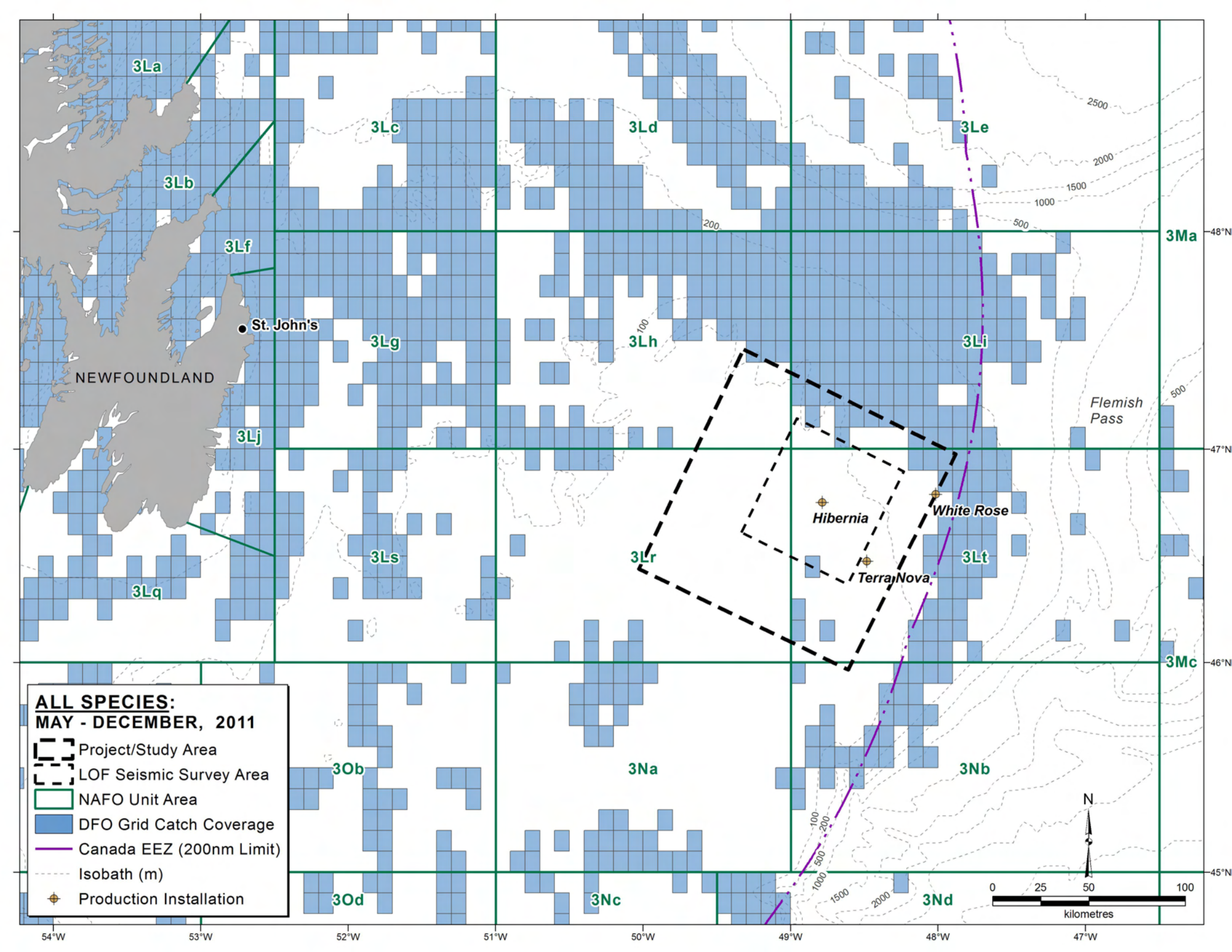
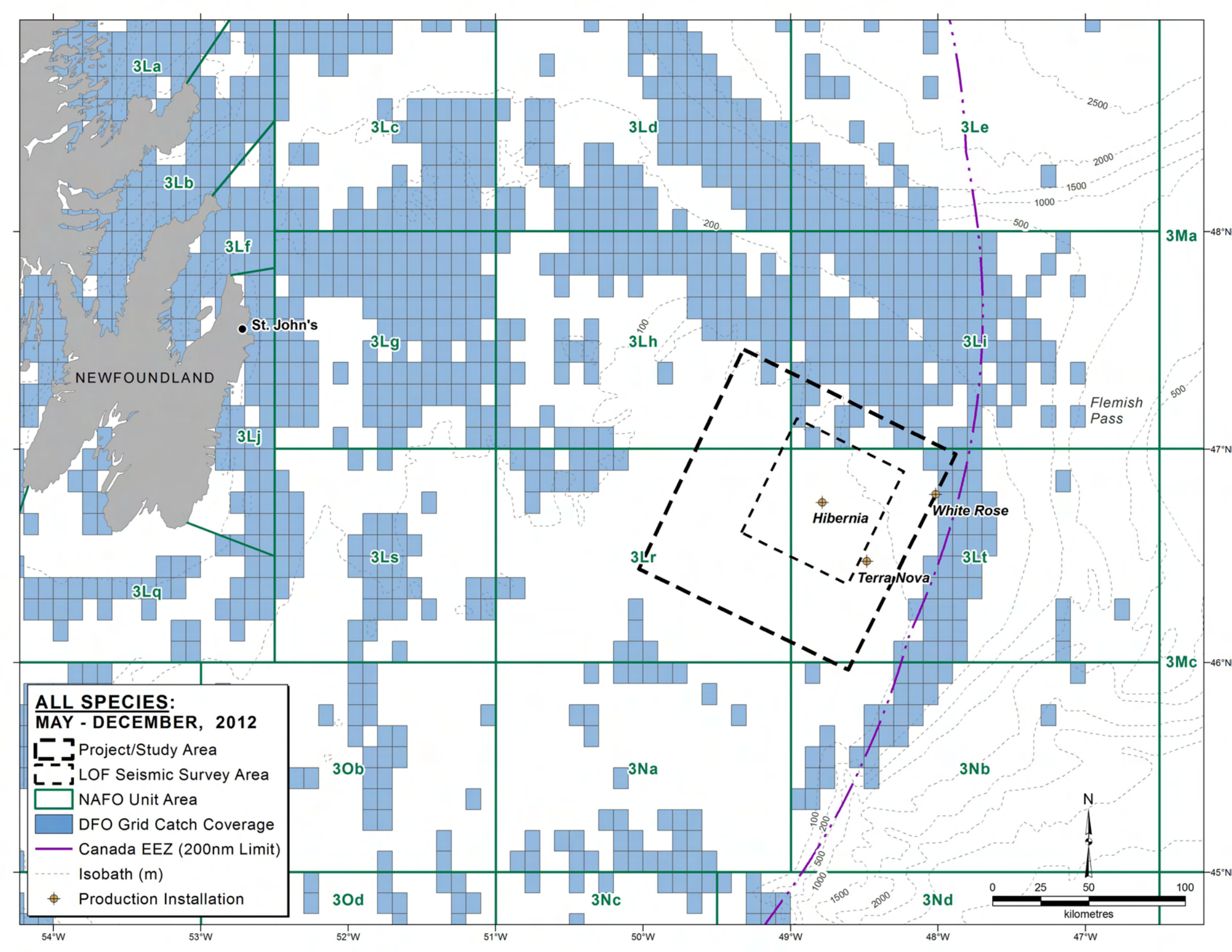
