environmental effects monitoring, compliance monitoring, and any monitoring of identified species at risk (Species at Risk) that may be required pursuant to the Species at Risk Act.*” The Development Plan Guidelines (C-NLOPB 2006) also include the requirements for the following monitoring programs to be addressed: Biological Observation Requirements, Physical Environmental Observation Program and Forecasting Programs.

There are a number of other federal and provincial regulations and guidelines are applicable to this Project including that may require monitoring to verify compliance. In addition, ExxonMobil Canada Properties (EMCP) has committed to undertake observational and monitoring programs associated with certain Project activities.

The following sections address all of the above requirements.

15.1 Environmental Effects Monitoring

A key component of monitoring the construction and operations of a project is the Environmental Effects Monitoring (EEM) program. EEM programs take repetitive measurements of environmental variables over time to detect changes caused by external influences directly or indirectly attributable to a specific anthropogenic activity or development (Duinker 1985). Ultimately, EEM programs are an assessment tool to help determine the sustainability of human activities on ecosystem health. EEM programs verify environmental effects predictions and the effectiveness of mitigative measures, as well as facilitate the identification of any unforeseen environmental problems that may arise, thereby allowing them to be addressed in a timely and effective manner.

EEM programs are designed using an iterative process that allows for opportunities to review the EEM design over the life of a project and address

project changes, as well as changing priorities in environmental management policies and practices while allowing for the incorporation of new and/or improved technologies and methodologies.

15.1.1 Proposed Offshore Environmental Effects Monitoring Program

The development and design of EEM programs in the Newfoundland and Labrador offshore oil and gas industry has built upon the considerable knowledge and experience gained from industry monitoring in the North Sea and the Gulf of Mexico. Each of the subsequent Canadian EEM programs (*i.e.*, Cohasset-Panuke, Hibernia, Sable Gas, Terra Nova and White Rose) has sought input from the regional, national and international scientific community, regulatory agencies and other stakeholders to further define expectations and goals of their EEM programs. The following describes the process that has been used to date in the development of EEM programs in the Newfoundland and Labrador offshore oil and gas industry. EMCP is proposing to use a similar process in the development of the EEM for this Project.

The initiation of the EEM process has typically consisted of the identification of the parameters to be measured, data gaps to be addressed and the overall goals and purpose of the EEM program. This step typically includes a literature and data review and identification of marine resources of interest as well as the establishment of boundaries and scale for the monitoring program. A conceptual model may also be developed at this stage, which describes the underlying cause-and-effect links of the project that may be used to generate environmental effects predications to be tested in the EEM program.

During this initial stage of the EEM process, input from the scientific community, regulatory agencies and key stakeholders groups is solicited through a series of formal and informal meetings and/or consultations. These meetings and consultations assist in developing a focused monitoring strategy by:

- ◆ Defining the purpose of the EEM Program
- ◆ Defining interactions from project discharges
- ◆ Determining the appropriate parameters to be monitored and the rationale for their inclusion / exclusion for the program
- ◆ Determining the means by which to measure environmental effects predictions
- ◆ Determining the requirement for new or additional site specific baseline data
- ◆ Determining the spatial design and statistical methodologies to be used for the various EEM components
- ◆ Reporting and incorporating information into the overall Environmental Protection Plan (EPP) to facilitate decision-making

Where an EEM program identifies unanticipated environmental effects, or where mitigation is found to be ineffective, EMCP will work with the applicable regulatory authorities to amend the EEM program and/or mitigation strategies to ensure that the Project does not result in significant adverse environmental

effects. EMCP will include the EEM program as a part of the overall Management System outlined for the Project in Chapter 16 of this Comprehensive Study Report (CSR).

As stated above, under CEAA, the Responsible Authority has overall responsibility for ensuring necessary mitigation and that a Follow-Up Program is designed and implemented in accordance with CEAA. EMCP, in consultation with the C-NLOPB, will engage the other regulatory agencies to ensure the results of the EEM program are communicated in a manner that facilitates the obligations of Responsible Authorities to report on the EEM program. Where EEM requirements are identified through the permitting stage (*i.e.*, authorizations under the *Canadian Environmental Protection Act*), these programs will be incorporated into the overall EEM program framework.

In addition to the operational EEM program, EMCP is committed to a fish habitat compensation monitoring program. The details regarding fish habitat compensation monitoring will be determined in consultation with DFO. A fish habitat compensation monitoring survey is conducted following completion of the compensation works to verify the amount and productivity of habitat created.

