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Roadmap for Planning Controlled Oil
Spill Countermeasures Research in the
Canadian Beaufort Sea

Feuille de route pour la planification
de la recherche sur les mesures de
prévention appliquées au déversement
d'hydrocarbures contrôlé dans la mer
de Beaufort en territoire canadien.



June 19, 2015

FINAL REPORT

Roadmap for Planning Controlled Oil Spill Countermeasures Research in the Canadian Beaufort Sea



REPORT

Report Number: 14-1320-0001





ABSTRACT

The *Roadmap for Planning Controlled Oil Spill Counter Measures Research in the Canadian Beaufort Sea* (the Roadmap) is intended to provide support and guidance to assist researchers “through the long and complicated process of obtaining all of the necessary approvals and permits required to conduct controlled oil spill countermeasures research in Arctic waters”. As there is limited field knowledge on oil spill fate and effects or efficient response measures in the Canadian Arctic, it has been suggested that countermeasures should be developed by conducting controlled oil spill field trials in Arctic waters. Such an applied research project can only be conducted after detailed planning, comprehensive consultations and obtaining the necessary approvals from the regulators at federal and territorial levels, as well as co-management boards and land claim organizations with authority under the *Inuvialuit Final Agreement* (IFA) and potentially the *Umbrella Final Agreement* in the Yukon.

The Roadmap describes consultation, Environmental Assessment (EA), and permit requirements for oil spill countermeasures research in the Canadian Beaufort Sea and adjacent onshore areas within the Northwest Territories (NWT) and Yukon portions of the Inuvialuit Settlement Region (ISR) only. Requirements of organizations or agencies of neighbouring jurisdictions (e.g., Nunavut or Alaska) should also be considered when applying for permits and authorizations for potential future oil spill countermeasures research.

Following extensive laboratory and test tank studies in the 1970s and 1980s, research into oil spill counter measures occurred in the Canadian and Alaskan portions of the Beaufort Sea which included the behaviour of oil in ice, the effectiveness of dispersant use, in-situ burning and the effectiveness of several skimmers. Renewed interest in oil exploration in the Canadian Beaufort Sea, as well as in Arctic areas in Russia, Norway, and the United States has led to a demand for further research. The seven research categories of potential future field trials in support of oil spill countermeasures research include:

- 1) Mechanical Recovery;
- 2) In-situ Burning;
- 3) Dispersant Use;
- 4) Shoreline Clean-up Techniques;
- 5) Modeling;
- 6) Detection and Monitoring; and
- 7) Impact and Assessment.

Based on these seven potential research categories, the Roadmap addresses the comprehensive consultation and permitting processes in separate chapters outlining the following requirements:

- northern community stakeholder consultation process;
- EA requirements;
- regulatory permit requirements; and
- safety, logistical and support requirements.



The northern community stakeholder consultation process is an essential component of the regulatory process in the ISR spanning the northern portions of the NWT and the Yukon, including the Beaufort Sea. Under the IFA, there are various stakeholders, communities and community organizations that may need to be consulted and engaged in proposed development and research projects in the ISR. In many instances, consultations are a prerequisite for the approval process and developers and researchers must provide evidence that they included not only the results of the consultations in the respective project or research applications but also implemented suggestions and recommendations into their proposed project design.

The Roadmap provides a list of agencies that either provide guidance on the consultation process or otherwise need to be involved. The Environmental Impact Screening Committee (EISC), Environmental Impact Review Board (EIRB), and Aurora Research Institute (ARI) describe the details of consultation requirements for potential developers in the ISR. For the Yukon portion of the ISR, the Yukon Environmental and Socio-economic Assessment Board (YESAB), addresses the consultation process. The Inuvialuit Land Administration (ILA) requires community consultations for their permitting purposes for proposed development on Inuvialuit-owned Lands, as does the Inuvialuit Regional Corporation (IRC) prior to development planning in the ISR.

Preliminary stakeholder interviews during the compilation of this Roadmap showed that there is some resistance to oil spill counter measure field trials in the Beaufort Sea. Residents in the ISR feel a need to be involved in any decision making prior to the permitting process. In particular, they would like to be involved in decisions on the type of experiment to be conducted and/or the experimental design. Ongoing and timely communications with appropriate regulatory agencies and community members will be fundamental to successfully permit oil spill countermeasures experiments in the Canadian Beaufort Sea.

The consultation process needs to take place through face-to-face meetings and will take a considerable amount of time and effort. However, since all land claim organizations and several regulators require stakeholder consultations as well, a streamlined approach can be designed and proposed to all involved parties. This approach may minimize duplication and result in efficiencies.

The EA requirements for approving oil spill countermeasures experiments in the Canadian Beaufort Sea will involve EA processes established under the respective land claim agreements and may involve additional federal EA requirements. In general, federal EA processes for oil and gas projects fall under the jurisdiction of the Canadian Environmental Assessment Agency (the CEA Agency) and the National Energy Board (NEB). In the ISR, EAs are the responsibility of the (Inuvialuit) EISC and EIRB (for projects located in the NWT and Yukon). The YESAB are responsible for proposed projects on the Yukon North Slope and adjacent Beaufort Sea. They coordinate their assessments and schedules according to to the EISC / EIRB process which is considered in the YESAB assessments.

Through agreements between the Inuvialuit and the federal government designed to minimize duplication of EA efforts, it can be assumed that the EISC and EIRB, with involvement of the YESAB (depending on the proposed project area) and the CEA Agency, will follow a streamlined process. The EISC / EIRB process, with involvement of all applicable Inuvialuit co-management boards and organizations, would likely substitute for the CEAA process if approved by the Minister of the Environment. To facilitate this streamlining, initial consultation needs to take place with the EISC, EIRB, and YESAB well prior to the detailed planning and design phase of potential oil spill countermeasures research to allow input into the research design and the potential development of specific agreements between the organizations.

RÉSUMÉ

Le but de la feuille de route pour la planification de la recherche sur les mesures de prévention appliquées au déversement d'hydrocarbures contrôlé dans la mer de Beaufort en territoire canadien (la feuille de route) est d'offrir un soutien et une orientation aux chercheurs et de les aider « tout au long du processus long et compliqué d'obtention de tous les permis et approbations nécessaires pour mener des travaux de recherche sur les mesures de prévention appliquées au déversement de pétrole contrôlé dans les eaux de l'Arctique ». Comme les connaissances de terrain sur le sort et les conséquences du déversement du pétrole ou sur les mesures d'intervention efficaces sont limitées dans l'Arctique canadien, il a été proposé d'élaborer des mesures de prévention en exécutant des essais sur des déversements d'hydrocarbures contrôlés dans les eaux de l'Arctique. Ce projet de recherche appliquée ne peut être effectué qu'après une planification détaillée et des consultations approfondies et l'obtention des approbations nécessaires des organismes de réglementation au niveau fédéral et territorial ainsi que des conseils de cogestion et des organismes de revendications territoriales ayant autorité en vertu de la Convention définitive des Inuvialuit (CDF) et éventuellement de l'Accord-cadre définitif dans le Yukon.

La feuille de route décrit la consultation, l'évaluation environnementale (EE) et les exigences relatives aux permis nécessaires pour l'exécution de recherches sur les mesures de prévention du déversement d'hydrocarbures dans la mer de Beaufort en territoire canadien et des zones côtières adjacentes dans les Territoires du Nord-Ouest (T.N.-O) et uniquement dans les parties du Yukon englobant la région désignée des Inuvialuit. Les exigences des organisations ou des organismes des administrations voisines (p ex., le Nunavut ou l'Alaska) devront également être prises en compte lors de la demande de permis ou d'autorisations pour l'exécution de recherches éventuelles sur les mesures de préventions relatives aux déversements d'hydrocarbures.

Après l'exécution d'études approfondies en laboratoire et dans les réservoirs d'essai durant les années 1970 et 1980, des recherches ont été menées sur les mesures de prévention des déversements d'hydrocarbures dans les parties de la mer de Beaufort situées au Canada et en Alaska qui comprenaient le comportement des hydrocarbures dans la glace, l'efficacité de l'utilisation des dispersants, la combustion in-situ et l'efficacité de plusieurs écremeurs. L'intérêt renouvelé dans l'exploration pétrolière dans la mer de Beaufort canadienne ainsi que dans les régions de l'Arctique en Russie, en Norvège et aux États-Unis a entraîné une demande pour l'exécution de nouvelles recherches. Les sept catégories de recherche sur les futurs essais possibles sur le terrain en soutien à la recherche sur les mesures de prévention du déversement des hydrocarbures sont les suivantes :

- 1) la récupération mécanique;
- 2) la combustion sur place;
- 3) l'utilisation d'agents dispersants;
- 4) les techniques de restauration des rives;
- 5) la modélisation;
- 6) la détection et la surveillance;
- 7) les répercussions et l'évaluation.

En se basant sur ces sept catégories de recherche possibles, la feuille de route traite des processus approfondis de consultations et de demandes de permis dans des chapitres distincts portant sur les exigences suivantes:

- le processus de consultations des intervenants des communautés nordiques;
- les exigences relatives à l'EE;
- les exigences réglementaires relatives aux permis;
- les exigences relatives à la sécurité, à la logistique et au soutien.



The timeline for EA processes can vary between 100 and 800 days, depending on the location, nature of the project and processes involved. The EISC screening will generally take approximately 100 days and if required, the Environmental Impact Statement (EIS) through the EIRB will add another 450 to 500 days to the schedule. It is anticipated that a Net Environmental Benefit Analysis (NEBA) will be a required component of an EIS. The concurrent YESAB process (if required), can take anywhere between 100 and 800 days.

The regulatory permit requirements for potential oil spill countermeasures research are complex and will depend on the actual design of the experiments. There are a large variety of required permits, licences and authorizations from federal, territorial and land claim organizations. Once the experimental design is completed and the field trials can be broken down into single activities, the exact requirements can be determined. The Roadmap provides a description of all potential regulators, their mandate, governing legislation and permitting authorities relevant to the potential oil spill countermeasures field trials. In addition, contact names, numbers and physical addresses are provided for each organization. Most of the permitting and licensing requirements can be processed concurrent to the EA processes and many of the agencies and organizations will be involved in the screening process, so that efficiencies among the two processes can be achieved.

In January 2014, the federal government introduced **Bill C-22, the Energy Safety and Security Act (ESSA)**. It received Royal Assent in February 2015. Bill C-22 now amends, amongst many other changes, the *Canada Oil and Gas Operations Act* to establish a legal framework to permit the safe use of spill-treating agents in specific circumstances and with that to allow the Minister to authorize and establish conditions for depositing oil, an oil surrogate or a spill-treating agent in the territorial sea of Canada for research purposes. ESSA only applies to research on spill treating agents for offshore activities. It does not include research on alternative response methodologies such as in-situ burning.

The safety, logistical and support requirements must be in place to demonstrate that the proponents have adequate knowledge and experience to carry out the work safely, effectively, and in an environmentally responsible manner. Acquiring permits and authorization requires adequately detailing an Experimental Plan which includes an Operational Plan, a Logistics Plan, a Health and Safety Plan, and an Environmental Protection Plan (EPP). In the offshore areas of the Canadian Beaufort Sea, the GNWT works with the NEB on all regulatory aspects. The EPP is required by the NEB on a project-specific basis centered on environmental management parameters. These parameters should describe the necessary actions or requirements to protect sensitive environmental factors, including natural and cultural resources. It needs to outline specific responsibilities, expectations, and methodologies for the protection of the environment.

Depending on the actual design of oil spill countermeasures experiments, additional plans and documents may be required as part of the EA and permitting processes and can be developed concurrently with input from the governing organizations.

Estimated Timeline

It is estimated that the combined consultation, EA and regulatory permitting processes will take approximately 2 to 2.5 years (based on the tasks and associated timelines shown in Figure 1). Completion of the required consultation, requests for additional meetings/presentations, hearings and potential revisions of various reports and submissions contribute to schedule uncertainties and have the potential to extend planned timelines. Regulatory permitting, licensing and approval requirements, as outlined in the Roadmap, could be completed



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during the screening and review processes; however, most agencies streamline their responses with the EISC / EIRB and YESAB approvals which could further extend the timeline.

An overview of the timelines associated with the northern stakeholder consultation process, environmental assessment requirements, regulatory permit requirements and safety, logistics and support requirements is shown in Figure 1. Note, that only key permit requirements were considered in this summary chart. Additional permits and licences may be required but could be applied for within the presented timeframe. Actual regulatory requirements will depend on the final experimental design and on any possible changes in territorial or federal legislation in the coming years.

Figure 1 demonstrates that the northern stakeholder consultations should continue throughout the entire regulatory approvals process. Consultations should be started at the onset of the experimental design phase to receive input, support for such oil spill field trials and buy-in from the communities. The order of approvals in Figure 1 is not binding but was chosen to fit into the overall timeframe dictated through the procedures that require the longest approval periods (the EIRB and YESAB Executive Office Screening processes). Specific milestones can be established around these long processes once details are known.

The goal of the Roadmap is to provide support and guidance for the permitting process of any future field trials. It is intended as a “hands-on” tool and includes contact names and numbers as well as important web links which the readers can easily access. Some of the information was moved into appendices which are referenced throughout the report.



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Task	Months																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Northern Stakeholder Consultation Process																														
Ongoing Consultations																														
Environmental Assessment Requirements																														
Environmental Impact Screening Committee																														
Environmental Impact Review Board																														
Yukon Environmental and Socio-economic Assessment Board																														
Designated Office Evaluation Process																														
Executive Committee Screening																														
Regulatory Permit Requirements																														
Environment Canada																														
New Substance Notification																														
Disposal at Sea Permit																														
Permit for Species at Risk																														
Research in Migratory Bird Sanctuaries and National Wildlife Areas																														
Fisheries and Oceans Canada																														
Offsetting Plan																														
SARA Permit for Affecting Schedule 1 Aquatic Species																														
Transport Canada																														
Navigation Protection Act Approval																														
Aurora Research Institute																														
Scientific Research Licence																														
Prince of Wales Northern Heritage Centre																														
NWT Class 2 Archaeological Permit																														
GNWT Department of Lands																														
Land Use Permit																														
GNWT Department of Environment and Natural Resources																														
Wildlife Research Permit																														
Yukon Water Board																														
Water Use Licence																														
Inuvialuit Land Administration																														
Land Use Permit																														
Inuvialuit Water Board																														
Water License																														
Safety, Logistics, and Support Requirements																														
Experimental Plan *																														
Additional Regulatory Requirements *																														
* as required																														

Figure 1: Estimated timeframes for key regulatory requirements for oil spill countermeasures experiments in the Canadian Beaufort Sea.



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1.0 INTRODUCTION

The Environmental Studies Research Fund (ESRF) is a research program in support of environmental and social studies addressing terms and conditions under which petroleum exploration, development and production activities in Canada's frontier lands¹ should be conducted. The ESRF Program was initiated in 1983 and receives its legislative mandate through the *Canada Petroleum Resources Act* (1987). The ESRF is directed by a joint government, industry and public Management Board. This 12-member Management Board has representation from the federal government (four members), the Canada-Newfoundland Offshore Petroleum Board (one member), the Canada-Nova Scotia Offshore Petroleum Board (one member), the oil and gas industry (four members) and the general public (two members). The ESRF is administered by a secretariat, residing in the Office of Energy Research and Development, Natural Resources Canada (NRCan) in Ottawa (Ontario).

The ESRF Management Board activities are supported by Regional Research Managers (RRM) for the East Coast and the North respectively. Normally, the RRM establishes a Technical Advisory Board (TAG) to oversee and provide advice on the technical and scientific aspects of a project. A TAG was established to oversee and review this report.

In December 2013, IMG-Golder Corporation (IMG-Golder) in partnership with Golder Associates Ltd. (Golder) and subcontractor SL Ross Environmental Research (SL Ross) was retained to prepare a *Roadmap for Planning Controlled Oil Spill Counter Measures Research in the Canadian Beaufort Sea* (the Roadmap). The Roadmap will provide support and guidance to assist researchers "through the long and complicated process of obtaining all of the necessary approvals and permits required to conduct controlled oil-spill countermeasures research in Arctic waters". As there is limited field knowledge on oil spill fate, effects and efficient response measures in the Canadian Arctic, it has been suggested that countermeasures should be developed by conducting controlled oil spill field trials in Arctic waters. Such an applied research project can only be conducted after detailed planning, comprehensive consultations and obtaining the necessary approvals from the regulators at federal and territorial levels, as well as co-management boards and land claim organizations with authority under the *Inuvialuit Final Agreement* (IFA) and potentially the *Umbrella Final Agreement* in the Yukon.

With increasing interest from the oil and gas industry in offshore exploration and drilling in the Beaufort Sea comes a duty and responsibility to collaborate and work with local communities and governments to combine resources to accomplish productive and timely research (C-CORE 2013a). An efficient research program to investigate Arctic offshore oil spill countermeasures is of particular importance due to the limited amount of field trials that have been completed to date and the large number of gaps that are left following laboratory or temperate climate trials. Such a high-profile project offers the opportunity to involve the public at the early stages of seeking regulatory approvals through consultation and community engagement. The involvement of the public through the regulatory process for oil spill countermeasures research will increase the common understanding of risks associated with oil and gas exploration and extraction in the Arctic and build confidence that regulators and industry can address an oil spill in the Beaufort Sea with a field tested, safe and environmentally responsible approach (C-CORE 2013a).

¹ Frontier lands are those areas situated in the offshore areas of Canada's East and West Coasts north of 60 degrees latitude where Canada has the right to dispose of or exploit the natural resources.



This report is structured into distinct sections addressing the requirements for northern stakeholder consultations, environmental assessments, permitting and logistics, support and health and safety plans (Sections 2 through 5). Each of these four Roadmap section has a “Conclusion” chapter at the end which highlights the respective findings at a high level and provides an overview of the most important processes either in diagram format or in structured tables. Additional details are provided in Appendices A through D. Appendix A is designed as a stand-alone document because it was used in communications with northern stakeholders. The other appendices have to be read in conjunction with the Roadmap. Cross references between the appendices and the main document are frequently included, acronyms are not reintroduced in the appendix text and all cited literature is included in the Roadmap Reference Section (Section 7). The reader of the Roadmap should be able to review each stage of the regulatory process involved in oil spill countermeasures field trials. The value of the Roadmap is to clarify this process.

1.1 Categories of Potential Future Oil Spill Countermeasures Research

Appendix A of the Roadmap describes the seven research categories of potential future field trials in support of oil spill countermeasures research:

1. Mechanical Recovery;
2. In-situ Burning;
3. Dispersant Use;
4. Shoreline Clean-up Techniques;
5. Modeling;
6. Detection and Monitoring; and
7. Impact and Assessment (Appendix A).

In addition and to support the different research categories / approaches, Appendix A presents an overview of past oil spill research in the Arctic marine environment. It details **approaches and standards used during similar field research in Canada and other international jurisdictions.**

These research categories formed the basis for the assessment of the consultation and regulatory requirements outlined in this Roadmap.

1.2 Recent Computer Models to assess Oil Spill Behaviour in the Beaufort Sea

The World Wildlife Fund (WWF) has recently published a study that uses computer modeling to assess the behavior of oil spills in the Arctic region, in particular in the Beaufort Sea. The goals of the work included the assessment of the best available model input data, projection of probable behaviour of spilled oil using best modelling practices and production of models and maps for various scenarios (Canadian Broadcasting Corporation [CBC] 2014a; Gearon et al 2014). The WWF developed an interactive website to demonstrate the results for the 22 different spill scenarios (available at: <http://arctic spills.wwf.ca>). It also provides a link to the technical report on the modelling project (prepared by RPS ASA), and a summary of this report (prepared by WWF).



Twenty-two different oil spill scenarios were conducted based on four generalized “spill analyses” including:

- a shipping spill analysis in the eastern region of the Beaufort Sea in the Amundsen Gulf;
- a trans-boundary analysis of various spill types on the coastal Beaufort Shelf near the U.S./Canada border;
- a shallow blowout analysis close to shore on the Beaufort shelf; and
- a deep blowout analysis on the Beaufort shelf break (CBC 2014a; Gearon et al 2014).

Results suggest a transport of oil over long distances to the west along the shelf break with the Beaufort Gyre current. A less common trajectory consisted of eastward movement of oil into the Mackenzie River Delta and the Canadian archipelago (Gearon et al. 2014). Traditional Knowledge also indicates an easterly current along the Yukon North Slope. Potential future oil spill counter measures research needs to address the fact that the effects are likely to be felt along the Yukon and Alaskan North Slope. The study also showed that a large spill during open water conditions could not be contained and cleaned up prior to the ice moving in, suggesting that countermeasures research needs to take ice cover into account (independent of the timing of the spill).

1.3 Lessons Learned from the Exxon Valdez Spill

The Exxon Valdez oil tanker spill 25 years ago (in March 1989) in the Gulf of Alaska (off the coast of the Kenai Peninsula), including experiments and monitoring that took place in response to this spill, have taught stakeholders a range of important lessons (Shigenaka 2014). Some of the key findings from the review of the spill (and how it was responded to and monitored over time) that should be considered during design of oil spill countermeasure experiments in Arctic and sub-Arctic waters (including the Beaufort Sea) include:

- Consideration must be given to the variability of biological communities and the necessity to integrate this factor into assessments of oil spills and treatment activities.
- Long-term monitoring has to be included in any oil spill countermeasures experiment design. Shorter-term (1 to 5 years) and longer-term (5 to 20 years) monitoring by National Oceanic and Atmospheric Administration (NOAA) during and after the response to the spill has made this clear (Shigenaka 2014). This work suggests that biological recovery from intensive shoreline disturbance occurs within 1 to 2 years. The addition of oil and intrusive clean-up activities will double the recovery time to approximately 2 to 4 years. Changes related to decadal changes at regional (basin-wide) scale are not apparent without monitoring over 5 to 10 year or longer periods.
- Oiled sites that are designated as “no treatment” zones should be included in every experimental design to distinguish the effects of oil from the effects of clean-up agents and activities.
- Baseline assessment of biophysical and biological environments should be undertaken before oil spill countermeasures experiments. There is ample evidence that baseline conditions are not static or constant, but are changing over time. It may be difficult to distinguish between natural variability at a regional scale and how an organism, animal or marine ecosystem is responding to a spill over time.



- Design of monitoring programs associated with a countermeasures program should consider that a sufficient number of non-impacted reference sites (background sites without oil contamination) are included in addition to the impacted sites.
- Long-term trends of a warming climate are evident for the Arctic. Large areas will become warmer and ice-free and will be difficult to assess in the context of disturbance effects and recovery while these warming processes are ongoing. Trends induced by climate change need to be considered in experimental designs.
- Gravel beaches are common in the Arctic, and they are difficult to treat after an oil spill. Wave energy, which can reduce oil persistence, is less prevalent in this environment (Shigenaka 2014), though this may be changing in the Beaufort Sea (and other Arctic waters), as a result of a longer open water period in the summer and/or fall, and more storms that generate waves that reach the shore.

While there are no direct lessons that may apply to the regulatory process described in this Roadmap, this accident may come up in consultations and will have to be addressed.

2.0 DOCUMENTATION OF THE NORTHERN COMMUNITY STAKEHOLDER CONSULTATION PROCESS

The potential oil spill countermeasures field experiments described in Appendix A will require a wide range of permits and licences from Inuvialuit, territorial and federal agencies and organizations. Those are described in Sections 3 and 4 of this Roadmap. Prior to, and as an integral part of the permitting process, comprehensive community and stakeholder consultations need to take place. These are described in this section. Carrying out oil spill countermeasures experiments will be considered a “development” and a “research” project and therefore follow the processes outlined for both categories.

Community and stakeholder consultations are an essential component of the regulatory process in the Inuvialuit Settlement Region (ISR). In many instances, consultations are a prerequisite for the approval process and developers and researchers must provide evidence that they included not only the results of the consultations in the respective applications but also implement suggestions and recommendations into their proposed project design.

There are three organizations in particular that describe in detail the consultation requirements for potential developers in the ISR and one that addresses consultations for developers in the Yukon portion of the ISR:

- the Environmental Impact Screening Committee (EISC);
- the Environmental Impact Review Board (EIRB);
- the Aurora Research Institute (ARI); and
- the Yukon Environmental and Socio-economic Assessment Board (YESAB).

In addition, the Inuvialuit Land Administration (ILA) requires community consultations for their permitting purposes for proposed development on Inuvialuit-owned Lands but does not provide specific guidelines (P. Stuart, ILA, pers. comm. 2014). The ILA links their applications to the EISC and ARI approval processes and



with that refer to their consultation requirements. More details on the ILA application and approval process is provided in Section 4 of this Roadmap.

The Inuvialuit Regional Corporation (IRC) also expects consultations to take place prior to development planning but does not provide further guidance on the process: “It is an expectation that Inuvialuit Institutions are consulted on research as they have authority to approve research as well as have a support and facilitating role for research in the Inuvialuit Settlement Region (ISR)” (IRC 2013).

Federal and territorial governments developed guidelines for their employees to assist with their own consultation processes, including in the ISR. Aboriginal Affairs and Northern Development Canada (AANDC) established the document *Aboriginal Consultation and Accommodation: Updated Guidelines for Federal Officials to Fulfill the Duty to Consult* (AANDC 2011). The Government of the Northwest Territories (GNWT) guides their employees with the *Government of the Northwest Territories’ approach to consultation with Aboriginal Governments and organizations* (GNWT 2007). Both guidelines are generic and not specific to the ISR.

Appendix B provides a brief summary of the consultation requirements specifically for proposed development and research projects in the ISR. *It should be noted that this section is a compilation of a comprehensive list of consultation processes that may be required for oil spill countermeasures research in the Canadian Beaufort Sea and adjacent onshore areas within the ISR only. Consultations with organizations or agencies of neighbouring jurisdictions (e.g., Nunavut or Alaska) may be required in addition to the requirements outlined in this section.*

2.1 Stakeholders in the Inuvialuit Settlement Region

There are a large variety of stakeholders, communities and community organizations that may need to be consulted and engaged in proposed development and research projects in the ISR. The six Inuvialuit communities are:

- Aklavik;
- Inuvik;
- Paulatuk;
- Sachs Harbour;
- Tuktoyaktuk; and
- Ulukhaktok.

All communities are located within the NWT portion of the ISR. There are no communities in the Yukon part of the ISR.

The following list in Section 2.4.1 includes potential stakeholders comprised of Inuvialuit organizations, co-management groups and regulatory agencies that may need to be consulted.



2.1.1 Inuvialuit Organizations

2.1.1.1 Inuvialuit Game Council

Under the IFA, the mandate of the Inuvialuit Game Council (IGC) is to represent the collective Inuvialuit interest in wildlife. It is comprised of a Chairman and at least one representative from each community's HTC. The IGC advises the relevant governments through the Wildlife Management Advisory Council (WMAC; for both the NWT and the Yukon's North Slope) on wildlife issues. It is responsible for selecting three members to the EISC and three members to the EIRB on behalf of the Inuvialuit (Joint Secretariat 2014).

Contact Information

Contact:	IGC Chair	Telephone:	867-777-2828
Mailing Address:	Inuvialuit Game Council Joint Secretariat – Inuvialuit Renewable Resource Committees PO Box 2120 Inuvik, NT, X0E 0T0	Fax:	867-777-2610
Email:	igc-js@jointsec.nt.ca	Online:	jointsecretariat.ca/igc.html

2.1.1.2 Inuvialuit Hunters and Trappers Committees

HTCs were established to represent Inuvialuit hunters and trappers in the Inuvialuit communities. Community specific regulations are enabled under the NWT *Wildlife Act* and describe community by-laws (e.g., polar bear by-laws) and were ratified in the 1990's:

HTCs control access to certain fishing and hunting activities through registration for fishing on Inuvialuit private lands through the Fisheries Joint Management Committee (FJMC) or HTCs. Community-specific by-laws for hunting beluga whales exist as well (supporting and enforceable through Fisheries and Oceans Canada's [DFO's] *Marine Mammal Regulations*).

Contact Information

The contact information for each of the HTCs for the ISR communities can be found at <http://www.jointsecretariat.ca/igc.html>.

2.1.2 Co-management Groups

2.1.2.1 Environmental Impact Screening Committee / Environmental Impact Review Board

The EISC was established based on the IFA to screen proposed projects and may determine that a proposed development requires a full review by the EIRB. The EISC / EIRB process is detailed in Sections 3.2.1 and 3.2.2. of the Roadmap. Through an informal presentation to the EISC, members will be able to confirm whether all Inuvialuit communities need to be included in the consultation process. The EIRB will outline in their Draft Terms of Reference which additional consultations need to be carried out.



Contact Information EISC

Contact: EIS Coordinator **Telephone:** 867-777-2828

Mailing Address: Environmental Impact Screening
Committee
Joint Secretariat, ISR
Inuvialuit Corporate Centre, Suite 204,
107 Mackenzie Rd
PO Box 2120
Inuvik, NT, X0E 0T0 **Fax:** 867-777-2610

Email: eisc@jointsec.nt.ca **Online:** screeningcommittee.ca

Contact Information EIRB

Contact: EIRB Coordinator **Telephone:** 867-777-2828

Mailing Address: Environmental Impact Review Board
Joint Secretariat, ISR
Inuvialuit Corporate Centre, Suite 204,
107 Mackenzie Rd
PO Box 2120
Inuvik, NT, X0E 0T0 **Fax:** 867-777-2610

Email: eirb@jointsec.nt.ca **Online:** eirb.ca

2.1.2.2 Fisheries Joint Management Committee

The mission of the FJMC is to “ensure that the renewable marine, anadromous and freshwater resources of the Inuvialuit Settlement Region are managed and conserved for the wise use and benefit of present and future generations”. The FJMC is responsible under the IFA to assist the federal government and the Inuvialuit with management related to fisheries, to assist the Minister with carrying out responsibilities for the management of fisheries and marine mammals in the ISR and to advise the Minister in all matters relating to Inuvialuit and ISR fisheries. The FJMC provides input into the EISC screening process (FJMC 2009).

Contact Information

Contact: FJMC Chair **Telephone:** 867-777-2828

Mailing Address: The Fisheries Joint Management
Committee **Fax:** 867-777-2610
PO Box 2120
Inuvik, NT, X0E 0T0

Email: fjmc-rp@jointsec.nt.ca **Online:** fjmc.ca



2.1.2.3 Wildlife Management Advisory Council (NWT)

The jurisdiction of the WMAC (NWT) covers the portion of the ISR located within the NWT. The WMAC (NWT) participates in the conservation efforts of terrestrial wildlife species including polar bears and birds. They work to advise government ministers on matters relating to management, regulation, research, enforcement and administration of wildlife, habitat and harvesting as well as wildlife policy for their area of jurisdiction. The WMAC (NWT) is not involved in issuing permits or licences but provides input into the EISC and EIRB screening process (Joint Secretariat 2014a).

Contact Information

Contact: WMAC (NWT) Chair **Telephone:** 867-777-2828
Mailing Address: The Wildlife Management Advisory Council (NWT)
PO Box 2120
Inuvik, NT, X0E 0T0 **Fax:** 867-777-2610
Email: wmacnwt@jointsec.nt.ca **Online:** jointsecretariat.ca/wmacnwt.html

2.1.2.4 Wildlife Management Advisory Council (North Slope)

The jurisdiction of the WMAC (NS) covers the portion of the ISR located within the Yukon. WMAC (NS) was created in 1988 under the *Western Arctic (Inuvialuit) Settlement Act*. WMAC (NS) is made up of five members; two appointed by the IGC, one appointed by the federal Minister of the Environment, one by the Yukon Government, and an independent chairperson. The WMAC-NS participates in the conservation and management of wildlife for the Yukon North Slope by providing advice on management, regulation, research, enforcement and administration of wildlife, habitat and harvesting as well as wildlife policy to co-management partners and governing bodies. The WMAC-NS is not involved in issuing permits or licences but provides input into the EISC, EIRB and YESAB screening processes (WMAC-NS 2012).

Contact Information

Contact: WMAC (NS) Chair **Telephone:** 867-633-5476 or
867-633-5525
Mailing Address: Wildlife Management Advisory Council (North Slope)
P.O. Box 31539
Whitehorse, Yukon, Y1A 6K8 **Fax:** 867-633-6900
Email: wmacns@web.ca **Online:** wmacns.ca

2.2 Specific Stakeholder Consultation Requirements

To receive further input on the comprehensive consultation process required for potential oil spill countermeasures field trials in the Beaufort Sea, a project team member attended the IGC Regular Members Meeting on June 26 and 27, 2014 in Sachs Harbour, NWT. Information on the meeting and feedback received



from participants are described in Section 2.5.1. In addition, the FJMC was contacted to receive specific feedback. The results are presented in Sections 2.5.2. The specific ARI requirements are included in Appendix B.

2.2.1 Inuvialuit Game Council Meeting

A representative from IMG-Golder (Luc Prefontaine, Biologist) attended the meeting on June 26, 2014 and was allotted a timeslot to present the objectives of the Roadmap and initiate a follow-up discussion with all participants. The presentation was in a PowerPoint slide-show format with interactive questions and comments from meeting participants.

The IGC members present at the meeting included:

- Frank Pokiak (Chair);
- Joey Carpenter (Director, Sachs Harbour);
- Margaret Kanayok (Director, Ulukhaktok);
- Jordon McLeod (Alternate, Aklavik);
- John Noksana Jr. (Director, Tuktoyaktuk); and
- Ray Ruben (Alternate, Paulatuk).

No Inuvik representative for the IGC was present at the meeting on June 26. Other presenters and observers that attended the meeting included:

- Steve Baryluk (IGC Staff);
- Jen Lam (IGC Staff);
- Norm Snow (Joint Secretariat);
- Marsha Branigan (GNWT ENR);
- Carl Ozyer (NRCan);
- Michelle Cote (NRCan);
- Brian Chambers (NEB);
- Dan Slavik (World Wildlife Fund for Nature [WWF]);
- Neil Darlow (Imperial Oil Resources [IOR]);
- Jenny Hay (IOR); and
- Wendy Smith (IOR).

The presentation included background information of the Roadmap; an introduction to the scope, purpose, and requirements of the Roadmap; a brief description of previous Arctic oil spill countermeasures tests that have



been done; and an overview and brief explanation of the seven categories of research for oil spill countermeasures that could be proposed in the future (Section 1; Appendix A).

2.2.1.1 Inuvialuit Game Council Meeting Feedback

During the presentation, all questions were basic clarification questions regarding the Roadmap and IMG-Golder’s role that were answered immediately. It was also confirmed several times that no organization is currently proposing any oil spill countermeasures testing in the Canadian Beaufort Sea.

Good dialogue ensued following the presentation including questions from both the IGC Members and other participants. The details of the questions and answers are provided in Table 1. Some answers were provided at a later date in written form (and distributed to all meeting participants) to allow for oil spill specialists on the project team to provide informed answers and input.

Table 1: Questions and Answers resulting from the Presentation

Table with 2 columns: Question and Concerns, Answers. Contains 4 rows of Q&A pairs regarding oil spill testing volumes, regulatory conditions, roadmap completion, and hydrocarbon testing.



Question and Concerns	Answers
aviation fuel, and heavy lubricants) spill countermeasures testing considered currently and if so, will they be included in the Roadmap or will the Roadmap focus exclusively on weathered crude oil spill countermeasures?	however, most oil spill countermeasures that would be tested would be applicable to hydrocarbon fuels but not to lubricants.

The IGC was then asked if there are any research categories from the presentation that they foresee as not acceptable or if there are any locations or times of the year that they would not want any oil spill countermeasures testing to take place. They were also asked what they foresaw for the consultation process. The IGC members recommended that the same presentation be done for each of the six HTC and each of the six Inuvialuit communities prior to any further planning of oil spill countermeasures research. The IGC members also recommended that the HTC and communities feedback from such a consultation tour be included in the Roadmap document (if possible). HTCs and communities should be consulted before beginning any permitting or regulatory process for oil spill countermeasure testing. This would allow the public to be educated and offer input into the type and design of any proposed oil spill research, along with the location and timing considerations for proximity to communities, camps, traditional, and environmental concerns.

At the end of the presentation and discussion, Norm Snow indicated that he would like to discuss the matter with the project team at a later date and provide additional details.

2.2.1.2 Recommendations Resulting from the Inuvialuit Game Council Meeting

Through consultation and discussions with the IGC and other stakeholders at the IGC Regular Members Meeting in Sachs Harbour, it was determined that clarification is required concerning the permissibility of a release of crude oil into an ocean environment to assess the effectiveness of oil spill countermeasures. Some in attendance at the IGC meeting perceived the current state of federal legislation (specifically Environment Canada’s mandate) as not allowing a release of crude oil into the environment to study oil spill countermeasures, while there are recent documented field trials that have done just that (DFO 2015). Others were under the impression that work is currently under-way to change applicable legislation so that such a controlled release of crude oil could be allowed in the future. The current regulatory permit requirements are discussed in detail in the Section 4.

The IGC members also indicated that each of the six HTCs and their respective communities should have the option to attend a similar presentation in advance of finalizing the Roadmap, and that their feedback is included in this Roadmap. The current scope of the Roadmap will not allow for such a comprehensive consultation program to be completed and included in the Roadmap. It is therefore recommended to complete comprehensive HTC and community consultation programs as a project component prior to any planning or design of future proposed oil spill countermeasures field trials or testing in the ISR. Consultation should include a discussion with the HTC and the public in each community regarding the specific locations of tests, the seasonality and timing of the tests, and long term-monitoring of any incomplete clean-up of control tests and sites.



2.2.2 Fisheries Joint Management Committee Consultation Requirements

Since there was no Fisheries Joint Management Committee (FJMC) representation during the IGC meeting in Sachs Harbour (Section 2.5), the FJMC was contacted separately for feedback, input and recommendations. Representatives were contacted in January 2015 to set up a meeting to discuss the objectives of the Roadmap. Danny Swainson (FJMC Fisheries Resource Specialist) and Brian Zytaruk (Canadian Member FJMC) were contacted to schedule a meeting in Inuvik. Due to logistical issues and time constraints, the meeting could not be held. An email communication was established and the PowerPoint presentation used for the Sachs Harbour IGC meeting (Section 2.5.1) as well as the outcome of the Sachs Harbour meeting (Section 2.5.2) was provided. Similar to the attendees at the IGC meeting, the FJMC representatives were asked to provide feedback, special consultation requirements, and recommendations that should be included in the Roadmap.