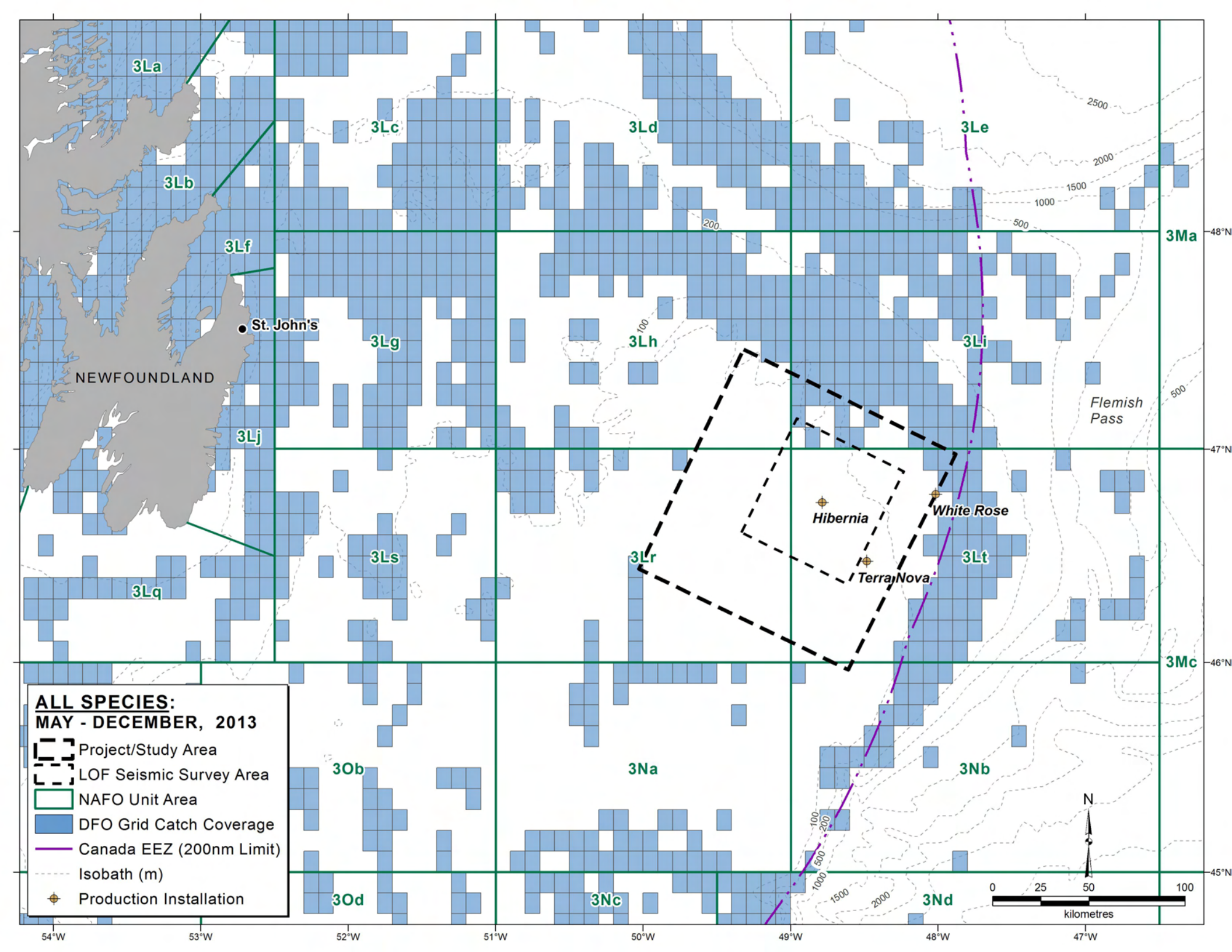
Appendix 1: A Recent Grand Banks Seismic EA (LGL 2012, electronic version)