In addition, should an accidental release of oil occur from a spill or blow-out, a spill EEM program will be instituted.

15.1.2 Existing Offshore Environmental Effects Monitoring Programs

The three EEM programs currently approved for the Newfoundland and Labrador offshore oil and gas industry have core similarities with some differences that make each program unique (Petro-Canada 2007; HMDC 2005; Husky Energy 2007). The core components of the EEM programs are sediment, water and commercial fish analyses (Figure 15-1).

The EEM programs conducted to date offshore Newfoundland and Labrador have typically adopted a radial gradient sampling design for sediment quality monitoring; parameters are measured at increasing distances along transect radii from the drill site(s). Gradient designs have been found to provide the greatest statistical power to detect changes associated with production and drilling activities, and to provide information on the scale of disturbance effects (Ellis and Schneider 1997; Green 2003). The sediment quality monitoring program is primarily designed to detect and monitor changes associated with the release of solid discharges from the operating platforms.

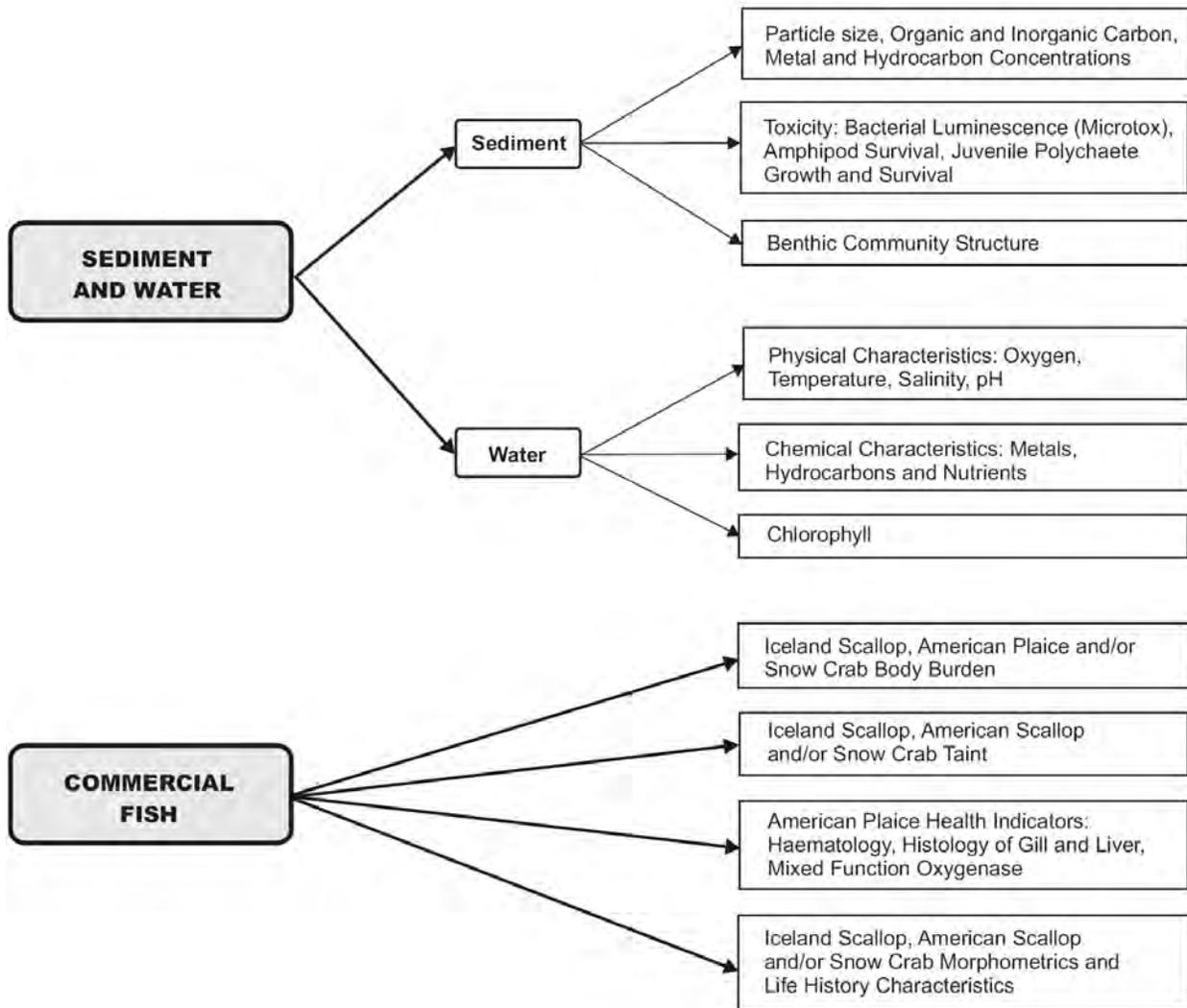


Figure 15-1 Environmental Effects Monitoring Program Components

Commercial fish parameters in Newfoundland and Labrador EEM programs have been typically examined in a control-impact design, where samples collected and parameters measured are examined from both study and control areas. The commercial fish programs are used to detect changes associated with both solid and liquid discharges.

Water sampling EEM programs have, for the most part in Newfoundland and Labrador, been based on a control-impact design or a modification of the control-impact design. These programs are designed to detect and monitor changes related to the release of liquid discharges, primarily produced water from the operating platforms.

All current EEM programs in Newfoundland and Labrador use more than one far-field reference station and have both baseline and operational EEM programs. The actual type(s) of EEM sampling design ultimately used for the Hebron Project will be chosen during the EEM design process. This process may be similar to that described above, and will build upon knowledge and data gained from existing Jeanne d’Arc Basin EEM programs. Upon

completion of a draft EEM design for the Hebron Project, the design will be formally submitted to the C-NLOPB for review and comment. Upon receipt of regulatory and other stakeholder comments, the Hebron EEM program will be finalized and implemented. Subsequent EEM programs will be reviewed and refined as necessary during the life of the project in order to ensure continual improvement.

15.1.3 Nearshore Environmental Effects Monitoring Program

EMCP will implement a nearshore EEM program to verify impact predictions in the marine environment in Bull Arm. The details of the nearshore EEM program will be developed in consultation with regulatory agencies and key stakeholders.

In addition, should an accidental release of oil occur from a spill, a spill EEM program will be determined based on criteria established with EMCP's Offshore Oil Spill Response Plan.