The FJMC reviewed the presentation and commented that:

“... the cleanup technologies have shown to have limited success in the conditions which are likely to exist in the Beaufort [Sea]. have had a chance to query many of the suppliers of the remedial measures suggested here and they indicated the methods have application in open water situations but will not work in the variable ice conditions of the Western Arctic”. In addition, it was felt that there is no reason to be conducting experiments of this nature in the Beaufort Sea “unless there is a revolution in the available technologies”.

FJMC members felt that technologies currently available have been proven to be ineffective in light ice cover. While some techniques may be able to clean up oil in the open water areas between broken and flowing ice, this would be a small percentage of an uncontrolled spill in the Beaufort Sea. The FJMC requested to be kept informed of any proposed oil spill countermeasures research activities associated as they might have implications for Inuvialuit interests the Beaufort Sea region (B. Zytaruk, FJMC; pers. comm. 2015).

2.3 Consultation Process – Conclusion

Stakeholder consultations are an essential component of the regulatory process in the ISR. In most instances, consultations are a prerequisite for the approval process and evidence must be provided that consultations took place and that recommendations stemming from the consultation process were implemented into the proposed project design (e.g., with regards to seasonality and location based on local knowledge of currents).

Table 2 summarizes key aspects of the consultation requirements for oil spill countermeasures research in the Canadian Beaufort Sea.

Table 2: Key Organizations and Agencies with Consultation Requirements

Table with 3 columns: Organization, Purpose of Consultation, Consultation Guidelines, Requirements and Comments. Row 1: Environmental Impact Screening Committee/ Environmental Impact Review Board (EISC / EIRB), Inform potentially affected parties, communities, organizations, individuals and relevant authorities of the potential environmental impacts and of the proposed activity., The developer has to determine which affected parties and communities should be consulted, as well as what information is to be shared. Members of the public or parties that are potentially affected must have the opportunity to engage with the developer, learn about the development, and provide input or comments into the project design. A detailed description of the consultation process must be submitted as par of the Project Description /





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Organization	Purpose of Consultation	Consultation Guidelines, Requirements and Comments
		Environmental Impact Statement.
Aurora Research Institute (ARI)	The process of consultation is in place to avoid harm to the natural, social and cultural environments of the NWT. This ensures that local communities are well informed of upcoming research projects, and that knowledge resulting from those projects returns to those communities.	The consultation process should be completed prior to the start of research. Before a licence can be issued, the researcher must demonstrate that they have consulted with appropriate community organizations and addressed any comments, concerns or suggestions regarding the proposed research. The ARI requires written confirmation from the community organizations potentially affected by the research that they have no remaining concerns regarding the project.
Yukon Environmental and Socio-economic Assessment Board (YESAB)	Legislation in the Yukon requires that developers consult with the affected Aboriginal groups and / or community residents in terms of environmental and socio-economic effects on their area and any proposed mitigation measures.	The consultations with the stakeholders must be completed prior to submitting a proposal to the YESAB.
Inuvialuit Game Council	The IGC represents the collective Inuvialuit interest in the ISR from a wildlife perspective.	No specific consultation structure needs to be followed. Representatives were consulted as part of this Roadmap and they requested intensive consultations with the communities prior to any oil spill countermeasures research in the ISR.
Inuvialuit Hunters and Trappers Committees	Receive input on the community specific regulations for hunting, fishing, and trapping.	No specific consultation structure needs to be followed. Representatives were consulted as part of this Roadmap and they requested intensive consultations with the communities prior to any oil spill countermeasures research in the ISR.
Fisheries and Joint Management Committee	Receive input on the comprehensive consultation process.	No specific consultation structure needs to be followed. Representatives were consulted as part of this Roadmap and they questioned the usefulness of oil spill countermeasures research in the ISR and the existence of appropriate technology to deal with oil spills of any nature in the Arctic.
Wildlife Management Advisory Council (NWT) – WMAC (NWT)	The WMAC (NWT) provides advice on management, regulation, research, enforcement and administration of wildlife, habitat and harvesting as well as wildlife policy for the NWT portion of the ISR.	No specific consultation structure needs to be followed.



Organization	Purpose of Consultation	Consultation Guidelines, Requirements and Comments
Wildlife Advisory Council (North Slope) – WMAC (NS)	The WMAC (NS) provides advice on management, regulation, research, enforcement and administration of wildlife, habitat and harvesting as well as wildlife policy for the Yukon portion of the ISR.	No specific consultation structure needs to be followed.

3.0 DOCUMENTATION OF THE ENVIRONMENTAL ASSESSMENT REQUIREMENTS

This section of the Roadmap describes the Environmental Assessment (EA) process for approving oil spill countermeasures experiments in the Beaufort Sea. The process may involve federal EA requirements and will involve EA requirements established under the respective land claim agreements.

In general, federal EA processes for oil and gas projects fall under the jurisdiction of the Canadian Environmental Assessment Agency (the CEA Agency) and the National Energy Board (NEB). Land claim EA processes are the responsibility of the (Inuvialuit) EISC and EIRB in the ISR (for projects located in the NWT and Yukon) and the YESAB for proposed projects on the Yukon North Slope and adjacent Beaufort Sea. The EISC and the EIRB also have jurisdiction over the Yukon North Slope portion of the Yukon, as it falls within the ISR (EISC and EIRB 2011). Under circumstances where a project requires an EA under the IFA and the CEA Act it is possible to substitute the IFA process for the CEA process with approval of the Minister of the Environment (Canadian Northern Economic Development Agency [CNEDA] 2013). The specific EA requirements for oil spill countermeasure field trials in the Canadian Beaufort Sea are described in the following sections.

3.1 Federal Environmental Assessment Processes

3.1.1 Canadian Environmental Assessment CEA Agency

The CEA Agency is a federal body accountable to the Minister. The role of the CEA Agency is to administer the *Canadian Environmental Assessment Act, 2012* (CEAA), conduct federal EAs, advance the science and practice of the EA process through research and development, provide administrative and advisory support for review panels, and to promote the use of strategic EAs (SEAs) as a key tool in sustainable decision making.

Experimental spills in the Canadian Beaufort Sea might be subject to consideration under CEAA 2012 if it is considered:

- a “designated project” under CEAA 2012; or
- a physical activity carried out on federal lands in relation to a physical work (CEA Agency 2013a; McCauley J., CEA Agency; pers. comm. 2014).

3.1.1.1 Designated Projects

Under CEAA, the *Regulations Designating Physical Activities* 2013 set out the types of physical activities that have been identified as likely to require a federal EA (i.e., “designated projects”). Experimental oil spills and



associated countermeasures are not listed in the regulations; therefore, are not “designated projects” under CEAA, which means that a federal EA is not likely to be required.

In special circumstances, the Minister of the Environment (the Minister) may, by order, designate a physical activity that is not prescribed by the regulations if, in the Minister’s opinion, either the carrying out of that physical activity may cause adverse environmental effects or public concerns related to those effects may warrant the designation. While special designation for oil spill countermeasure trials is possible, it is expected to be unlikely, particularly since trials in the Beaufort Sea will be subject to an EA process through the EISC who has the jurisdiction to refer a project to an Environmental Impact Statement (EIS) through the EIRB if the proposed development may cause adverse environmental effects (Section 3.2.3).

If a proposed development were to be “designated”, the CEA Agency would be the Responsible Authority for the federal EA process, which is outlined below (CEA Agency 2013a). It is likely that the process would be coordinated with the EA requirements of other jurisdictions so that one EA would meet the requirements of all parties and duplication could be avoided. It is also possible that the Minister could substitute another EA process for the federal EA process (and impose conditions on the carrying out of the oil spill trials in his/her decision statement). This is further described below.

3.1.1.1.1 Process and Timeline

If the project were designated by the Minister and a standard EA was required under CEAA, the process to be followed would be for a standard EA assessed by the CEA Agency as the Responsible Authority, or by a review panel. Due to the nature of the proposed project, it is expected that an assessment by a review panel would not be warranted (CEA Agency 2013a).

In certain cases, portions of the EA process could be delegated to another jurisdiction, as defined by CEAA, or where there is jurisdictional overlap, the EA process could be coordinated with or substituted by the other process(es). If there is no delegation or substitution of the federal EA process to another jurisdiction, the following process and timeline would be followed for a standard federal EA (McCauley J., CEA Agency; pers. comm. 2014).

The timelines provided are set by the legislation. An EA conducted by the CEA Agency must be completed within 365 days. This timeline starts when a notice of the commencement of the EA is posted on the Registry Internet site and ends when the Minister makes a decision as to whether the designated project is likely to cause significant adverse environmental effects. This timeline applies to government activities only, and does not apply to the period of time required by the proponent to gather the information needed to complete the EA. The following five steps briefly outline the CEA Agency EA process under CEAA (CEA Agency 2013a).

Step 1: Environmental Assessment Commencement

The commencement of the EA is marked by the CEA Agency posting a Notice of Commencement of the EA on the Canadian Environmental Assessment Registry Internet site (<http://www.ceaa-acee.gc.ca/050/index-eng.cfm>). The CEA Agency then prepares and posts Draft EIS Guidelines on its Registry site for public comments on proposed studies, methods and information required in the EIS. The CEA Agency considers comments from the public, Aboriginal groups and federal departments and then issues the final guidelines to the proponent.



The Minister has 60 days after the start of an EA to refer a project to a review panel. At the end of the commencement phase, the Minister will normally have made a decision about whether to refer the project to a review panel or to continue as a standard EA.

Step 2: Conduct the Analysis

After public comments are received, the Final EIS Guidelines are issued to the proponent, who is then required to prepare an EIS that identifies and assesses the environmental effects of the project and the measures proposed to mitigate those effects, according to the EIS Guidelines prepared by the CEA Agency. The proponent then submits the EIS to the CEA Agency for review.

The CEA Agency and other government officials review the proponent's EIS for adequacy and accuracy. Clarification or further information may be required to understand the potential environmental effects and the proposed mitigation measures. The proponent then revises the EIS if required and submits further information requested by the CEA Agency. The CEA Agency reviews the additional information and if any information gaps remain, or clarifications are needed, the proponent provides additional information to the CEA Agency. Once complete, the EIS report is posted on the Registry site and the CEA Agency solicits comments from the public.

Step 3: Environmental Assessment Report

Considering the EIS and the public comments received, the CEA Agency then drafts the EA Report, including the CEA Agency's rationale, conclusions and recommendations regarding the potential environmental effects of the project, mitigation and significance of remaining adverse environmental effects as well as follow-up program requirements. The CEA Agency then solicits comments on the draft EA report. After the comment period the CEA Agency finalizes the EA Report and submits it to inform the Ministers EA decision.

Step 4: Environmental Assessment Decision

Based on the EA Report, the Minister decides whether any adverse environmental effects are likely to be significant, taking into account any mitigation measures he or she considers appropriate. If the Minister decides that the project is likely to cause significant adverse environmental effects, the matter is referred to the Governor in Council (Cabinet) who will then decide if the likely significant adverse environmental effects are justified in the circumstances.

If the Minister decides that the project is not likely to cause significant adverse environmental effects (or Governor in Council has determined that such effects can be justified), the conditions such as mitigation and a follow-up program that the proponent must comply with for the proposed project to be carried out, are set out in the EA decision statement issued by the Minister. Proponents must not carry out any part of a designated project that may result in environmental effects unless it complies with the conditions included in the decision statement.

Federal decisions, such as whether to issue regulatory permits, approvals or authorizations (such as *Fisheries Act* Authorizations, Disposal at Sea Permits, or *Navigable Waters Protection Act* Approvals), that would permit the project to proceed, can only be made by federal departments and agencies after the EA is complete. Federal authorities responsible for such decisions may exercise any power or perform any duty or function in relation to the designated project if an EA decision statement has been issued stating that:

- with the implementation of the conditions set out in the decision statement, the project is not likely to cause significant adverse environmental effects; or



- the significant adverse environmental effects that the project is likely to cause after the implementation of the conditions are justified in the circumstances.

Note: Regulatory permit requirements are described in detail in Section 4.

Step 5: Enforcement and Follow-up

CEAA requires the proponent to comply with the conditions identified in the decision statement. Mitigation measures identified in the EA decision statement should be incorporated into the design plans and implemented with the project. A follow-up program should also be implemented to verify that the EA was accurate and the mitigation measures were effective. Since 2012, new provisions under CEAA permit the implementation of the conditions identified in the decision statement to be verified (e.g., through inspections) and, if not implemented appropriately, legal actions may be taken (e.g., fines or penalties).

3.1.1.2 Projects on Federal Lands

If the project is not a “designated project” under CEAA, but a portion occurs on federal land, CEAA requires that before federal authorities make any decision that would allow a project to proceed, they must determine whether the project is likely to cause significant adverse environmental effects, though this is not in the form of a formal EA under CEAA (CEA Agency 2013b).

A “project” is defined (by section 66 of CEAA) as a physical activity that is carried out on federal lands in relation to a physical work and is not a designated project. Thus, to meet the definition of a “project”, any experimental oil spills would need to be carried out on federal lands. Federal lands are defined in CEAA and include the following lands and areas (CEA Agency 2013b):

- the internal waters of Canada, in any area of the sea not within a province;
- the territorial sea of Canada, in any area of the sea not within a province;
- the exclusive economic zone of Canada; and
- the continental shelf of Canada.

These lands do not include lands under the administration and control of the Commissioner of Yukon, the Northwest Territories or Nunavut. Thus, activities in the offshore, where the Crown retains ownership of waters under subsection 7(3) of the IFA, are within federal lands.

To meet the second portion of the definition of a “project”, any experimental spills would need to be related to a physical work, which is defined as anything that has been or will be constructed (human-made) and has a fixed location. Examples include a bridge, building or pipeline; however, natural water bodies, airplanes and ships at sea are not physical works. Since it is not expected that physical works will be involved, it is unlikely that the activities would be considered a project under CEAA, in which case, it would not be subject to a determination under section 67 of CEAA.

If the activities did meet the definition of a project, the next step would be to identify any federal authorities who would have a decision to make that could enable this project to proceed. This could be any type of involvement in a project, such as being the project proponent, providing a permit or approval, or providing funding to allow the project to proceed. If so, those authorities would have a responsibility under CEAA to determine the significance of adverse environmental effects (CEA Agency 2013b).



3.1.1.3 Contact Information

Contact: Canadian Environmental Assessment Agency, Alberta, Prairies and NWT **Telephone:** 780-495-2037

Mailing Address: Canada Place 9700 Jasper Avenue, Suite 1145 Edmonton, AB T5J 4C3 **Fax:** 780-495-2876

3.1.2 National Energy Board

The NEB is an independent federal agency established in 1959 to regulate aspects of the oil, gas and electric utility industries (NEB 2014a). The NEB's mandate is to regulate pipelines, energy development and trade while promoting safety and security, environmental protection and efficient energy infrastructure. The NEB regulates specified offshore activities in northern Canada under the *Canada Oil and Gas Operations Act* (1985) and the *Canada Petroleum Resources Act* (1985), and is also the regulator for specified onshore activities within the ISR under section 12.1(1) of the *National Energy Board Act* (1985). As part of its mandate, the NEB conducts EAs for proposed regulated oil and gas activities in the Canadian Arctic offshore (NEB 2014b).

Under CEAA, the NEB is the responsible authority for certain designated projects, including activities that are regulated under the *National Energy Board Act* and the *Canada Oil and Gas Operations Act*. While management of spills in the context of unauthorized discharges, emissions or escapes of petroleum is regulated under the *Canada Oil and Gas Operations Act*, management of planned spills is not regulated by the NEB (Steedman R., NEB; pers. comm. 2014); therefore, **the NEB would not have a trigger to be the responsible authority for a federal EA for any proposed oil spill countermeasures research in the Beaufort Sea.**

3.1.3 Federal Government and Inuvialuit Land Claim Organization Environmental Assessment Agreements

The Government of Canada and the EIRB (for the ISR) have an agreement in place outlining how the EA process of the EIRB under the IFA may be substituted for a panel review under CEAA (CEA Agency 2000). The Memorandum of Understanding (MOU) between the two parties details the process and the steps each would follow should the EIRB request such a substitution. Project-specific agreements are concluded by both parties on a case-by-case basis whenever they deem it appropriate. The MOU respects both the EA requirements established for the EIRB under the IFA and those for panel reviews and substitution of process as set out in the CEAA. Under CEAA, the Minister has the discretionary power to approve the substitution of another federal hearing process (Section 3.1.1), such as the one established under a land claims agreement, for an EA review panel under CEAA.

In addition, a project-specific MOU was signed in 2002 between the Inuvialuit and the Minister to streamline the CEAA requirements through the EISC and EIRB processes and to not duplicate EA efforts during the Mackenzie Gas Project review process (NEB 2013).

In 2012, the NEB entered into an MOU with the EISC and EIRB with the purpose of outlining each party's roles and responsibilities in the EA review processes of oil and gas development in the ISR. The MOU was intended



to streamline existing processes under existing legislation and to increase the efficiency of all involved organizations (NEB 2013).

3.1.4 Federal BILL C-22

In January 2014, the federal government introduced Bill C-22, the *Energy Safety and Security Act* (ESSA), for first reading in the House of Commons (NRCan 2014). It received Royal Assent in February 2015. Bill C-22 now amends, amongst many other changes, the *Canada Oil and Gas Operations Act* to establish **a legal framework to permit the safe use of spill-treating agents in specific circumstances** and with that to allow the Minister to authorize and establish conditions for depositing oil, an oil surrogate or a spill-treating agent in the territorial sea of Canada for research purposes. ESSA only applies to research on spill treating agents for offshore activities. It does not include research on alternative response methodologies such as in-situ burning (Parliament of Canada 2015).

Environment Canada and DFO might be implicated in this recent change which is described in detail in Section 4 of this Roadmap.

3.2 Environmental Assessment Processes under Land Claim Agreements

The Canadian Beaufort Sea falls within parts of the NWT and Yukon that form the ISR. Within the ISR, EA processes are the responsibility of the EISC and the EIRB, as detailed in the IFA. A YESAB review may be triggered by projects in the Yukon portion of the ISR.

The IFA is a land claim agreement between the federal government and the Inuvialuit people within the ISR. Following 10 years of negotiations, the IFA was signed on June 5, 1984. The legislation implementing the IFA is the *Western Arctic (Inuvialuit) Claims Settlement Act*. The agreement gives the Inuvialuit legal ownership over their land including subsurface mineral rights (e.g., oil and gas), the right to hunt and harvest wildlife anywhere within the claim area, and the responsibility to ensure good wildlife management. The ISR covers 90,650 km², 5,000 km² of which include surface and sub-surface rights and 30,000 km² of which include surface rights (including granular resources) across the NWT and the Yukon North Slope (IRC 2007). The IFA also lays out the establishment of the EISC, EIRB and associated environmental screening and review processes.

Both the environmental impact screening by the EISC and the environmental impact review by the EIRB involve a large group of advisors comprised of Inuvialuit community and co-management groups, territorial government departments (e.g., Government of the Northwest Territories' (GNWT) Department of Environment and Natural Resources [ENR]) and federal agencies (e.g., Environment Canada, the Canadian Wildlife Service [CWS], Aboriginal Affairs and Northern Development Canada [AANDC], DFO, Transport Canada [TC] and Parks Canada Agency [Parks Canada]). These, and other organizations, can review and comment on a proposed development. Their input is considered when framing the terms and conditions of an approval (EISC 2012a; EISC and EIRB 2011).

3.2.1 Environmental Impact Screening Committee

The EISC was established based on the IFA to complete environmental screenings of proposed projects for onshore and offshore areas of the ISR, such as oil and gas, mineral exploration and extraction, industrial site



clean-up and restoration, granting of water rights, commercial tourism ventures, and land use associated with government sponsored or funded research (EISC 2014; Section 2.1).

The IFA is a land claim agreement between the federal government and the Inuvialuit people within the ISR. Following 10 years of negotiations, the IFA was signed on June 5, 1984. The legislation implementing the IFA is the Western Arctic (Inuvialuit) Claims Settlement Act, 1984. The agreement gives the Inuvialuit legal ownership over their land including subsurface mineral rights (including oil and gas), the right to hunt and harvest wildlife anywhere within the claim area, and the responsibility to ensure good wildlife management. The ISR covers 90,650 km², 5,000 of which include surface and sub-surface rights and 30,000 of which include surface rights (including granular resources) across the NWT and the Yukon North Slope (IRC 2007). The IFA lays out the establishment of the EISC and associated screening processes.

In addition to federally legislated EA processes (Section 3.1), the environmental impact screening process as identified in the IFA is required for all projects in the ISR independent of any licence, permit or authorization requirements as long as they are determined to constitute a 'development' as defined in the IFA (EISC 2014). If the proposed development may cause negative environmental impacts, the EISC can refer development proposals to the environmental impact review process through the EIRB. Projects determined as 'developments' and therefore subject to the Inuvialuit environmental impact screening process and potentially the environmental impact review process include:

- proposed developments likely to cause a significant environmental impact;
- proposed developments that could have a significant negative impact on wildlife, wildlife habitat, or on present or future wildlife harvesting;
- all proposed developments relating to the Yukon North Slope;
- proposed developments that the Inuvialuit have requested to be subject to screening;
- proposed developments in areas where traditional Dene, Métis, or Inuvialuit harvesting may be adversely affected, upon request of the Dene, Métis, or Inuvialuit; and,
- projects, research, or infrastructure sponsored by, conducted by, or under the day-to-day control of government agencies or corporations (EISC 2014).

Under the IFA, the EISC's provisions must be complied with for project permitting and approval. The EISC screening process applies to all development proposed within the ISR including both onshore and offshore as well as projects outside of the ISR that have the potential to impact the environment within it. Examples of projects that would require EISC screening are:

- government funded or conducted scientific research;
- development project research;
- camps and fuel caches requiring land use permits;
- proposals for commercial tourism;
- granting of water rights / water withdrawals;



- disposal of industrial waste;
- exploration and extraction activities (hydrocarbon, mineral, aggregate);
- commercial plant resource harvesting;
- commercial transportation developments; and
- scheduled military activities (EISC 2014).

The EISC has prepared their *Environmental Impact Screening Guideline* (EISC 2014) to guide project proponents and stakeholders through the procedures, requirements and structure of the EISC and assist with the preparation of a Project Description (PD). The companion document to the guidelines is *Rules of Procedure for the Environmental Impact Screening and Review Process of the Inuvialuit Final Agreement* (the Rules of Procedure; EISC and EIRB 2011) provides the framework for the procedures by which the EISC operates and how proponents and stakeholders can participate in the environmental impact screening process. These two documents formed the basis of the following paragraphs.

3.2.1.1 Process and Timeline

Step 1: Screening

Proponents are encouraged to contact the EISC early to discuss their proposed development. The first step is to complete an online questionnaire (project summary) which serves to register the project on the EISC public registry and to notify the EISC officially about the proposed project. In the online questionnaire, a proponent can ask that the project proceed directly to the screening process (already identified as a 'development') or the proponent can ask that the project be reviewed for a possible exemption from the screening process (not a 'development'). If the proposed project is not exempt and is considered a 'development', the proponent must submit a Project Description (PD) to the EISC for environmental impact screening (EISC 2014).

Step 2: Preparation and Submission of a Project Description

The PD provides a description of the proposed development, environmental impact and cumulative effects analysis, documents engagement and consultation activities carried out to date, and identify proposed mitigation measures and commitments by the proponent. The PD is to be prepared in accordance with the EISC's *Environmental Impact Screening Guidelines* (EISC 2014).

Step 3: Environmental Impact Screening

Upon review of the PD, if the EISC determines that the PD is not complete, it will return the PD to the proponent and ask for a revised PD to be submitted within 30 days. If a revision is not received in 30 days, the proponent must begin the process again with Step 1 (the online questionnaire; EISC 2014).

If complete, the PD and a notice of the environmental impact screening is posted on the EISC registry website, which initiates a 45 day comment period. During this period any interested parties (e.g., individuals, government agencies, non-governmental organizations) can make a request to the EISC for registration as a 'Party to the Proceedings'. Registered parties can then submit information requests (IRs) to the EISC during the first 35 days of the comment period and, if accepted by the EISC, the IRs are posted to the online registry. After the first 35 days, a registered party can make a request for a public presentation to clarify information that was submitted



by that registered party. If approved, a notice to the registered parties is posted on the EISC online registry with the time, date, and location of the public presentation.

Written submissions by registered parties are considered by the EISC for the first 45 days. All information received during this period is added to the online registry and is used by the EISC Screening Panel for its screening decision. The Screening Panel consists of appointed members from the EISC to complete the screening process.

Following the 45 day comment period, the proponent is given ten days to respond to IRs and comments. After ten days, the EISC will close the Record of Proceedings if it is complete so that a decision can be made. However, the EISC may extend the Proceedings to further consider information, seek clarification, or submit an IR for any information gaps. Once the Record of Proceedings is closed, a Notice of Termination of Proceedings is issued (EISC 2014).

Step 4: Decision

The EISC's mandate is to complete a 'preliminary assessment of a proposed development and its environmental effects to determine whether a proposed development could have a significant negative environmental impact'. After considering all available information, the EISC will notify the government authority responsible for authorizing the proposed project that one of the following decisions has been made:

- the development will have no significant negative impact and may proceed without environmental impact assessment and review under the IFA;
- the development, if authorized subject to the environmental terms and conditions recommended by the EISC, will have no such significant negative impact and may proceed without environmental impact assessment and review under the IFA;
- the development could have significant negative impact and is subject to assessment and review under the IFA by either the EIRB or a governmental authority responsible for the proposed development or environmental impact review that satisfies the assessment and review function of the IFA; or
- the proposed development has deficiencies of a nature that warrant a termination of its consideration and the submission of another PD (EISC 2014).

Whichever decision is made, the EISC's Decision Letter and reasons for decision will then be posted on the online registry and the Record of Proceedings will be closed.

3.2.1.2 Contact Information

Contact:	EISC Coordinator	Telephone:	867-777-2828
Mailing Address:	Environmental Impact Screening Committee Joint Secretariat, ISR Inuvialuit Corporate Centre, Suite 204, 107 Mackenzie Rd PO Box 2120 Inuvik, NT, X0E 0T0	Fax:	867-777-2610



Email: eisc@jointsec.nt.ca

Online: screeningcommittee.ca

3.2.2 Environmental Impact Review Board

The EIRB is a co-management board that was established by and operates within the scope of the IFA. The Board's purpose is to carry out detailed environmental impact assessments and public reviews for proposed development within the ISR that have been referred by the EISC (if proposed projects have the potential to cause negative environmental or socio-economic effects). Similar to the EISC, the EIRB is made up of seven appointed board members. As noted in Section 3.2.1.1, if the EISC refers a development proposal to the EIRB, the EIRB subsequently decides whether to approve the development and, for approved developments, identifies terms and conditions. In its review, the EIRB considers needs for wildlife compensation, mitigation and remedial measures.

The EIRB's *Environmental Impact Review Guidelines* (EIRB 2011a) detail the process followed by the board to complete the EIS process. They specify the procedures the EIRB follows when completing a public review of a development proposal, and describes the basic approaches that can be taken to complete a review.

3.2.2.1 Process and Timeline

Step 1: Process Initiation

When the EISC refers a proposed development to the EIRB, the EISC will forward the PD along with the EISC's Decision Letter, reasons for the decision, a copy of all the information from the EISC's Record of Proceedings, and a contact list of EISC Registered Parties to the Proceedings. Within 30 days of receiving a referral for an environmental impact review from the EISC, the EIRB will:

- contact the developer and arrange a meeting or discussion to explain the *Environmental Impact Review Guidelines* and answer questions;
- establish a file on the EIRB online registry;
- publish a public notice of referral online, and in other local media;
- post the PD and all information from the EISC referral package on the EIRB online registry;
- identify parties to the proceedings;
- identify the need for, and if required, retain specialists to provide expert technical advice to the EIRB;
- establish a schedule for completion of the Environmental Impact Review; and
- meet to review and confirm the public process, review the schedule and possibly request information from the developer to decide how to proceed with the Environmental Impact Review (EIRB 2011a).

Step 2: Scoping and Terms of Reference

The Draft Terms of Reference (ToR) are drafted by the EIRB to identify the specific requirements the proponent must address in its EIS. The Draft ToR are placed on the online registry and circulated for a 30-day review and comment period which can include optional Community Scoping Sessions (EIRB 2011a). After the 30-day review period, the ToR are finalized and sent to the proponent.



Step 3: Draft Environmental Impact Statement

Once the ToR are sent to the proponent, the proponent has 90 days to submit a Draft Environmental Impact Assessment (EIS). If 90 days is not a suitable timeframe, the proponent can make a written request for an extension (EIRB 2011a).

Step 4: Review of Environmental Impact Statement

When the Draft EIS is received, the EIRB will announce a 30-day conformity review period, to determine if the Draft EIS contains all of the information required by the ToR. At the end of the 30-day review period, the EIRB prepares and releases a public Conformity Statement to the proponent. The proponent then has 45 days to finalize the EIS to address any deficiencies that were identified in the Conformity Statement.

Step 5: Review Panel and Technical Review

Upon acceptance of the Final EIS, the EIRB will appoint a Review Panel to determine an appropriate Review Schedule which is made public and posted online. The schedule typically includes a 90-day technical review period and a 76-day information request (IR) period. The IRs are an opportunity for parties to request information or clarification regarding the content of the EIS. An extension for the technical review or for the IR period can be requested by a party (EIRB 2011a).

Step 6: Amendments

If desired, a request for amendments to the EIS can be made by the proponent. If permitted by the Review Panel, the technical review and IR periods can also be re-opened. The decision regarding amendments will be posted online and circulated with a new schedule (EIRB 2011a).

Step 7: Pre-hearing Conference, Hearing Notice, and Public Hearings

A pre-hearing conference may be held if warranted, based on a decision by the Review Panel considering the outcome of the technical review and IR periods. If held, the pre-hearing conference will finalize the issues to be addressed at the hearing, set timelines, procedures, and consider means for simplifying the hearing. A hearing notice will be issued at 30 days prior outlining the details, time and location of the hearing and who will participate (EIRB 2011a).

Step 8: Close of Public Registry and Review Panel Decision

The online registry will be closed 14 days after the end of the public hearings. The Review Panel will then convene to come to a decision and complete a decision report within 90 days. The recommendation will either be made to allow the proposed project to proceed as described in the EIS, or the Review Panel can make additional recommendations regarding sustainable development, minimizing harvesting conflicts, environmental or wildlife monitoring, and potential liabilities of the proponent. The decision will be made public and posted online as well as forwarded in writing to the proponent, all parties, regulatory agencies, and, if required, to the Minister (EIRB 2011a).

3.2.2.2 Contact Information

Contact:	EIRB Coordinator	Telephone:	867-777-2828
Mailing Address:	Environmental Impact Review Board Joint Secretariat, ISR Inuvialuit Corporate Centre, Suite 204,	Fax:	867-777-2610



107 Mackenzie Rd
PO Box 2120
Inuvik, NT, X0E 0T0
Email: eirb@jointsec.nt.ca

Online: eirb.ca

3.2.3 Inuvialuit Co-Management Boards and Organizations

Under the IFA, there are a variety of co-management boards and Inuvialuit organizations to be included in the EA process through the EISC and EIRB (through consultations and review processes). The six Inuvialuit communities are listed in Section 2.4. All communities are located within the NWT portion of the ISR. There are no communities in the Yukon part of the ISR.

Co-management boards and Inuvialuit organizations in the ISR may contribute to the environmental screening and review processes. These boards and organizations may have valuable information relevant to planning and design as well as mitigation measures for proposed projects in the ISR (EISC 2014; EISC and EIRB 2011), and include the following:

- Co-Management Boards:
 - FJMC;
 - WMAC –NS; and
 - WMAC –NWT.
- Inuvialuit Organizations:
 - Inuvialuit Land Administration (ILA);
 - Inuvialuit Game Council (IGC); and
 - Inuvialuit HTC.

3.2.3.1 Co-management Boards Fisheries Joint Management Committee

The FJMC is responsible under the IFA to assist the federal government and Inuvialuit with management related to fisheries and marine mammals, provides input into EISC screenings and EIRB review. The mission of the FJMC is to “ensure that the renewable marine, anadromous and freshwater resources of the Inuvialuit Settlement Region are managed and conserved for the wise use and benefit of present and future generations”. (FJMC 2009; more details are provided in Section 2.4).

Wildlife Management Advisory Council NWT

Participates in the conservation efforts of terrestrial wildlife species including polar bears and birds in the NWT, provides input into EISC screenings and EIRB review. The WMAC-NWT is not involved in issuing permits or licences but provides input into the EISC and EIRB screening process (Joint Secretariat 2014a; more details are provided in Section 2.4).



Wildlife Management Advisory Council NS

Participates in the conservation efforts of wildlife for the Yukon North Slope and also provides input into EISC screenings as well as EIRB and the YESAB review. The jurisdiction of the WMAC-NS covers the portion of the ISR located within the Yukon. The WMAC-NS is not involved in issuing permits or licences but provides input into the EISC, EIRB and YESAB screening processes (WMAC-NS 2012; more details are provided in Section 2.4).

3.2.3.2 Inuvialuit Organizations

Inuvialuit Land Administration

The ILA is responsible for managing and administering Inuvialuit-owned lands in the ISR. Applications to access and/or use Inuvialuit lands are reviewed and approved by the ILA (ILA 2005; more details are provided in Section 4.5.1).

Inuvialuit Game Council

The mandate of the IGC is to represent the collective Inuvialuit interest in wildlife. The IGC advises relevant government bodies through the WMAC on wildlife issues. It is responsible for selecting three members for the EISC and three members for the EIRB on behalf of the Inuvialuit (Joint Secretariat 2014b; for more details are provided in Section 2.4).

Inuvialuit Hunters and Trappers Committees

The HTC's were established to represent Inuvialuit hunters and trappers in the six Inuvialuit communities. They control access to certain fishing and hunting activities through registration for fishing on Inuvialuit private lands (EISC 2012; more details are provided in Section 2.4).

3.2.4 Yukon Environmental and Socio-economic Assessment Board

For projects in the ISR on the Yukon North Slope, both the IFA and the *Yukon Environmental and Socio-Economic Assessment Act* (2003; YESSAA) apply. For projects in the Yukon, the YESAB has jurisdiction and may need to be involved in the EA process for any projects in addition to the EISC and potentially the EIRB processes (YESAB 2014).

The YESAB is an independent body established to conduct comprehensive assessments of projects in order to consider their environmental and socio-economic effects within the Yukon and along the Yukon North Slope. The board came into effect in 2005 under the *Umbrella Final Agreement* and the *Yukon First Nations' Final Agreements*. The YESAB's Dawson City Designated Office completes assessments for the Yukon North Slope, in parallel with screenings conducted by the EISC.

The YESSAA provides for a comprehensive, neutrally conducted assessment process for projects to ensure that they do not adversely affect the Yukon's environmental quality, heritage resources, and provide socio-economic benefits. The YESSAA also describes circumstances under which an assessment under YESAB may be required for proposed activities. The *Assessable Activities, Exceptions and Executive Committee Projects Regulations* (2005) provide the criteria and thresholds that trigger an assessment, including a description of specific activities and exceptions to activities requiring assessments. **Depositing oil in waters, or any area frequented by migratory birds, for scientific purposes requires an assessment under Part 5 of Schedule 1 of the regulation.**



3.2.4.1 Process and Timeline

The YESAB follows an assessment process similar to that of the EISC (Section 2.2.1). Permits and authorizations are not issued directly by the YESAB, but the board conducts assessments to determine if the potential environmental and socio-economic activities should proceed without terms and conditions, proceed with terms and conditions, or not proceed. It then submits its recommendations to federal and territorial governments, and/or Aboriginal decision-making bodies (YESAB 2014). Proposed projects are assessed through the YESAB **Designated Office Evaluation Process**, which takes an average 42 days to complete.

The Designated Office Evaluation Process is composed of three stages including an Adequacy Stage, Evaluation Stage and a Recommendation Stage. The Adequacy Stage allows the YESAB to conduct information and location reviews and request additional information from the proponent. An adequacy review can take from eight to 29 days or more depending on the proponent's response time. The Evaluation Stage includes preparation of the scope of project, creation of a notification list, and the opening of the project proposal to public comment. This can take from 14 to 70 days or more depending on the proponent's response time. The Recommendation Stage allows time for the evaluation report to be written and a recommendation be made to the decision-making body. Decision-making bodies have an additional 30 days to issue a decision document once a Designated Office has tabled a recommendation.

Large, complex project proposals may need an **Executive Committee Screening**, which can take between six months and two years (YESAB 2014). The projects either come directly to the Executive Committee or are referred by a Designated Office. This Executive Committee Screening process includes an Adequacy Review, Screening, Reporting, and Decision. The Adequacy Review may take from 60 to 90 days or more and may include additional information requests. The Screening includes two public comment and review stages, one for the initial proposal and another following completion of the draft screening report. These public comment and review stages can take from 30 to 60 days each. Completion of the draft screening report can take from 120 to 390 days and may include an additional 21 days if further information is required from the proponent. Finalization of the report and submittal of the recommendation then takes from 60 to 90 days. Decision-making bodies have an additional 60 days to issue a decision document once the executive committee has tabled a recommendation. The total Executive Committee Screening process may take up to 800 days.

3.2.4.2 Contact Information

Contact:	YESAB Coordinator	Telephone:	867-668-6420
Mailing Address:	YESAB Head Office Suite 200 – 309 Strickland Street Whitehorse, YK, Y1A 2J9	Fax:	867-668-6425
Email:	yesab@yesab.ca	Online:	yesab.ca

3.3 Net Environmental Benefit Analysis

As part of an EIS, the EIRB (or the CEA Agency) can require that a Net Environmental Benefit Analysis (NEBA) be completed. A NEBA is a decision making tool for regulators to assess proposed emergency environmental responses with the goal of determining if the available options for countermeasures offer relative environmental



benefits over natural recovery (i.e., doing nothing; Nicolette 2013). A NEBA is often required for offshore projects in the description of potential oil and chemical spill countermeasures as part of an Emergency Response Plan.