See attached disc.

Appendix 2: Distribution of Commercial Catches in and Near the Study Area, 2011 to 2012 Based on DFO Grid Data


3La
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St. John's
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White Rose
Terra Nova
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kilometres
ALL SPECIES:
MAY - DECEMBER, 2011
Project/Study Area
LOF Seismic Survey Area
NAFO Unit Area
DFO Grid Catch Coverage
Canada EEZ (200nm Limit)
Isobath (m)
Production Installation


3La
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kilometres
ALL SPECIES:
MAY - DECEMBER, 2012
Project/Study Area
LOF Seismic Survey Area
NAFO Unit Area
DFO Grid Catch Coverage
Canada EEZ (200nm Limit)
Isobath (m)
Production Installation


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kilometres
ALL SPECIES:
MAY - DECEMBER, 2013
Project/Study Area
LOF Seismic Survey Area
NAFO Unit Area
DFO Grid Catch Coverage
Canada EEZ (200nm Limit)
Isobath (m)
Production Installation

Appendix 3: SPOC (and FLO) Protocols, Procedures and Reporting Forms

One Ocean Protocol for Seismic Survey Programs in Newfoundland and Labrador

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Website: www.oneocean.ca

One Ocean

In the province of Newfoundland and Labrador, a unique model has been developed to facilitate effective communication between the offshore fishing and petroleum sectors. In 2002, One Ocean was established as a voluntary, inter-industry liaison organization providing a neutral and practical medium for information exchange. The model promotes mutual awareness and understanding of industry operational activities and its proactive approach to address areas of potential concern is enhanced through its commitment to cooperation and transparency.

One Ocean initiates industry specific activities to meet regional challenges and participates in Research and Development projects relating to potential environmental effects of the fishing and petroleum industries to ensure sustainable and safe practices in the marine environment. Research entities are referenced in Appendix B.