15.2 Environmental Compliance Monitoring

Environmental compliance monitoring (ECM) programs refers to activities used to ensure compliance with all regulatory and self-imposed environmental requirements. ECM assures regulators and the public that environmental regulations and standards are followed.

EMCP will implement a comprehensive Environmental Protection Plan (EPP) for the Nearshore Project Area and the Bull Arm Site. In addition, pursuant to the *Drilling and Production Regulations*, an EPP will be implemented for the offshore drilling and production operations.

15.2.1 Nearshore Environmental Compliance Monitoring

During construction activities at the Nearshore Project Area, as required by regulation, or as may be prescribed in the EPP and consistent with ExxonMobil standards, EMCP will implement an audit and compliance monitoring program. This program will incorporate compliance reporting requirements for applicable federal and provincial regulations governing activities at the Bull Arm Site. These regulatory instruments include, but are not limited to:

- ◆ Section 36 of the federal *Fisheries Act*, which prohibits the discharge of deleterious substances into any type of water frequented by fish
- ◆ Section 32 of the federal *Fisheries Act*, which prohibits the destruction of fish by any means other than fishing
- ◆ Section 35 of the *Migratory Birds Convention Act, 1994*, which prohibits the deposit of oil, oil wastes or any other substance harmful to migratory birds in any waters or any area frequented by migratory birds
- ◆ *Oil Pollution Prevention Regulations* of the *Canada Shipping Act*, which details how fuel transfers between ship and shore or between ships are conducted

- ◆ The *Hazardous Products Act*, which is the basis for Workplace Hazardous Materials Information System (WHMIS), which promotes proper labelling of controlled products and requires workers to receive education and training safe storage, use and handling of controlled products
- ◆ The Authorization for Works or Undertakings Affecting Fish Habitat, issued by Fisheries and Oceans Canada (DFO) under the *Fisheries Act*, and the Permit to Alter a Body of Water under the *Water Resources Act*, which details how infilling will be conducted
- ◆ Ocean disposal requirements under the *Canadian Environmental Protection Act*
- ◆ Newfoundland and Labrador Department of Environment and Conservation (NLDEC) Guidance Documents *Dredge Spoils Disposal* GD-PPD-028-1 and *Leachable Toxic Waste, Testing and Disposal* GD-PPD-026-1, which details the testing and disposal requirements of dredged materials from marine construction activities. The removal and disposal of dredge spoils from within the marine/freshwater environment requires testing as per GD-PPD-026-1 and approval from the Government Service Centre
- ◆ *Garbage Pollution Prevention Regulations, Pollutant Substance Regulations, Pollutant Discharge Reporting Regulations* and *Oil Pollution Prevention Regulations* as required by the CSA, which will govern all vessel activities
- ◆ The NLDEC *Water and Sewer Regulations* for waste water discharge, which requires testing of the water from any on-land settling ponds prior to discharge