Recent legislative amendments introduced in the House of Commons in January 2014 (Bill C-22; Section 3.1.4) may provide regulators with the authority to approve the use of oil spill countermeasures, particularly dispersants, in consultation with the federal Ministers of Environment and Natural Resources if a net environmental benefit can be shown, such as advancing our understanding of the effectiveness of countermeasures (DFO 2014). As described in Section 3.1.4, ESSA regulates spill treating agents exclusively and does not address alternative response measures such as in-situ burning. It is anticipated that a NEBA will be a required component of an EIS for testing of oil spill countermeasures in the Beaufort Sea in which a complete recovery or clean-up may not be possible (e.g., through the use of dispersants, chemical herders for in-situ burning, or long-term monitoring of shoreline clean-up testing). Appendix A of this Roadmap describes a NEBA tool recently developed by the U.S. National Research Council which can be accessed at: <http://www.arcticresponsetechnology.org/project-updates/environmental-impacts-from-arctic-oil-spills-and-arctic-oil-spill-response-technologies/launch-new-tool-to-aid-oil-spill-decision-making>.

3.4 Jurisdictional Overlap

3.4.1 Overlap with Federal Environmental Assessment Process

At present, jurisdictional overlap in the part of the ISR located within the NWT is limited. Previous and current agreements between the Inuvialuit and the federal government are aimed at minimizing potential overlap (Section 3.1.3).

Only in the event that the federal Minister chooses to designate experimental oil spills as a designated project requiring an EA under CEAA, would there be jurisdictional overlap between the federal EA process and that of the Inuvialuit. This overlap could be addressed through a coordinated EA process, whereby one EA would meet the requirements of all jurisdictions. Likewise, under subsection 26. (1) of CEAA, the CEA Agency may delegate any part of the EA of the designated project and the preparation of the EA report to another jurisdiction. In either the case of coordination or delegation, the CEA Agency cannot delegate the final decisions. Similarly, CEAA has provisions for substitution and equivalency of the EA process as explained in the following paragraphs.

3.4.1.1 Substituted Federal EA

When approving a substitution, the Minister must be satisfied that another jurisdiction's EA process is an appropriate substitute for the CEAA process and that the substantive requirements of the CEAA process will be satisfied by the other process (CEA Agency 2013c). The requirements consist of:

- consideration of the same factors as would occur during a federal EA;
- an opportunity for the public to participate and have access to documents and the final EA report;
- submission of the report to the CEA Agency; and
- any other conditions set by the Minister.

If the Minister is satisfied that the substantive requirements of CEAA can be met by another process and if the other jurisdiction requests substitution of their process, the Minister must allow for the substitution of the federal



EA process. The CEAA allows substitution to be requested at any point during the EA. Under a substituted process, the federal Minister still retains a federal decision-making role at the end of the process and would make a decision about the project using the EA report prepared by the other jurisdiction (CEA Agency 2013c).

For oil spill countermeasure experiments in the NWT portion of the ISR, the IFA process, which involves EISC and EIRB screening and reviews of developments, could possibly be substituted for the CEAA process. For experimental spills in the Yukon portion of the ISR, the *Yukon Environmental and Socio Economic Assessment Act* (YESAA) process, which involves assessment by the YESAB, could possibly be substituted along with the IFA process for the CEAA process; however, it is understood that the Minister would require a formal agreement to be negotiated with the other jurisdiction prior to such a substitution taking place. This could be done in a MOU between all involved parties (federal government, EISC, EIRB and YESAB).

Under the equivalency provisions of CEAA, where another process meets all of the conditions for the substitution of a process, the Minister may recommend to the Governor in Council that a designated project be exempted from the application of CEAA (CEA Agency 2013c). Equivalency agreements between the federal government and other jurisdictions have not yet been drafted.

3.4.2 Overlap between Land Claim Environmental Assessment Process

In addition to the potential federal EA process overlap noted above (Section 3.4.1), EISC/EIRB and YESAB processes may also overlap.

The YESAB tries to coordinate assessments with other agencies, including the EISC. Timelines are coordinated as best possible, and input from the EISC and EIRB processes is used to inform the YESAB process where appropriate (S. Jordan, YESAB; pers. comm. 2014). Most assessments are conducted as a Designated Office evaluation, while larger projects are assessed by an Executive Committee screening. Projects that may cause significant environmental effects, significant public concern, or involve controversial technology may be subject to review by a Panel of the Board (S. Jordan, YESAB; pers. comm. 2014).

Since there are few projects in the North Slope area of the Yukon, no formal policy harmonization between the YESAB and the EISC is in place (J. Snyder, EISC; pers. comm. 2014). However, in practice, the YESAB typically waits for the EISC to release a decision first, so that outcomes are harmonized.

3.5 Conclusion – Environmental Assessment Requirements

Based on the review of federal and land claim EA process requirements and discussions with knowledgeable representatives of the respective organizations, it can be assumed that EA processes for future oil spill countermeasure field trials will include the EISC and EIRB with involvement of the YESAB (depending on the proposed project area) and the CEA Agency. It can further be assumed that the EISC/EIRB will be leading the process with involvement of all applicable Inuvialuit co-management boards and organizations. However, to simplify this process and build on efficiencies in completion of the required EAs, initial consultations need to take place with the EISC, EIRB, YESAB and CEA Agency. These consultations should be scheduled well prior to the detailed planning and design phase of potential oil spill countermeasures research to allow input into the research design and the potential development of specific agreements between the organizations.



FINAL ROADMAP REPORT

Figures 1 and 2 provide an overview of the key components and associated timelines of the EISC and EIRB processes, respectively. Figure 3 demonstrates the steps and timelines involved in the YESAB Designated Office Evaluation Process and Executive Office Screening.



FINAL ROADMAP REPORT

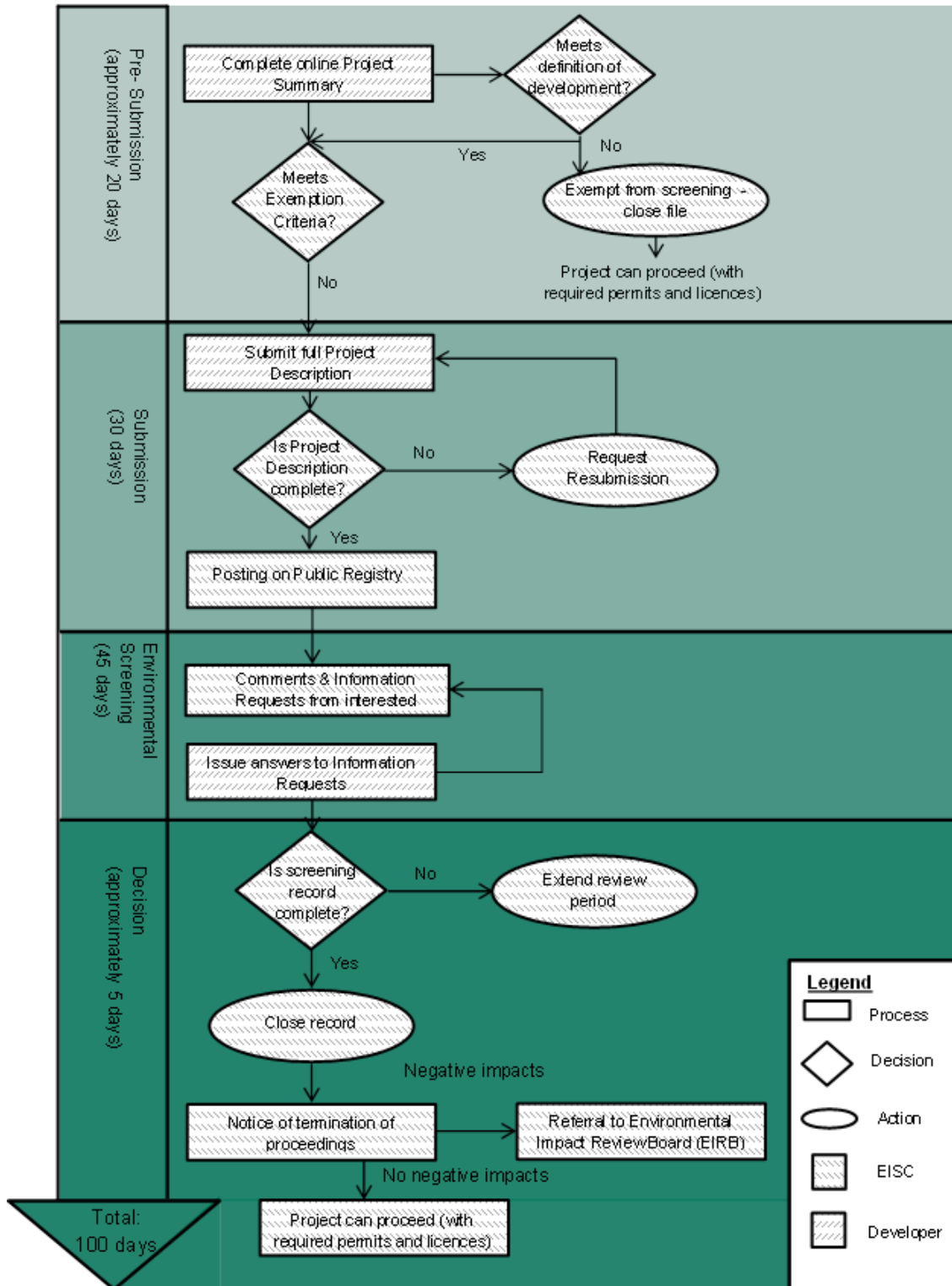


Figure 2: Overview of the EISC Process (EISC 2014).



FINAL ROADMAP REPORT

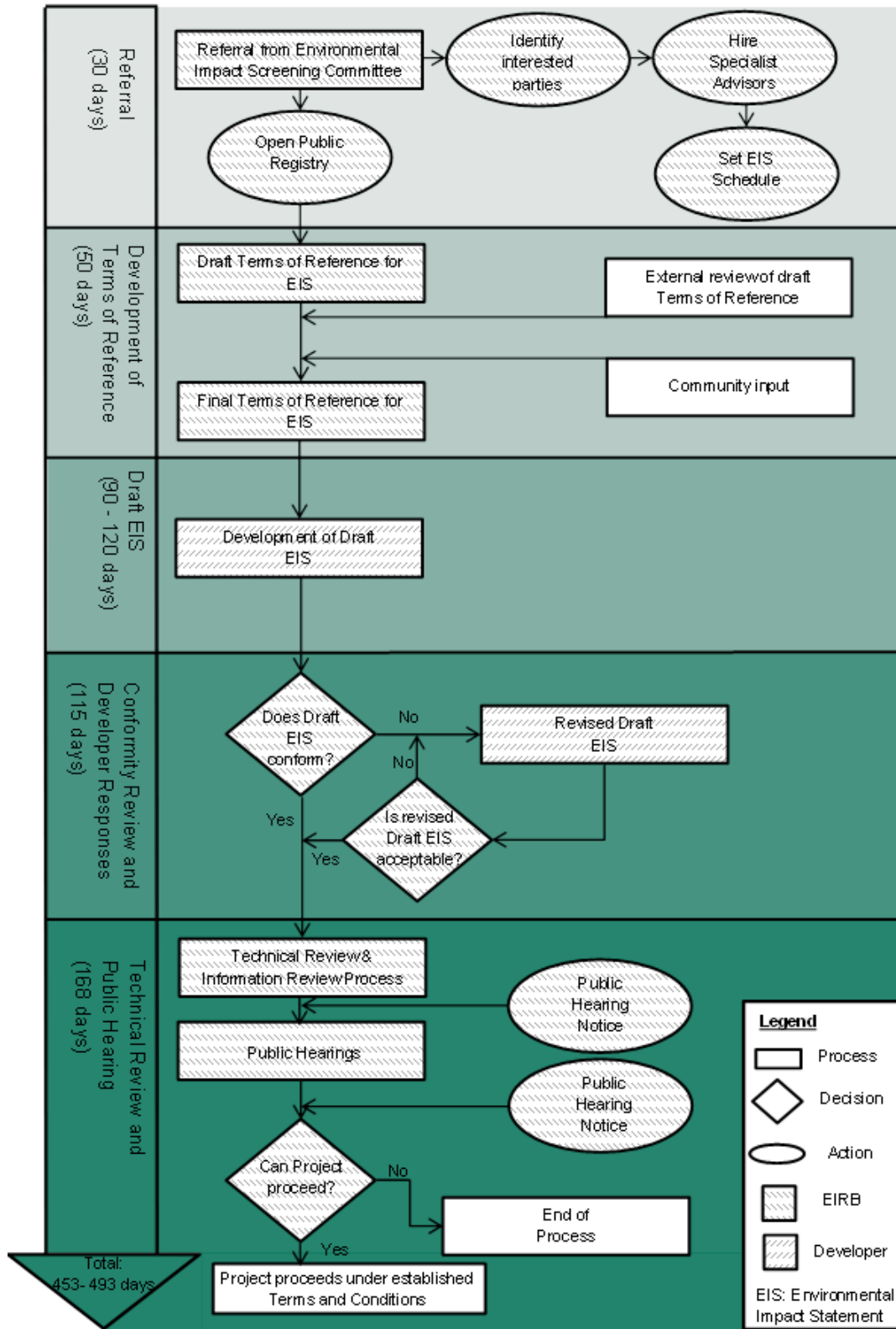


Figure 3: Overview of the EIRB Process (EIRB 2011a).



FINAL ROADMAP REPORT

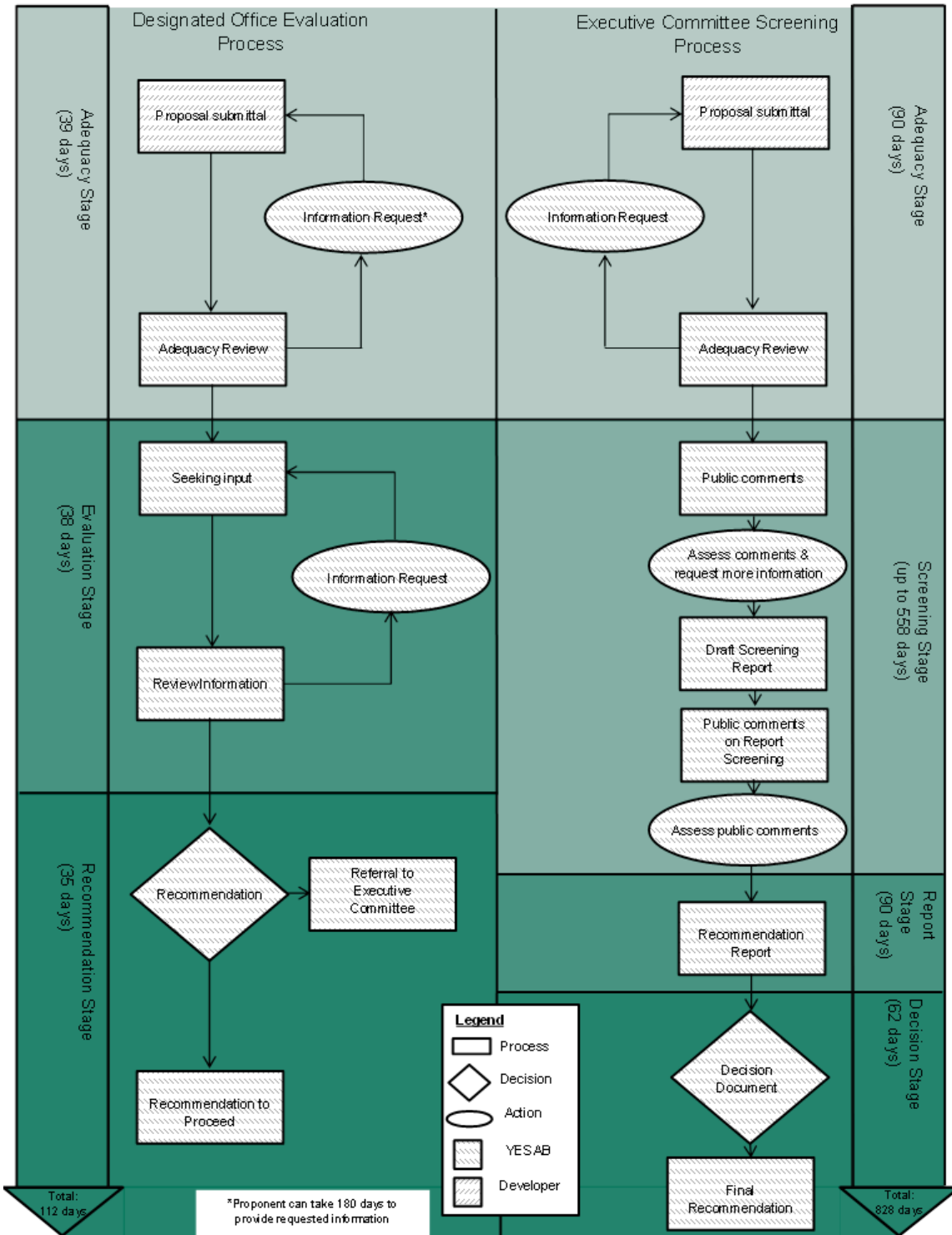


Figure 4: Overview of the YESAB Process (YESAB 2014).



4.0 DOCUMENTATION OF THE REGULATORY PERMIT REQUIREMENTS

This section is a compilation of a comprehensive list of regulatory requirements and processes that may be required for oil spill countermeasures research **in the Canadian Beaufort Sea and adjacent onshore areas within the ISR only**. The list is based on an assessment of potential experimental designs in Appendix A, our interpretation of current requirements and through discussions with key regulatory contacts. Consultation with organizations or agencies of neighbouring jurisdictions (e.g., Nunavut or Alaska) may be required in association with the requirements outlined in this section. The permit requirements are in addition to the EA requirements described in Section 3 of this Roadmap. If resources and equipment are sourced from other countries, additional requirements may apply; e.g., foreign researchers may need work permits and partnership agreements may need to be established.

This section of the Roadmap lists organizations and agencies that are either directly involved in permitting or licensing of activities that may be relevant to the oil spill countermeasures trials in the Canadian Beaufort Sea or that are involved in the environmental screening processes through the relevant agencies described in the Section 3.

4.1 Devolution in the Northwest Territories

As detailed in the following, Bill C-15 (the *Northwest Territories [NWT] Devolution Act*), introduced in Parliament on 3 December 2013, was intended to replace the *Northwest Territories Act* and implemented the *Northwest Territories Lands and Resources Devolution Agreement* (Cassels Brock & Blackwell LLP 2014). The agreement was signed on 25 June 2013 by the Government of Canada, the Government of the Northwest Territories (GNWT) and five regional Aboriginal governments (the IRC, the NWT Métis Nation, the Gwich'in Tribal Council, the Sahtu Secretariat Incorporated and the Tlicho Government). In addition, it will replace or change several other acts, including the *Northwest Territories Waters Act* and the *Mackenzie Valley Resource Management Act*. As part of the Devolution process in the NWT, approximately 27 federal acts and regulations were mirrored by the GNWT and became territorial legislation in April 2014. Several of the new acts relevant to the Roadmap are discussed throughout this section because information is often not readily available to researchers or developers. The planned amalgamation of the local land and water boards into a newly structured Mackenzie Land and Water Board will not affect the ISR (see also Section 4.2.1.1).

Devolution in the NWT took effect on 1 April 2014 (GNWT 2014a). This process included the transfer of responsibilities and rights over NWT Crown lands, resources, and inland waters from the Government of Canada to the GNWT. This transfer of responsibilities does not affect the authority of Aboriginal governments over settlement lands and resources or those of future settlements. The transfer of responsibility with regard to Crown lands has resulted in the formation of the **Department of Lands** under the GNWT. This department is now responsible for the management and administration of all public lands in the NWT. This includes Commissioner's lands which were previously administered by the **Department of Municipal and Community Affairs (MACA)** and Crown lands previously administered by the federal Aboriginal Affairs and Northern Development Canada (AANDC; GNWT 2014b).

Some responsibilities with regard to resources transferred from the Government of Canada to the GNWT will be incorporated into existing responsibilities of the **Department of Industry, Tourism and Investment (ITI)**. These responsibilities include the management of mineral and onshore petroleum resources including the *Oil and Gas*



Operations Act, the *Petroleum Resource Act* and the *Mining Regulations*. The Office of the Regulator of Oil and Gas Operations, located in Yellowknife, NWT, will be responsible for public health and safety, environmental protection and the conservation of petroleum resources (GNWT 2014b). The Government of Canada retains its responsibilities for offshore resources under the regulation of the National Energy Board (NEB) and is coordinating the administration of offshore and onshore resource management with the GNWT (GNWT 2014a; Government of Canada and the GNWT 2013). This coordination also includes the IRC and covers topics such as:

- development of, or changes to, oil and gas policies;
- administration of overlapping areas of jurisdiction;
- permitting of oil and gas exploration and development projects;
- setting of rules by which oil and gas companies must abide; and
- determining royalties to be charged for oil and gas production (Government of Canada and GNWT 2013).

The transfer of responsibilities with regard to rights over inland waters, as well as other relevant environmental responsibilities, is handled by the **Department of Environment and Natural Resources (ENR)** (GNWT 2014b). ENR's added responsibilities include (among others):

- waters in the Mackenzie Valley and inland waters of the Inuvialuit Settlement Region (ISR) previously administered by the Mackenzie Valley Land and Water Board (MVLWB) and the Inuvialuit Water Board (formerly known as the Northwest Territories Water Board), respectively;
- the NWT Cumulative Impact Monitoring Program (CIMP) previously administered by AANDC; and
- environmental protection during land use planning and proposed development reviews (GNWT 2014b).

4.2 Federal Organizations and Agencies

4.2.1 Aboriginal Affairs and Northern Development Canada

The GNWT, AANDC and the IRC have agreed to coordinate and cooperate on their post-Devolution jurisdictions with respect to oil and gas resource management in the ISR, particularly where they straddle the offshore and onshore areas. A Memorandum of Agreement will be in place for an initial 20-year term, and will create an **ISR Oil and Gas Coordination Committee** to facilitate information sharing and coordinate straddling resources and their development (GNWT, ITI 2014).

4.2.1.1 Legislation and Regulations

AANDC is one of the federal departments responsible for meeting the Government of Canada's obligations to Aboriginal people through over 50 laws and regulations. AANDC is partly responsible for the following acts and regulations which may apply to the oil spill countermeasures research:

Northwest Territories Waters Act (1992)



The *Northwest Territories Waters Act* was repealed on 1 April 2014 with Devolution. The GNWT has produced mirroring legislation (the *Waters Act*) that is now the mandate of the Inuvialuit Water Board in the ISR. The federal government maintains jurisdiction over waters in the Northwest Territories as per the recently amended *Mackenzie Valley Resource Management Act* but this applies only to the areas of the Mackenzie Valley and not to the ISR (GNWT 2014h).

The *Waters Act* does only apply to inland waters (i.e., freshwater) and not to marine areas. Its applicability for potential oil spill countermeasures field trials is reduced to the potential effects on coastal areas and to possible land based support activities.

Northwest Territories Waters Regulations (2009)

The federal Northwest Territories Waters Regulations are administered by AANDC and apply to geographical areas of the Northwest Territories including all of the Arctic Islands (water management area 4) and all waters and river basins draining into the Arctic Ocean or adjacent waters (water management area 7). These regulations have not yet been repealed but the mirroring territorial Waters Regulations (2014) came into force with Devolution on 1 April 2014.

The Northwest Territories Waters Regulations (2009) and the territorial Waters Regulations (2014) set out the same regulations, fees, and licence application processes for the use and management of water in these areas. If these waters are to be used, the research may be subject to these regulations under the category of *industrial use* or *miscellaneous*. A use of water is described as *obtaining water, crossing a watercourse, modifying the bed or bank of a watercourse, flood control, water diversion, altering the flow of, or storing water*. The licensing process is detailed in the regulations and sets the parameters for a type A licence or a type B licence. A type A licence is required for the use of 300 cubic meters (m³) of water, while a type B licence is required for the use of more than 100 m³ and less than 300 m³ of water for industrial uses. The use of less than 100 m³ of water for an industrial use does not require a licence. If categorized as *miscellaneous*, it is likely that only a type B licence is required. The water licence application process is described in detail in Section 4.5.2.

Arctic Waters Pollution Prevention Act (1985)

The *Arctic Waters Pollution Prevention Act* (AWPPA) provides for the protection of Arctic waters from the adverse effects that could arise from shipping and exploitation of natural resources. The act prohibits the deposit of waste in Arctic waters except by regulations that stipulate the manner and circumstances under which waste can be deposited. The mandate for AWPPA is shared between AANDC, Transport Canada (TC) and NRCan:

- AANDC is responsible for pollution releases from land;
- TC is responsible for pollution releases from vessels; and
- NRCan is responsible for non-shipping aspects of AWPPA in Hudson Bay.

Arctic Waters Experimental Pollution Regulations (1982)

Under the authorization of the AWPPA, regulations have (historically) been made allowing exceptions. The Arctic Waters Experimental Pollution Regulations, with versions that came into effect between 1978 and 1982, allowed specific proponents (Norcor Engineering and Research Ltd., Dome Petroleum Ltd. and Canadian Marine



Drilling Ltd.) to deposit rapeseed oil (now called canola oil) and crude oil into specific locations for a specific time period on an experimental basis. No deposit was to exceed 0.5 m³ and the aggregate of all the deposits was not to exceed 18.6 m³. The companies were to remedy any damage to property or the environment after completion of their projects.

The regulations are no longer in effect but are included here to show examples of past federal regulations to accommodate and regulate experimental spills.

Arctic Waters Pollution Prevention Regulations (2009)

These regulations apply to the deposit of waste in the Arctic waters or any place on the mainland or islands of the Canadian Arctic where the waste can enter the Arctic waters. They do not apply to the deposit of waste by a ship (which is regulated through the *Arctic Shipping Pollution Prevention Regulations* [2014] described in Section 4.2.5.1). The Arctic Waters Pollution Prevention Regulations specify that industrial waste is any waste produced by an industrial operation. Industrial operations can include any process for industry, manufacture, trade or business, exploring, developing, or exploiting a natural resource, and that domestic waste can mean any waste other than industrial waste. Domestic waste can be deposited if it is of a type or quantity authorized under the *Public Health Ordinance* of the NWT or Yukon Territory. Industrial waste may be deposited if it is a type and quantity authorized by the *Oil and Gas Production and Conservation Act*, the *Territorial Lands Act*, or the *Public Lands Grants Act*.

Canada Petroleum Resources Act (1985)

This act established the Environment Studies Research Fund (ESRF) as a board that will administer an account for each of the prescribed regions defined in the *ESRF Regions Regulations*. The purpose of the funds is to finance environmental and social studies pertaining to exploration, development, and production activities.

ESRF Regions Regulations (1987)

The *ESRF Regions Regulations* describe regions for the purposes of the description of funding in the *Canada Petroleum Resources Act*. The following regions are described, within which the oil spill countermeasures research may occur: Prescribed Region 17 (Beaufort South), Prescribed Region 18 (Beaufort North), Prescribed Region 19 (Western Archipelago), Prescribed Region 20 (Central Archipelago), Prescribed Region 23 (Yukon North), and Prescribed Region 25 (Mackenzie Delta).

4.2.1.2 Permits and Licences

Contaminant-related Research

The Northern Contaminants Program (NCP), administered by AANDC, was established to determine and respond to human exposure to contaminants in species that form the diets of northern Aboriginal peoples. All proponents investigating the occurrence of natural and / or man-made contaminants in aquatic, terrestrial or atmospheric systems should contact the NWT Regional Contaminants Committee (NWT-RCC) before conducting fieldwork. This committee serves as a means of exchanging information on contaminants between researchers, relevant organizations and programs, and Northerners (ARI 2011). For research projects taking place in the ISR, the Inuvialuit Research Advisor should be contacted.



Contact Information

Contact: NWT Regional Contaminants Committee Research Advisor **Telephone:** 867-777-7026

Mailing Address: P.O. Box 1500 Yellowknife, NT, X1A 2R3 **Fax:** 867-777-2138

Email: sohara@inuvialuit.com **Online:** www.science.gc.ca

Timeline

The NWT-RCC meets annually in February to review and allocate funds for proposed projects from researchers from both government and academia, which are supplied to the NWT-RCC through the AANDC NCP. No specific permit or licence is issued by the NWT-RCC, however they do make recommendations to the AANDC NCP regarding social and cultural impacts from the proposed projects. The NWT-RCC should be notified regarding the details of the proposed oil spill countermeasures research.

4.2.2 Environment Canada

Environment Canada (EC) is a federal department that was established in 1971 for the protection of the environment, conservation of Canada's natural heritage, and provision of weather and meteorological information (EC 2014a). EC's mandate is to:

- preserve and enhance the quality of the natural environment;
- conserve Canada's renewable and water resources;
- forecast daily weather conditions and provide meteorological information;
- enforce rules relating to boundary waters; and
- coordinate environmental policies and programs for the Government of Canada.

4.2.2.1 Legislation and Regulations

Canadian Environmental Protection Act (1999)

The *Canadian Environmental Protection Act* (CEPA), 1999, is concerned with pollution prevention and the protection of the environment and human health and sets out processes to assess the risks to the environment and human health posed by substances in commerce, imposes timeframes for managing toxic substances, and provides a wide range of tools to manage toxic substances, other pollution, and wastes (EC 2004). Part 5 of CEPA details the requirements for understanding and reducing the risks posed by new and existing substances. Part 5 includes the requirements for assessment of these substances, which should be evaluated to determine whether they meet any of the criteria set out in section 64 of the act (Controlling Toxic Substances; EC 2012a).

The Domestic Substances List (DSL) is a list of approximately 23,000 substances that were in use for manufacturing, manufactured, or imported into Canada in mass of 100 kilograms (kg) or more in any year between 1 January 1984 and 31 December 1986, prior to the establishment of CEPA. It also lists substances that have been deemed eligible under the new substances notification and assessment regime under CEPA. Substances of the DSL are classified by their potential toxicity to the environment (as "persistent",



“bioaccumulative”, and / or “inherently toxic to the environment”) or by their toxicity to human health (as “greatest potential for exposure”, and / or “inherently toxic to humans”; EC 2012a).

Part 5 of CEPA has provisions that no new substances can be introduced to the Canadian public without being assessed for their toxicity to the environment or human health. If a substance is not on the DSL, EC must be notified prior to manufacturing or importing the substance. Some substances new to Canada that are not on the DSL may be accepted as being in commercial international use and may be listed on the Non-Domestic Substances List and may not require as much information to be provided to EC. The information required will include whatever is necessary for EC to assess the potential toxicity. If these assessment requirements are met by another federal Act then the CEPA requirements do not apply (EC 2004).

Also under CEPA, disposal at sea is the deliberate disposal of approved substances at sea from ships, aircraft, platforms or other structures. Only those substances listed in Schedule 5 of CEPA may be considered for disposal at sea. These are: dredged material, fisheries waste, ships or platforms, inert geological matter, uncontaminated organic matter and bulky substances. Discharges from land or from normal ship operations (such as bilge water) are not considered disposal at sea, but are subject to other controls (EC 2014b).

Disposal at Sea Permit Application Regulations (2014)

The Disposal at Sea Permit Application Regulations has replaced the Regulations Respecting Applications for Permits for Disposal at Sea. These changes are effective as of 24 September, 2014. To assess a permit application and the total possible period for which a given Permit for Disposal at Sea may be valid, officials from EC's Disposal at Sea Program require specific information, such as the total quantity of the substance to be disposed of at sea for the initial permit and each expected renewal, as well as the number of times the permit being applied for may require renewal. Schedule 1 to the new regulations provides the form in which an application for a new permit for disposal at sea must be submitted. Schedule 2 provides the form in which an application for a renewal of a permit must be submitted (EC 2014c).

Fisheries Act (1985)

The *Fisheries Act* regulates the conservation and protection of fish habitat essential for freshwater and marine fish species. Although the act is administered by the Minister of Fisheries and Oceans, the Minister of the Environment is responsible for the sections of the *Fisheries Act* that deal with water pollution. As such, EC administers the pollution prevention provisions of the act: section 34 and sections 36 to 42. These sections deal with “the deposit of deleterious substances into waters frequented by fish or places where the substances may enter such waters”. (EC 2012b; DFO 2014c). A substance is considered “deleterious” when added to water if it would degrade or alter water quality in a way that it could be harmful to fish, fish habitat or the consumption of fish by people (EC 2015b).

Generally, DFO administers section 35 of the act, which outlines the key habitat protection provision, “prohibiting any work or undertaking that would cause the harmful alteration, disruption or destruction of fish habitat”. Since the amendments to the *Fisheries Act* in 2013, DFO will still investigate serious harm to fish if they are part of or support a commercial, recreational or Aboriginal fishery. If that is not the case, EC will investigate violations to fish habitat as it now falls under section 36(3) of the *Fisheries Act* (Craig Broome, Operations Manager, EC; pers. comm. March 2015).

Species at Risk Act (2002)



The *Species at Risk Act (SARA)* was implemented in 2002 to:

- prevent Canadian wildlife species from disappearing;
- assist with the recovery of wildlife species that are listed as extirpated, endangered, or threatened as a result of human activity; and
- manage species of special concern to prevent them from becoming endangered or threatened.

Migratory Birds Convention Act (1994)

This act outlines the conservation of migratory bird populations in Canada by regulating potentially harmful human activities. Activities affecting migratory birds, including activities for scientific research purposes (such as possibly the oil spill countermeasures research) may require permits under this act.

Subsection 5.1 of the act prohibits depositing a substance that is harmful to migratory birds, or may become harmful to migratory birds, in waters or an area frequented by migratory birds, or in a place from which the substance may enter such waters or such an area, unless authorized under an Act of Parliament or by the Minister of the Environment.

The Migratory Bird Sanctuary Regulations protect migratory bird habitat areas. Migratory Bird Sanctuaries are designated for the protection of marine birds from hunting and other anthropogenic disturbances (a list of Migratory Bird sanctuaries is provided in Section 4.2.2.2).

4.2.2.2 Permits and Licences

New Substances Notification

Any person or company that proposes to use, import or manufacture a substance that is not listed on the DSL under the regulations of CEPA must provide EC with a New Substances Notification Package with all information and fees required by the CEPA regulations for Chemical, Polymers, and Organisms. The information required and timing depends of the type of substance and the circumstances surrounding its import or manufacturing (EC 2013a).

Contact Information

Contact:	New Substances Notification Information	Telephone:	800-567-1999 819-953-7156
Mailing Address:	Notifications & Client Services Section New Substances Division Environment Canada 351 St. Joseph Blvd. Gatineau, PQ, K1A 0H3	Fax:	819-953-7155
Email:	substances@ec.gc.ca	Online:	http://www.ec.gc.ca/subsnouvelles-newsubs/





Timeline

A joint assessment process is carried out with Health Canada to determine any potential adverse effects and / or toxicity to the environment or human health. The assessment time limit is usually 60 days, but can vary from 5 to 120 days, depending on the substance and the amount that is to be manufactured or imported.

Disposal at Sea Permit

EC administers permits controlling the disposal of waste and other matter at sea. Each permit is granted following a detailed assessment and sets conditions to protect the marine environment and human health. Permit applications are reviewed by EC with advice from various interested parties which may include other members of EC, DFO and relevant provincial regulatory authorities. Views of other stakeholders and Aboriginal groups are also considered. Only materials on Schedule 5 of CEPA that have been rigorously tested and which meet the requirements under Schedule 6 of the CEPA assessment process, as well as its related regulations, policies and guidelines, are approved for ocean disposal.

Permit applications must use an application form which can be found at EC's Disposal at Sea Web page (EC 2014b; www.ec.gc.ca/iem-das) or by contacting the regional Disposal at Sea Program office.

Contact Information

Contact:	Prairie and Northern Region	Telephone:	
Mailing Address:	Environmental Protection Operations Directorate PO Box 2310, 5019 52nd Street Nova Coast Plaza, 4th floor Yellowknife, Northwest Territories X1A 2P7	Fax:	867-873-8185
Email:	sea-mer@ec.gc.ca	Online:	www.ec.gc.ca/iem-das

Timeline

As of 24 September 2014, there will be a 90-day period for EC to reach a permit decision once an applicant has been notified by EC that their application is complete. In some situations, the time limit will not apply. For example, if additional analysis or consultations are required to meet certain statutory obligations. As well, there will be a 45-day period for EC to reach a decision regarding a permit renewal (EC 2014c).

Canadian Wildlife Service: Migratory Bird Permits

Under the *Migratory Bird Convention Act*, a **Scientific Permit** is required for research projects that will result in migratory birds being taken, salvaged or disturbed. The application will require copies of the relevant Scientific Research Licence obtained through the ARI (Section 4.3.1.2). The regional CWS office will need to be contacted to begin the application process. Additional **migratory bird permits** may be required by the CWS based on the specific project details and the potential to negatively affect migratory birds. This would include permits for deterring birds from entering an oiled area (hazing), capturing oiled birds, and / or providing humane treatment to oiled birds (EC 2000; Jean-Francois Dufour, EC, pers. comm. 2015). Early consultations with the CWS are recommended in order to clarify this process and make expectations clear for all parties (Jean-Francois Dufour, EC, pers. comm. 2015).



Contact Information

Contact: CWS Prairies and Northern Telephone: 780-951-8600
Region

Mailing Address: Twin Atria Building, Room 200 Fax: 780-495-2615
4999-98 Avenue
Edmonton, AB, T6B 2X3

Email: enviroinfo@ec.gc.ca **Online:** <http://www.ec.gc.ca>

Timeline

Once the application for the Scientific Permit has been submitted and acknowledged, a decision will be provided within 40 calendar days (EC 2015a). Additional permit timelines will vary.