The organization consists of a Chairperson, Secretariat, Industry Board and Working Group. The One Ocean Industry Board is a core component of the organization and is comprised of equal, senior-level representation from the two industry sectors. Fishing industry members are represented by the Fish, Food and Allied Workers (FFAW) union and the Association of Seafood Producers (ASP). Petroleum industry members are affiliates of the Canadian Association of Petroleum Producers (CAPP). The Please see Appendix A for more information on One Ocean member entities.

One Ocean is an industry driven organization not mandated by government. Members identified the value of having industry regulators represented on the Board in the capacity of Official Observers including the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB), regulator for the offshore petroleum industry and Fisheries and Oceans Canada (DFO), regulator for the fishing industry. Other Official Observers include the Fisheries and Marine Institute of Memorial University of Newfoundland (Marine Institute) and the Canadian Coast Guard (CCG).

To enhance the functioning of One Ocean, the Industry Board appointed a Working Group in 2009 to provide recommendations and working level support. The Working Group consists of Industry Board entity members from the fishing and petroleum industries.

Please see http://www.oneocean.ca for more information.

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EXECUTIVE SUMMARY

In 2011, One Ocean reviewed fishing and petroleum industry practices and processes related to offshore seismic survey programs in Newfoundland and Labrador. The objective was to identify opportunities to better understand and improve operational processes that would mutually benefit both industries.

The results of the review are incorporated in this document, *One Ocean Protocol for Seismic Survey Programs in Newfoundland and Labrador*, (Seismic Protocol) and outline practices and processes to facilitate seismic survey program planning and execution for the provincial fishing and petroleum industries including:

1. A sequential overview of a seismic survey program process;
2. The qualifications, objectives, duties and responsibilities of a Fisheries Liaison Officer (FLO) and Single Point of Contact (SPOC);
3. One Ocean initiatives such as the *Risk Management Matrix Guidelines for the Utilization of Fisheries Liaison Officers and Fisheries Guide Vessels for the Fishing and Petroleum Industries of Newfoundland and Labrador* (Matrix), Vessel Monitoring System (VMS) access and Industry Consultations; and
4. Frequently Asked Questions on seismic survey programs.

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LIST OF ACRONYMS

2D	Two-Dimensional Seismic Surveys
3D	Three-Dimensional Seismic Surveys
4D	Four-Dimensional Seismic Surveys
Accord Acts	*Canada-Newfoundland Atlantic Accord Implementation Act*, the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act*
ASP	Association of Seafood Producers
CAPP	Canadian Association of Petroleum Producers
CCG	Canadian Coast Guard
CFV	Canadian Fishing Vessel
C-NLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board
DFO	Fisheries and Oceans Canada
FFAW	Fish, Food and Allied Workers
FLO	Fisheries Liaison Officer
GGEG	Geophysical, Geological, Environmental and Geotechnical Program Guidelines
GPS	Global Positioning System
HSE	Health Safety and Environment
HUET	Helicopter Underwater Escape Training
HUEBA	Helicopter Underwater Escape Breathing Apparatus
MED	Marine Emergency Duties
NL	Newfoundland and Labrador
OCR	Onboard Client Representative
PIL	Petroleum Industry Liaison
ROC-MC	Marine Radio Operator's Certificate
SOCP	*Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment*
SPOC	Single Point of Contact
STCW	Standards of Training, Certification and Watch Keeping
VSP	Vertical Seismic Profiling
WHMIS	Workplace Hazardous Material Information System
WSS	Well Site Survey

1.0 INTRODUCTION

In 2011, One Ocean reviewed fishing and petroleum industry processes and practices for offshore seismic survey programs in Newfoundland and Labrador. The objective was to identify opportunities to better understand and improve operational processes that would mutually benefit both industries.

The results of the review are outlined in this document, *One Ocean Protocol for Seismic Survey Programs in Newfoundland and Labrador*, (Seismic Protocol) and reference streamlined information on suggested operational procedures and processes to facilitate planning and execution of seismic survey programs for the provincial fishing and petroleum industries.

The content of this Seismic Protocol is not meant to influence, form or be adopted by regulatory entities or referenced as a requirement. The Seismic Protocol is a property of One Ocean, strictly for information purposes and as such One Ocean members assume no liability for its use or application. One Ocean reserves the right to make changes to the Seismic Protocol without notice.