15.2.2 Offshore Environmental Compliance Monitoring

The ECM program requirements for the offshore oil and gas industry are detailed in the *Offshore Waste Treatment Guidelines* (OWTG) (National Energy Board (NEB) *et al.* 2010). The OWTG (NEB *et al.* 2010) outline the recommended practices and standards for the treatment and disposal of wastes and the sampling and analysis of waste streams. All operations will adhere to the most recent version of the guidelines.

The OWTG (NEB *et al.* 2010) provide minimum standards for the treatment and disposal of specific waste streams, including air emissions, produced water, drilling muds, drilling solids, storage displacement water, bilge and ballast water, deck drainage, produced sand, well treatment fluids, cooling water, desalination brine, sewage and food wastes, water for testing fire control systems, monoethylene glycol, naturally-occurring radioactive material and other substances, wastes and residues. For further information with respect to the standards for the treatment, disposal and monitoring of waste streams listed above, the reader is referred to the OWTG (NEB *et al.* 2010).

An Authorization for Works or Undertakings Affecting Fish Habitat will also be issued under the *Fisheries Act* for Project components occurring at the Offshore Project Area.

EMCP will adhere to ocean disposal requirements under the *Canadian Environmental Protection Act* for disposal of dredge spoil from any potential future excavated drill centres.

15.3 Other Required Programs

EMCP has committed to undertaking monitoring and reporting of various VECs during certain activities associated with the Hebron Project. In addition, pursuant to C-NLOPB guidelines and regulatory requirements, EMCP may have to undertake monitoring programs associated with the issuance of permits / authorizations. These may include, but are not limited to:

- ◆ Collection of data on marine mammals, sea turtles and marine birds during blasting programs at Bull Arm
- ◆ Collection of data on marine mammals and marine birds during geophysical programs. Marine mammal and sea turtle monitoring and observation protocols will be consistent with the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2011). Marine bird observations will be undertaken, where applicable, as per the pelagic marine bird monitoring protocol developed by the Canadian Wildlife Service
- ◆ Compliance monitoring to ensure that the *Navigable Waters Protection Act* Conditions of Approval are implemented as outlined by Navigable Waters Protection Program of Transport Canada
- ◆ Collection and reporting of physical environmental data
- ◆ Project activities affecting fish habitat evaluated as part of the fish habitat compensation program. All fish habitat compensation measures will be monitored to ensure no net loss of productive capacity in fish habitat. A fish habitat compensation monitoring survey is conducted following completion of the compensation works to verify the amount and productivity of habitat created. In addition, compensation monitoring to determine the continued functioning of the habitat will be conducted for a period of time and at intervals agreed upon by DFO and EMCP. The timelines for monitoring will be included in the Fish Habitat Compensation Plan, which will be provided as a condition of Section 35(2) of the *Fisheries Act*

15.4 Environmental Assessment Validation

Various program activities during the life of the Hebron Project will require authorization under the Atlantic Accord Acts (e.g., drilling, dredging, geotechnical, geohazard and seismic surveys). Authorizations may be valid for one to five years at the discretion of the C-NLOPB. The schedule of Project activities outlined in this environmental assessment is based on the best available knowledge at this time. EMCP recognizes the requirement to ensure that the environmental assessment is kept current and valid to support the renewal of any applicable authorizations and/or any important changes in environment or resource use in the Project Areas during that time. Therefore, during the life of the Project, as authorizations are renewed or new ones are

required, EMCP will submit documentation to the C-NLOPB and federal regulatory authorities to confirm that:

- ◆ The scope and nature of activities planned and addressed under this environmental assessment have not changed
- ◆ The nature of the species at risk in the Project and Study Areas have been validated and have not changed (including review of Recovery Strategies and Management Plans)
- ◆ The nature and extent of the fishing activities in the Project Area have been validated and have not changed
- ◆ The mitigation measures defined and committed to in the environmental assessment are still valid

As part of its continuous improvement and stakeholder engagement, EMCP will consult with stakeholders, including fishers, regarding ongoing operations, as necessary.