Canadian Wildlife Service: Permit for Species at Risk

Under Section 73 of SARA, the Minister may enter into an agreement or issue a permit authorizing a person to engage in an activity affecting a listed wildlife species, any part of its critical habitat or its residences. If an agreement or permit is entered or issued, an explanation must be provided of why this was entered into or issued in the public registry. Agreements or permits can be entered into or issued, if:

- the activity is scientific research relating to the conservation of the species and conducted by qualified persons;
- the activity benefits the species or is required to enhance its chance of survival in the wild; or
- affecting the species is incidental to the carrying out of the activity (SARA 2013).

Currently, there are 17 marine, aquatic², avian and terrestrial species, potentially occurring in the waters and coastal areas of the Beaufort Sea that are listed by SARA (Government of Canada 2012). The species are provided in the following list (note that their rankings differ and the list below presents species that appear on the SARA registry independent of their ranking):

Marine and anadromous fish:

- Blackline prickleback (*Acantholumpenus mackayi*); and
- Northern wolfish (*Anarhichas denticulatus*).

Marine mammals:

- Atlantic walrus (*Odobenus rosmarus rosmarus*);
- Bowhead whale (*Balaena mysticetus*);
- Grey whale (*Eschrichtius robustus*); and
- Polar bear (*Ursus maritimus*).

² Note that aquatic species, other than individual animals in or on federal lands administered by the Parks Canada Agency, fall under the jurisdiction of DFO.



Terrestrial mammals:

- Peary caribou (*Rangifer tarandus pearyi*);
- Woodland caribou (Boreal population; *Rangifer tarandus caribou*);
- Barren-ground caribou (Dolphin and Union population; *Rangifer tarandus groenlandicus x pearyi*);
- Grizzly bear (*Ursus arctos*);
- Wolverine (Western population; *Gulo gulo*); and
- Collared pika (*Ochotona collaris*).

Marine avifauna:

- Eskimo curlew (*Numenius borealis*);
- Ivory gull (*Pagophila eburnean*);
- Red knot ssp. rufa (*Calidris canutus rufa*);
- Red knot ssp. roselaari (*Calidris canutus roselaari*); and
- Ross's Gull (*Rhodostethia rosea*).

Terrestrial Birds:

- Peregrine falcon (anatum-tundrius complex; (*Falco peregrinus anatum-tundrius*);
- Rusty blackbird (*Euphagus carolinus*); and
- Short-eared owl (*Asio flammeus*).

Contact Information

Contact: CWS Prairies and Northern Telephone: 780-951-8600
Region

Mailing Address: Twin Atria Building, Room 200 Fax: 780-495-2615
4999-98 Avenue
Edmonton, AB, T6B 2X3

Email: enviroinfo@ec.gc.ca **Online:** <http://www.ec.gc.ca>

Timeline

Application can be made using the SARA E-permitting System or by contacting the appropriate EC regional office. SARA permit decisions are made within a 90-day timeline, which may not apply in all circumstance (SARA 2013). An NWT Wildlife Research Permit (Section 4.2.4.2) may also be required (ARI 2011).



Canadian Wildlife Service: Research in Migratory Bird Sanctuaries and National Wildlife Areas

Any kind of research, including physical studies, non-intrusive activities, and aerial surveys in or adjacent to a Migratory Bird Sanctuary or National Wildlife Area requires a permit from EC's CWS (ARI 2011).

In Canada, Migratory Bird Sanctuaries are established and managed by the CWS to protect migratory bird populations and their key habitats (EC 2013b). Migratory Bird Sanctuaries are designated under the *Migratory Birds Convention Act* (1994) and regulated through the Migratory Bird Sanctuary Regulations, which outline rules and prohibitions regarding the taking, injuring, destruction or molestation of migratory birds or their nests or eggs in the sanctuaries. Hunting of listed species under the *Migratory Birds Convention Act* is not permitted in any Migratory Bird Sanctuary (EC 2013b).

Five federally protected Migratory Bird Sanctuaries are located in the ISR, all established in 1961:

- Anderson River Delta Migratory Bird Sanctuary;
- Banks Island Migratory Bird Sanctuary No. 1;
- Banks Island Migratory Bird Sanctuary No. 2;
- Cape Parry Migratory Bird Sanctuary; and
- Kendall Island Migratory Bird Sanctuary.

Contact Information

Same as above.

Timeline

Required in addition to a NWT Wildlife Research Permit (Section 4.2.4.2); decisions are typically made within a 90-day timeline.

Parks Canada Research / Collecting Permit and Species at Risk

Parks Canada Agency (Parks Canada) is an agency within EC, responsible for the administration of Canada's National Historic Sites, National Parks, and National Marine Conservation Areas. Within the Canadian Beaufort Sea region there are three national parks and one Canadian Landmark with boundaries along the Beaufort Sea Coast:

- Aulavik National Park (Banks Island, NWT);
- Tuktoyaktuk National Park (East of Paulatuk, NWT);
- Ivvavik National Park (North Slope, Yukon); and
- Pingo Canadian Landmark (Tuktoyaktuk, NWT).

To conduct research in or collect material from a national park, national historic site, or a national marine conservation area, a Parks Canada Research / Collecting Permit is required. Parks Canada's on-line Research and Collection Permit application can be used to apply (http://www.pc.gc.ca/apps/rps/page1_e.asp). The application must include a proposal. Parks Canada indicates that an Aurora Research Centre (ARI) Research



Licence Application (described in Section 4.3.1) is acceptable to use as the proposal format to avoid creating multiple proposals (Parks Canada 2009). Proposals are to be submitted to the Ecosystem Secretariat Manager.

If a proposed activity affects a Schedule 1 species (listed by SARA) in a protected area (e.g., national park, national historic site, or national marine conservation area) administered by Parks Canada, a separate application must be made through Parks Canada's on-line research and collection permit system. This application has to indicate that research affecting a species at risk will be taking place (Parks Canada 2006).

Contact Information

Contact:	Western Arctic Field Unit Research Coordinator	Telephone:	867-777-8810
Mailing Address:	P.O. Box 1840 Inuvik, NT, X0E 0T0	Fax:	867-777-8820
Email:	Nelson.perry@pc.gc.ca	Online:	http://www.pc.gc.ca/apps/rps/page1_e.asp

Timeline

An application must be made through Parks Canada's on-line research and collection permit system. Permits are typically issued annually but multi-year permits can be issued. When an application is submitted it is assigned a reference number, all permits and reports related to the study will then be linked to the reference number. Once the research program is complete an Investigator Annual Report summarizing the work must be submitted to Parks Canada (Parks Canada 2006).

4.2.3 Fisheries and Oceans Canada

DFO is responsible for developing and implementing policies and programs in support of Canada's scientific, ecological, social and economic interests in oceans and fresh waters. Through this mandate, DFO aims to provide safe and accessible waterways, maintain healthy and productive aquatic ecosystems and allow for sustainable fisheries and aquaculture. The Canadian Coast Guard (CCG; Section 4.2.4) is a Special Operating Agency within DFO (DFO 2013a).

4.2.3.1 Legislation and Regulations

Oceans Act (1996)

The *Oceans Act* outlines the development and implementation of a national oceans management strategy and provides for the consolidation and clarification of federal responsibilities for the management of Canada's oceans.

The *Oceans Act* contains three key provisions that relate to activities in the Beaufort Sea:

- *Integrated management planning* under the *Oceans Act* must engage a wide array of stakeholders and participants during the planning process. An example of integrated management planning is the Beaufort Sea Integrated Oceans management Plan (Beaufort Sea Partnership 2010). In the Beaufort Sea, these stakeholders and participants may include DFO, EC, AANDC, Transport Canada (TC), Foreign Affairs and International Trade Canada, Parks Canada, Inuvialuit coastal communities, Inuvialuit-federal co-management institutions, GNWT, Government of the Yukon, industry, and Non-Governmental Organizations (NGOs).



- *Marine protected area planning* is provided for through the designation of a national system of Marine Protected Areas (MPAs). Certain operations within MPAs may be prohibited or restricted in order to protect fishery resources, protect species, protect habitat, protect biodiversity or any other marine resource as is necessary to fulfill the mandate of the Minister of Fisheries and Oceans. There is currently one MPA within the Beaufort Sea, called Tarium Niryutait MPA (TNMPA). The MPA consists of three individual areas called Niaqunnaq, Okeevik, and Kittigaryuit (Beaufort Sea Partnership 2010). The TNMPA covers approximately 1,800 km² of the former beluga management zones outlined in the Beaufort Sea Beluga Management Plan.
- *Marine environmental quality guidelines* may be established by the Minister of Fisheries and Oceans in collaboration with other parties such as Inuvialuit bodies and other stakeholders. To date, guidelines and standards for marine environmental quality have not been developed for the Beaufort Sea.

Fisheries Act (1985)

The *Fisheries Act* establishes the requirements for conservation and management of fisheries and fish habitats, licensing, enforcement, and international fisheries agreements. The protection of fish and fish habitats is achieved through several general prohibitions, such as the prohibition of killing fish by means other than fishing; the prohibition of the harmful alteration, disruption, or destruction of fish habitat; and the prohibition to deposit deleterious substances. Section 36 of the *Fisheries Act* prohibits the deposit of any deleterious substance into the Canadian marine environment, and has been interpreted by some regulators to prohibit dispersant and herding agent use (DFO 2014a).

As outlined in Section 4.2.1.1, although the act is administered by DFO, EC administers the pollution prevention provisions (section 34 and sections 36 to 42). These sections deal with “the deposit of deleterious substances into waters frequented by fish or places where the substances may enter such waters” (EC 2012b; DFO 2014c). While DFO administers section 35 of the act, which outlines the key habitat protection provision (see Section 4.2.1.1), since the amendments to the Fisheries Act in 2013, DFO now only investigates serious harm to fish if they are part of or support a commercial, recreational or Aboriginal fishery. If that is not the case, EC will investigate violations to fish habitat as it now falls under Section 36(3) - Deposit of Deleterious Substances - of the Fisheries Act (Craig Broome, Operations Manager, EC; pers. comm. March 2015). This section outlines that “..any person who without authorization deposits a deleterious substance in any water frequented by fish or in any place where the deleterious substance or any other deleterious substance resulting from the deposit of the deleterious substance may enter such water commits an offence”.

Species at Risk Act (2002)

The *Species at Risk Act* (2002; SARA) is intended to protect species at risk of extinction in Canada, and promote their recovery. Under SARA, DFO is the federal government department that has responsibility for aquatic species (except for those on lands administered by Parks Canada) and species located in MPAs and other areas designated under the *Oceans Oct.* Subsection 32(1) of SARA prohibits killing, harming, harassing, capturing or taking individuals of species listed as Threatened or Endangered (listed species) and the sale or trade of listed species is prohibited by Subsection 32(2). SARA also prohibits damage or destruction of residences (or their parts) of listed species (Section 33), or destruction critical habitat of listed species (Subsection 58(1)).

Canada Shipping Act (2001)



The majority of responsibilities under the *Canada Shipping Act (2001)* are within TC (Section 4.2.5.1). The Minister of Fisheries and Oceans has limited responsibilities under the act including:

- navigation services by the CCG; and
- response to oil spills from ships or oil handling facilities.

4.2.3.2 Permits and Licences

As described above, one of the provisions in the *Fisheries Act* is the **prohibition in Section 36(3) against releasing deleterious substances into waters frequented by fish**. According to recently released draft regulations, DFO is working on establishing a framework to permit deposits of deleterious substances under Section 36 of the *Fisheries Act* in certain circumstances (Ignasiak and Duncanson 2014). Currently, no permitting or authorization process addresses this issue and consultations with DFO need to take place to clarify Section 36 (3) provisions and the potential for violating this provision.

Offsetting Plan

Subsection 35(1) of the *Fisheries Act* prohibits the carrying on of a work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery. However, under Paragraph 35(2)(b) of the *Fisheries Act*, the Minister of Fisheries and Oceans may issue an authorization with terms and conditions in relation to a proposed work, undertaking or activity that may result in serious harm to fish (DFO 2013a).

An application form (provided in Appendix D) can be obtained from DFO online (<http://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/application-eng.html>) and must be completed with a description of proposed work, a timeline, the location, a description of fish and fish habitat, a description of effect on fish and fish habitat, measures and standards to avoid or mitigate serious harm to fish, residual serious harm to fish (i.e., after implementation of avoidance and mitigation measures and standards), and an Offsetting Plan. A letter of credit for financial security to ensure the implementation of the Offsetting Plan will be possible if required. Federal, provincial, and territorial government applicants are exempt from the letter of credit requirement (DFO 2013a).

Authorization under Paragraph 35(2)(b) of the Fisheries Act

If a project is unable to meet specific criteria, a project proposal must be submitted to DFO for review, using a Request for Project Review form found on the DFO website (DFO 2014b). If, after a project review, it is determined that a project will cause serious harm to fish that are part of or that support a commercial, recreational or Aboriginal fishery, an application is required for an Authorization (Paragraph 35(2)(b) *Fisheries Act* Authorization from the Minister of Fisheries and Oceans).

Contact Information

Contact:	Northwest Territories Fisheries Protection Program	Telephone:	855-852-8320
Mailing Address:	Fisheries and Oceans Canada 867 Lakeshore Road Burlington, ON, L7R 4A6	Fax:	
Email:	fisheriesprotection@dfo-mpo.gc.ca	Online:	http://www.dfo-mpo.gc.ca/pnw-ppe/reviews-



Timeline

DFO has 60 days from the receipt of the application to determine if it is complete or incomplete and to notify the applicant of its decision. DFO then has 90 days from the date of notification that application is complete to issue or deny the authorization (DFO 2013a).

SARA Permit for Affecting a Schedule 1 Aquatic Species.

Under certain circumstances, DFO may authorize an activity affecting a listed aquatic species (provided in Section 4.2.3.2) or any part of a listed aquatic species critical habitat under the *Species at Risk Act (2002)* allows the issuance of a permit or agreement authorizing a person to affect a listed species under certain conditions. Under Section 73 of SARA, the Minister of Fisheries and Oceans may enter into an agreement with a person, or issue a permit to a person, authorizing the person to engage in an activity affecting a listed aquatic species, any part of its critical habitat, or the residences of its individuals.

Under section 73(2) of SARA, the agreement can be entered into, or the permit issued, **only** if the Minister of Fisheries and Oceans is of the opinion that:

- the activity is scientific research relating to the conservation of the species and conducted by qualified persons;
- the activity benefits the species or is required to enhance its chance of survival in the wild; or
- affecting the species is incidental to the carrying out of the activity.

Contact Information

Contact:	Species at Risk Management Division	Telephone:	204-983-4438
Mailing Address:	Fisheries and Oceans Canada Freshwater Institute 501 University Crescent Winnipeg, MB R3T 2N6	Fax:	none
Email:	fwisar@dfo-mpo.gc.ca	Online:	www.dfo-mpo.gc.ca/species-especies/permits-permis/guidelines-directives-eng.htm

Timeline

DFO has 60 days from the receipt of the application to determine if it is complete or incomplete and to notify the applicant of its decision. DFO then has 90 days from the date of notification that application is complete to issue or deny the authorization (DFO 2013a).

4.2.4 Canadian Coast Guard

The CCG operates the Government of Canada's civilian fleet, and as a Special Operating Agency of DFO, it is responsible for the programs and services that contribute to the safety, security, and accessibility of Canada's waterways. CCG provides maritime services to Canadians and helps DFO meet its responsibility to



ensure safe waterways and ensure the sustainable use and development of Canada's oceans and waterways (CCG 2013a).

4.2.4.1 Legislation and Regulations

Oceans Act (1996)

The *Oceans Act (1996)* provides for the development and implementation of a national oceans management strategy and provides for the consolidation and clarification of federal responsibilities for the management of Canada's oceans. The Act establishes Canada's sovereign rights within its exclusive economic zone, defines Canada's principles for oceans management and allows for the creation of marine protected areas. Under the act, DFO is given the authority, in collaboration with other federal departments, provincial and territorial governments, Aboriginal organizations, coastal communities and other stakeholders, to lead the development of Canada's Ocean Strategy.

The *Oceans Act* makes the CCG responsible for aiding navigation, marine communications, icebreaking and ice-management services, and marine pollution response among others. The CCG is also mandated to support other government departments by providing ships, aircraft, and other services under the *Oceans Act*.

Canada Shipping Act (2001)

The majority of responsibilities under the *Canada Shipping Act (2001)* are within TC. A description of the act can be found in Section 4.2.4.1. The Minister of Fisheries and Oceans has limited responsibilities under the act including:

- navigation services by the CCG; and
- response to oil spills from ships or oil handling facilities.

Under the *Canada Shipping Act, 2001*, the CCG is also responsible for aids to navigation, search and rescue, pollution response, and vessel traffic services.

Reporting a Marine Pollution Incident

Under the Vessel Pollution and Dangerous Chemical Regulations – Part 3 (2012), all pollution or threats of pollution must be reported by vessels and oil handling facility operators. The report must include all relevant information including:

- the identify of any ship and oil-handling facility;
- the time and location of the discharge or estimated time and location of the probable discharge;
- the nature of the discharge, including type and quantity of the pollutant; and
- a description of the assistance and salvage measure(s) used.

Contact Information

Contact:	Regional Superintendent, Environmental Response	Telephone:	519-383-1951 800-265-0237 (Emergency)
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Mailing Address: Central and Arctic Region
520 Exmouth Street
Sarnia, ON, N7T 8B1

Fax: 519-383-1991

Email: Xca-erdo@dfo-mpo.gc.ca

Online: www.ccg-gcc.gc.ca/eng/CCG/ER_Reporting_Incident

Timeline

The report of a marine pollution incident will dispatch or keep the National Response Team notified; which consists of CCG Environmental Response personnel. The Environmental Response team has members across Canada who are knowledgeable and trained to monitor, manage or assist in responses to pollution incidents. This provides the framework for a coordinated national response to a marine pollution incident or other disaster. There is no timeline specified; however, the reporting has to occur immediately after the incident and the response will be initiated as fast as possible. Additionally, this can trigger the Canada-United States Joint Marine Pollution Contingency Plan or other international assistance (CCG 2013b).

4.2.5 Transport Canada

TC's mission is to serve the public interest through the promotion of a safe and secure, efficient and environmentally responsible transportation system in Canada (TC 2014a). Two key components of their mandate (relevant to this report) include the management and enforcement of guidelines for safe and environmentally responsible marine vessel operations, and the protection of the public right to navigation on Canadian waters. These two goals are achieved through TC's Operations and Environmental Programs branch and through the Navigation Protection Program (NPP). The NPP, in particular, is responsible for the administration and enforcement of the *Navigation Protection Act*.

4.2.5.1 Legislation and Regulations

Arctic Waters Pollution Prevention Act (1985)

The *Arctic Waters Pollution Prevention Act* provides for the protection of Arctic waters from the adverse effects that could arise from shipping and exploitation of natural resources. The Act prohibits the deposit of waste in Arctic waters except by regulations that stipulate the manner and circumstances under which waste can be deposited. The following regulations enforce the act:

Arctic Shipping Pollution Prevention Regulations (2014)

These regulations govern shipping in the Canadian Arctic by setting out hull design and construction standards for ships operating in Arctic waters, and standards for navigation and safety equipment on ships navigating in Arctic waters. The regulations also outline the manner and circumstances under which sewage and oil may be deposited in Arctic waters.

Arctic Waters Pollution Prevention Regulations (2009)

These regulations provide regulations with respect to the deposit of domestic and industrial waste within the Arctic waters.

Canada Shipping Act (2001)



The *Canada Shipping Act, 2001* concerns marine navigation, marine search and rescue, pleasure craft safety, marine ship-source pollution prevention and response, lighthouses, receiver of wrecks, and support to other federal departments and agencies.

Under the *Canada Shipping Act, 2001*, an autonomous underwater vehicle (AUV) is considered a vessel as it is "...capable of being used solely or partly for navigation in, on, through, or immediately above water." (Canada Shipping Act, 2001). The use of AUVs may be considered for use in oil spill countermeasures research.

The Minister of Transport has authority under the act, along with limited responsibility by the Minister of Fisheries and Oceans. Relevant regulations under the act include the Response Organizations and Oil Handling Facilities Regulations which pertain to plans, equipment and measures that must be in place at oil handling facilities. These regulations also list the requirements for oil spill procedures, contingencies, equipment and resources that are required at these facilities.

Numerous other regulations are in place under the *Canada Shipping Act, 2001* that relate to the safe operation of vessels.

Aeronautics Act (1985)

The federal Aeronautics Act authorizes the control of aeronautics in Canada. It is administered by TC, the Minister of National Defence (for matters relating to defence) and the Minister of Public Safety and Emergency Preparedness (TC 2014c). The Canadian Aviation Regulations (CARs) is an important aspect of the Act. In 1996, the CARs came into effect replacing the previous Aviation Regulations. CARs incorporate new processes, principles and recommendations, and similar to the former Aviation Regulations, promotes safety and the importance of communication to the aviation community (TC 2014c).

Navigation Protection Act (2014)

The *Navigation Protection Act* (NPA) replaces the former *Navigable Waters Protection Act* (1985) and authorizes and regulates interferences with the public right of navigation. TC administers the NPA through the Navigation Protection Program (NPP). A primary purpose of the NPA is to regulate works and obstructions that risk interfering with navigation in the navigable waters listed on the schedule to the Act. A work, for purposes of the NPA, is anything, whether temporary or permanent, that is made by humans, and that is in, on, over, under, though or across any navigable water in Canada. The NPA also prohibits the depositing or throwing of materials that risk impacting navigation in navigable waters and the dewatering of navigable waters (TC 2014b).

The schedule to the act lists the Arctic Ocean as waters the act applies to, including "all waters from the outer limit of the territorial sea up to the higher high water mean tide water level and includes all connecting waters up to an elevation intersecting with that level".

The NPA requires owners (proponents) to provide Notice to the Minister of Transport about certain works on navigable waters in Canada. The detailed information submitted in a Notice to the Minister is required for the NPP to identify likely interferences with shipping and boating activities. A notice is required for all work on navigable waters listed on the schedule to the NPA (except minor work) and may be required for works on other waters. An Application for Approval is only required if the NPP assessment of impacts to navigation finds that the work is likely to substantially interfere with navigation.

Transportation of Dangerous Goods Act (1992)



This act addresses the classification, documentation, marking, means of containment, required training, emergency response, accidental release, protective measures and permits required for the transportation of dangerous goods by road, rail, marine, or air. Relevant associated Regulations include the Transportation of Dangerous Goods Regulations which pertain to the handling and offering for transport and transportation of dangerous goods. In the NWT, the *NWT Transportation of Dangerous Goods Act (1988)* (Section 4.3.6) applies to transportation of dangerous goods by vehicle on a highway, while the federal act applies to all other dangerous goods transportation.

4.2.5.2 Permits and Licences Arctic Pollution Prevention Certificate

An Arctic Pollution Prevention Certificate is a voluntary document that indicates compliance with the Arctic Shipping Pollution Prevention Regulations (2014). The certificate indicates the design category of a vessel and when and where it can navigate in Canadian Arctic waters. This is generally determined by the ice class of the vessel. The certificate provides ship owners and TC with evidence that a ship meets the Arctic regulatory requirements in advance of the vessel entering Canadian Arctic waters (TC 2013).

Contact Information

Contact: Manager, Special Projects & Arctic Shipping
Telephone: 613-991-3145

Mailing Address: 303 Sparks Street
Ottawa, ON, K1A 0N8
Fax:

Email:
Online: tc.gc.ca

Timeline

The timeline and process varies for vessels depending on their size and age. The certificate is voluntary; if a ships owner would like to obtain certification, the Manager of Special Projects and Arctic Shipping can be contacted to determine the specific process and timeline for individual vessels.

Navigation Protection Act Approval

Any works in, on, over, under, through or across navigable waters that would substantially interfere with navigation cannot proceed without an NPP approval issued by TC. In some situations, an application for an NPP approval may trigger an EA (i.e., through the Environmental Impact Review Board [EIRB] in the ISR; explained in Section 3 of this Roadmap).

Contact Information

Contact: Regional Manager, Prairie and Northern Region
Telephone: 780-495-8215

Mailing Address: NPP Transport Canada
Canada Place
1100-9700 Jasper Avenue (RMEB)
Edmonton, AB, T5J 4E6
Fax: 780-495-8607

Email: Npppnr-ppnrpn@tc.gc.ca
Online: tc.gc.ca/eng/programs-621.html



Timeline

A proponent can apply for approval under the NPP by completing the *Application for Approval* available from TC online. There is authority under the *Navigation Protection Act (NPA)* for the NPP to set and collect fees but there are currently no fees in place. The NPA requires that notice be provided to TC about certain works on navigable waters. The notice must include a *Notice of Works* form and additional required information.

The NPP screens the *Notice of Works* for completeness. An NPP officer is then assigned, and the work is assessed for likelihood of interfering with navigation. Environmental review, Aboriginal consultation, or public advertising may be required (see Section 3 of this Roadmap).

Canada Shipping Act, 2001 - Approvals

Canadian registered vessels (including AUVs) operating in Canadian marine waters, including the Beaufort Sea, may be required to be certified for marine safety by TC. These vessels will also be subject to ongoing inspections to ensure compliance with regulations. Foreign registered vessels are subject to similar safety approvals as well as other various approvals from the Canadian Transport Agency and the Canada Revenue Agency.

Contact Information

Contact:	Executive Director, Regulatory Services and Quality Assurance	Telephone:	613-998-0600
Mailing Address:	Transport Canada 330 Sparks Street Ottawa, ON, K1A 0N8	Fax:	613-991-5670
Email:	marinesafety@tc.gc.ca	Online:	tc.gc.ca/eng/marinesafety/tp-tp13585-policy-ce-csa2001-1356.htm

Timeline

Approval under the *Canada Shipping Act, 2001* can vary greatly by vessel, where it is registered, and what is being transported. Regulatory Services should be contacted to determine the timelines and processes for specific approvals that may be required under the *Canada Shipping Act, 2001*.

Special Flight Operations Certificate

An application to operate an unmanned aerial vehicle (UAV) is required and is satisfied by obtaining a Special Flight Operations Certificate (SFOC) as required by Section 602.41 of the CARs, based on the standards as defined by Section 623.65(d) for the operation of UAVs (TC 2014c). For the use of helicopters and fixed wing aircraft, the operating company is responsible for the appropriate permits and authorizations under these regulations. UAVs, helicopters and fixed-wing aircraft may be used in support of oil spill countermeasures research (e.g., for detection of oil spills).

Contact Information

Contact:	Civil Aviation Safety Inspector	Telephone:	204-983-4767
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Mailing Address: Aerodromes and Air Navigation
1100 – 9700 Jasper Avenue
Edmonton, AB, T5J 4E6

Fax: 204-984-2069

Email: pnrspecialflightops@tc.gc.ca

Online: <https://www.tc.gc.ca/eng/civilaviation/standards/general-recavi-brochures-uav-2270.htm#unmanned>

Timeline

Applications for a SFOC are submitted in letter form and must include the applicants information, the operators information, contact information during the operation, the purpose, operation dates, a description of the UAV, a security plan, an emergency contingency plan, the operations manager's information, and an operations plan.

4.3 Territorial Organizations and Agencies in the NWT

4.3.1 Aurora Research Institute

The Aurora Research Institute (ARI) is the research division of Aurora College. Their mandate is to improve NWT resident's quality of life by solving northern problems through the application of scientific, technological and indigenous knowledge. They also work to advance social and economic goals within the NWT (ARI 2014a). In pursuance of this mandate the ARI is committed to:

- promote communication between researchers and community members;
- promote the importance and availability of science, technology and traditional knowledge; and
- support or conduct research that contributes to the prosperity of people living in the NWT (ARI 2014a).

The ARI is also responsible for licensing and coordinating research in accordance with the *NWT Scientist's Act*.

4.3.1.1 Legislation and Regulations

NWT Scientist's Act (1988)

The *NWT Scientist's Act* is a regulatory document controlling scientific research within the NWT. It sets out licensing specifications and responsibilities of researchers to the NWT, as well as clear delineation of research regarding wildlife (covered under the *Wildlife Act*) and archaeology (covered under the Northwest Territories Archaeological Sites Regulations; GNWT 1988).

4.3.1.2 Permits and Licences

Scientific Research Licence

A scientific research licence can be applied for through the Aurora Research Institutes online licensing process through the Portal for Online Licence Applications for Research (POLAR). For detailed information on creating and administering a POLAR account, refer to the "Researchers Guide to POLAR" document located on the ARI website (ARI 2014b).

Once the submittal is accepted by ARI, it is distributed to NWT community organizations for review and feedback (usually within a week of the submission date). This submittal occurs through the licence portal and will update



the researcher's POLAR account with a distribution list. Concerns or comments will be forwarded to the researcher through the ARI to be addressed directly. Records of communication with the NWT community organizations should be added to the licence application by submitting them to the Manager of Scientific Service or the Licensing Coordinator. They will be used during the licensing decision. Proof that issues or concerns have been addressed may be required before a licence can be submitted (ARI 2011; ARI 2014b).

Multi-year licences can be issued for up to five years. Projects exceeding five years must re-do the entire application process every five years (ARI 2014b). Following the initial licensing of a multi-year project, a yearly update to the communities must be submitted. Significant changes to the research project during the term of the multi-year licence may require a new licence application through POLAR (ARI 2011).

Researchers are required to submit a summary of their research by June 30 of the year following licence acquisition. The summary should be less than 200 words, written in plain-language and submitted through the research portal (POLAR). It will be included in an annual publication by ARI that is distributed to all NWT community organizations, libraries and high schools (ARI 2011).

Any publications and reports developed from the research need to be submitted to the ARI library in Inuvik (through POLAR). Submittals to the ARI library will be stored in the permanent collection and made accessible to the community and other researchers. Community organizations that are affected by or express interest in the research should be kept apprised of its progress using updates and preliminary reports (ARI 2011).

Contact Information

Contact:	Licensing Coordinator	Telephone:	867-777-3298
Mailing Address:	P.O. Box 1450 Inuvik, NT, X0E 0T0	Fax:	867-777-4264
Email:	licence@nwtresearch.com	Online:	ARI: nwtresearch.com POLAR: polar.nwtresearch.com

Timeline

Application processing can take up to three months. Working within this potential time constraint it is recommended to apply for a licence even if some details are unknown or "in progress" such as exact site locations or field dates (ARI 2014b).

4.3.2 Prince of Wales Northern Heritage Centre

The Prince of Wales Northern Heritage Centre (PWNHC) was developed to promote and preserve the heritage of the Northwest Territories. Functioning as a museum, archive, and gallery the centre not only displays pieces of the Territories heritage, it also develops exhibits that travel throughout the NWT. The Centre also designs, develops and delivers educational programs to children of all ages in order to pass along the territories heritage and history (PWNHC 2014).

Its role in mitigating impacts of developments on archaeological sites is to

- identify the need for an impact assessment and make recommendations to the appropriate regulatory agency;
- assist in setting the terms of reference for the study;



- suggest the names of qualified individuals to undertake the study;
- issue a NWT Class 2 Archaeological Permit authorizing field work;
- assess the completeness of the study and its recommendations; and
- in conjunction with the land management authority, ensure that the developer complies with the recommendations (PWNHC 2008).

A developer **must determine if there are any known archaeological sites in their area of interest** and may apply to the PWNHC for a licence agreement to access relevant information on the NWT Archaeological Sites Database. (PWNHC 2008).

4.3.2.1 Legislations and Regulations

Pre-Devolution: Archaeological Sites Regulations (2001), Northwest Territories Act (1985)

The Archaeological Sites Regulations are in place to protect archaeological sites/artifacts within the Northwest Territories. Governed by the *Northwest Territories Act*, the regulations outline the handling of permits regarding the study of archaeological sites in the NWT by the PWNHC (PWNHC 2014).

Post-Devolution: Archaeological Sites Act (2014)

The *Archaeological Sites Act* will mirror the legislation outlined by the Archaeological Sites Regulations and the *Northwest Territories Act*. Currently it is in a state of transition, but will recognize permits previously obtained through the Archaeological Sites Regulations (GNWT 2014a; GNWT 2014c).

4.3.2.2 Permits and Licences

An Archaeological Reconnaissance is required when the developers and government managers need to obtain detailed information of an area's archaeological resources to formulate recommendations for future development planning. In cases where a reconnaissance results in a very low or negligible archaeological potential, no further studies are required.

The main purpose of an Archaeological Reconnaissance is to:

- provide baseline data of potential archaeological sites and heritage resource potential;
- identify potential impacts to these resources;
- produce terms of reference for possible further archaeological studies; and
- develop preliminary mitigation measures for archaeological resources (if required).

NWT Class 2 Archaeological Permit

Based on the Archaeological Sites Regulations, an NWT Class 2 Archaeological Permit is required to carry out reconnaissance and assessment studies. A request to access to the NWT Archaeological Sites Database does not constitute an archaeological review of a project. An archaeological review is typically required as a component of a land use application. It is the responsibility of the proponent to ensure that a qualified archaeologist completes the required study and adhere to permit requirements (PWNHC 2008).



Contact Information

Contact:	Assessment Archaeologist	Telephone:	867-873-7258
Mailing Address:	P.O. Box 1320 PWNHC Yellowknife, NT, X1A 2L9	Fax:	867-873-0205
Email:	archaeology@gov.nt.ca	Online:	pwnhc.ca/programs/archaeology.asp

Timeline

Before an NWT Archaeological Permit can be issued, the procedures require consultation with the community and / or land claim authority which can take up to 60 days. Permit applications must be received by the PWNHC by March 31 if work is to be done in the following field season. The application is sent by the PWNHC to the appropriate land claim organizations for comment (e.g., the Inuvialuit Land Administration [ILA] and local Hunters and Trappers Committees [HTCs] in the ISR). If a review agency or community has concerns, they are addressed before the permit is issued or are reflected in conditions attached to the permit. A permit may be refused if the research has not been adequately justified, obligations have not been met or if there a proposed disturbance to a site of spiritual significance. Prior to expiry of the permit, the permit holder must have submitted the following items:

- a technical report on the work performed;
- a non-technical summary for public education; and
- catalogued artifacts, field notes, maps, and photos to the PWNHC by March 31 following the calendar year in which the permit was issued (PWNHC 2008).

4.3.3 GNWT Department of Lands

Established in 2014 through the process of Devolution (described in Section 4.1), the Department of Lands (Lands) is responsible for support, management, protection and administration of public land in the NWT. Lands assumed management of Commissioner's land (formerly administered by MACA) as well as land related responsibilities devolved from AANDC (Crown land; GNWT 2014d).

4.3.3.1 Legislation and Regulations

NWT Lands Act (2014)

This act transfers administration from the *Commissioner's Land Act* (1988), and the federal *Territorial Lands Act* (1985) and *Federal Real Property and Federal Immovables Act* (1991). The *NWT Lands Act* details the rules and regulations pertaining to land management zones, disposition of territorial and Commissioner's lands, reservation of lands along seas or shores of navigable waters and the enforcement of the NWT Land Use Regulations

NWT Land Use Regulations (2014)

The NWT Land Use Regulations detail the permitting requirements and regulations for projects impacting or occurring on territorial Crown land (including those in the ISR). Through Devolution, the mandate for most areas of territorial Crown land is now with Lands (formerly with AANDC). These regulations do not apply to lands



identified in the *Mackenzie Valley Resource Management Act* (1998), anything done in the course of hunting, fishing or trapping, prospecting, and on privately-owned lands (including Inuvialuit lands with surface rights as identified in the IFA).

NWT Devolution of Lands and Resources Agreement (2013)

This agreement transferred responsibility for territorial Crown lands to Lands. Lands is now responsible for the management and administration of all public lands in the NWT. This includes Commissioner's lands which were previously administered by MACA and territorial Crown lands previously administered by the Federal Government (GNWT 2014b).

4.3.3.2 Permits and Licences

Land Use Permit

A Land Use Permit is required for projects impacting or occurring on territorial Crown land in the ISR. Through Devolution, the mandate for most areas of territorial Crown land is now with Lands (formerly with AANDC). In the ISR, land use permitting is subject to the Northwest Territories Land Use Regulation and applications for Land Use Permits are available from Lands offices or online. Two types of permits can be issued for land use: Type A and Type B. Type A permits are those that are more intensive or longer term than those requiring a Type B permit. A land use permit issued by Lands may be required depending on the proposed land use activity (GNWT 2014d).

A Class A Permit is required for the following work or undertaking (*NWT Land Use Regulations 2014*):

- the use in any 30-day period of more than 150 kilograms (kg) of explosives;
- the use of a vehicle exceeding 10 tonnes (t) net vehicle weight, except on a road;
- the use of power driven machinery for earth drilling whose operating weight exceeds 2.5 t;
- the establishment of camps to be used for more than 400 person-days;
- the establishment of a fuel storage facility exceeding 80,000 litres (L) or using a single container exceeding 4,000 L;
- the use of a self-propelled power driven machine for moving earth or clearing land of vegetation;
- hydraulic prospecting, earth moving, or land clearing; or
- levelling, grading, clearing, cutting, or snowplowing or a line, trail, or right-of-way exceeding 1.5 m in width or 4 hectares (ha) in area.

A Class B Permit is required for the following work or undertaking (*NWT Land Use Regulations 2014*):

- the use in any 30-day period of more than 50 kg but less than 150 kg of explosives;
- the use of a vehicle, except on a road, exceeding 5 t but less than 10 t net vehicle weight, or the use of a vehicle exerting ground pressure in excess of 35 kilopascals (kpa);
- the use of power drive machinery for earth drilling whose operating weight is greater than 500 kg but less than 2.5 t;



- the establishment of camps to be used for more than 100 but less than 400 person-days;
- the establishment of a fuel storage facility exceeding 4,000 L and less than 80,000 L, or the use of a single container exceeding 2,000 L but less than 4,000 L; or
- levelling, grading, clearing, cutting or snowplowing of a line, trail or right-of-way exceeding 1.5 m in width but not exceeding 4 ha in area.

The application must include the following details:

- a description of all activities (including equipment, fuel, schedule and locations);
- a summary of potential environmental impacts;
- a proposed mitigation and restoration plan;
- a list of other rights, licences or permits related to the land use permit application;
- a waste management plan;
- a spill contingency plan (for all hazardous substance used during the course of the development); and
- a calculation of the Land Use Fees: \$150.00 Land Use Fee (for up to 2 ha) and additional \$50.00 per additional ha).