2.0 OFFSHORE SEISMIC SURVEY PROGRAM OVERVIEW

For reference purposes, One Ocean has developed a seismic survey program overview, providing insight on sequential processes and practices inclusive of but not exclusive to:

1. Information on proposed offshore seismic programs is frequently shared between fishing and petroleum industry members of One Ocean (Appendix A) in advance of formal and/or regulatory notices;

2. The Canada-Newfoundland and Labrador Offshore Petroleum Board, (C-NLOPB) is the regulator for the provincial offshore petroleum industry (Section 7.10). The C-NLOPB notifies relevant government departments and agencies, One Ocean and fishing industry representatives of proposed seismic survey activities and provides documentation regarding the program for review and comment;

3. The C-NLOPB begins its review process (Sections 7.10) and may consult with federal departments including Fisheries and Oceans Canada, (DFO) regulator for the fishing industry (7.11);

4. The proponent company (Operator) and/or fishing industry representatives: Association of Seafood Producers (ASP); Fish Food and Allied Workers (FFAW) union, may contact One Ocean to discuss planning details of the seismic survey program in preparation for consultation meetings (Section 3.2);

5. The Operator, One Ocean, ASP and the Petroleum Industry Liaison (PIL) at the FFAW (Section 3.1) schedule consultation meetings;

6. The Operator incorporates details of consultation meetings with the fishing industry and One Ocean, including proposed mitigation measures, into its environmental document and submits it to the C-NLOPB;

7. The fishing industry may submit comments to the C-NLOPB pertaining to the proposed seismic program;

8. Seismic survey initiatives developed by members of One Ocean (Section 3.0) are reviewed once the Operator is in a position to communicate timing, space and logistical details of the program to the fishing industry. This may occur at initial consultation or subsequent meetings;

9. The Operator and/or the fishing industry may contact One Ocean to provide assistance with items identified at consultation and/or subsequent meetings;

10. For 2D and 3D seismic programs, (other programs when deemed necessary) the Operator should contract a Fishery Liaison Officer (FLO) to support the program (Section 4.0). The FFAW provides FLO services and maintains an updated list of qualified FLOs and certification requirements;

11. The Operator will arrange for Notice to Shipping, including contact information for the Single Point of Contact (SPOC) [Section 6.0];

12. The Seismic Survey Contact List (Section 4.4; Appendix C) is completed by the Operator and shared with the fishing industry and One Ocean;

13. The PIL prepares a Summary Report on fishing activity for the FLO, including Vessel Monitoring System, (VMS) data (Section 3.4) for pre-departure;

14. The Operator and/or the FFAW will arrange for the provision of VMS data to the FLO while on board the seismic vessel on an as needed basis for the duration of the program;

15. Arrangements are made by the Operator and the FFAW for the FLO to board the seismic vessel;

16. Pre-departure tasks are completed and confirmed by the FLO and onboard Client Representative and reviewed with senior vessel crew (Section 4.4);

17. The FLO participates in pre-departure, Orientation/Safety session(s). The CAPP-FLO video (Section 3.6) is presented at this time;

18. The FLO commences offshore duties (Sections 4.6-4.10).

19. The FLO records activities, observations and communications three times a day in the Daily Report (Section 4.7) and submits it to the onboard Client Representative;

20. In the event of physical contact with fishing gear, (Section 4.9) the FLO will advise the onboard Client Representative and vessel Master, complete a Fishing Gear Incident Report (Appendix F) and submit it to the onboard Client Representative;

21. The onboard Client Representative will notify the Operator of the incident and the Operator will contact the SPOC, if needed and advise the C-NLOPB of the incident (Section 5.0). The Operator will notify the FFAW within 24 hours of the incident.

22. Communication between the Operator, the fishing industry and One Ocean is maintained on an as needed basis throughout the program;

23. At the end of the seismic program, the FLO or contracted Service Provider is responsible for providing the Operator with a complete record of FLO activities, observations and communications;

24. Upon completion of the offshore seismic survey program, the Operator may host a Close-out meeting with One Ocean and fishing industry representatives.

3.0 ONE OCEAN SEISMIC SURVEY INITIATIVES

In an effort to enhance cooperation, information exchange, mitigation measures and safe practices between the fishing and petroleum industries, One Ocean developed several projects that apply to offshore seismic survey programs.