An EISC screening letter (explained in Section 3 this Roadmap) or a lease application may be required along with the Land Use Permit application as well as any leases required for research on Commissioners lands (Section 3.2.3.2). Research that is long-term or requires permanent installations or infrastructure taking place on Commissioner's lands (formerly administered by MACA), may require a lease from Lands in addition to a Land Use Permit

Contact Information

Contact:	GNWT Department of Lands	Telephone:	867-777-8906 or 1-888-NWT-LAND
Mailing Address:	86 Duck Lake Road Bag Service #1 Inuvik, NT, X0E 0T0	Fax:	867-777-2090
Email:	nwtlands@gov.nt.ca	Online:	lands.gov.nt.ca

Timeline

Lands will only process applications that are complete with all relevant information. Once a complete application for a Land Use Permit is received and the appropriate Land Use Fees are paid, the application is reviewed to ensure completeness and conformity with approved plans. The proponent receives a confirmation of completeness from Lands within ten days of receipt of the application indicating that the application is complete and that it has been assigned a file number. Approval of the Land Use Permit, a request for additional information, a refusal, or a referral to the EISC (if screening was not completed) is typically forwarded to the proponent within 42 days of receipt of a complete application (D. Carmichael, Land Use Advisor, pers. com. 2014).



In addition, Lands has a coordinating role on behalf of the GNWT in the ISR for reviewing project applications during the EISC screening process, undertaking impact assessments, consulting with Aboriginal people and the general public, and building consensus among Responsible Ministers for decision making. Lands will coordinate their assessment of a project's relevance to the GNWT's mandate during the EISC screening process and their timelines (explained in detail in Section 3 this Roadmap; GNWT, Lands 2014).

Research on Commissioner's Lands

Commissioner's lands are mostly located within municipal boundaries and were formerly administered by MACA. They are now also under the administration of Lands. Project proponents or developers should contact the Lands regional office nearest to the proposed development. Lands may issue a lease if the project is intrusive or consists of any long-term improvements (ARI 2011).

To apply for a lease, an Application for Territorial Land must be obtained online or from a Regional Lands Office. Lease applications are subject to an environmental review and consultation process which can result in a lease refusal (GNWT, Lands 2014).

Contact Information

Contact:	GNWT Department of Lands	Telephone:	867-777-8906 or 1-888-NWT-LAND
Mailing Address:	86 Duck Lake Road Bag Service #1 Inuvik, NT, X0E 0T0	Fax:	867-777-2090
Email:	nwtlands@gov.nt.ca	Online:	lands.gov.nt.ca

Timeline

Once a proponent contacts Lands to determine if a lease is required, Lands will indicate their required timeline for authorization. Following Devolution, the newly created Lands is currently developing an engagement strategy in order to discuss with stakeholders, Aboriginal groups, and the public how lands are managed and administered (GNWT, Lands 2014).

4.3.4 GNWT Department of Environment and Natural Resources

ENR is involved in the sustainable use, development, and protection of the environment and natural resources in the NWT. This is done in co-operation with Aboriginal and municipal governments, federal and territorial departments, boards and agencies, as well as the residents of the NWT (GNWT, ENR 2014).

4.3.4.1 Legislation and Regulations

Environmental Protection Act (1998)

The *Environmental Protection Act* is a regulatory document developed for the protection of the environment of the Northwest Territories. It includes legislation regarding discharge of contaminants, unsightly land, licensing and actions in response of environmental contamination/damage. Relevant regulations under this act include *Spill Contingency Planning and Reporting Regulations* (GNWT 1998).

Wildlife Act (2014)



The *Wildlife Act* is a regulatory document developed for the protection of wildlife in the Northwest Territories. It includes legislation regarding licensing and permits, wildlife management, wildlife use and possession, and enforcement. Relevant regulations under this act include Wildlife Export Regulations and Wildlife Licences and Permits Regulations (GNWT 2014e).

With regards to wildlife issues in ISR, although there are no specific wildlife permitting or licensing requirements under the IFA, there is an extensive EA process which is described in detail in Section 3 of this Roadmap. This requires all proposed research and development to be reviewed by the EISC and, if recommended, the EIRB in conjunction with the co-management boards which include the FJMC, the WWMAC-NWT and the WMAC-North Slope.

4.3.4.2 Permits and Licences

Wildlife Research Permit

This licence is required in order to study wildlife (including migratory birds and species at risk, but excluding fish and marine mammals) or wildlife habitat within the NWT.

Before submitting an application, all Aboriginal renewable resource organizations need to be informed of the project or research plan, and their approval obtained. Organizations will need to outline any concerns, suggestions or requirements for the proposed study by filling out a *Recommendation Form* (available through ENR). Organizations need to state clearly whether they agree or disagree with the proposed study. Copies of the *Recommendation Form* need to be included with the application. The community consultation process will take at least 30 days (GNWT 2014f).

A Wildlife Research Permit lasts for one year after which a new application has to be submitted (GNWT 2014f). ENR requires that all research projects that obtain a Wildlife Research Permit complete and submit a wildlife research permit summary report. Templates are available on the ENR website. Reports can be submitted to the Director of the Wildlife Division of ENR in Yellowknife, NWT (GNWT 2014f).

Contact Information

Contact: Director, Wildlife Division Telephone:
Mailing ENR GNWT Fax: 867-873-0293
Address: PO Box 1320 Yellowknife NT, X1A 2I9
Email: Wildliferesearch_permit@gov.nt.ca Online:

Timeline

The consultation process can take at least 30 days depending on availability of the various organizations. Given the possibility of a drawn out consultation process it is recommended that application for a Wildlife Research Permit begin three months prior to the start of research (P. Handley, ENR Wildlife Division, pers. comm. 2014).

Hazardous Waste: Registration Number and Waste Manifest

In the event that recovered oil from potential oil spill countermeasures research falls into the category of hazardous waste, steps will need to be taken to ensure its appropriate handling. A generator of hazardous waste must register with ENR and is ultimately responsible for ensuring that waste is properly managed from the moment of generation to its final disposal (GNWT, ENR 1998; Gerald Enns, Hazardous Waste Specialist, ENR;





pers. comm. 2014). The generator is responsible for properly classifying, labeling and storing the hazardous waste, ensuring the proper completion and use of a waste manifest. Further, the generator must ensure that the waste is transported by a registered hazardous waste carrier to a registered receiver and disposed of by an acceptable method. The carrier and receiver of the hazardous waste must also be registered either with ENR or in the province or territory in which the company is based (GNWT, ENR 1998). The following information is required when applying for a registration number:

- Generator:
 - company name, address, phone number and contact person;
 - location and description of the activity from which the waste was generated;
 - expected type and quantity of hazardous waste; and
 - method of storage.
- Carrier:
 - company name, address, phone number and contact person;
 - proof of transport liability insurance;
 - operating authority for transport in the NWT; and
 - confirmation that the company meets transport authority training requirements.
- Receiver:
 - company name, address, phone number and contact person;
 - location and description of the management facilities and activities for hazardous waste;
 - expected type and quantity of hazardous waste; and
 - method of storage (GNWT, ENR 1998).

Guidelines laid out by the GNWT do not specifically address hazardous waste in relation to off-shore development (Gerald Enns, Hazardous Waste Specialist, ENR; pers. comm. 2014). This aspect is currently under revision. On-shore guidelines can be applied in conjunction with the Transport of Dangerous Goods Regulations (Section 4.3.6.2) and Environment Canada's Interprovincial Movement of Hazardous Waste Regulations as needed (Gerald Enns, Hazardous Waste Specialist, ENR; pers. comm. 2014).

The final destination of hazardous waste needs to be determined during the design phase of oil spill countermeasures experiments and the appropriate provincial legislation reviewed.

If any hazardous waste is exported to the United States or elsewhere outside of Canada then EC's Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (EIHWHMR) will apply (EC 2014c). This would require the proponent to notify the Minister of Environment of their intent to export the generated hazardous waste. The notification doubles as an application for a permit, without which the shipment would not be able to proceed across Canadian boundaries.



Contact Information

Contact: Gerald Enns, Hazardous Waste Specialist
Telephone: 867-447-0326
Mailing Address: ENR GNWT
PO Box 1320
Yellowknife NT, X1A 2L9
Fax: 867-873-0221
Email: Gerald_Enns@gov.nt.ca
Online:

4.3.5 GNWT Department of Industry, Tourism and Investment

ITI was developed in 2005 to “create a prosperous, diverse and sustainable economy for the benefit of all NWT residents”. It is involved in the responsible development of the NWT’s natural resource industries as well as diversification of the territories economy through tourism, trade and investment (ITI 2014).

Through Devolution, ITI became responsible for administration of onshore oil and gas interests in the NWT including the ISR. The ITI Petroleum Resources Division is responsible for petroleum resources exploration and development. Offshore oil and gas remains the responsibility of the federal government (GNWT 2014a).

4.3.5.1 Legislation and Regulations

NWT Oil and Gas Operations Act

The *NWT Oil and Gas Operations Act* (2014) apply to inland oil and gas operations outside of the ISR in the NWT regulated under the Office of the Oil and Gas Regulator. Both the offshore and inland (onshore) oil and gas operations in ISR are subject the *NWT Petroleum Resources Act* (2014), which falls under NEB regulation.

NWT Petroleum Resources Act

In 2014, the *NWT Petroleum Resources Act* was adopted to mirror the federal act of the same name. It outlines regulation surrounding the petroleum industry including royalty rates, the administration of petroleum licences and permits such as those associated with exploration licences, significant discovery licences, and production licences. However, in the ISR, the NEB regulates both offshore and onshore petroleum resources on behalf of the GNWT.

NWT Dredging Regulations (under the NWT Lands Act, 2014)

The *NWT Dredging Regulations* were adopted by the GNWT in 2014 and mirror the federal *Territorial Dredging Regulations*. These regulations outline the royalties and requirements for issuing leases for dredging for minerals in the submerged beds of any river in the NWT.

4.3.5.2 Permits and Licences

ITI issues no licences or permits that are relevant to an oil spill countermeasures field program. Similar to other organizations, ITI is providing input into the EISC screening process.

4.3.6 GNWT Department of Transportation

The Department of Transportation (DOT) is the department in charge of transportation infrastructure in the NWT. This includes community airports (27), docks (five ferry and ice crossings), highway systems (2,200 km of all weather road, 1,450 km of winter roads), as well as the licensing of individual drivers and their vehicles (GNWT, DOT 2014).



4.3.6.1 Legislation and Regulations

NWT Transportation of Dangerous Goods Act

The *NWT Transportation of Dangerous Goods Act* (1988) and the associated regulations detail the requirements for transporting dangerous goods on highways in the NWT and include safety standards, inspections, and liabilities. This act does not apply to transportation of dangerous goods by sea or air that are transported under direction of the federal Department of Defence, other exemptions outlined in the regulations, or if exempted by the satisfaction of a permit and compliance with the terms of the permit.

In 1996, an agreement was established between the Government of Canada and the GNWT to regulate the administration of the federal *Transportation of Dangerous Goods Act* (1992). The agreement provides that the GNWT will administer all on-highway inspection and enforcement activities in NWT while the Government of Canada will administer all off-highway inspection and enforcement activities (Government of Canada 1996).

4.3.6.2 Permits and Licences

The DOT issues no licences or permits that are relevant to an oil spill countermeasures field program. TC and the federal *Transportation of Dangerous Goods Act* (Section 2.1.6) should be consulted regarding regulations and permit requirements for the transportation of crude oil for testing as well as dispersants, surfactants, and other chemicals that may be used during oil spill countermeasures research.

The DOT should also be consulted in the event that recovered oil falls under the classification of hazardous waste. Section 4.3.4.2 provides detailed information regarding the handling of hazardous waste in the NWT.

4.3.7 GNWT Department of Municipal and Community Affairs

MACA is the department in charge of community support and development. The department supports community governments and assists them in providing a safe, sustainable and healthy environment for the community's residents (GNWT, MACA 2014). With Devolution, MACA gave up responsibility for Commissioner's land in the NWT to Lands (GNWT 2014b).

4.4 Territorial Organizations and Agencies in the Yukon

The ISR includes Yukon coastal, nearshore and offshore areas. For that reason, a brief description of some Yukon organizations is provided below. The YESAA regulates EAs through the YESAB in the Yukon and is described in detail in the Section 3 of this Roadmap.

Under the 1993 Canada Yukon Oil and Gas Accord, the federal and territorial governments are sharing the offshore management regime in the Beaufort Sea portion of the Yukon (Yukon Government 2014).

4.4.1 Yukon Water Board

The Yukon Water Board is responsible for water use licencing and regulating the use of water and / or the **deposit of waste into waters in the Yukon**, including the Yukon portion of the ISR (the Inuvialuit Water Board is discussed in Section 4.5.2). The objectives of the Yukon Water Board are to "provide for the conservation, development and utilization of waters in a manner that will provide the optimum benefit from them for all Canadians and for the residents of the Yukon in particular" (Yukon Water Board 2014).



4.4.1.1 Legislation and Regulations

Waters Act (2003)

In Yukon, the *Waters Act* (2003) makes provision for control of all rights in respect of water the responsibility of the Government of Yukon other than waters in federal conservation areas (i.e., national parks, migratory bird areas, and lands set aside by the federal government for the protection of wildlife, defined in the *Yukon Act*, 2002). The *Waters Act* established the Yukon Water Board and details its mandate and licencing responsibilities. It also identifies management areas, waste prohibitions, and regulations pertaining to water use.

Umbrella Final Agreement (1993) Chapter 14

The *Umbrella Final Agreement* (1993) is a land claim agreement between the Government of Canada, the Council for Yukon Indians, and the Government of the Yukon. The agreement asserts aboriginal rights to traditional territories, provides for settlement agreements, and protects the culture and traditional way of life of Yukon First Nations. Chapter 14 of the agreement addresses the need for maintaining the natural condition and providing for sustainable use of the waters of the Yukon. The agreement stipulates that one-third of the members of the Yukon Water Board are to be nominated by the Council for Yukon Indians and provides that Yukon First Nations have exclusive rights to use water on or flowing through its Settlement Land. Chapter 14 also provides for resolution of water use disputes and compensation for water use.

4.4.1.2 Permits and Licences

Water Use Licence

The Yukon Water Board hosts the WATERLINE, a public registry providing access to water licences in the Yukon. The goal of WATERLINE is to create an easily accessible forum for public participation in the water licensing process (available at: <https://apps.gov.yk.ca/pls/apex40p/f?p=127:101:3347784437339784>).

The board has licensing officers and technical consultants to review information provided in Water Use Applications. All applications for Water Use Licences have to be accompanied by a decision letter from the YESAB because the board cannot issue a Water Use Licence contrary to a YESAB decision (Yukon Water Board 2014).

There are two types of licences based on the potential water use or disturbance caused by the proposed project or the amount of waste to be deposited: Type A and Type B Water Use Licences. The type of licence depends on the amount of water use per day applied for, whether the applicant proposes to deposit waste, or proposes other types of activities that use water or may change the watercourse. A Type A application is more complex and involved than a Type B application. The Waters Regulations (2003) outline criteria for both types of licences.

Applicants can create applications, upload reports, and add documents online. WATERLINE supports a search for licences and application and viewing and uploading of reports. Users are also able to request receiving notification regarding updates to applications and licences as well as submit public comments online.

The water use licensing process can be divided into four main phases:

- the application phase;
- the public comment phase;



- the board review phase; and
- the decision (Yukon Water Board 2014).

Contact Information

Contact:	Yukon Water Board Secretariat	Telephone:	867-456-3980
Mailing Address:	Yukon Water Board Suite 106, 419 Range Road Whitehorse, YT, Y1A 3V1	Fax:	867-456-3890
Email:	ywb@yukonwaterboard.ca	Online:	yukonwaterboard.ca

Timeline

Although there are legislated time frames for the licensing process, the Yukon Water Board does not guarantee a certain time frame (Yukon Water Board 2014). The length of time to approval is based on the comments received, the applicant's responses and the complexity of the project.

For a Type A application, the public comment period is approximately 30 days and the *Waters Act* states a minimum 35 days from the public notice date before a public hearing can begin. For a Type B application, the public comment period is a minimum of 10 days but a longer period can be set by the Water Board Secretariat if needed (Yukon Water Board 2014).

4.4.2 Government of Yukon, Environment Yukon

Environment Yukon is responsible for environmental management and protection in the Yukon. Their responsibilities include: air emissions permitting, bear safety, campgrounds and parks, climate change, species conservation and species at risk, contaminated sites, environmental education, licensing of hunting and fishing, fuel and chemical storage, household hazardous waste, spill reporting, and water resources (Environment Yukon 2014).

4.4.2.1 Legislation

Environment Yukon's mandate is based on a large variety of different acts and regulations, including the *Yukon Act* (2003), (*Yukon Wilderness Act* (2002), (*Yukon Parks and Land Certainty Act* (2001), the *Yukon Surface Rights Board Act* (1995) and the *Yukon's Environment Act* (1995).

The *Yukon's Environment Act* provides for the protection of the territory's land, water, and air. Permits governing certain activities are issued containing detailed terms and conditions under nine of the regulations of the act. In some cases, an assessment under the *Yukon Environmental and Socio-economic Assessment Act* (described in Section 3 of this Roadmap) is required before a permit can be issued. Regulated activities include, among others, fuel storage and handling, solid waste management, hazardous waste management, air emissions and the assessment and clean up of spills.

The *Parks and Land Certainty Act* is a regulatory document developed for the protection and management of representative areas of territorial significance and other special places in the Yukon and to provide recreational opportunities for Yukoners and visitors. It includes legislation regarding establishment of parks, existing parks, and new settlement agreement parks. Relevant regulations under this act include the Herschel Island Park Regulations



4.4.2.2 Permits and Licences

Special Waste Permit

Environment Yukon prohibits releases of any special (hazardous) waste into the environment, as defined in the Special Waste Regulations if these substances may cause an adverse effect. A release can be authorized by the Yukon's *Environment Act* or the Special Waste Regulations, or a Special Waste Permit can be issued. Permits may include the Generator Permits for storing, or handling a special waste, or Disposal Permits for the disposal of special wastes. Inspections of permitted activities are regularly carried out by Environmental Protection Officers to ensure they are operating in accordance with the applicable regulations and permit conditions (Environment Yukon 2011a).

Contact Information

Contact:	Environmental Programs Branch	Telephone:	(867) 667-5683
Mailing Address:	Department of Environment (V-8), Box 2703, Whitehorse, Yukon, Y1A 2C6	Toll free:	1-800-661-0408 ext. 5683
		Fax:	867-393-6205
Email:	envprot@gov.yk.ca	Online:	http://www.env.gov.yk.ca/environment-you/Environment_Act.php

Timeline

There are no legislated time frames for the licensing process and the length of time to approval is based on the quantity and nature of the waste.

Relocating Contaminated Material Permit

A permit is required to relocate soil, sediment, snow or water that is contaminated above any of the standards in the Yukon's Contaminated Sites Regulation. Approval must be received prior to relocating any contaminated material resulting from a spill or historical contamination. A permit application can be obtained from the Environmental Programs Branch or online at www.environmentyukon.gov.yk.ca/documents/CSR_RP_App.pdf. In addition to completing the application, written approval from the landowner of the site with the contaminated materials, and a letter of authorization from the disposal or treatment facility which is accepting the contaminated material must be provided. There are additional steps that must be taken if the contaminated material is the result of a spill. The Environmental Programs Branch should be contacted for more information (Environment Yukon 2011b) in this regard.

Contact Information

Contact:	Environmental Programs Branch	Telephone:	(867) 667-5683
Mailing Address:	Department of Environment (V-8), Box 2703, Whitehorse, Yukon, Y1A 2C6	Toll free:	1-800-661-0408 ext. 5683
		Fax:	867-393-6205
Email:	envprot@gov.yk.ca	Online:	http://www.env.gov.yk.ca/air-water-waste/contaminated_sites_regs.ph



p#contact

Timeline

There are no legislated time frames for the licensing process and the length of time to approval is based on the quantity and nature of the contaminated material.

Research and Educational Activities Park Permit

Applicants wishing to use Herschel Island as a staging point for research will be required to obtain a park use a Research and Educational Activities Park Permit. These permits need to be obtained prior to arrival and applications are available online or through Yukon Parks offices (Environment Yukon 2015).

A Research and Educational Activities Park Permit authorizes an activity, development or use of a park or campground that is permitted under the *Parks and Land Certainty Act (PLCA)* and that is consistent with approved Yukon park management plans (Environment Yukon 2015). A permit authorizes an individual, group, or organization to carry out a specific activity, development or use and outlines conditions under which the activity may occur.

This permit applies to all research and monitoring activities including but not limited to, collection of specimens, establishment of research plots, monitoring, surveying, inventory and other research.

Contact Information

Contact:	Yukon Parks	Telephone:	867-667-5648
Mailing Address:	Box 2703 (v-4) Whitehorse, Yukon Y1A 2C6	Fax:	867-393-6223
Email:	Yukon.parks@gov.yk.ca	Online:	http://www.env.gov.yk.ca/camping-parks/ParkPermits.php

Timeline

There is no fee for this permit and a decision regarding an application is made within 30 days of it being received.

4.5 Organizations and Boards in the Inuvialuit Settlement Region

The IFA is a land claim agreement between the federal government and the Inuvialuit people within the ISR. Following 10 years of negotiations, the IFA was signed on 5 June 1984. The legislation implementing the IFA is the *Western Arctic (Inuvialuit) Claims Settlement Act*, 1984. The agreement gives the Inuvialuit legal ownership over their land including subsurface mineral rights (including oil and gas), the right to hunt and harvest wildlife anywhere within the claim area, and the responsibility to ensure good wildlife management. The ISR covers 90,650 km², 5,000 of which include surface and sub-surface rights and 30,000 of which include surface rights (including granular resources) across the NWT and the Yukon North Slope (IRC 2007).

4.5.1 Inuvialuit Land Administration

The ILA is the division of the IRC responsible for managing and administering Inuvialuit-owned lands under the IFA in the ISR. The ILA is responsible for the review and approval of all applications for the access to and use of Inuvialuit private lands (ILA 2005a).



4.5.1.1 Legislation and Regulations

Inuvialuit Final Agreement

The IFA is an agreement between the Inuvialuit of the Inuvialuit Settlement Region and the Government of Canada that grants claim to the Inuvialuit rights, benefits, and compensation to and for the lands of the ISR. The IFA preserves Inuvialuit cultural identify, enables Inuvialuit to equally and meaningfully participate in the northern and national economy, and protects and preserves Arctic wildlife, the environment and biological processes (IFA 1984).

4.5.1.2 Permits and Licences

Land Use Permit

A Land Use Permit is required for projects occurring on or impacting Inuvialuit lands. To determine if a Land Use Permit is necessary, the ILA must be contacted directly. Access that is more than casual and individual in nature to Inuvialuit lands requires permission from the Inuvialuit. Accordingly, the ILA issues Rights to access both 7(1)(a) (surface and subsurface) and 7(1)(b) (surface only) lands (ILA 2005a).

The ILA has developed an internet-based Land Use Application System (LUAS) that allows applicant to submit applications to and work with the ILA online. The LUAS can be accessed at www.inuvialuitland.com. The LUAS portal requires the user to sign up for an account with the ILA. Application phases include:

- applicant submits detailed application;
- ILA invoices the applicant applicable land use fees (land use fees are detailed in the ILA's Fee Schedule);
- ILA initiates a 30-day consultation phase;
- ILA receives and reviews comments;
- ILA outlines permit terms and conditions; and
- ILA creates a permit (P. Stuart, pers. comm. 2014).

For additional information, proponents are directed to contact the Land Use Applications Coordinator (currently: Patrice Stuart) at 867-977-7100 or pstuart@inuvialuit.com. Fees associated with a Land Use Permit vary depending of the nature of the land use and area.

Contact Information

Contact:	Land Use Application Coordinator	Telephone:	867-977-7100
Mailing Address:	P.O. Box 290 Tuktoyaktuk, NT, X0E 1C0	Fax:	867-977-7101
Email:	pstuart@inuvialuit.com	Online:	http://www.inuvialuitland.com

Timeline

It is recommended that applicants apply to the ILA at least 45 to 60 days in advance of proposed development activities (P. Stuart, ILA, pers. comm. 2014).



4.5.2 Inuvialuit Water Board

The Inuvialuit Water Board (formerly known as the NWT Water Board) operates under the *NWT Waters Act* (1992; modified in 2014) for the conservation, development and utilization of inland waters. It is responsible for the licensing of freshwater water use and waste disposal in the NWT portion of the ISR. Prior to Devolution in April 2014, the NWT Water Board - Board of Directors was appointed by the Minister of AANDC whose department also employed the NWT Water Board's support staff. The current appointments carry over until the end of their current terms. As of April 2014, the Inuvialuit Water Board's Board of Directors and its support staff have devolved to the GNWT and are now administered through ENR (NWT Water Board 2014).

4.5.2.1 Legislation and Regulations

NWT Waters Act (1992; modified in 2014)

The *NWT Waters Act* has been developed as part of an integrated system of land and water management in the NWT. Bill C-15 amended the act to make changes to the jurisdiction and structure of the board, to add time limits for decision making process, and to modify the penalty regime (GNWT 2014g).

4.5.2.2 Permits and Licences

Water Licence

A Water Licence may be required for projects occurring in the ISR. The Inuvialuit (NWT) Water Board *Guide to Water Licensing in the Inuvialuit Settlement Region of the Northwest Territories* details the application process. Usage thresholds are identified in the guide to determine whether a licence is required or not (NWT Water Board 2011).

A form must be completed, available at www.nwtwb.com, and two hard copies and one digital copy are to be submitted. The details that must be included in an application are listed in the *Guide to Water Licensing in the Inuvialuit Settlement Region of the Northwest Territories*. There are two types of water licences: Type A and B, which are based on the potential water use or disturbance caused by the project or the amount of waste to be deposited. The Board will determine whether the application is Type A or Type B based on the following specifications (NWT Water Board 2011):

Water use and deposit of waste requiring a Type A Licence includes the following:

- industrial undertakings (other than oil and gas exploration) where water use is above 300 m³ per day.
- dams or dikes for storage greater than 60,000 m³;
- deposit of drill waste from oil and gas exploration (other than to a sump or underground formation or reservoir); and
- deposit of waste from oil and gas production, processing and refining (other than deposit of drill waste into an underground formation or reservoir (NWT Water Regulations 2014).

Water use and deposit of waste requiring a Type B Licence (NWT Water Regulations 2014) includes the following:

- oil and gas exploration with water use over 100 m³ per day;



- industrial undertakings (other than oil and gas exploration) with water use between 100 m³ and 300 m³ per day;
- construction of crossings, including pipelines, bridges and roads over a watercourse 5 m or wider (at the high water mark);
- construction of a permanent in-stream structure for the purpose of flood control;
- diversion of a watercourse that is 2 m wide or greater (at high water mark);
- dams or dikes with instream storage between 2,500 m³ and 60,000 m³, or instream storage of a quantity of water less than 60,000 m³;
- deposit of oil and gas drill waste to a sump;
- deposit of any waste in conjunction with hydrostatic testing, cooling, or any other industrial undertakings (NWT Water Regulations 2014).

Contact Information

Contact:	Inuvik Main Office	Telephone:	867-678-2942
Mailing Address:	PO Box 2531 Inuvik NT, X0E 0T0	Fax:	867-678-2943
Email:	info@nwtwb.com	Online:	www.nwtwb.com

Timeline

Review of an application should take less than 60 days for a Type B application (without a public hearing) and less than 120 days for a Type A application (including a public hearing). A type B application that includes a public hearing should be reviewed in less than 120 days (NWT Water Board 2011).

For a type A Water Licence, a public hearing is set to occur within 35 days from the date of notice provided to the public. If no responses are received by the board prior to ten days before the hearing date, the review may proceed without a public hearing.

For Type B applications, public comment is allowed for 10 days following the date of notice to the public. The Inuvialuit (NWT) Water Board will decide whether or not a public hearing is necessary, but they are not required for the majority of Type B water licences (NWT Water Board 2011).

4.5.3 Inuvialuit Co-management Boards

The **Joint Secretariat** was created under the IFA to provide technical and administrative support to four of the five co-management bodies (the WMAC-NWT, the FJMC, the EISC and The EIRB [as described in Sections 2 and 3 of this Roadmap]) and the Inuvialuit Game Council (IGC). The fifth co-management body, the WMAC-NS is administered by the Secretariat office in Whitehorse, Yukon. Management responsibilities in the ISR are shared equally among the Inuvialuit and the governments of Canada, the NWT and the Yukon (Joint Secretariat 2009).



4.6 Regulatory Overlap

In addition to a thorough EA process through several agencies, potential oil spill countermeasure research trials in Canada are regulated through a variety of permits, licences, authorizations and other documentation. As stated earlier, this Roadmap only addresses those regulatory requirements in the ISR provided through federal, Inuvialuit and territorial (NWT and Yukon) legislation. Neighbouring jurisdictions, such as Alaska in the west and Nunavut in the east, may need to be consulted as well if it is determined that experimental spills or other associated activities may have the potential to impact the natural, cultural and/or socio-economic environment in these areas.

There is some degree of overlap between federal and territorial permitting requirements outlined in the above sections of this report. Some possible key areas of overlap are discussed in the following paragraphs.

Species at Risk and Related Permitting

Provincial, territorial and federal government departments all have a role in the protection and recovery of species at risk. SARA makes it illegal to destroy the critical habitat³ of species at risk and can restrict development and construction projects. As outlined previously, although EC has the lead responsibility for federally listed species at risk, aquatic species fall under the jurisdiction of DFO, and Parks Canada is responsible for the protection and recovery of listed species found in national parks, national marine conservation areas, national historic sites and other protected heritage areas administered by Parks Canada. As such, it may be appropriate to consult with all three federal departments to determine whether permitting requirements should be sought under SARA section 73 (SARA 2013).

EC and DFO may also have applicable permits or authorizations under other federal acts, such as *Fisheries Act* Authorizations or Migratory Birds Regulations permits, which have, under section 74 of SARA, the same effect as SARA permits (SARA 2013). The SARA prohibitions do not apply to activities authorized under section 73 (by permits or agreements) or 74 (by agreements, permits, licences, orders or *Fisheries Act* authorizations) of SARA as long as a series of strict preconditions can be met prior to issuing the authorization (DFO 2007).

Consultation Process

There is likely an overlap in the need to consult through the various EA and/or permitting processes, as well as the Crown's duty to consult with Aboriginal peoples (outlined in detail in Section 2 of this Roadmap). It is possible that a comprehensive consultation process can meet the requirements of several regulatory processes. The same is likely true for federal permits - some will have specific notification requirements, but the general consultation process used for the EA process may be sufficient for these aspects as well. AANDC, the EISC, YESAB and applicable territorial governments should be consulted ahead of time to design an adequate consultation process that satisfies all requirements.

Territorial and Federal Permit Requirements

It is likely, that several permit requirements through the federal and territorial (NWT and Yukon) governments address similar aspects (e.g., disposal of hazardous substances). It is advisable to consult with the applicable

³ Defined by SARA as the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species critical habitat in the recovery strategy or in an action plan for the species.



departments ahead of time to determine a common format that may meet all requirements. Contact addresses and numbers are provided throughout this Roadmap.

EA Process and Permitting

The EA process is described in the section 3 of this Roadmap. The acceptance of an EA prepared by a developer will directly tie into the permitting process to streamline the terms and conditions provided by the applicable agencies and organizations.

4.7 Conclusion

A large variety of permits may be required for oil spill counter measured experiments in the Beaufort Sea. The Roadmap lists all potential permits, licences, authorisations and certificates that may be triggered by the potential experiments listed in Appendix A. The actual permits required will depend on the final experimental design. The experimental design will have to consider multiple environmental and social factors to answer research questions while also respecting the input and concerns of northern stakeholders (Section 2). Table 3 provides a summary of the key permit requirements as described in Section 4.

Table 3: Key Permit and Licences required for Oil Spill Countermeasures Experiments in the Canadian Beaufort Sea

Table with 4 columns: Organization, Acts and Regulations, Permit / Licence / Authorization / Regulatory Requirement, and Timeline. It lists requirements for Aboriginal Affairs and Northern Development Canada and Environment Canada.



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Organization	Acts and Regulations	Permit / Licence / Authorization / Regulatory Requirement	Timeline
		<p><u>Disposal At Sea Permit</u>: permit is granted following a detailed assessment and sets conditions to protect the marine environment and human health. Permit applications are reviewed by EC with advice from DFO and relevant provincial regulatory authorities, other stakeholders and Aboriginal groups.</p>	<p>90-day period to reach decision after the application is filed. 45-day period to reach a decision for renewal of the permit.</p>
		<p><u>Permit for Species at Risk (Canadian Wildlife Service)</u>: permit authorizing a person to engage in an activity affecting a listed wildlife species or any part of its critical habitat. A NWT Wildlife Research Permit might be required prior to applying.</p>	<p>90-day period to reach decision after application has been filed.</p>
		<p><u>Research in Migratory Bird Sanctuaries and National Wildlife Areas</u>: permit is required for physical studies, non-intrusive activities, and aerial surveys in or adjacent to a Migratory Bird Sanctuary or National Wildlife Area. A NWT Wildlife Research Permit is required prior to applying.</p>	<p>90-day period to reach decision after application has been filed.</p>
		<p><u>Collecting Permit and Species at Risk (Parks Canada Research)</u>: permit to conduct research in or collect material from a national park, national historic site, or a national marine conservation area.</p>	<p>There is no timeline specified. Permits are issued annually but multi-year permits can also be issued.</p>
<p>Fisheries and Oceans Canada</p>	<p><i>Oceans Act (1996), Fisheries Act (1985), Species at Risk Act (2002), Canada Shipping Act (2001), Coastal Fisheries Protection Act (1985)</i></p>	<p><u>Offsetting Plan</u>: an authorization with terms and conditions in relation to a proposed work, undertaking or activity that may result in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery.</p>	<p>60-day period to notify if the application is complete or incomplete. 90-day period from the date of notification to issue or deny the authorization.</p>
		<p><u>SARA Permit for Affecting Schedule 1 Aquatic Species</u>: permit authorizing the holder to engage in an activity affecting a listed aquatic species, any part of its critical habitat, or the residences of its individuals.</p>	<p>60-day period to notify if the application is complete or incomplete. 90-day period from the date of notification to issue or deny the authorization.</p>



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Organization	Acts and Regulations	Permit / Licence / Authorization / Regulatory Requirement	Timeline
Canadian Coast Guard	<i>Oceans Act (1996), Canada Shipping Act (2001), Vessel Pollution and Dangerous Chemical Regulations (2012)</i>	<u>Reporting Marine Pollution Incident</u> : all pollution or threats of pollution must be reported by vessels and oil handling facility operators to a marine communications and traffic services officer (CCG) or a marine safety inspector (TC). The report must include all relevant information specified under the regulations.	The reporting has to occur immediately after the incident and the response will be initiated as fast as possible.
Transport Canada	<i>Arctic Waters Pollution Prevention Act (1985), Arctic Shipping Pollution Prevention Regulations (2014), Arctic Waters Pollution Prevention Regulations (2009), Canada Transportation Act (1996), Canada Shipping Act (2001), Aeronautics Act (1985), Navigation Protection Act (2014), Transportation of Dangerous Goods Act (1992)</i>	<u>Arctic Pollution Prevention Certificate</u> : a voluntary document that indicates compliance with the Arctic Shipping Pollution Prevention Regulations (2014). The certificate indicates the design category of a vessel and when and where it can navigate in Canadian Arctic waters.	The timeline and process varies for vessels depending on their size and age. This is a voluntary certification.
		<u>Navigation Protection Act Approval</u> : any project in, on, over, under, through or across navigable waters that would substantially interfere with navigation requires this permit.	No timeline is specified. Additional consultations might be required.

Territorial Organizations and Agencies in the NWT

Aurora Research Institute	<i>NWT Scientist's Act (1988)</i>	<u>Scientific Research Licence</u> : all research projects in the NWT need to be licensed. The licence can be applied for through the ARI online licensing process - Portal for Online License Applications for Research (POLAR).	Application processing can take up to 60 days.
Prince of Wales Northern Heritage Centre	<i>Pre-Devolution: Archaeological Sites Regulations (2001), Northwest Territories Act (1985), Post-Devolution: Archaeological Sites Act (2014)</i>	<u>NWT Class 2 Archaeological Permit</u> : required to carry out reconnaissance and assessment studies. An archaeological review is typically required as a component of a land use application. It is the responsibility of the proponent to ensure that a qualified archaeologist completes the required study and adhere to permit requirements	Consultations can take up to 60 days. Permit applications must be submitted by March 31 for work in the following field season.
GNWT Department of Lands	<i>NWT Lands Act (2014), NWT Land Use Regulations (2014), NWT Devolution of Lands and Resources Agreement (2013)</i>	<u>Land Use Permit</u> : required for projects impacting or occurring on territorial Crown land in the ISR. Two types of permits can be issued for land use. Type A permits are those that are more intensive or longer term than those requiring a Type B permit.	10-day period to notify if the application is complete. 45-day period from the date of notification to issue or deny the permit.



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Organization	Acts and Regulations	Permit / Licence / Authorization / Regulatory Requirement	Timeline
		<u>Research on Commissioner's Lands</u> : a lease may be issued if the project is intrusive or consists of any long-term improvements. Application for Territorial Land must be obtained and the applications are subject to an environmental review and consultation process which can result in a lease refusal.	Lands will indicate their required timeline for authorization.
GNWT Department of Environment and Natural Resources	<i>Environmental Protection Act (1998), Wildlife Act (2014)</i>	<u>Wildlife Research Permit</u> : required in order to study wildlife (including migratory birds and species at risk, but excluding fish and marine mammals) or wildlife habitat within the NWT.	The consultation process can take 30 days. Application for a Wildlife Research Permit should begin 3 months prior to the start of research.
		<u>Hazardous Waste</u> : Registration Number and Waste Manifest are required in the event that recovered oil from potential oil spill countermeasures research falls into the category of hazardous waste.	No specific timeline or processes are established.

Territorial Organizations and Agencies in the Yukon

Yukon Water Board	<i>Waters Act (2003), Umbrella Final Agreement (1993) Chapter 14</i>	<u>Water Use License</u> : there are Type A and Type B Water Use Licenses. The type of license depends on the amount of water use per day applied for, whether the applicant proposes to deposit waste, or proposes other types of activities that use water or may change the watercourse. A Type A application is more complex than a Type B application.	<u>Type A application</u> : 30-day public comment period and a minimum 35 days from the public notice date before a public hearing can begin. <u>Type B application</u> : 10-day public comment period for.
Government of Yukon, Environment Yukon	<i>Yukon Act (2003), (Yukon) Wilderness Act (2002), (Yukon) Parks and Land Certainty Act (2001), the Yukon Surface Rights Board Act (1995), Yukon's Environment Act (1995)</i>	<u>Special Waste Permit</u> : to authorize the release of special / hazardous waste to the environment. <u>Generator Permits</u> : for storing, or handling special / hazardous waste. <u>Disposal Permits</u> : to authorize the disposal of special / hazardous wastes.	No timeline specified. The length of time to approval is based on the quantity and nature of the waste.

Organizations and Boards in the Inuvialuit Settlement Region



Organization	Acts and Regulations	Permit / Licence / Authorization / Regulatory Requirement	Timeline
Inuvialuit Land Administration	<i>Inuvialuit Final Agreement (1984)</i>	<u>Land Use Permit</u> : required for projects occurring on or impacting Inuvialuit lands. To determine if a Land Use Permit is necessary, the ILA must be contacted directly. Access that is more than casual and individual in nature to Inuvialuit lands requires permission from the Inuvialuit.	Recommended to apply for a permit at least 45 to 60 days in advance of proposed development activities.
Inuvialuit Water Board	<i>NWT Waters Act (1992; modified in 2014)</i>	<u>Water Licence</u> : there are two types of water licenses: Type A and B, which are based on the potential water use or disturbance caused by the project or the amount of waste to be deposited. The Board will determine whether the application is Type A (for larger projects) or Type B based on the specifications set out by the Inuvialuit Water Board.	<u>Type A Licence</u> : less than 120 days (without public hearing). <u>Type B Licence</u> : less than 60 days (with public hearing).

5.0 DOCUMENTATION OF SAFETY, LOGISTICAL AND SUPPORT REQUIREMENTS

This section summarizes the required organizational, environmental and health and safety plans needed to complete future oil spill countermeasures in the Canadian Beaufort Sea. Section 5.1 outlines a project-specific Experimental Plan (composed of separate plans) and Section 5.2 describes a variety of additional plans and documents that may be required by the regulators – depending on the final project design, timing and area. These crucial aspects are part of the Project Description and other project documentation required by the regulators all of which are described in detail in the Section 3 and 4 of this Roadmap.

5.1 Experimental Plan

To be granted the required permits and authorizations and subsequently carry out oil spill counter measure experiments in the Canadian Beaufort Sea, extensive planning will be required. In a broad sense, the requirement will be to demonstrate that the proponents have solid scientific and engineering justification for performing the experiments and have adequate knowledge and experience to carry out the work safely, effectively, and in an environmentally responsible manner. In specific terms, this will mean adequately detailing an Experimental Plan with the following major elements:

- Operational Plan;
- Logistics Plan;
- Health and Safety Plan; and
- Environmental Protection Plan.



In the absence of a specific design for an experimental oil spill in the Canadian Beaufort Sea, the following sections were completed in broad terms. Aspects of these examples will also apply to smaller scale experiments and the plans can be adjusted accordingly once the design for the experiments has been completed.

This section relies on valuable experience gained from previous studies, such as:

- SL Ross / SINTEF in-situ burning and chemical herder studies off Spitsbergen in 2008 and 2009;
- Newfoundland Offshore Burn Experiment (NOBE) in 1993;
- Baffin Island Oil Spill (BIOS) Project in 1980; and
- experiments carried out by the Arctic Petroleum Operators Association (APOA) in the Beaufort Sea during the late 70's or early 80's.

5.1.1 Operational Plan

An Operational Plan is required when working in remote environments. It needs to outline all aspects of the project and describe proposed contingencies. For large-scale oil spill countermeasures experiments, the plan will include, at a minimum, the following components:

- the operational techniques to be followed, with detailed descriptions of each step;
- a list of vessels and aircraft to be used;
- a project staff list (including roles and responsibilities);
- a list of equipment (including manufacturer details);
- a list of chemicals and other products that may be used (including Material Safety Data Sheets [MSDS]);
- other support requirements (e.g., shore-based infrastructure); and
- contingencies related to weather, equipment malfunction, and other factors that may modify the operations.

The **development of contingencies** is particularly important when working in remote environments. Contingencies have to be included in all aspects of the oils spill countermeasure experiments. They have to be approved by the relevant regulators (at the time of project approval) and endorsed by the developer (prior to demobilization and during the execution phase). The most common contingencies are:

- change in the project schedule (an alternative schedule has do be developed prior to commencement);
- use of backup equipment (which has been identified and is on standby); and
- change in the study area (an alternative study area has to be determined and approved prior to commencement).

5.1.1.1 Safety Plan

The Safety Plan assigns and outlines the roles of personnel and management involved in the project. As a requirement under the COGOA, developers have to submit a Safety Plan as part of an Operational Plan (described in Section 5.1.1). The Safety Plan should be broad enough to assign and outline the roles of personnel and management involved in the undertaking. There are no specific formats but the regulations have



specific requirements that need to be included when creating a Safety Plan (NEB 2011a). The regulations specify that the plan should:

- adequately address and comply with the requirements outlined in the regulations;
- describe safety hazards, risks, and mitigations for the proposed project;
- display commitment to safety by implementing review and audit of safety procedures; and
- be part of the operational safety management system and remain consistent with the overall project.

5.1.2 Logistics Plan

The Logistics Plan describes experimental approaches and all associated logistics components. Similar to the Operations Plan (Section 5.1.1), the Logistics Plan will be based on the chosen experimental design (Appendix A). It needs to describe detailed experimental approaches, identify project tasks and all associated activities and logistics components. Prior to commencement of the field trials, the plan will need to be adjusted to the final design of the oil spill countermeasures experiments (Potter and Buist 2010). This plan will describe the detailed use of resources and equipment broken down by project task and will outline the sequence of tasks involved in the project. This includes activities of field personnel as well as management staff and the use applicable specialized equipment, vessels and helicopters. Gantt charts and flowcharts can be used in support of descriptive text

5.1.3 Health and Safety Plan

The *Safety Act* (1988) of the NWT requires all employers to “take all reasonable precautions and adopt and carry out all reasonable techniques and procedures to ensure the health and safety of every person in his or her establishment”. To effectively meet this requirement a Health and Safety Plan has been developed by the developer, including the following components:

- general principles;
- project specific details/policies;
- hazard assessment; and
- training and Personal Protective Equipment (PPE).

In preparation for any oil spill countermeasures experiment in the Canadian Beaufort Sea, a detailed project-specific Health and Safety Plan should be prepared to address at a minimum the following aspects:

- high level project scope and design;
- Safe Work Practices and Safe Job Procedures;
- project area;
- emergency contact numbers and communications flow chart;
- emergency preparedness and procedures;
- detailed risk and hazard assessments;



- description of hazard mitigation and control measures;
- assignment of responsibilities for all personnel;
- designation of a site safety officer;
- description of training requirements and completion of training;
- description of PPE required for each task;
- personnel and equipment decontamination processes;
- identification of decontamination area(s);
- description of ongoing air monitoring; and
- disposal procedures.

The main risk categories associated with oil spill countermeasure experiments can be summarized as follows:

- incidents during vessel operations;
- incidents during aircraft operations;
- risk associated with the storage, transport, and release of crude oil;
- smoke and heat from ISB experiments; and
- inhalation of crude oil vapors.

The project-specific Health and Safety Plan needs to address those risk categories and develop mitigation strategies, which may consist of:

- project design
- use of adequate PPE;
- crew training; and
- use of current, relevant Safe Work Practices and Safe Job Procedures for all identified tasks.

The Health and Safety Plan needs to also consider the Maritime Occupational Health and Safety Regulations with regard to all employees working onboard a vessel and are involved in its loading or unloading. These regulations include the following provisions:

- work has to be carried out in a manner that does not endanger the health or safety of those on board the vessel;
- provide an acceptable onboard living environment for employees;
- complete regular inspections of work areas; and
- structures, machinery or equipment are not to be used unless properly reassembled and inspected.



5.1.4 Environmental Protection Plan

The GNWT operates under the guidelines and authority provided by *Environment Protection Act* (1988) for the prevention, protection and enhancement of the environment. The authority resides with the Minister of Environment and Natural Resources to develop, coordinate, and administer these guidelines. In the offshore areas of the Canadian Beaufort Sea, the GNWT works with the NEB on all regulatory aspects (described in Section 5.1.2).

The Environmental Protection Plan (EPP) is a requirement by the NEB. It needs to outline specific responsibilities, expectations, and methodologies for the protection of the environment. The NEB does not require a specific format but does require the following elements within an EPP:

- incorporation of compliance with all relevant legislations (statutes and regulations);
- identification of all environmental protection measures; and
- commitments to environmental protection as a part of the proposed project (NEB 2011b).

Note that the EPP will be tailored to the specific design to address the oil spill field testing as laid out in the documentation required by the regulators (described in the Section 3 and 4 of this Roadmap). Based on the project design, the EPP needs to balance potential environmental damage while providing the information needed to better understand the effects of countermeasures on key resources.

A project-specific EPP is a tool to communicate the developer's environmental protection procedures and mitigation measures not only to the regulators but also to project crews. The purpose of an EPP is to outline all project-specific environmental commitments and associated mitigation measures in a concise way. Conformance by all personnel to the policies and procedures contained in the Health and Safety Management System (described in Section 5.1.2) and the EPP pertaining to all project activities is mandatory.

The EPP is developed on a project-specific basis centred on environmental management parameters, which describe the necessary actions or requirements to protect sensitive environmental parameters, including natural and cultural resources. An EPP needs to be project-specific and details of the potential impacts and protective measures need to be addressed in the plan (NEB 2011b). The purpose of the EPP is to describe conceptual environmental protection measures that are designed to limit the potential environmental disturbances associated with the proposed project work. Environmental management parameters can be used for project activities during all phases, such as equipment and personnel mobilization, conducting of the experiment, clean-up and remediation operations, reclamation, demobilization and transportation. Environmental management practices need to address the project plan as well as contingencies (described in Section 5.1.1), and, as such all seasons should be considered (under open water and ice conditions).

An EPP should include the following components:

- environmental overview/regional setting;
- potential environmental impacts caused by the project;
- mitigation and protection measures;
- expected residual impacts after mitigation measures are implemented;



- cultural and heritage resources in the area; and
- proposed environmental monitoring during and after project completion (NEB 2011b).

5.2 Additional Regulatory Requirements

The operational, logistical, safety and environmental protection plans outlined in Section 5.1 are mandatory project-specific requirements in support of the project logistics and safety. Depending on the actual design of oil spill countermeasure experiments in the Canadian Beaufort Sea, additional plans and documents may be required as part of the regulatory process. Those are discussed in the following sections. It should be noted that while several regulators provide guidance for some of the plans (which is referenced accordingly in the respective sections), outlines in the following chapters were developed also based on experience in completing the required documentation for development projects in the NWT and in particular in the ISR.

Information that is required to be included in the documentation discussed in Section 5.1 (above) and 5.2 (below) may be partially redundant. However, that does not eliminate the need to comply with the regulatory process and to submit the plans as determined by the regulators. Each plan fulfills a certain purpose and needs to be completed (if applicable) independent of parts of the information being available elsewhere. Appendix C provides details on purpose, structure and specific content for each of the plans discussed below.

5.2.1 Emergency Response Plan

The Emergency Response Plan (ERP) outline provided in Appendix C is an amalgamation of existing guideline requirements by the NEB (2011a), EISC (2004), and the GNWT MACA (2011). In addition, if the project requires any logistic support from the ARI, a Journey Management Plan (JMP) is required. The JMP will need to include an ERP (ARI 2014a). The ERP outline is also based on relevant experience in producing ERPs for a large variety of development projects in the onshore regions of the ISR.

ERPs need to be completed by developers to take responsibility in anticipating, preventing, mitigating, and managing emergency events. ERP procedures should develop and focus around the company's policies on emergency management, environmental protection, and worker and public safety (NEB 2011b). Appendix C provides details for consideration when developing a project-specific ERP.

5.2.2 Spill Contingency Plan

The Spill Contingency Plan (SCP) outlines a set of procedures to implement in the event of an accidental hazardous spill. It is a guide that will identify delegation of authority and responsibility to mitigate and contain the resulting effect on human health and the environment. This requirement is independent of the project being an oil spill countermeasure experiment.

An SPC needs to address any equipment (vessel, aircraft, vehicle) and hazardous substance (oil, herders, igniters, dispersants) used in the countermeasures experiment. The GNWT Department of Environment and Natural Resources (ENR) developed guidelines to aid developers in the response to and reporting of accidental spills of hazardous substances (GNWT, ENR 2011). A spill is defined as an accidental release of a contaminant into the environment that has the potential for adverse impact. Under the 1990 *NWT Spill Contingency Planning and Reporting Regulations*, if there is a spill or a likelihood that a spill has occurred, it must be reported to the **NT-NU 24-Hour Spill Report Line** at (867) 920 8130. In addition, a **NT-NU Spill Report Form** must be



completed. The report form is provided in Appendix D and should be part of the SPC as well. The goal of the SCP is to establish a proper reporting structure, communication channels, and an action plan to implement in the case of accidental spills (GNWT, ENR 2011). Table 4 summarizes reportable spill volumes in the NWT.

Table 4: Threshold Quantities for Spill Reporting for the NWT Spills Database*

Transportation of Dangerous Goods Class	Substance	Immediately Reportable Quantities for NWT or Nunavut 24-Hour Spill Report
1	Explosives	Any amount
2.3	Compressed gas (toxic)	
2.4	Compressed gas (corrosive)	
6.2	Infectious substances	
7	Radioactive substances	
None	Unknown substance	
2.1	Compressed gas (flammable)	Any amount of gas from containers with a capacity greater than 100 litres (L)
2.2	Compressed gas (non-corrosive, non-flammable)	
3.1, 3.2 and 3.3	Flammable liquids	≥ 100 L
4.1	Flammable solids	≥ 25 kilograms (kg)
4.2	Spontaneously combustible solids	
4.3	Water reactant	
5.1	Oxidizing substances	≥ 50 L or 50 kg
9.1	Miscellaneous products or substances, excluding PCB mixtures	
5.2	Organic peroxides	≥ 1 L or 1 kg
9.2	Environmentally hazardous substances	
6.1	Poisonous substances	≥ 5 L or 5 kg
8	Corrosive substances	
9.3	Dangerous wastes	
9.1	PCB mixtures of 5 or more parts per million	≥ 0.5 L or 0.5 kg
None	Other contaminants, such as crude oil, drilling fluid, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, sewage effluent and waste water	≥ 100 L or 100 kg
None	Sour natural gas (i.e., gas containing H ₂ S)	Uncontrolled release or sustained flow of 10 minutes or more
	Sweet natural gas	

* From Schedule B of the 1990 *Spill Contingency Planning and Reporting Regulations of the Northwest Territories' Environmental Protection Act*.

In addition to the NWT guidelines outlined above, Indian and Northern Affairs Canada (INAC) prepared the *Guidelines for Spill Contingency Planning* (2007) which are currently in use by the Inuvialuit Water Board (IWB). The two guidelines should be consulted when preparing the project-specific SCP for potential oil spill countermeasure experiments in the Canadian Beaufort Sea.



Appendix C provides details for consideration when developing a SCP. Specific project design elements have to be included in the document.

5.2.3 Waste Management Plan

The EISC screening process applies to all development proposed within the ISR including both onshore and offshore as well as projects outside of the ISR that have potential to impact the environment within it. Waste management is part of the EISC screening process (explained in the Section 3 of this Roadmap).

Waste that is generated from an activity must be managed in an acceptable manner that is consistent with government regulations, industry approved standards, and company policies. The GNWT Environmental Protection Services (EPS) regulates the discharge of contaminants and the consequential environmental impact. EPS is responsible to guide all waste management procedures, recommended emission levels, and disposal methods that are committed to protect the environment. To minimize impacts to the environment, it is essential to adopt a Waste Management Plan (WMP) as a part of all operations (GNWT, ENR 1998). In addition to the GNWT, the IWB provides guidance in the development of a WMP for development projects in the ISR (IWB 2014). Appendix C briefly outlines the contents of a generic WMP. It will need to be adjusted to meet the specific requirements of the future oil spill countermeasures experiments (once a project design has been established).

5.2.4 Wildlife Encounter Management Plan

A Wildlife Encounter Management Plan (WEMP), as required for the EISC Environmental Screening Process (described in Section 3 of this Roadmap), will address the possibility that work crews may encounter wildlife during the completion of the oil spill countermeasures experiments. Although this document should cover encounters with all wildlife, ENR recommends a specific focus on polar bears (*Ursus maritimus*). Note that encounters with marine wildlife (marine mammals and seabirds) are covered in Section 5.2.5 and aspects relating to fish and fish habitat are addressed in Section 5.2.6.

The objective of any WEMP is **to maintain human and wildlife safety and welfare at all times**. Wildlife encounters may occur at any time. It is everyone's responsibility to ensure the safety and welfare of people and wildlife on-site. Accordingly, this plan also provides instructions on how to act in case wildlife cannot be avoided.

The WEMP has to be reviewed by all on-site personnel and copies will be provided to each crew member and also be stored in the camp where it can be available for all on-site personnel at all times. Daily tailgate meetings will address and discuss the contents of the plan.

No specific guidelines exist for the development of a WEMP in Canada; however, the GNWT's ENR does provide information regarding safety in bear country and a guideline regarding bear encounter response (GNWT 2009; 2011). Regulators in the ISR recommend following these guidelines. In addition, EC summarized some guidelines on how to avoid attracting wildlife (EC 2007).

A WEMP can be structured based on the following components:

- wildlife awareness and identification;
- hazard assessment;
- monitoring;
- detection and avoidance;



- deterrence; and
- wildlife encounter reporting.

Dependent on the time of year (during periods of open water or ice cover) and location (offshore, coastal and/or onshore) of the project components, the WEMP needs to be modified to address the specific timeline within which activities will take place and the boundaries of an appropriate study area. Additional information in Appendix C was completed based on a wide and generic approach and some aspects may not apply once a final design for oil spill countermeasures in the Beaufort Sea has been completed.

5.2.5 Marine Wildlife Observation Plan

A Marine Wildlife Observation Plan may need to be implemented to manage the potential impacts to marine wildlife (marine mammals and seabirds) associated with oil spill countermeasures field trials in the Beaufort Sea. No concrete guidelines exist for the development of a Marine Wildlife Observation Plan in Canada and most Marine Mammal Observation and/or Management Plans focus on issues regarding seismic activity. For the purposes of this Roadmap, a generic approach was chosen to developing this plan based on previous experience with project work in the Canadian Beaufort Sea. The plan may need to be adjusted and streamlined with the WEMP (Section 5.2.4) once the oil spill countermeasures experiment design has been completed. Possible components of a Marine Wildlife Observation Plan may include:

- project overview;
- marine wildlife and wildlife habitat;
- marine wildlife observer program; and
- project-specific mitigation measures.

Appendix C provides a brief outline of the potential content of a Marine Wildlife Observation Plan for oil spill countermeasures field trials in the Canadian Beaufort Sea.

5.2.6 Authorization under Paragraph 35(2)(b) of the *Fisheries Act* / Offsetting Plan

An Authorization under Paragraph 35(2)(b) of the *Fisheries Act* (Authorization) may be required as outlined in Section 4.2.3. The Government of Canada has defined regulations under the *Fisheries Act* to provide guidance in the completion of the application and DFO has established a guide to developing and submitting an application that is in line with the regulations (Government of Canada 2014; DFO 2013).

The application for Authorization is required to include the following information and documentation, along with an irrevocable letter of credit which would cover the costs of implementing a required **Offsetting Plan** (Government of Canada 2014):

- contact information;
- description of proposed work, undertaking or activity;
- timeline;
- location;



- description of fish and fish habitat (aquatic environment);
- description of effects on fish and fish habitat;
- measures and standards to avoid or mitigate “serious harm to fish” (defined as “the death of fish or any permanent alteration to, or destruction of, fish habitat”);
- residual “serious harm to fish” after implementation of avoidance and mitigation measures and standards; and
- an Offsetting Plan.

Some select sections of the Authorization application are discussed in Appendix C.

5.2.7 Communications Plan

Ongoing and timely communications with appropriate regulatory agencies and community members will be fundamental to carrying out successful oil spill countermeasures experiments in the Canadian Beaufort Sea. A Communications Plan should be implemented to manage and execute communications between all involved parties (including the affected communities) as needed. Local communities and their HTC's need to be appraised at all times about project progress as their harvesting and other traditional activities may be impacted by the project. In addition to written documentation (to be posted at prominent locations around the communities), messages for local radio stations may be distributed for that purpose.

The plan should include the following components at a minimum:

- a list of all key project personnel and subcontractors;
- a list of relevant regulatory agencies (as outlined in Section 4 of this Roadmap);
- a list of affected communities and all relevant community organizations;
- the required communications (possibly depicted in a flow chart); and
- necessary timelines.

It should be noted that this Communications Plan is in addition to and does not waive the requirements for Northern Stakeholder Consultations as outlined in the Section 2 of this Roadmap.

5.2.8 Harvester Compensation Plan

Under the IFA, a Harvester Compensation Plan might be required as part of the oil spill countermeasures field trials to be accountable for any impacts on Inuvialuit subsistence harvest or guided sport hunting of polar bears (and potentially other marine mammal and wildlife species; Inuvialuit Regional Corporation [IRC] 2007a). Any polar bear killed as a consequence of the project activity (e.g., through oiling or euthanasia) will be subtracted from the harvest quota for the respective subpopulation (GNWT, ENR 2014a). Therefore, the developer should negotiate some form of compensation for actual wildlife harvest loss and also for calculated potential future harvest loss if polar bears (or other wildlife species) are killed as a consequence of the developer's project activities. The negotiations and establishment of a compensation plan may go through the Inuvialuit Game Council (IGC).



5.3 Conclusion

Table 5 provides a summary of all Safety, Logistical and Support Documentation that may be required by the regulators and advisory agencies for the completion of oil spill countermeasure field trials in the Canadian Beaufort Sea.

Table 5: Overview of potentially required Safety, Logistical and Support Documentation

Safety, Logistical and Support Documentation	Objective of the Plan	Requirement Authority / Legislation
Experimental Plan		
Operational Plan	This plan is a requirement when working in remote environments. It outlines all aspects of the project and comprehensive contingencies have to be included.	The plan (including contingencies) has to be approved by the relevant regulators. It needs endorsement from the developer prior to commencement of the project.
Operational Plan - Safety Plan	This plan assigns and outlines the roles of personnel and management involved in the project. Specific requirements need to be included when creating this plan.	The National Energy Board (NEB) regulates the Safety Plan under the <i>Canada Oil and Gas Operations Act</i> (1985) and the <i>Canada Petroleum Resources Act</i> (1985).
Logistics Plan	This plan describes experimental approaches and all associated logistics components. Prior to commencement of the field trials, the plan will need to be adjusted to the final design of the oil spill countermeasures experiments.	The plan needs to be fully updated and endorsed by the developer prior to commencement of the project.
Health and Safety Plan	A Health and Safety Plan has been developed by the developer and adhered to by all project personnel throughout the course of the project.	The NWT <i>Safety Act</i> (1988) requires all employers to “take all reasonable precautions and adopt and carry out all reasonable techniques and procedures to ensure the health and safety of every person in his or her establishment”.
Environment Protection Plan (EPP)	The EPP is a requirement by the NEB. It needs to outline specific responsibilities, expectations, and methodologies for the protection of the environment.	The Government of the Northwest Territories (GNWT) operates under the <i>Environment Protection Act</i> (1988) for the prevention, protection and enhancement of the environment. In the offshore areas of the Canadian Beaufort Sea, the GNWT works with the NEB on all regulatory aspects.
Additional Regulatory Requirements		
Emergency Response Plan (ERP)	ERPs need to be completed by developers to take responsibility in anticipating, preventing, mitigating, and managing emergency events. ERP procedures should be developed and focus around the company’s policies on emergency management, environmental protection, and worker and public safety.	<p>Many regulators require developers to submit an ERP prior to project commencement. The Environmental Impact Screening Committee (EISC) requires the ERP to be uploaded to the public registry.</p> <p>An ERP development outline is provided by the NEB.</p>
Spill Contingency Plan (SCP)	The Spill Contingency Plan	Many regulators require developers to submit



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Safety, Logistical and Support Documentation	Objective of the Plan	Requirement Authority / Legislation
	(SCP) outlines a set of procedures to implement in the event of an accidental hazardous spill. It is a guide that will identify delegation of authority and responsibility to mitigate and contain the resulting effect on human health and the environment.	a SCP prior to project commencement. The Government of Northwest Territories Department of Environment and Natural Resources provides guidelines for developing a SCP.
Waste Management Plan (WMP)	The WMP is a strategy that needs to be implemented for proper collection, storage, handling, treatment, transport, and disposal of waste under accepted regulations. The plan is intended to provide concise and clear guidelines on the safe handling, management, and disposal of project generated waste streams.	The WMP is required for the EISC environmental screening process and is regulated by the Government of Northwest Territories Environment Protection Services.
Wildlife Encounter Management Plan (WEMP)	This plan aims at maintaining human and wildlife safety and welfare at all times. It provides instructions on how to act in case wildlife cannot be avoided. This document should cover encounters with all wildlife species potentially encountered, with a specific focus on predators, such as polar bears. The plan outlines wildlife avoidance and deterrence techniques as well as measures to be implemented if wildlife is encountered.	This plan is required for the EISC environmental screening process and needs to be uploaded to the public registry.
Marine Wildlife Observation Plan	A Marine Wildlife Observation Plan may need to be implemented to manage the potential impacts to marine wildlife (marine mammals and seabirds) associated with oil spill countermeasures field trials in the Beaufort Sea. This plan should also provide an overview of marine wildlife and wildlife habitat that may be encountered in the area of oil spill countermeasures field activities. The research crew and Inuvialuit Marine Wildlife Observers should be trained in wildlife and habitat identification so potential encounter situation and avoid encounters.	No concrete guidelines exist for the development of a Marine Wildlife Observation Plan in Canada.
Authorization under Paragraph 35(2)(b) / Offsetting Plan	An Authorization under Paragraph 35(2)(b) of the	The Government of Canada has defined regulations under the <i>Fisheries Act</i> (1985) to



Safety, Logistical and Support Documentation	Objective of the Plan	Requirement Authority / Legislation
	<p><i>Fisheries Act</i> describes an Offsetting Plan as a plan regulating the implementation of measures to offset the “serious harm to fish” that may occur. Quantification of the likely residual “serious harm to fish” can be presented as the number of fish killed, area of habitat destroyed, area of habitat permanently altered, duration of the mortality event, duration of the alteration, and/or the degree of the alteration.</p>	<p>provide guidance in the completion of the application and DFO has established a guide to developing and submitting an application that is in line with the regulations.</p>
Communications Plan	<p>This plan is implemented to manage and execute communications between all involved parties (including the affected communities) as needed. Local communities and their HTC’s need to be appraised at all times about project progress as their harvesting and other traditional activities may be impacted by the project. In addition to written documentation (to be posted at prominent locations around the communities), messages for local radio stations may be distributed for that purpose.</p>	<p>No concrete guidelines exist for the development of a Communications Plan.</p>
Harvester Compensation Plan	<p>This plan is required if projects have the potential to negatively affect Inuvialuit subsistence harvest or guided sport hunting (e.g., of polar bears).</p>	<p>The <i>Inuvialuit Final Agreement</i> (1984) outlines the need of a compensation plan; however, no concrete guidelines are provided.</p>

6.0 ROADMAP CONCLUSION AND RECOMMENDATIONS

This Roadmap was developed to demystify the complex regulatory process for oil spill countermeasures experiments and to guide researchers through the comprehensive procedures involved in the process. While the requirements are divided into four distinct report chapters (Sections 2 through 5), the actual processes are not as distinct and will require an open and ongoing dialogue with the regulators. Efficiencies can be achieved by involving all parties in the early stages of project design. In particular, the EA requirements can be simplified through consultations with the respective organizations and agencies.

One aspect that may hold the key for a successful and timely approval of oil spill countermeasures experiments is the northern stakeholder consultation process. In addition to all of the regulatory requirements outlined in the Roadmap, a social licence to conduct oil spill countermeasures research may be just as important. The experimental design will have to consider multiple environmental and social factors to answer research questions while at the same time respecting the wishes and concerns of the affected communities. Preliminary



consultations with some stakeholders (as part of developing this Roadmap) revealed some degree of scepticism, including in the following:

- existing technologies to respond efficiently to oil spills in the Arctic;
- existing understanding of the Arctic marine environment;
- the necessity of conducting oil spill countermeasures research at all; and
- the design of previous oil spill countermeasures experiments.

It was also highly recommended to involve the communities and community organizations in the early stages of project design so that input can be provided and concerns voiced.

If researchers follow these recommendations they may achieve efficiencies in the EA and permitting processes and get the necessary support and buy-in from the communities which would assist the regulatory approval process considerably.

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Report Signature Page

IMG-GOLDER CORPORATION

Julia Krizan, M.Sc., Ph.D.
Senior Biologist / Arctic Ecosystems

IMG-GOLDER CORPORATION

Dave Kerr, M.Sc., P.Ag
Principal, Oil and Gas Market Sector Lead

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APPENDIX A

Approaches to Oil Spill Countermeasures Experiments



1.1 Overview of Potential Scenarios for Controlled Oil Spill Countermeasure Trials

The goal of the Roadmap is to identify, in broad terms, the type of oil spill countermeasure work that might be performed, what portions of the environment could potentially be affected, and based on these findings, which government and stakeholder agencies and organizations would need to be consulted and involved in the approval processes.

It is important to emphasize that the scenarios outlined in the following sections aim at a brief description of the range and type of experiments that may be considered for a future experiment in the Beaufort Sea. There are no current plans or requests to conduct any of these experiments, and the timing and priority of any or all of these possible experiments would be subject to the results of ongoing laboratory and field work and priorities set by oil and gas proponents, regulators and affected communities.

While field experiments can be very valuable, they are too expensive and time-consuming as an initial or early task in the overall development of a technique. Instead, field trials is only used as a final verification of a technique, after a series of smaller scale tests in laboratories and test facilities (where experimental variables can be more easily controlled and measured, compared to work in the field). In each of the technical areas described below, a field experiment would only be contemplated once all major issues of concern had been worked out under controlled conditions.

This has been the case for previous research efforts in the field of Arctic spill response. A comprehensive summary of the state-of-the-art in Arctic spill countermeasures and description of previous research activities is available in Potter et al. (2012) and SL Ross et al. (2010). Our observations and conclusions in section 1 of the Report are based on knowledge and insight about research that is summarized in the two cited reports, among other documents.

There was a noticeable research effort in the 1970's and 1980's in the Canadian and Alaskan portions of the Beaufort Sea, accompanying the oil exploration program ongoing at that time. It is noted that the Arctic and Marine Oil Spill Program (AMOP), which started in 1978, is one of the few initiatives from this period that is ongoing today. More details about AMOP, including recent technical seminars, are available at Environment Canada (2014). Many aspects of this work are summarized in Hume et al. (1983). In Canada alone, there were at least five experimental spills studying the following:

- the behaviour of oil in ice (Norcor 1975; Comfort and Purves 1982; Dickins and Buist 1981; SL Ross and DF Dickins 1987; Sergy and Blackall 1987);
- the effectiveness of dispersant use (Swiss and Vanderkooy 1988);
- in-situ burning (Dickins and Buist 1981); and
- the effectiveness of several skimmers (Dickins and Buist 1981).

In each case, the field work followed extensive laboratory and test tank studies (SL Ross 2010).

For the following years, there was less interest in Arctic exploration, and hence, fewer research activities related to spill response took place. This has changed in the past decade with renewed interest in oil exploration in the Canadian Beaufort Sea, as well as in Arctic areas in Russia, Norway, and the United States. A multi-year



research program, sponsored by several oil companies with Arctic interests (managed by the Foundation for Scientific and Industrial Research [SINTEF], an independent research organization in Scandinavia), culminated in a series of spills over two years in the Norwegian Barents Sea (Sorstrom et al. 2010). In those experiments, various tests looked at oil behaviour in pack ice, the use of dispersants in pack ice, the use of in-situ burning in pack ice using fire-resistant booms and herding chemicals, and several detection options. A summary of experimental spills that have been performed in Arctic conditions is presented in Section 1.2 of this appendix.

The following sections are structured according to the main technical areas of oil spill research that are discussed in the Environmental Studies Research Fund (ESRF) Publication 194, *Strategic Plan for Oil Spill Research in Canadian Arctic Waters* (C-CORE 2013). These technical areas of research include:

1. Mechanical Recovery;
2. In-situ Burning;
3. Dispersant Use;
4. Shoreline Clean-up Techniques;
5. Modeling;
6. Detection and Monitoring; and
7. Impact and Assessment.

1.1.1 Mechanical Recovery

Background

Mechanical recovery deploys the use of **booms** (for containment of the spill) and **skimmers** (for oil recovery). For several reasons, mechanical recovery techniques are not likely to be a high-priority area for oil spill field trials. First, mechanical recovery is a relatively mature technology, with many years of test tank and field experiments, as well as actual field experience to guide researchers. Second, there are a number of laboratory and full-scale facilities that can provide a reasonable reproduction of field conditions and provide a better environment for skimmer development and testing than actual field trials.

There have been a number of skimmers designed specifically for Arctic use in recent years, and these have been tested in manufacturers' facilities, and test tanks at the National Oil Spill Response Research and Renewable Energy Test Facility's Oil and Hazardous Materials Simulated Environment Test Tank (Ohmsett) in New Jersey (United States; Schmidt et al. 2014) and the Foundation for Scientific and Industrial Research (SINTEF - an independent research organization in Scandinavia), as well as in the field in the 2008/2009 Barents Sea field experiments (Sorstrom et al. 2010). Ohmsett has an outdoor saltwater tank facility where full-scale oil spill response research is conducted in a marine environment under controlled environmental conditions.

There is currently only a limited capacity for **storage and disposal of recovered oil** through mechanical recovery in Arctic waters and only minimal capacity in the Beaufort Sea. Additional infrastructure would need to be developed to address this shortcoming (C-CORE 2013).



Beaufort Sea Testing

Should such testing be considered in the Beaufort Sea, it would likely involve discharges of weathered crude oil on the order of 1 to 10 cubic metres (m³) under relatively controlled conditions, with little or no sea ice present, such that near complete recovery of the oil would eventually be possible with test skimmers and supplemented by manual clean-up with sorbent materials. This and the following experimental oil spill scenarios are based on using weathered crude oil (versus the use of fresh crude oil) because it is more realistic in terms of what responders would encounter once they get to the spill scene and weathered oil is more difficult to disperse, to ignite and to skim. Therefore, all techniques applicable to weathered crude oil will also apply to fresh oil.

The experiments would likely be performed in an offshore location over a period of several days, and, for logistical reasons, would probably be carried out in an area close to a settlement or support base. The selection process would also be influenced by wind and sea state at the time of the trial, and by expected velocity/direction of surface currents (which, combined with wind, affect drift of the spilled oil). The probability of any nearshore or shore zone contamination would be low (Table 1).

1.1.2 In-situ Burning

Background

In-situ burning is likely a category to be considered for oil spill field trials because of its applicability to potential Beaufort Sea spills (Buist et al. 2013), including spills in different concentrations of sea ice, and its relative prominence in industry response plans. However, it should be noted that there is a mixed level of acceptance among stakeholders as to its overall effectiveness and potential effects on the environment (Buist et al. 2013).

In-situ burning has been researched and used in actual responses dating back to the 1970's; however, it is still considered an evolving technique in its limited use in actual spills and under various ice conditions.

Considerable work has been done in the past on the use of in-situ burning in conjunction with **chemical herders**, which can be used to thicken oil in drift ice conditions where conventional fire-resistant boom would not be applicable (Buist and Potter 2010; Potter and Buist 2010). Herders are specially-formulated chemicals that, when sprayed onto the water surrounding an oil slick, are causing the slick to contract, which causes it to thicken. This can be beneficial for in-situ burning, particularly for oil spills among broken ice (Buist and Potter 2010; Potter and Buist 2010). Herders are detergent-like chemicals and are composed of low toxicity components. As part of the approval process through Environment Canada (described in section 3 of the Roadmap - *Documentation of the Regulatory Permit Requirements*), prior laboratory testing would need to confirm that the proposed herders are effective and not toxic to marine life in the Beaufort Sea.

Research on interactions of chemical herders with the variety of oil types in the Beaufort Sea should also be examined prior to any field trials. These interactions will determine the effectiveness of the oil spill treatment.

In-situ burning with herders could be considered as a viable option for an experimental spill in Beaufort Sea conditions.

Beaufort Sea Testing

An in-situ burning experiment in the Beaufort Sea would likely involve discharges of weathered crude oil on the order of 1 to 10 m³ under relatively controlled conditions, such that near complete removal of the oil would eventually be possible. For sub-sea applications, not all experiments would have to use weathered crude oil.



Careful thought would be given to the range of ice conditions (ice type, concentration and floe size) that need to be tested (included) in the trial. Some flexibility would be required for this part of experimental design, since actual conditions in a given area cannot be predicted or planned for in advance with complete certainty or accuracy.