3.1 Petroleum Industry Liaison Position

To provide effective technical capacity to the FFAW regarding the petroleum industry, an arrangement was undertaken by One Ocean in 2006 for the employment of a Petroleum Industry Liaison (PIL) at the FFAW. The principle objective of the PIL is to ensure the views and concerns of fish harvesters are considered by the offshore petroleum industry and regulators during the development, review and execution of exploration, development and production activities. The PIL is the main contact for petroleum related activities at the FFAW.

3.2 One Ocean Matrix

In 2010, One Ocean produced the *Risk Management Matrix Guidelines for the Utilization of Fisheries Liaison Officers and Fisheries Guide Vessels for the Fishing and Petroleum Industries of Newfoundland and Labrador* (Matrix). Fisheries Liaison Officer (FLO) participation in offshore seismic survey programs is outlined in C-NLOPB guidelines and is referenced in the Matrix. The use of Fisheries Guide Vessels (FGV) is offered as a consideration in the Matrix for transit and tow operations; not for seismic programs. The Matrix outlines considerations to advance industry consultations but does not in any way replace them. The Matrix is available on the One Ocean website: http://www.oneocean.ca

3.3 Vessel Monitoring System

One Ocean and Fisheries and Oceans Canada (DFO) have an arrangement to provide Vessel Monitoring System (VMS) information to petroleum company members of One Ocean. The VMS program at DFO Newfoundland Region provides a satellite based, near real time, positional tracking system of fishing vessels within the Canadian Exclusive Economic Zone (EEZ), as well as foreign and domestic vessels in the Northwest Atlantic Fisheries Organization (NAFO) Regulatory Area outside the 200 nautical mile limit. The ability to access current fisheries data (location of activity) is an important component in the development of operational plans for offshore petroleum related activities. The VMS data generated by DFO consists of coordinates only and does not divulge information of a confidential or sensitive nature. Please contact One Ocean for more information.

3.4 Canada-Newfoundland and Labrador Offshore Petroleum Board Map

In 2011, One Ocean requested the C-NLOPB incorporate Northwest Atlantic Fisheries Organization (NAFO) Divisions and Shrimp Fishing Areas (SFA) on its maps illustrating petroleum industry licenses. The map is an important tool to facilitate joint planning and information exchange between the fishing and petroleum industries regarding common offshore

areas of operations. A link to the map is available on the One Ocean website: http://www.oneocean.ca

3.5 Canadian Association of Petroleum Producers Fishery Liaison Officer Video

In 2012, the Canadian Association of Petroleum Producers (CAPP) developed a ten-minute video to communicate the importance of FLO participation in offshore Newfoundland and Labrador exploration activities. The video highlights the role of the FLO and interaction with vessel crew and Client Representatives. The FLO Video is available on the One Ocean and CAPP websites: http://www.oneocean.ca
http://www.capp.ca/environmentCommunity/relationshipPartners/Pages/FishingIndustry.aspx

3.6 Fact Sheet for Non-One Ocean Petroleum Industry Members

The *Fact Sheet for Non-One Ocean Petroleum Industry Members* (Fact Sheet) was developed for non-One Ocean petroleum members to provide information on current practices and expectations between the fishing and petroleum industries in Newfoundland and Labrador. The Fact Sheet provides details on One Ocean, its initiatives and member contact information to facilitate effective communication on proposed offshore petroleum exploration activities.

3.7 Industry Consultations

The *One Ocean Protocol for Consultation Meetings: Recommendations for the Fishing and Petroleum Industries in Newfoundland and Labrador,* (Consultation Protocol) outlines recommendations for preparing and holding a consultation meeting as well as follow-up meetings. Its purpose is to streamline the process and expectations for both sectors. Joint industry consultation provides a valuable opportunity to effectively exchange information and facilitate understanding of each other's operational activities; especially time and location details. Information exchange has assisted the two industries in determining best operational time frames and mitigation measures. The Consultation Protocol is available on the One Ocean website: http://www.oneocean.ca

4.0 FISHERIES LIAISON OFFICER ACTIVITIES

Fisheries Liaison Officer (FLO) participation in offshore petroleum industry seismic survey programs is considered a practice of mitigation under the C-NLOPB's *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* for 2D and 3D seismic programs.