It is assumed that the oil would either be consumed in the burn or subsequent to the burn using manual clean-up with sorbent materials. The experiments would likely be performed in an offshore location over a period of several days, and, for logistical reasons, would likely be performed in an area close to a settlement or support base. Wind and sea state at the time of the trial, together with a forecast or anticipated range of ice conditions, and expected velocity/direction of surface currents (which, combined with wind, affect drift of the spilled oil) would be taken into account as well. The likelihood of any nearshore or shore zone contamination would be very low.

The burn would generate considerable volumes of smoke and soot, so the site would be selected with proximity of downwind communities or hunting/fishing camps and other sites of importance in mind. A monitoring plan would be part of the experiment in order to determine the extent, composition and possible effects of the smoke plume (Table 1).

1.1.3 Dispersant Use

Background

Like in-situ burning (Section 1.1.2), dispersant use is likely of interest for potential Beaufort Sea spill trials. It is considered in industry response plans and it also receives a mixed level of acceptance by stakeholders with regards to its overall effectiveness and potential effects on the environment. Dispersants can be applied by helicopter or boat. For large spills, fixed-wing aircraft are typically used (Gass et al. 2011). Dispersants break oil into small droplets which are easier to disperse throughout the water column and may be more efficiently biodegraded by microbes. Although dispersant use reduces the overall amount of oil that reaches the shore, it may allow easier penetration of oil into coastal terrain, where it is not as efficiently biodegraded (Gulf of Mexico Research Initiative 2013).

Dispersant use has been researched and used in actual responses dating back to the 1970's. It had limited use in actual spills in North America and considerations for use in various ice conditions are rare. The response to the Macondo blowout in the Gulf of Mexico in 2010 (Gass et al. 2011) was the first widespread use of dispersants in North American waters and the first extensive use of subsea application of dispersants (Johns and Beckmann 2011). Surface application of dispersant could be considered as a viable option for an experimental oil spill in the Beaufort Sea. Sub-sea application may also be considered for trials, given the difficulty of replicating water depth (or pressure-related) effects in the laboratory. Sub-surface currents may also "refresh" the seawater that dispersant would be introduced to in a sub-sea setting. Arctic applications are particularly challenging because of the presence of sea ice.

Oil-mineral aggregates (OMAs) are formed in ocean environments that are rich in suspended sediments and may be a potential application in oil spill countermeasures in offshore areas. In addition, drilling muds could be used to replicate suspended sediments (C-CORE 2013). Both the use of dispersants and OMAs are likely subject to Net Environmental Benefit Analyses (NEBA) prior to any trial planning (further discussed in Section 2 of the Roadmap - *Documentation of the Environmental Assessment Requirements*). Note that sinking agents are banned in several jurisdictions and may not be a suitable approach for future oil spill countermeasure research.



Beaufort Sea Testing

A dispersant application experiment in the Beaufort Sea would likely involve discharges of weathered crude oil on the order of 1 to 10 m³ under relatively controlled conditions. Unlike recovery (Section 1.1.1) or burning techniques (Section 1.1.2), the intention would be to disperse the oil into the water column, and recovery of sub-surface oil would not be contemplated. Collection of any oil remaining on the surface might be considered using skimmers or manual clean-up with sorbent materials. The experiments would likely be performed in an offshore location over a period of several days. For logistical reasons, experiments would likely be performed in an area close to a settlement or support base. Selection of a suitable region would also be influenced by wind and sea state at the time of the trial, and by expected velocity/direction of surface currents (which, combined with wind, affect drift of spilled oil on the surface that has been treated with dispersant). If sub-sea application of dispersant is contemplated, expected velocity/direction of sub-surface currents needs to be taken into account as well. The probability that oil dispersed into the water column would reach coastal waters before it biodegrades, and cause nearshore or shore zone contamination, is believed to be low, but it should be investigated further during any “fate and effects” work (including spill trajectory modelling) that takes place on this trial. An experiment involving use of dispersant, if effective, would generate a small amount of dispersed oil in the upper part of the water column that could move in different directions at different velocities depending on the depth of sub-sea application. Consequently, a monitoring plan would be part of the experiment to determine the extent, composition and possible effects of dispersed oil in the water column (Table 1).

1.1.4 Shoreline Clean-up Techniques

Background

Shoreline clean-up techniques are a relatively mature technology, with many years of field experiments and actual field experience to guide researchers. Several studies have been performed in Arctic regions, including Baffin Island in the 1980’s (Sergy and Blackall 1987) and Svalbard in the 1990’s (Sergy et al 1998; Section 1.2). Work related to shoreline types and substrates that are specific to the Beaufort Sea may warrant further study, including research prior to field trials. The Shoreline Clean-up and Assessment Techniques (SCAT) are best practices that were developed for shoreline clean-up. Application of SCAT to the Arctic needs to be further developed (C-Core 2013), which is occurring (see above).

Due to limitations concerning logistics, safety, weather and waste management, **natural oil removal and biodegradation processes** should be studied and considered as an alternate option for shoreline clean-up. In addition, oil may penetrate the shoreline and may become buried at locations, depending on shoreline types and shoreline processes, and would be less easily detectable.

Beaufort Sea Testing

Pre-spill characterization of the Beaufort Sea should be considered if shoreline techniques such as SCAT are planned. Environment Canada has recently developed a vulnerability assessment of parts of the Beaufort Sea coast, which can be consulted (Environment Canada 2008). The ongoing eSPACE Project (Environment Canada 2012; LaForest et al. 2014) is also providing relevant or pertinent information on susceptibility of shorelines to erosion or other alteration. This project was initiated to identify, characterize and map shoreline properties and coastal habitats as part of an effort to describe resources at risk and enhance preparedness for environmental emergency response/management, including oil spill response activity. The Mackenzie Delta and coast of the Beaufort Sea comprise one of three Arctic regions in the eSPACE pilot project.



Should such testing be considered in the Beaufort Sea, it would likely involve discharges of weathered crude oil (up to 1 to 10 m³) on different types of shoreline under relatively controlled conditions, allowing for treatment and/or removal of significant amounts of the oil. However, it is very likely that such experiments would include **control plots where oil would intentionally be left to weather naturally** and monitored over a period of months and possibly years.

The experiments would be performed in a nearshore and on-shore location over a period of several days initially, but could potentially extend over a year or more. Certain types of experiments in this category could generate oiled shoreline areas that persist for a year or more, so the sites would be selected based on proximity to settlements, hunting/fishing camps, and other sites of importance. A monitoring plan would be part of the experiment to determine the extent and persistence of any oiled areas.

1.1.5 Modeling

Background

Modeling of open water oil spills is a relatively mature technology, however the **fate and behaviour of oil-in-ice** is not, with the **fate of oil trapped in multi-year ice** an area of particular weakness. Current spill trajectory models do not adequately include sea ice cover and its characteristics (including pattern of drift over different time and distance scales, ice types, concentration, floe size, etc). It also does not include physical and chemical properties of Arctic oil. Models need to be developed in conjunction with current research to predict sea ice movement and thickness (C-CORE 2013).

Work related to some aspects of modelling may not be possible in laboratories, or at facilities with test tanks. Field trials may be required to address this deficiency. However, it is not clear if separate experiments are required for this research priority subject. Results and findings from above mentioned research categories (Sections 1.1.1 through 1.1.4) may be sufficient.

Beaufort Sea Testing

Should such testing be considered in the Beaufort Sea, it would likely be in conjunction with or set up similar to those tests described in Sections 1.1.1 through 1.1.4. Tests would be carried out in an offshore area and complete recovery of the oil would not be possible (Table 1).

1.1.6 Detection and Monitoring

Background

Detection and monitoring of oil in various ice conditions is an evolving technology. A relatively small amount of field experience exists to guide researchers. It is crucial to detect spills in order to respond and treat them. The lack of experience in Arctic conditions is due to a lack of satellite coverage and ongoing bandwidth problems in Arctic Canada (C-CORE 2013). Existing space-based systems could be used as a basis to develop new sensors and capabilities to detect oil in various ice conditions in real time and distribute this information effectively. In addition to satellite imagery, surveillance flights using aircraft or unmanned aerial vehicles (UAVs) can assist with more detailed detection and monitoring of oil in (under) sea ice. Autonomous underwater vehicles (AUVs) could be deployed to detect oil under ice. Both methods (UAVs and AUVs) require additional permit considerations which are addressed in section 4 of the Roadmap - *Documentation of the Regulatory Permit Requirements*.



Information received from these new and upgraded systems may need to be validated with field data, which may not be possible to obtain from work at laboratories or facilities with test tanks. Therefore, field experiments may be required to support data acquisition and interpretation.

Beaufort Sea Testing

Should such testing be considered in the Beaufort Sea, it would likely be carried out in conjunction with (or set up during) the possible trials described in Sections 1.1.1 through 1.1.4. Tests would be carried out in an offshore area and complete recovery of the oil would not be possible (Table 1).

1.1.7 Impact and Assessment.

Background

Impact and assessment of oil in various ice conditions is a relatively new area, carried out in limited laboratory and field experiments in the past and with little actual field experience to guide researchers. In particular, the long-term effects of oil on Arctic ecosystems are not well-understood, but this knowledge is necessary for required NEBAs for oil spill countermeasures experiments and actual industry activities in the offshore. Several aspects of this situation related to Arctic ecosystems (and specifically, conditions in the Beaufort Sea) need to be examined:

- accurate biological baseline needs to be established, including natural variability and climate change (this can tie in to current activities by various organizations);
- past transects of oil spill experiments should be resampled (Section 1.2)
- habitat mapping and sensitivity analysis (this can tie in to current activities by various organizations)
- impacts of oil and oil spill countermeasures on Valued Components (this will also include toxicity analysis of spill treatment agents); and
- increase existing knowledge and understanding of biodegradation processes and the persistence of various oil types in Arctic marine ecosystems (this can build upon previous experiments supplemented by laboratory experiments and field trials; C-CORE 2013).

It is not clear if separate trials are required for this research priority subject. Results and findings from previously mentioned subjects may be sufficient.

Ongoing baseline and research activities in the Beaufort Sea form the basis for addressing knowledge gaps related to baseline conditions. In addition, specific types of field data on impacts and biodegradation processes will be required, which may not be possible to obtain from experiments at laboratories or facilities with test tanks. Consequently, field trials may be needed.

Beaufort Sea Testing

Should such testing be considered in the Beaufort Sea, it would likely be in conjunction with or set up similar to those tests described in Sections 1.1.1 through 1.1.4. It would likely involve discharges of weathered crude oil on the order of 1 m³. Complete recovery of the oil would not be possible (Table 1). The experiments could be performed in offshore, nearshore, and on-shore location over an extended period (months or more).



Table 1 summarizes and compares some key aspects of the research categories briefly described in Sections 1.1.1 through 1.1.7. Research categories with an estimated high priority rating (based on their applicability) are shaded.

Table 1: Experimental Summary Matrix

Experimental Category	Estimated Research Priority	Need for Field Experiments	Potential Oil Volume	Likelihood of Clean-up	Location
Mechanical Recovery	Low	Low	1 to 10 m ³	High	Offshore
In-situ Burning	High	High	1 to 10 m ³	High	Offshore
Dispersant Use	High	High	1 to 10 m ³	High	Offshore
Shorelines	Medium	High	1 to 10 m ³	Low	Nearshore and on-shore
Modeling*	High	High	1 to 10 m ³	Low	Offshore
Detection and Monitoring*	Medium	Medium	1 to 10 m ³	Low	Offshore
Impact and Assessment*	Medium	Low	1 m ³	Low	Offshore, nearshore and on-shore

* if separate field trials should be considered.

1.2 Past Oil Spills and Countermeasures Experiments in the Arctic

Knowledge drawn from actual spills of significant size in Arctic conditions is limited; therefore, the main source of knowledge to-date on oil behavior and countermeasures has been drawn from experimental studies. There is a considerable breadth of such work, starting in the 1970's, and including work done in Canada, Norway, and the United States.

The following summaries highlight most of the medium to large-scale experimental crude oil spills known to have been conducted in sea ice, regardless of latitude. Also included are two significant shoreline projects involving experimental spills and long term monitoring. There may be other experiments (for example, in the Russian Federation) that are not included because of limited available information. This review does not include spills in open water, or terrestrial spills focused on oil spreading and absorption in snow.

1.2.1 Behavior of Oil Spills in the Arctic

A series of small-scale spills one to two m³ was conducted on fast ice in the Chukchi Sea by the United States Coast Guard in July 1970. The surface spills (diesel and North Slope crude) quickly drained through a permeable, recrystallized upper layer and collected on the melt pools. The crude oil pumped under the ice at two



sites rose and collected in the under-ice depressions. The researchers concluded that the presence of ridges and under hanging blocks under the ice would be able to contain fairly large oil volumes as long as currents and turbulence in the water column were low (Glaeser and Vance 1971).

1.2.2 Crude Oil Behavior on Arctic Winter Ice

This project was carried out in 1970 in Alaska. It was aimed at understanding the spreading of oil on snow and ice. Much of the work involved developing spreading theories from first principles. Three spills were made with warm North Slope crude on sea ice surfaces. The spreading rates measured in the field generally matched the theoretical predictions and confirmed that only gravity and inertia forces need to be considered. A key observation was that there was no significant penetration into the ice surface by the warm oil. Fresh snow blowing across the oil tended to stick and migrate downward, creating a dry mixture of 80% snow by volume. A heavy snowfall directly on top of the oil compacted the upper snow/oil interface and prevented the new snow from infiltrating the already spilled oil (McMinn 1973).

1.2.3 Interaction of Crude Oil with Arctic Sea Ice

A total of 54 m³ of two different crude oils was released in stages throughout the winter of 1974/1975 into containment skirts cut into fast ice within a confined bay near Cape Parry on the Canadian Beaufort Sea coast. This was the first large-scale investigation into all aspects of oil in ice behavior, including:

- spreading under ice;
- encapsulation and progressive vertical migration as the ice warmed;
- spreading on surface melt pools in the spring; and
- weathering (Norcor 1975).

A large portion of the oil was removed by in-situ burning on the ice in the following June. In addition to the contained spills, two additional spills were carried out 30 km offshore, where the oil was allowed to spread freely in the presence of a 10 centimetre/second (cm/sec) surface current. Movement of the oil was documented by divers with underwater camera footage. This study demonstrated conclusively that effective removal of oil spilled under ice could be achieved through in-situ burning in the spring. Mechanical removal of the residue completed the successful clean-up. The presence of the trapped oil had no significant effect on the eventual ice thickness, comparing control and oiled sites. The presence of oil pooled on the ice surface in the spring advanced the rate of ice deterioration and break-up by several days to one week (Norcor 1975).

1.2.4 Oil Behavior under Multi-year Ice

Three small-scale spills of approximately 0.6 m³ each of Norman Wells crude oil were completed at Griper Bay in the Canadian High Arctic in June 1978 (Comfort et al. 1983). An overflight later that summer showed a considerable amount of oil on the surface at two of the spills. A field visit in September of the following year found oil in the ice at two of the sites (up to 10% of the spill volume) and smaller amounts at the third side, which was bisected by a crack. No oil was found at any of the sites in the fall of 1982, four years after the spill. This is the only known field test involving oil and multi-year ice (Comfort et al. 1983).



1.2.5 Oil and Gas under Sea Ice

The focus of this unique project was to investigate the fate and behavior of oil released below surface with compressed air (to mimic the possible buoyancy effects of natural gas driving the plume, or supporting its ascent to the surface) to simulate a shallow water blowout in 20 m of water under stable fast ice (Dickins and Buist 1981). This is the only known project of its kind that comes close to approximating the conditions that would be faced with a subsea release in the presence of gas under ice. Three spills of Prudhoe Bay crude, of approximately six m³ each, were discharged over the winter of 1979/80; releases occurred in December, April and May at a nearshore site in the Canadian Beaufort Sea. Individual spill volumes ranged from 5.9 to 6.8 m³.

Oil behavior and fate depended largely on the ratio of gas to oil and timing. Early in the season, the thin ice sheet was uplifted by the gas, which vented through cracks. Finer droplets were carried further out from the discharge point as gas volumes increased. In all of the spills, the oil was encapsulated by new ice growth within a time frame of 24 to 48 hours regardless of whether there was gas present (Dickins and Buist 1981). The spills later in the winter led to larger pools of oil underneath gas pockets that filled the natural under-ice depressions. An estimated 85% of the spill volume appeared on the ice surface in the spring, as a result of surface melting down to the section of ice containing the trapped oil droplets. Vertical migration of oil occurred from larger trapped oil pools along fractures and cracks in the ice above it. Approximately two-thirds of the spill was removed through a series of effective in-situ burns in numerous melt pools. Residue was recovered by teams manually on the ice prior to break-up (Dickins and Buist 1981).

1.2.6 Oil Migration and Modification Processes in Solid Sea Ice

Nelson and Allen (1981) describe a series of 18 small-scale spills (up to 0.07 m³) of fresh and emulsified Prudhoe Bay crude oil and diesel under first-year fast ice during the early part of the winter of 1979/80. Immediate vertical migration occurred when hot crude oil or diesel was injected without any opportunity for new ice to form beneath the oil. The authors noted that abnormally deep snowdrifts at times could have led to internal ice temperatures more representative of spring than winter conditions. Emulsions injected in the Prudhoe Bay tests did not migrate vertically to any extent. The tests were terminated in March 1980 when the oiled ice was cut out of the parent ice and removed to shore (Nelson and Allen 1981).

1.2.7 Physical Interaction and Clean-up of Crude Oil with Slush and Solid First-year Ice

During the winter and spring of 1980/81, three experimental spills involved spraying 1 m³ of hot Prudhoe Bay crude oil onto snow to simulate a surface oil well blowout in mid-winter and spring (Nelson and Allen 1982). In the winter test under cold temperatures with 30 cm of hard snow, the oil covered an area of close to 500 m² and penetrated less than 5 cm into the snow surface. In the spring test in mid-April, the oil immediately saturated the snow-slush mixture to a much greater extent than in colder winter temperatures. When left for two weeks, the low albedo oil surface gradually subsided relative to the surrounding clean snow (Nelson and Allen 1982).

1.2.8 The Baffin Island Oil Spill Project

The Baffin Island Oil Spill (BIOS) Project sponsored multidisciplinary field studies between May 1980 and August 1983 in Canada's eastern Arctic on the northern end of Baffin Island (Sergy and Blackall 1987). Forty-five m³ of a sweet, medium gravity crude oil were released in two experimental spills designed to assess and compare the short- and long-term fate and effects of chemically dispersed oil nearshore versus a beached oil slick. The main conclusions of the BIOS Project were: First, the results offer no compelling ecological reasons to prohibit the use



of chemical dispersants on oil slicks in nearshore areas. Second, the results provide no strong ecological reasons for the clean-up of stranded oil (on certain shoreline types). From these results, the authors concluded that consideration would be given to using chemical dispersants nearshore where warranted to protect wildlife or their critical habitat or traditional human land-use sites (Sergy and Blackall 1987).

1.2.9 Emulsions in Ice

This project involved two spills of crude oil under 1.65 m thick solid fast ice at McKinley Bay in the Canadian Beaufort Sea in March 1982. The spills involved 0.2 m³ of 60% oil in water emulsion at two adjacent sites, and the same volume of fresh oil in a third skirted area as control. The highly viscous emulsion formed a static irregular “lumpy” surface under the ice with no lateral spreading. In contrast the fresh oil formed a more uniform coating within the skirted area. New ice crystals started forming within the emulsion within 24 hours and all spills were encased by a thin skim of new ice beneath the oil within 48 hours. The presence of the oil had no measurable effect on ice growth. The fresh crude started to appear in quantity on the ice surface through natural migration through the sheet by mid-June while the equivalent surfacing of the emulsions did not occur for another 3 weeks. This difference was attributed to viscosity affecting the ability of emulsions to flow up the open brine channels in the melting ice. Rather than through migration, the emulsified oil was brought to the ice surface by a combination of melting of the ice from the surface down, and melting of ice above the trapped emulsion layer through solar heating. Eventually, an estimated 90% of all the oil was released from the ice by the time break-up occurred on July 8. The emulsions were stable through the entire project duration and did not “break down” (Buist et al. 1983).

1.2.10 Experimental Spills of Crude Oil in Pack Ice

Three discharges of one m³ each of Alberta sweet mixed blend crude were completed offshore of Nova Scotia, Canada in March 1986 (Buist and Dickins 1987). This was the first project to involve experimental spills of crude oil in dynamic pack ice. Ice conditions ranged from open drift ice (40 to 60% coverage) to close pack (70 to 80% coverage). The main finding was that high concentrations of slush or brash ice between floes greatly reduced and in many cases stopped the oil spreading. The oil in this case interacted with the ice by saturating the brash ice in the water between the floes and splashing onto the edges of small pancakes as the ice pieces ground together. Small volumes of oil were swept under the floes by relative water motion. Oil was rarely transported to the surface of ice. The experimental results demonstrated that if slush and brash are not major factors, spreading of oil in pack ice can be predicted by simple modifications to standard open water equations, to account for the effect of ice concentration. Existing models developed to predict the final area of a spill in snow, can be adopted for spreading of oil among slush and brash ice at sea. There was no evidence of emulsification in spite of a water temperature of -1.5°C. There was some evidence of natural dispersion but the oil droplets being created were relatively large and rapidly rose to collect under the ice. Two of the three discharges in the experiment were contained in very close pack were successfully burned with efficiencies ranging from 80 to 93%. There were no problems with ignition or sustaining the burn and the residue was easily picked up. The spill in 4 to 6/10ths ice cover was not contained to a thickness that could sustain combustion and no attempt was made to recover the oil. It was concluded that burning appeared to be the only feasible countermeasure for spills under these conditions (Buist and Dickins 1987).

1.2.11 Marginal Ice Zone Experiment

In 1993, following a series of test tank experiments, an experimental spill involving 26 m³ of North Sea crude oil took place in the Barents Sea marginal ice zone off the coast of Norway (Singsaas et al. 1994; Vefsnmo and



Johannessen 1994). The high concentrations of pack ice kept the oil thick and immobile, which, combined with cold temperatures and limited wave action, significantly slowed oil-weathering processes. Oil spreading and film thickness were sensitive to relatively small changes in ice concentration: the spill thickness rapidly dropped from 1 cm to 1 millimetre (mm) as the ice cover opened slightly from 80 to 70% coverage. Most of the oil remained in the slush and openings between floes. Approximately 2 to 5% of the total volume “rimmed” or adhered to edges of ice floes, and a small portion of the spill was transported as small particles under the ice. An attempt to use an oleophilic rope mop skimmer for recovery was hampered by the influence of the vessel (used to deploy the skimmer), which opened up the ice cover, and allowed the oil to spread. No other effort was made to clean up or recover the oil (Singsaas et al. 1994; Vefsnmo and Johannessen 1994).

1.2.12 In-situ Clean-up of Oiled Shorelines (Svalbard Shoreline Project)

Experimental oil spill studies were conducted on Svalbard to quantify the effectiveness of selected in-situ shoreline treatment options to accelerate natural oil removal processes on mixed-sediment (sand and pebble) shorelines (Sergy et al. 1998). A total of 5.5 m³ of oil was deposited in July and August 1997 along a 3 m wide swath in the upper intertidal zone at three sites (each containing several plots). Approximately one week after oiling, a different treatment technique was applied to each plot: sediment relocation (surf washing), mixing (tilling), bioremediation (fertilizer application), and bioremediation combined with mixing. In addition, one plot at each site was monitored for natural attenuation. The results verified that relocation of oiled sediments significantly accelerated the rate of oil removal by more than one year. OMA formation process was active and was increased by sediment relocation. Oil biodegradation occurred both in the oiled sediments and on the fine mineral particles removed from the sediment by natural physical processes. The biodegradation of oil in sediment was stimulated by bioremediation activities. Mixing (by tilling) did not clearly stimulate oil loss and natural recovery. None of the treatment techniques resulted in elevated toxicity levels in the nearshore environment to unacceptable levels, nor did they result in consequential alongshore or nearshore oiling (Sergy et al. 1998).

1.2.13 Svalbard Experimental Spill 2006

This experiment involved a discharge of 3.4 m³ of fresh Statfjord crude oil under 65 cm solid fast ice in a fjord on Svalbard on March 27, 2006 (Dickins et al. 2008). The spill was contained within a skirted area of 100 m². Average oil film thickness was 3.5 cm but under ice depressions led to pockets of oil over 10 cm deep. The primary objective of the experiment was to create an under-ice spill to document the weathering processes of the oil. Oil started to migrate naturally to the surface 24 days after the spill. Most of the oil had surfaced by May 30, just over 60 days following release. The oil was burned with an efficiency estimated at 96% after lying exposed on the ice surface for over one month and being 27% evaporated at that time (Dickins et al. 2008).

1.2.14 Joint Industry Program on Oil Spill Contingency for Arctic and Ice-covered Waters: Oil in Ice Field Experiments 2008 and 2009

As part of a large international, multi-disciplinary Joint Industry Program (JIP) carried out over four years, two field projects were conducted in the Norwegian Barents Sea between 78 and 79°N, east of Svalbard, within the pack ice (Sorstrom et al. 2010). In 2008, two small uncontained spills totaling 0.8 m³ were completed with the purpose of testing the application of herders to thicken an oil slick in open pack ice enough to support in-situ burning. The test was successful, with more than 90% removal effectiveness. This was the first time such a countermeasure combining herders and burning had been tried in an Arctic field setting.



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In 2009, three uncontained releases (0.5, 2 and 7 m³, respectively) took place in close pack ice (over 80% coverage) to document oil weathering and fate and assess dispersant effectiveness and demonstrate the application of towed booms. Findings showed that burning of thick oil films trapped between floes in pack ice is highly effective (confirming earlier work in Canada and elsewhere). Findings further showed that dispersants are potentially useful to deal with a spill in pack ice as long as sufficient mixing energy is available. Fire resistant booms can also be used in light ice cover to both recover and burn oil at high efficiencies in low ice concentrations that would otherwise not be ignitable. Measurements of the weathering of oil and the resulting and ignitability verified laboratory and meso-scale studies, and were used to develop predictive models for in-situ burning (Sorstrom et al. 2010).

Table 2 summarizes the above-mentioned field experiments in various Arctic areas, including type of trial, location and timing.

Table 2: Summary of Field Experiments in Arctic Conditions

Field experiment	Location	Year
Behavior of Oil Spills in the Arctic	Chukchi Sea	1970
Crude Oil Behavior on Arctic Winter Ice	Beaufort Sea, United States	1972
Interaction of Crude Oil with Arctic Sea Ice	Beaufort Sea, Canada	1975
Oil Behavior Under Multi-year Ice	High Arctic, Canada	1978
Oil and Gas Under Sea Ice	Beaufort Sea, Canada	1979/1980
Oil Migration and Modification Processes in Solid Sea Ice	Beaufort Sea, United States	1979/1980
Physical Interaction and Clean-up of Crude Oil with Slush and Solid First-year Ice	Beaufort Sea, United States	1980/1981
The Baffin Island Oil Spill Project	Baffin Island, Canada	1980 to 1983
Emulsions in Ice	Beaufort Sea, Canada	1982
Experimental Spills of Crude Oil in Pack Ice	Nova Scotia, Canada	1986
Marginal Ice Zone Experiment	Barents Sea, Norway	1993



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Field experiment	Location	Year
In-situ Clean up of Oiled Shorelines; Svalbard Shoreline Project	Svalbard	1997
Svalbard Experimental Spill 2006	Svalbard	2006
Joint Industry Program on Oil Spill Contingency for Arctic and Ice-covered Waters: Oil in Ice Field Experiments 2008 and 2009	Barents Sea, Norway	2008/2009



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APPENDIX B

Specific Consultation Guidelines



The following sections provide a brief summary of specific consultation requirements for proposed development and research projects in the ISR (NWT and Yukon). *It should be noted that this section is a compilation of consultation guidelines that apply to oil spill countermeasures research in the Canadian Beaufort Sea and adjacent onshore areas within the ISR only. Consultation with organizations or agencies of neighbouring jurisdictions (e.g., Nunavut or Alaska) may be required in addition to the requirements outlined in this section.*

1. Environmental Impact Screening Committee / Environmental Impact Review Board

1.1 Purpose of the Consultation Process

The EISC and the EIRB describe the consultation process within their respective guidelines (*Environmental Impact Screening Guidelines 2014* and the *Environmental Impact Review Guidelines 2011*) which are available at <http://www.screeningcommittee.ca/resources/reports.html> and <http://www.eirb.ca/resources/reports.html>, respectively.

Section 3 of this Roadmap describes in detail the mandates of the EISC and EIRB with regards to the environmental assessment (EA) process and Section 4 of the Roadmap outlines the screening and approval processes of the two boards in light of the permitting processes in the ISR.

This section of the Roadmap is intended to focus on the consultation processes and therefore will only highlight any requirements associated with community and stakeholder consultations outlined by the two boards.

The EISC and the EIRB define the purpose of an in depth consultation process as fulfilling the following requirements:

- inform potentially affected parties, communities, organizations and individuals of the proposed development;
- inform the relevant authorities of the proposed development;
- identify potential negative environmental effects of the development and demonstrate how they will be mitigated;
- discuss the proposed development with potentially affected parties and the public;
- address or resolve any concerns expressed about the proposed development; and
- gather any local and traditional knowledge that could potentially be available and relevant to the development (EISC 2014; EIRB 2011).

If these requirements are fulfilled, the consultation process has been successfully completed. Depending on the scale of the project, the requirements may be reduced or altered.

The EISC does not accept any Project Description for which no effort has been made to consult with affected parties or communities (EISC 2014). Both the EISC and EIRB recognize the responsibilities of both the developer and the affected parties or communities to participate in the consultation process. The amount of engagement and consultation that takes place will depend on the size and scope of the proposed development and can be determined through discussions with the EISC prior to the planning process. In addition, the affected



communities have to be determined prior to actual consultations as well. For projects in the Beaufort Sea, all six Inuvialuit communities are typically included.

1.2 Consultation Guidelines

The type of engagement and consultation required for the EISC and the EIRB can vary from providing information and requesting feedback to face-to-face engagement. Face-to-face engagement is required for the purposes of the EIRB (as part of Environmental Impact Statement). It is up to the developer to determine which affected parties and communities should be consulted with, as well as what information is to be shared or explained with regard to the anticipated effects of the development. Members of the public or parties that are potentially affected must have the opportunity to engage with the developer, learn about the development, and provide input or comments (EISC 2014; EIRB 2011).

The Community Conservation Plan (CCP) for each community in the ISR outlines that the local HTC would normally provide the collective view or comments of the community. However, the EISC and the EIRB expect that a developer will consult with more than the HTC in each affected community and other consultations may include other community organizations and the public.

While it is expected that proponents must make reasonable efforts to engage the public and to include members of the public that may be affected by the development, the potentially affected parties are also expected to actively participate in the process, obtain information about the development and to comment on the proposed development (EISC 2014; EIRB 2011).

1.3 Reporting Guidelines

Both the EISC and the EIRB expect proponents to provide details to demonstrate the extent of their community and public engagement process. The preferred format is a report providing clear information about the level and extent of consultation that took place. The report has to include information such as:

- name of affected parties, communities, and organizations that were consulted;
- date, duration and location of consultation;
- format of consultation (public meeting, presentation to targeted group, or other types);
- aspects of the proposed development that were discussed;
- any commitments that were made as part of the consultation; and
- all issues that were raised and answers / solutions that were provided by the developer (EISC 2014; EIRB 2011).

2. Aurora Research Institute

2.1 Purpose of the Consultation Process

The research regulatory processes are in place to avoid harm to the natural, social and cultural environments of the NWT (including the ISR). They are also in place to ensure that local communities are well informed of upcoming research projects, and that knowledge resulting from those projects returns to those communities. It is the responsibility of the Aurora Research Institute (ARI) to “[promote] communication between researchers and the people of the communities in which they work” and to “[support or conduct] research which contributes to the social, cultural and economic prosperity of the people of the NWT” (ARI 2011). As such, a Scientific Research



Licence may not be issued if appropriate community consultation does not take place in conjunction with the application submission. The licensing process is discussed in detail in Section 4 of the Roadmap.

2.2 Consultation Requirements

The ARI process specifies that records of communication with the NWT community organizations should be added to the licence application by submitting them to the Manager of Scientific Service or the Licensing Coordinator. They will be used during the licensing decision. Before a licence can be issued, the researcher / project proponent must demonstrate that they have consulted with appropriate community organizations and have addressed any comments, concerns or suggestions regarding the proposed research. Proof that issues or concerns have been addressed may be required before a licence can be submitted (ARI 2011; ARI 2014b). A Scientific Research Licence may not be issued if appropriate community consultation has not taken place in conjunction with the application submission. The ARI however does not require a specific format or setting for the consultations and the communities can determine whether they feel that they were consulted appropriately. The ARI requires written confirmations that the communities and / or agencies potentially affected by the project have no outstanding / unanswered concerns. A response form is sent out by the ARI to collect these written confirmations from each affected community and organization (ARI 2011). The researcher / project proponent can also assist to support this process by establishing communication logistics (e.g. through telephone calls, fax transmissions and email communications). The licensing process is discussed in more details in Section 4.3.1 of this Roadmap.

2.3 Consultation Guidelines

The ARI outlines that the consultation and research licence application process should be completed prior to the start of research (further discussed in Section 2.5.5 of the Roadmap). Before a licence can be issued, the researcher must demonstrate that they have consulted with appropriate community organizations and addressed any comments, concerns or suggestions regarding the proposed research. Concerns arising from this consultation process may need to be addressed before the ARI can issue a licence (ARI 2011). The ARI requires written confirmation from the community organizations potentially affected by the research that they have no concerns regarding the project.

2.4 Reporting Guidelines

The ARI requires that a community consultation report be included with the Scientific Research Licence application to assist in the determination whether a licence can be issued. Community organizations in the NWT are directly involved in the licensing process and records of consultation with those organizations must be submitted to the ARI to facilitate this process. Reports and copies of publications related to proposed research must be submitted to community organizations upon request (ARI 2011).

3. Yukon Environmental and Socio-economic Assessment Board

The ISR also overlaps with the Yukon North Slope. However, no communities are located in the Yukon part of the ISR. Legislation in the Yukon requires that where a project is located on or has the potential to have environmental or socio-economic effects on an area, that the affected First Nations (including those for which no final agreement is in effect) and / or community residents be consulted. This must be done prior to submitting a proposal to the YESAB executive committee (Government of Yukon 2003). Details of the YESAB mandate and process are provided in Section 3 of this Roadmap. Aboriginal groups, community organizations and the public, in consultation, are to be provided with:

- details of the project;



APPENDIX B – SPECIFIC CONSULTATION GUIDELINES

- time to review, understand, and develop a view of the project;
- an opportunity to present those views; and
- consideration in acknowledgement of those views (Government of Yukon 2003).

The YESAB reserves the right to make rules with regard to the manner in which the above consultation takes place (Government of Yukon 2003). Once the proposal has been submitted, the YESAB will perform its own consultation to determine the potential environmental and socio-economic effects of the proposed project. This will include gathering and analyzing relevant information from various sources such as federal, territorial and Aboriginal governments, experts in the field, and the public (YESAB 2014a).



APPENDIX C

Details of Plans Required for the Regulatory Process



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1.0 EMERGENCY RESPONSE PLAN

The Emergency Response Plan (ERP) outline provided below is an amalgamation of existing guideline requirements by the NEB (2011a), EISC (2004), and the GNWT MACA (2011). In addition, if the project requires any logistic support from the ARI, a Journey Management Plan (JMP) is required. The JMP will need to include an ERP (ARI 2014). The ERP outline is also based on relevant experience in producing ERPs for a large variety of development projects in the onshore regions of the ISR.

ERPs need to be completed by developers to take responsibility in anticipating, preventing, mitigating, and managing emergency events. ERP procedures should develop and focus around the company's policies on emergency management, environmental protection, and worker and public safety (NEB 2011b).

1.1 Purpose of an Emergency Response Plan

The ERP will ensure that, in the event of an emergency, appropriate protocols will be followed in order to prevent serious harm to individuals, equipment or the environment. The ERP is to be implemented in conjunction with the project-specific health and safety protocols (described in Section 5.1 of the Roadmap). The ERP needs to;

- identify the types of emergencies that might arise in the course of the work;
- describe how emergencies are assessed and categorized according to their expected severity;
- outline the emergency response organization and the roles of key team members;
- provide procedures for responding to emergencies;
- outline the support services provided to those involved in an emergency; and
- identify the requirements for communication with all involved parties.

1.2 Objectives of an Emergency Response Plan

The ERP should be able to anticipate, prevent, and mitigate conditions during an emergency (NEB 2011a). Therefore, the objective of the ERP is to prepare the personnel involved in the project to:

- respond promptly to emergencies that might arise during the course of their field work;
- ensure the safety of the personnel directly involved with the operation and the response;
- assist personnel in assessing the level of threat posed by potential or actual emergencies; and
- take prompt action to protect themselves, others, and the environment.

1.3 Project Specific Details

The developer needs to complete a brief description of the project outlining the scope and the activities that will be completed. The ERP should be able to predict and anticipate potential emergency with regards to all phases of the project (NEB 2011a).

1.4 Emergency Assessment

Emergencies may result in different levels of severity and are categorized to reflect that. Each of the levels define how severe the emergency is and what sort of response is required. All possible scenarios of



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emergencies need to be identified and outlined with reporting procedures. The use of transparent flowcharts can help to identify key contacts and procedures.

Table 1 provides a summary of general levels of emergency. Table 2 describes the appropriate response procedures with regards to the level of emergency.

Table 1: Levels of Emergency

Level Emergency	Definition	Required Communication
Alert	No threat to life, property or environment. Control of the incident is immediate and improving	Notify on-site Field Crew Leader
Level One Emergency	Immediate control of the hazard becomes progressively more complex because of deteriorating conditions. No immediate threat to property or environment; minor personal injuries	Notify on-site field crew leader and the immediate supervisor.
Level Two Emergency	Imminent and / or intermittent control of the hazard is possible. Personnel with serious injuries; environmental damage.	Notify on-site field crew leader and immediate supervisor. Initiate Emergency Response Procedures.*
Level Three Emergency	Imminent control of the hazard is not possible. Outside assistance is required. Life threatening injuries or fatality.	Notify on-site field crew leader and immediate supervisor. Initiate Emergency Response Procedures.*

* See Table 2

Table 2: Emergency Response Procedure

Level of Emergency	Emergency Response Procedure	Post Emergency Procedure
Alert	On-site as required.	As required.
Level One Emergency	First responders and/ or crew members with first aid training attend the scene. Ensure that scene is safe to access. Assess levels of emergency.	Attend Debriefing meetings. Complete all necessary reports. Identify required improvements. Revise the ERP if improvements are required.
Level Two Emergency	First responders and/ or crew members with first aid training attend the scene. Ensure that scene is safe to access. Assess level of emergency.	Attend Debriefing meetings. Complete all necessary reports. Identify required improvements. Revise the ERP if improvements are required.
Level Three Emergency	First responders and / or crew members with first aid training attend the scene. Ensure that the scene is safe to access. Assess level of emergency.	Attend Debriefing meetings. Complete all necessary reports. Identify required improvements. Revise the ERP if improvements are required.



1.5 First Response Procedures

Using Tables 1 and 2 as a reference, developers should identify in the ERP all potential scenarios of emergency that can arise out of the undertaking. The first response procedures should formulate an emergency management program and procedure based on identified and analysed hazards. It should have an up-to-date description of emergency procedure that is available for use to all first response personnel (NEB 2011a). Use of flow charts for step-by-step procedures would be the best approach.

1.6 Emergency Contact List

The ERP needs to contain an up-to-date list of all the key contact on-site personnel, off-site managers and applicable organizations in the case of reporting an emergency and requesting assistance for emergency situations. That list can be provided in table format.

2.0 SPILL CONTINGENCY PLAN

The Spill Contingency Plan (SCP) outlines a set of procedures to implement in the event of an accidental hazardous spill. It is a guide that will identify delegation of authority and responsibility to mitigate and contain the resulting effect on human health and the environment. This requirement is independent of the project being an oil spill countermeasure experiment.

A possible SCP structure is provided in the following sections.

2.1 Introduction and Project Details

A brief description of the project, summary of tasks, and equipment used should be provided. The project area should be outlined and maps provided, clearly depicting communities that might be affected. In general, the following aspects should be covered in this section (INAC 2007):

- company name, site name, site location;
- purpose and scope of the plan;
- company environmental policy related to environmental protection, safety, spill response and clean-up;
- project description;
- study area description (including a detailed map);
- identification of potentially impacted communities, traditional use areas and any environmentally sensitive areas (e.g. parks, resource harvesting areas, wildlife habitat and migration routes, beaches, archaeological and historic sites, etc.);
- list of type and amount of hazardous materials, including storage and transport methods;
- Material Safety Data Sheets (MSDS's) for each hazardous substance (included in an Appendix);
- existing preventive measures (such as secondary containment, substance handling procedures, etc.);
- probable accidental spill locations and direction of flow on land and in water;



- locations of all response equipment; and
- any approved disposal sites.

Identification of all possible sources of spills will be significant in establishing a strong response procedure. An inventory of probable spill locations and the direction of its flow on land or water (point and non-point sources) should be created to identify potential risks (INAC 2007).

2.2 Response Organization

Project personnel structure, duties, work locations and contact numbers should be included in this section. Key response personnel needs to be identified, such as the Site Safety Officer (Section 5.1.4 of the Roadmap) and Field Operations Supervisor. For this, a flowchart of all response personnel (including contact numbers) with pre-determined communication pathways should be prepared (INAC 2007).

2.3 Action Plan

The developer needs to provide a set of response procedures to be implemented when an accidental spill occurs (INAC 2007). In addition, follow-up procedures need to be designed, including restoring affected areas and providing timely progress reports of the clean up process. The response procedures should be coordinated within an action plan and depicted in tables and flowcharts.

2.3.1 Notification

The Action Plan of the SCP should also include a spill reporting procedure to establish an effective notification protocol for the research crew. It should include detailed internal and external contact information and reporting requirements for the reporting of any spill event (INAC 2007). This should include at a minimum:

- telephone numbers of company officials, off-site spill response personnel and government agents who can provide technical assistance;
- instructions for when and how to report spills to NWT 24- Hour Spill Report Line (1-867-920-8130). The information required for the reporting is outline in the Spill Report Form (provided in Appendix D); and
- notification procedure for the public if they are to be impacted by the accidental spill.

2.4 Resource Inventory

This section should include all specialized resources and equipment to respond to potential accidental spills (INAC 2007). This may include personnel and equipment as well as quantities and strategic locations of spill kits and other response equipment. If off-site equipment and personnel (e.g., specialized contractors) are included in the spill response planning, they need to be listed as well (including locations and contact numbers).



2.5 Training Program

All personnel involved in spill response needs to be equipped with appropriate knowledge, resources, and training to respond appropriately. An adequate training program is a necessary component of the spill response when dealing with emergency situations and should be outlined in this SPC section (INAC 2007). The training should enable personnel to generate a rapid and competent response to a spill consistent with company policies to implement the Action Plan (Section 2.3). In addition, regulators may require a description of record keeping procedures that document which employees did receive relevant training and when.

3.0 WASTE MANAGEMENT PLAN

To minimize impacts to the environment, it is essential to adopt a Waste Management Plan (WMP) as a part of all operations (GNWT, ENR 1998). In addition to the GNWT, the IWB provides guidance in the development of a WMP for development projects in the ISR (IWB 2014). The following paragraphs briefly outline the contents of a generic WMP. It will need to be adjusted to meet the specific requirements of the future oil spill countermeasures experiments (once a project design has been established).

3.1 Purpose

The WMP is a strategy that needs to be implemented for proper collection, storage, handling, treatment, transport, and disposal of waste under accepted regulations. The plan is intended to provide concise and clear guidelines on the safe handling, management, and disposal of project generated waste (IWB 2014).

3.2 Scope

The WMP needs to be planned and implemented based on a project and site-specific scenario. The WMP needs to include all types of wastes generated by all project related activities (IWB 2014). The WMP should apply to all casual, permanent, part-time, and full-time employees and contractors who will be involved in the project.

3.3 Location and Layout of the Project Area

The WMP needs to specify the project area and needs to be aligned with the operations of the project. An inventory of waste generation sites needs to be identified and addressed with in the WMP.

3.4 Waste Management Principles

The developer needs to identify the commitment to ensure environmentally sound waste management practices and governing guidelines. The WMP should be distributed to personnel and posted in accessible areas. Meetings with all key personnel need to be held to discuss the WMP contents and strategies, and provide an opportunity for concerns to be brought forth and addressed in a timely and appropriate manner. The waste Management Principles should involve methods used to **reduce, recycle or reuse** the various types of waste generated for the duration of the project

3.5 Responsibilities

An outline of the expectation of all personnel and management to comply with the waste handling and managing procedures must be distributed. All personnel need to be advised of the health and safety aspect and the



expectation to comply with all applicable precautions and handling procedures with regard to hazardous waste materials.

3.6 Waste Identification and Classification

Various types of wastes can be generated from an activity. All different types of waste need to be qualified and quantified for its intended management (IWB 2014). The developer is responsible for ensuring that all generated wastes are properly identified, characterized and classified as hazardous or non-hazardous to develop safe and efficient handling strategies that assure regulatory compliance (GNWT, ENR 1998). Key personnel need to be trained in waste management principles and waste segregation tasks.

3.7 Waste Storage and Disposal

The waste storage and disposal methods need to be clearly identified in the WMP (IWB 2014).

Hazardous Industrial and Domestic Waste

Hazardous industrial waste needs to be identified and properly contained due to its risk to human health and the environment. Hydrocarbon contaminated materials that may result from planned and accidental spills also fall into this category. These wastes need will be collected and stored in used containers, which will be labelled appropriately. The handling of waste and containers should be according to Workplace Hazardous Materials Information System (WHMIS) requirements and disposed of as per prior approval (mentioned as part of the Health and Safety Plan in Section 5.1.4 of the Roadmap).

EPS developed the *Guideline for the General Management of Hazardous Waste in the NWT*, which outlines the registration and tracking of generators, carriers and receivers of hazardous wastes in the NWT.

Non-Hazardous Industrial and Domestic Waste

Non-hazardous industrial and domestic waste produced by project activities needs to be identified and the associated waste management described. To minimize potential impacts on human health and environment during project activities, all non-hazardous and domestic waste needs to be properly contained and stored (e.g., stored in wildlife-proof containers) and transported to a landfill that has agreed to accept the waste.

Grey Water and Human Waste

The management of all grey water and human waste needs to be described. This includes all steps from generation to disposal.

3.8 Training

Project personnel is required to receive adequate training specific to their area of work and duties, including safe operation practices, safe handling and storage of hazardous and non-hazardous waste products. The WMP should clearly indicate that on-site crew members have received the appropriate training and are qualified to handle all waste products.

4.0 WILDLIFE ENCOUNTER MANAGEMENT PLAN

A Wildlife Encounter Management Plan (WEMP), as required for the EISC Environmental Screening Process (described in Section 3 of the Roadmap), will address the possibility that work crews may encounter wildlife



during the completion of the oil spill countermeasures experiments. Although this document should cover encounters with all wildlife, there should be a specific focus polar bears (*Ursus maritimus*). Note that encounters with marine wildlife (marine mammals and seabirds) are covered in Section 5 below and aspects relating to fish and fish habitat are addressed in Section 6 below.

A WEMP can be structured based on the following components:

- wildlife awareness and identification;
- hazard assessment;
- monitoring;
- detection and avoidance;
- deterrence; and
- wildlife encounter reporting.

Dependent on the time of year (during periods of open water or ice cover) and location (offshore, coastal and/or onshore) of the project components, the WEMP needs to be modified to address the specific timeline within which activities will take place and the boundaries of an appropriate study area. The following sections were completed based on a wide and generic approach and some aspects may not apply once a final design for oil spill countermeasures in the Beaufort Sea has been completed.

4.1 Wildlife Awareness and Identification

This section should provide a brief overview of wildlife and wildlife habitat that may be encountered during oil spill countermeasures field activities. The research crew and Inuvialuit Wildlife Monitors should be trained in wildlife and habitat identification so that they may recognize potential encounter situation and avoid encounters (or reduce their likelihood; EC 2007).

Prior to commencement of any field trials, sensitive time periods and areas of sensitive wildlife habitat should be identified and avoidance strategies outlined (EC 2009). Project personnel should be trained in the identification of sensitive habitat so that if it is encountered in the field it can be avoided. Sensitive time periods should also be avoided (if possible) to reduce the likelihood of an encounter. The WEMP should describe relevant wildlife and wildlife habitat protection measures. Human health and safety considerations are discussed below.

Some species and habitat of concern may include (depending on time of year and area):

- polar bears and their denning habitat (identification of habitat characteristics, areas of common occurrence and signs to watch for, identification of common denning areas, timing of denning);
- barren-ground caribou (*Rangifer tarandus groenlandicus*);
- Peary caribou (*Rangifer tarandus Pearyi*);
- muskox (*Ovibos moschatus*);
- wolves (*Canis lupus*);



- Arctic foxes (*Vulpes lagopus*); and
- migratory birds

This section should also discuss training materials and procedures for project personnel. Personnel should participate in wildlife awareness training so that they understand the importance of appropriate avoidance and deterrence methods and are capable of behaving appropriately during a wildlife encounter (EC 2007). This training may include:

- bear awareness training;
- emergency response training; and
- cultural and environmental awareness training.

4.2 Hazard Assessment

As part of the Health and Safety Plan (Section 5.1.4 of the Roadmap), hazard assessments should be completed to address the inherent risks to encounter wildlife (and in particular polar bears) during the oil spill countermeasures field trials with respect to:

- hazards to crew members;
- hazards to property / equipment; and
- hazards to wildlife.

As most oil spill counter measures activities are likely conducted from a vessel (with support from aircraft), the first two hazard categories may be irrelevant. However, they were included for the purpose of completeness.

4.3 Monitoring

Continuous monitoring of the environment is necessary to minimize potential risks to personnel, equipment / property, wildlife and sensitive habitat. Wildlife monitoring will include training of project personnel in monitoring techniques as well as hiring of Inuvialuit Wildlife Monitors who will be trained in wildlife monitoring, detection, avoidance and deterrence. Components of the monitoring section of the WEMP may include:

- Wildlife Monitor practices and protocols; and
- Wildlife Monitor training and certification requirements.

Marine Wildlife Observers may also be used to watch for marine mammals during project activities under open water conditions. This aspect is described in detail in the Marine Wildlife Observation Plan (Section 5 below). Depending on the final scope of the oil spill countermeasures field trials, the two plans (the WEMP and the Marine Wildlife Observation Plan) may be combined or streamlined to compliment one another.

4.4 Detection and Avoidance

Wildlife encounters can be avoided and managed through early detection, attractants management, safe deterrence, and personnel training. This section should outline the developer's principles of early detection and avoidance (such as attractants management).



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Early detection can assist in the avoidance of wildlife encounters. Sighting wildlife or sign of wildlife will help to determine how to respond to the situation. Marine wildlife detection and avoidance potentially occurring during the open water season is discussed in Section 5 below.

Site attractiveness can be minimized by following a detailed WMP (as discussed above). Key aspects to consider are to store food, garbage and other attractants in wildlife proof, airtight containers away from the crew at secured disposal sites and to maintain closed sewage and grey water lines collecting sewage and grey water in appropriate containment (GNWT, Resources, Wildlife and Economic Development [RWED] 2002). These factors may not apply to vessel based activities and need to be assessed and adjusted once a project design has been developed.

4.5 Encounter Management

This section should outline how to respond appropriately to a wildlife encounter with particular attention to polar bears. It should provide information regarding wildlife/polar bear behaviour and the appropriate response that should be given by personnel. The section should inform the crew about appropriate behaviour and actions in the event of an encounter. If feasible, the section can be separated into polar bear encounters and other wildlife encounters.

Table 3 lists some select documents that can be consulted when designing this section of the WEMP.

Table 3: Wildlife Encounter Response Resources

Title	Organization	Description
Safety in Polar Bear Country	Parks Canada (2010)	This two page document provides information to people accessing National Parks in the Canadian Arctic. It provides information on the species and its conversation as well as how to avoid an encounter, how to handle an encounter, and how to choose a safe campsite.
Polar Bear Safety	Parks Canada (2012)	This webpage gives an overview of Parks Canada's safety management practices in National Parks where polar bears can be encountered. The site provides information on traveling in the parks, laws protecting polar bears, what to do in the event of an encounter, polar bear facts and conservation.
Safety in Grizzly and Black Bear Country	GNWT ENR (2009)	This two page document provides information on species identification, tips on travelling, camping, fishing and hunting in bear country, as well as what to do if a bear is encountered. It also provides information on deterrents and what to do if a bear charges.
Bear Encounter Response Guidelines	GNWT, ENR (2011a)	All developers working in the ISR need to follow these guidelines and acknowledge the review of the document in their WEMP. The guidelines describe the recommended behaviour during an encounter and the subsequent reporting procedure.



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Title	Organization	Description
Bear Aware: Working in Bear Country	St. John Ambulance, 2014	This is an online course available through St. John Ambulance that discusses safety procedures for personnel working in the field as well as the components of a safe camp.

4.6 Deterrence Techniques

This section of the WEMP should detail the use of non-lethal deterrence, appropriate equipment, and appropriate escalating protocol to follow in the event that non-lethal deterrence proves ineffective.

Wildlife Monitors, trained in the safe deterrence of all wildlife (with particular attention to polar bears) should be employed on field programs in the ISR.

Table 4 summarizes non-lethal wildlife deterrence techniques.

Table 4: Non-lethal Wildlife Deterrence Techniques*

Deterrence Method	Shooting Projectiles	Making Noise	Chemical Repellents	Flashing Lights	Vehicle Operation
Examples	Cracker shells Bean bags Rubber bullets Scare cartridge Screamers	Acoustic recordings Cracker shells Thunder flashes Flares Air horns	Pepper spray (limited effectiveness due to short distance application)	Vehicle head lights Bright flashlight	Starting the engine Reving the engine Chasing the bear following appropriate safety protocol

* Perham 2005; GNWT, ENR 2011a; Parks Canada 2010

An order of potential responses to problem bears has been established for bear encounters at camps (GNWT, ENR 2011a) and can be adjusted to different scenarios. Potential steps include:

- Wildlife Monitors will use conventional, non-lethal means of deterring problem bears (as outlined in Table 6).
- If not effective, a helicopter (if available) can be used to chase the bear away (note that undue harassment is illegal).
- All events have to reported to ENR Wildlife Officers as soon as possible.
- If no immediate threat exists, ENR may capture and re-locate the bear.



- If all deterrents have failed, capture and re-location have been deemed impossible, ENR may destroy the bear or give instructions to do so.

4.7 Wildlife Encounter Reporting

Polar bear sightings and encounters have to be reported to the closest ENR office. If polar bear encounters result in a defence kill, the incident will be reported to ENR. ENR's "Bear Report Checklist" is provided in Appendix D of this Roadmap and has to be made available for use by the Wildlife Monitors (GNWT, ENR 2011a).

This section is designed to outline the appropriate reporting procedures for all wildlife encounters. In reference to polar bear encounters, GNWT, ENR in the Inuvik region has developed "Bear Encounter Response Guidelines" to be followed by all developers in the region. Developers can request these guidelines by contacting ENR in Inuvik at 867-678-6650 (phone) or 867 678 6659 (fax) to receive a copy. This document is not available on the internet.

The guidelines are structured as follows (GNWT, ENR 2011a):

- I. Principles (the guiding principles are: 1. Protection of Life and Property and 2. Conservation);
- II. Operational Guidelines (the recommended encounter guidelines are: 1. Deterrence; 2. Re-locate if feasible; and 3. Destroy);
- III. Operational Procedures (contacts and response personnel need to be determined);
- IV. Response actions need to be outlined, including the following:
 - Wildlife Monitors will be the ones reporting problem bears.
 - Wildlife Monitors need to have sufficient supplies of approved deterrents.
 - All bear sightings and encounters need to be reported to the closest ENR office.
 - If a bear is in or around den site, all work must stop. ENR will assess the situation and may establish a buffer zone around den (300 metres [m]).
- V. Bear Report Checklist (provided in Appendix D):
 - report details (e.g., date, reporters name, contact numbers, Wildlife Monitor's name);
 - site details (e.g., coordinates, type of camp, number of people, aircraft on site?);
 - history of problem (e.g., date/time bear first sighted, species, sex, age, den site found, was bear attracted, , behaviour of bear, damage done by bear); and
 - deterrent action (e.g., type of deterrent, present status of bear).



5.0 MARINE WILDLIFE OBSERVATION PLAN

A Marine Wildlife Observation Plan may need to be implemented to manage the potential impacts to marine wildlife (marine mammals and seabirds) associated with oil spill countermeasures field trials in the Beaufort Sea. No concrete guidelines exist for the development of a Marine Wildlife Observation Plan in Canada and most Marine Mammal Observation and/or Management Plans focus on issues regarding seismic activity. For the purposes of this Roadmap, a generic approach was chosen to developing this plan based on previous experience with project work in the Canadian Beaufort Sea. The plan may need to be adjusted and streamlined with the WEMP (Section 4 above) once the oil spill countermeasures experiment design has been completed. Possible components of a Marine Wildlife Observation Plan may include:

- project overview;
- marine wildlife and wildlife habitat;
- marine wildlife observer program; and
- project-specific mitigation measures.

The following sections provide a brief outline of the potential content of a Marine Wildlife Observation Plan for oil spill countermeasures field trials in the Canadian Beaufort Sea.

5.1 Project Overview

The project overview should provide a brief outline of the plan components and will include the proposed goals or objectives of the plan (e.g., to minimize and/or avoid the potential impacts to marine wildlife as a result of project activities). It will also provide a description of the potential risk or hazards to marine wildlife as a result of project commencement (e.g., Enbridge 2014).

5.2 Marine Wildlife and Wildlife Habitat

This section should provide an overview of marine wildlife that may be encountered during project related field activities as well a description of their habitat. Maps of the species' distribution (in relation to project activities) may be included.

Marine mammal species that could potentially be encountered and their habitat are listed in Table 5.

Table 5: Beaufort Sea Marine Mammal Species and their Habitat*

Common Name	Scientific Name	Seasonal Occurrence	Habitat
Ringed seal	<i>Pusa hispida</i>	Year-round	Shore-fast ice and pack-ice
Bearded seal	<i>Erignathus barbatus</i>	Year-round	Pack-ice
Beluga whale	<i>Delphinapterus leucas</i>	Seasonal	Spring: ice-edge / leads Summer: shallow, coastal areas Fall: deep water
Bowhead whale	<i>Balaena mysticetus</i>	Seasonal	Spring: along ice edge Summer : open-water / pack-ice
Killer whale	<i>Orcinus orca</i>	Occasional	Coastal / offshore



APPENDIX C - DETAILS OF PLANS REQUIRED FOR REGULATORY PROCESS

Common Name	Scientific Name	Seasonal Occurrence	Habitat
Grey whale	<i>Eschrichtius robustus</i>	Occasional	Coastal / offshore
Atlantic walrus	<i>Odobenus rosmarus rosmarus</i>	Occasional	Pack-ice

* Feldhamer et al. 2003

Sensitive and protected areas affected by project activities need to be outlined and possibly mapped. The list should also include areas and sites in or in proximity to the project area that are important to the Inuvialuit and are recognized through territorial and federal legislation and/or through the six Inuvialuit Community Conservation Plans (available at: <http://www.screeningcommittee.ca/resources/reports.html>) . Relevant sites could include:

- Marine Protected Areas;
- National Parks;
- Territorial Parks;
- Migratory Bird Sanctuaries;
- Key Migratory Bird Habitat Sites and Important Bird Areas;
- Canadian Landmarks; and
- Inuvialuit Heritage Sites.

5.3 Marine Wildlife Observer Program

Observer Qualifications and Training – This section should provide an outline of expected qualifications for Marine Wildlife Observers (MWOs), such as previous experience with vessel-based marine wildlife monitoring.

Observer Manual and Protocols – This section should provide a description of the documents and resources that will be provided to MWOs such as a project-specific MWO manual or handbook and project-specific protocols outlining observer practices and procedures for action and reporting.

A project-specific MWO manual might include:

- roles and responsibilities of all crew;
- project-specific information:
 - number of MWOs and watch schedule;
 - provided or required tools and equipment (e.g., binoculars, range finder, and Global Positioning System [GPS]); and
- general MWO information (e.g., a description of marine wildlife biology and species identification guides).



Communications Plan - A project-specific MWO communication plan should be developed and provided to the crew onboard all vessels so that expectations are clear with respect to marine wildlife observations. Reporting and recording of observations will be important throughout project related field activities but particularly during field activities where dispersing of oil, application of dispersants or other activities that may cause harm to marine wildlife are taking place. Effective mitigation of risk to marine wildlife is dependent on good communication and the execution of appropriate actions.

5.4 Project-specific Mitigation Measures

This section needs to be completed based on the actual design of future oil spill countermeasures experiments. The paragraphs below provide some broad considerations that may be applicable for this section of the plan.

Timed search of safety zone/radius prior to the start of project activities – A detailed protocol should be included in this section describing a timed search for marine wildlife. This would include a time limit (e.g., 30 to 60 minutes), a proposed area (e.g., a measured area of the marine or coastal environment surrounding the release area), and related actions based on the presence/absence of marine wildlife. Fisheries and Oceans Canada (DFO), for example, has a prescribed safe zone around seismic equipment that consists of a circle with a radius of at least 500m (DFO 2007a). A project-specific safe zone may need to be determined.

Keeping a continuous search for marine wildlife during project activities – A description of continued or additional observation practices during project activities that pose a high risk to marine wildlife should be included. Such practices may include:

- The continued role of the MWOs as the project take place.
- The active participation of otherwise unoccupied crew with the marine wildlife search.
- Clear instructions for the need of a shutdown if marine wildlife is observed in the safety zone.

Remote detection techniques – If it is determined that basic observation of the marine environment does not constitute an adequate detection method of marine wildlife then it may be necessary to explore, and in turn describe remote detection methods such as passive acoustic monitoring. This method provides a means to detect marine wildlife underwater and at greater distances than simple observation; however, it will require a trained operator (e.g., Enbridge 2014).

Deterrence protocol – The development of and adherence to a protocol on deterrence techniques of marine wildlife in the safety zone is crucial for safely carrying out the oil spill countermeasures experiments. Once project activities have commenced, there is a risk that marine wildlife will enter the project-specific safe zone and be at risk of contamination. Deterrence methods will need to be described in a detailed protocol to allow MWOs and vessel crew to react to the appearance of marine wildlife during high risk project activities. Deterrence methods will vary for different wildlife species; therefore, the protocol needs to give specific instructions for the deterrence of each species.

Weather considerations – Marine wildlife observations are limited during times of inclement weather including fog events or as a result of high winds. It may be necessary to develop a protocol or action plan for the project crew so that appropriate measures can be taken or alternative detection methods can be used during those times. Alternatively, operations should be shut down during these time periods.



6.0 AUTHORIZATION UNDER PARAGRAPH 35(2)(B) OF THE FISHERIES ACT / OFFSETTING PLAN

An Authorization under Paragraph 35(2)(b) of the *Fisheries Act* (Authorization) may be required as outlined in Section 4.2.3 of the Roadmap. The Government of Canada has defined regulations under the *Fisheries Act* to provide guidance in the completion of the application and DFO has established a guide to developing and submitting an application that is in line with the regulations (Government of Canada 2014; DFO 2013).

Some select sections of the Authorization application are discussed briefly in the following sections.

6.1 Application Submittal

Engaging with DFO early in the process of developing the application is encouraged. This will allow for confirmation that the application is required and that each of the components are completed accurately. All applications must be made in writing to the Minister and submitted to a regional DFO office. An application form is provided in Appendix D. All supporting information and documentation can be attached to the completed form.

6.2 Proposed Work

A description of all project and activities and associated timelines is required including the aspects of the project that are likely to result in “serious harm to fish”. This description needs to include the purpose and the reasoning behind the project. Information regarding the phases of the project should be included such as infrastructure development, and the use of any tools, equipment and vessels.

6.3 Location

A description of the area where the proposed activities will take place will include:

- geographic coordinates;
- a small-scale plan (identifying overall location and boundaries);
- a large-scale plan (identifying detailed site information such as the location, size and nature of proposed activities);and
- the name, geographic coordinates, aerial photographs or satellite imagery of potentially affected water bodies.

It may be helpful to use nautical charts, sea marks, or other navigational aids to describe the location(s) of the proposed activities (Government of Canada 2014).

This section should also include information regarding the community nearest to the location of the proposed activities.

6.4 Fish and Fish Habitat

Fish or fish habitat potentially occurring within the project area and likely to be affected by the proposed work must be identified and described in detail. This section must also include a description of how the information was derived including sources, methodologies, and sampling techniques (if applicable; DFO 2013).

Table 6 provides examples of information to be provided in this section.



Table 6: Information for the Description of Fish and Fish Habitat*

Topic	Details to be Included
Fish Habitat	<ul style="list-style-type: none"> ■ Type of water source/water body. ■ Characteristics of the water source/water body: <ul style="list-style-type: none"> ■ Substrate ■ Aquatic and riparian vegetation ■ Flow/tides ■ Bathymetry ■ Bank/Shore ■ Conditions and requirements for fish migration and local movement. ■ Current state of fish habitat. ■ Other affected areas.
Fish	<ul style="list-style-type: none"> ■ Fish species present, or expected to be present. ■ Aquatic species at risk (as listed under the <i>Species at Risk Act</i>). ■ Estimate of fish abundance. ■ Fish characteristics, fish life-cycle functions, and functional relationships within the environment.

* DFO 2013.

It is important to note that this section should include all areas potentially affected by the proposed activities and not just the direct physical footprint. DFO recommends using drawings (plans, maps etc.), sonar imaging and photographs of the fish habitat features whenever possible (DFO 2013).

6.5 Effects on Fish and Fish Habitat

The application will require a description of the anticipated effects on fish and fish habitat likely to be caused by the project and whether or not these effects will be a direct or indirect result. Quantitative and/or qualitative information regarding potentially affected fish and fish habitat is required (DFO 2013). The assessment must cover all areas potentially affected by the proposed activities and should also include (DFO 2013):

- identification of potentially affected fish species;
- identification of potentially affected life stages of above identified fish;
- identification of the type of potentially affected fish habitat and its estimated area;
- description of the potential effect(s);



- probability or likelihood of occurrence;
- description of the magnitude;
- geographic extent (potential range); and
- expected duration.

This section should then be refined to identify how these affects are likely to result in “serious harm to fish” that are part of, or support a **commercial, recreational or Aboriginal fishery**. The “serious harm to fish” would need to be described including the measure, extent and likelihood that it would occur (DFO 2013).

6.6 Avoidance or Mitigation of Serious Harm to Fish

The applicant must demonstrate what efforts will be made to avoid impacts to fish and, if not possible, how to mitigate impacts to fish. Residual impacts (remaining after implementation of mitigation measures) to fish and fish habitat require the Authorization for which this application will be developed and are addressed through the Offsetting Plan (Section 5.2.6.7).

The applicant must provide comprehensive information about all of the best available measures and standards for avoidance and mitigation proposed to address “serious harm to fish”, such as:

- demonstration of avoidance and best available measures and standards to be applied;
- analysis of the effectiveness of the measures and standards for proposed mitigation; and
- identification of any reductions in “serious harm to fish” (DFO 2013).

Contingency measures (including relevant effectiveness monitoring) must also be in place so that they may be implemented if planned avoidance and mitigation measures do not meet the stated objectives.

6.7 Offsetting Plan

The Authorization describes an Offsetting Plan as a plan regulating the implementation of measures to offset the “serious harm to fish” that may occur after the application of avoidance and mitigation measures and standards (Government of Canada 2014; DFO 2013). Quantification of the likely residual “serious harm to fish” can be presented as the number of fish killed, area of habitat destroyed, area of habitat permanently altered, duration of the mortality event, duration of the alteration, and/or the degree of the alteration.

The Offsetting Plan should include:

- objectives of offsetting measures;
- measures to offset residual “serious harm to fish”;
- an analysis of how the offsetting measure will meet the objectives;
- measures to avoid or mitigate adverse effects on fish and fish habitat;
- monitoring measures to assess the effectiveness of offsetting measures;
- schedule for offsetting measures;



APPENDIX C - DETAILS OF PLANS REQUIRED FOR REGULATORY PROCESS

- contingency measures and associated monitoring measures if original measures to offset are ineffective;
- an estimate of the cost of implementation of each element of the plan; and
- a description of the steps that would need to be taken to access land, water sources or water bodies to implement the Offsetting Plan in areas that the applicant is not authorized to access (DFO 2013).



APPENDIX D

Forms for Various Permit Requirements



Bear Report Checklist

1. Report Details:

Date/Time of Report: _____
Reporters Name: _____
Affiliation/Location of Reporter: _____
Contact Number for Reporter: _____
Other on Site Contacts: _____
Wildlife Monitors Name: _____

2. Camp Details:

Location of Incident: _____
Latitude/Longitude: _____
Type of Camp- Permanent/ Mobile: _____
Number of People in Camp: _____
How Long has Camp Been Here (if Mobile): _____
Are there any Aircraft on site? If yes, Type: _____

3. History of the Problem:

Date/Time Bear First Sighted: _____
Type of Bear: Grizzly _____ Polar _____ Black _____
Sex of Bear: Male _____ Female _____ Unknown _____
Age of Bear: Cub _____ Juvenile _____ Adult _____
Has Bear Been Observed Before: _____

Den site found (YES NO)? If Yes description/LAT LONG _____

What was the Bear Attracted To: _____
Did the Bear Obtain Food: _____
Behaviour of Bear: Fearful _____ Not Fearful _____ Aggressive _____
Damage By Bear: _____

4. Deterrent Action:

Was the Bear Deterred? Yes _____ No _____
If Yes, Type of Deterrent Used: _____

Present Status of Bear: _____

5. Other Information:

Reporters Name/Title: _____
Weather on Site at Time of Report: _____
Checklist Forwarded to: _____



Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE

TEL: (867) 920-8130

FAX: (867) 873-6924

EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR		REPORT TIME		<input type="checkbox"/> ORIGINAL SPILL REPORT, OR <input type="checkbox"/> UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER _____
	B		OCCURRENCE DATE: MONTH – DAY – YEAR			
C	LAND USE PERMIT NUMBER (IF APPLICABLE)			WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION				REGION	
					<input type="checkbox"/> NWT <input type="checkbox"/> NUNAVUT <input type="checkbox"/> ADJACENT JURISDICTION OR OCEAN	
E	LATITUDE			LONGITUDE		
	DEGREES	MINUTES	SECONDS	DEGREES	MINUTES	SECONDS
F	RESPONSIBLE PARTY OR VESSEL NAME		RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION			
G	ANY CONTRACTOR INVOLVED		CONTRACTOR ADDRESS OR OFFICE LOCATION			
H	PRODUCT SPILLED		QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES		U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)		QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES		U.N. NUMBER	
I	SPILL SOURCE		SPILL CAUSE		AREA OF CONTAMINATION IN SQUARE METRES	
J	FACTORS AFFECTING SPILL OR RECOVERY		DESCRIBE ANY ASSISTANCE REQUIRED		HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT	
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS					
L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE	
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE	
REPORT LINE USE ONLY						
N	RECEIVED AT SPILL LINE BY	POSITION STATION OPERATOR	EMPLOYER	LOCATION CALLED YELLOWKNIFE, NT	REPORT LINE NUMBER (867) 920-8130	
LEAD AGENCY <input type="checkbox"/> EC <input type="checkbox"/> CCG <input type="checkbox"/> GNWT <input type="checkbox"/> GN <input type="checkbox"/> ILA <input type="checkbox"/> INAC <input type="checkbox"/> NEB <input type="checkbox"/> TC			SIGNIFICANCE <input type="checkbox"/> MINOR <input type="checkbox"/> MAJOR <input type="checkbox"/> UNKNOWN		FILE STATUS <input type="checkbox"/> OPEN <input type="checkbox"/> CLOSED	
AGENCY		CONTACT NAME		CONTACT TIME	REMARKS	
LEAD AGENCY						
FIRST SUPPORT AGENCY						
SECOND SUPPORT AGENCY						
THIRD SUPPORT AGENCY						



Application Form for Paragraph 35(2)(b) Fisheries Act Authorization (Normal Circumstances)

I, the undersigned, hereby request authorization to carry on a work, undertaking or activity which will result in serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery. I understand that the *Fisheries Act* Authorization, if granted, is only from the standpoint of the Minister of Fisheries and Oceans and does not release me from my obligation to obtain permission from other concerned regulatory agencies.

1. Applicant Contact Information

Applicant's Name:

If applicable:

Authorized Representative's Name:

Address:

Address:

Telephone No.:

Telephone No.:

Fax No.:

Fax No.:

E-mail:

E-mail:

DFO File Referral No. (if known):



2. Checklist for Prescribed Information

An applicant does not need to re-submit documents that have already been submitted to DFO for review. An applicant may reference documents such as Environmental Impact Statements, technical supplements, etc. in their application but must provide the appropriate reference to any document cited, including the chapter, section, page reference and date of submission.

Type of Information/ Documentation	Have you submitted the following? (Yes/No)	Identify the appropriate reference document: Title, Chapter, Section, Page Number and Date of Submission	DFO Comments (For official use only)
Type of Information/ Documentation	Have you submitted the following? (Yes/No)	Identify the appropriate reference document: Title, Chapter, Section, Page Number and Date of Submission	DFO Comments (For official use only)
Letter of Credit			
Description of Proposed work, undertaking or activity			
Project engineering specifications, scale drawings and dimensional drawings (for physical works)			
Timeline information			
Location information			
Description of Fish and Fish Habitat (Aquatic Environment)			
Description of Effects on Fish and Fish Habitat			
Description of Measures and Standards to Avoid or Mitigate Serious Harm to Fish			
Description of the Residual Serious Harm to Fish			



Offsetting Plan			
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3. Public and Aboriginal Engagement

Have you engaged the public or Aboriginal group(s) who may be affected by your proposed work, undertaking or activity?

Yes No

If yes, provide details including the groups engaged, type of engagement, dates, outcomes, etc.

If providing (attaching) supporting documentation to describe your engagement activities (e.g., meeting log, summary of meetings, etc.), include the title of each document.

4. Fisheries Management Objectives

Did you consider local Fisheries Management Objectives in your planning process? Yes No

If yes, please identify the Fisheries Management Objective(s)/Plan considered and, if applicable, reference the relevant sections.

Please identify any effects that the proposed work, undertaking or activity may have on achieving these objectives.

Applicant Declaration

I solemnly declare that the information provided for this application are true, complete and correct, and I make this declaration conscientiously believing it to be true knowing that it is of the same force and effect as if made under oath. This declaration applies to all material submitted as part of this application for a Paragraph 35(2)(b) *Fisheries Act* Authorization.

Applicant's signature (and corporate seal):

MM/DD/YYYY

Date



Information about the above-noted proposed work, undertaking or activity is collected by DFO under the authority of the *Fisheries Act* for the purpose of administering the Fisheries Protection Provisions of the *Fisheries Act*. Personal information will be protected under the provisions of the *Privacy Act* and will be stored in the Personal Information Bank number DFO PPU 680. Under the provisions of the *Privacy Act*, individuals have a right to, and on request shall be given access to, any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at www.infosource.gc.ca or in Government of Canada offices. Information other than "personal" information may be accessible or protected as required by the provision of the *Access to Information Act*.

If you require additional space to provide relevant information, please attach that information and indicate the title of the form being used and the section to which you are responding.

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Africa	+ 27 11 254 4800
Asia	+ 86 21 6258 5522
Australasia	+ 61 3 8862 3500
Europe	+ 44 1628 851851
North America	+ 1 800 275 3281
South America	+ 56 2 2616 2000

solutions@golder.com
www.golder.com

IMG-Golder Corporation
Suite 206, 125 Mackenzie Road, Box 2340
Inuvik, Northwest Territories, X0E 0T0
Canada
T: +1 (867) 777 5997