A FLO is engaged to monitor fishing and petroleum industry activities during offshore seismic survey programs. The FLO is tasked with identifying issues and offering advice that may prevent potential at-sea conflicts associated with time and space overlap between fishing and petroleum sectors. A FLO is stationed on board the seismic vessel for the duration of the seismic survey program to observe, record and report activities of and interactions between the seismic vessel and commercial fishing vessels to petroleum and fishing industry representatives.

As the liaison, FLOs will initiate and maintain communication with fish harvesters in the project area to gain insight on fishing activity and share details of the seismic survey program. At-sea communication with fish harvesters enables the FLO to collaborate with the onboard Client Representative and senior vessel crew to ensure effective planning and mitigate potential conflict. FLOs must have knowledge of fisheries and fishery operations, demonstrated communication and writing skills and possess valid training and certification to work offshore.

4.1 Objectives of the FLO Program

1. Provide information to identify potential at-sea conflicts with fishing activities during the offshore seismic program;
2. Build and maintain trust between the petroleum and fishing industries;
3. Provide the fishing industry and Operator with feedback on fisheries issues.

4.2 FLO Training and Certification Requirements

1. Marine Radio Operator's Certificate (ROC-MC);
2. Basic First Aid Certificate (or Marine Basic First Aid);
3. Marine Emergency Duties (MED) Certificate that includes:
    a. A1 Basic Safety;
    b. B1 Survival Craft;
    c. B2 Marine Firefighting; or
    d. Standards of Training, Certification and Watch keeping, (STCW) Basic Safety, Survival Craft, and Advanced Firefighting;
4. Seafarer's Medical Certificate;
5. Workplace Hazardous Material Information System (WHMIS) certificate;
6. Helicopter Underwater Escape Training (HUET) and Helicopter Underwater Escape Breathing Apparatus (HUEBA) training (if helicopter transfers are required).

4.3 FLO Qualifications

1. An ability to work independently and in a team environment;
2. Knowledgeable of offshore area fisheries and industry operations;
3. A working knowledge of seismic survey programs including vessels, equipment and operational routes;
4. An ability to initiate and maintain effective communication with fish harvesters, senior vessel crew and the onboard Client Representative during at-sea operations'
5. The capacity to assert authority and control in critical situations;
6. Ability to understand and interpret navigational charts;
7. Proficiency in offshore communication systems (radio, satellite telephones);
8. Ability to produce daily and weekly reports and other correspondence as required in either electronic and/or written format as requested by the Operator;
9. Marine Mammal and Seabird Observation training is an asset;
10. Possess a valid passport.

4.4 FLO Pre-Departure Preparation and Duties

1. The FLO will provide the onboard and/or shore-based Client Representative(s) with a pre-departure Summary Report, prepared by the Petroleum Industry Liaison (PIL), on fishing activity for the deployment and seismic survey program areas identifying approximate number of active fishing vessels, specie(s) actively harvested and gear type(s). Vessel Monitoring System (VMS) information should be included for reference;
2. The FLO will review the Summary Report with onboard and/or shore-based Client Representative(s) and senior vessel crew at pre-departure briefing;
3. The FLO and the onboard and/or shore-based Client Representative(s) will review and confirm information provided by the Operator in the Seismic Survey Program Contact List (Appendix C);
4. The FLO participates in pre-departure Orientation/Safety session(s); the CAPP-FLO video is presented at this time;
5. The FLO and the onboard and/or shore-based Client Representative(s) will review and confirm the Seismic Survey Program Check List provided by the Operator (Appendix D).

4.5 FLO Equipment

The Service Provider is responsible for supplying the FLO with:

1. Binoculars;
2. Laptop;
3. Camera;
4. Contact Information Sheet;
5. Daily/Weekly Report Forms;
6. Fishing Gear Incident Report Forms;
7. Fisheries information (As detailed in the EA and supplemented in Summary Report);

8. Copy of the One Ocean Seismic Protocol;
9. Copy of the One Ocean Matrix.

4.6 FLO Operational Responsibilities, Protocols and Communications

The FLO is the liaison between the commercial fishing industry and the petroleum industry during seismic survey programs. In the role of liaison, the FLO is tasked with identifying potential at-sea conflicts between fishing and petroleum operations. Specific activities include:

1. Stationed on the project seismic vessel, observe activities which may affect the fishing industry and petroleum operations;
2. Initiate and maintain radio contact with fishing boats in the area and ensure all communication with fishing vessels is conducted via the FLO;
3. Inform fishers nearby about the seismic survey program and provide coordinates and relevant spatial and temporal details;
4. Help identify/locate any fishing gear in and near the seismic survey program area so it can be avoided;
5. Determine gear type, layout, fishing plans (when in area, when leaving);
6. Advise bridge about best course of action to avoid gear and/or fishing activities;
7. Serve as initial contact if damaged gear is encountered, verify damage, help identify owners and file an incident report;
8. Regularly discuss/convey fisheries related aspects including changes in relevant fisheries, status of species quotas and closures with the onboard Client Representative;
9. Report to and confer with the onboard Client Representative regarding operational situations;
10. Attend regular operations briefings;
11. Attend safety meetings and participate in all relevant Health Safety and Environment (HSE) initiatives and procedures as requested;
12. Complete and submit a daily report (electronic/hardcopy) including all observations, communications and meetings attended to the onboard Client Representative;
13. Other duties as identified and approved through consultation with the Operator and Service Provider.

4.7 FLO Daily-Weekly Reports

The FFAW provides the FLO with a laptop containing electronically formatted Daily Report spreadsheets (Appendix E). The Daily Report is completed at three specific times per day and compiled for weekly reports. The spreadsheet captures specific information regarding activities, observations and communications for the project and area fisheries and is submitted daily to the onboard Client Representative. In addition to relevant information about the project and area fisheries, the Daily Reports supply relevant details of all fisheries-related gear observations (Section 4.8) and associated radio communication. Fishing gear incidents (Section 4.9) require a separate report but are recorded in the daily log.

4.8 Fishing Gear Observations Recording and Reporting

1. All fishing vessels and gear in the path of the petroleum exploration work should be avoided and clear areas pursued. Fish harvesters are not required to move their vessels or gear from the seismic survey program area and should not be told to do so;
2. If personnel onboard the seismic and/or scout vessel observe fishing gear (abandoned, adrift or active) it should be communicated to the FLO. Gear should not be touched / retrieved by project personnel as it is illegal for anyone but the gear owner to move the gear;
3. If the scout vessel makes the observation, personnel should record exact positions and name or Canadian Fishing Vessel (CFV) number on the gear (buoy/highflyer) and report it to the FLO;
4. The FLO will communicate with fishing vessels in the vicinity in an attempt to identify the gear owner;
5. If the CFV number is known, the FLO may be able to identify and contact the owner;
6. If identification and contact with the gear owner is successful, the FLO will attempt to determine the plans/schedule of the gear owner with respect to the gear and will encourage the owner to communicate with the FLO at sea;
7. If it is not possible to contact the gear owner the exploration vessel should attempt to work in another area and return to the location at a later time;
8. The FLO will record the information in the daily report and submit it to the onboard Client representative.

4.9 Fishing Gear Incident Recording and Reporting

1. Commercial fisheries gear incidents/accidents means a physical interaction versus an observation;
2. If there is any indication a project vessel or its equipment made contact with fishing gear it should be communicated to the FLO immediately;
3. The FLO should contact the onboard Client Representative and vessel Master as soon as possible after discovery of the incident;
4. The FLO will take all reasonable action to prevent any further or continuing damage;
5. If possible, photograph the gear or gear debris in the water and after recovery;
6. If necessary, secure and retain any of the gear debris;
7. Record the incident in the Daily Report;
8. File a Fishing Gear Incident Report (Appendix F) and distribute to the onboard Client Representative.

5.0 Regulatory Requirements for Reporting an Incident

The Canada-Newfoundland Offshore Petroleum Board (C-NLOPB) Guidelines state contact with fishing gear must be reported immediately even if no damage to the gear has occurred. The C-NLOPB maintains a 24-hour answering service at (709) 682-4426 for this purpose and can also be contacted during working hours at (709) 778-1400. Reports on contacts with fishing gear should include the exact time and location of initial contact, loss of contact and a description of any identifying markings on the gear. Incidents will be reported by the onboard Client Representative to the Operator who will report it to the C-NLOPB per the Board's incident reporting guidelines and/or the authorization requirements.

6.0 Single Point of Contact (SPOC)

Single Point of Contact (SPOC) is referenced as a practice of mitigation under the C-NLOPB's *Geophysical, Geological, Environmental and Geotechnical Program Guidelines*:

> "Where more than one survey operation is active in a region, the operator(s) should arrange for a 'Single Point of Contact' for marine users that may be used to facilitate communication."

Operator's may designate a SPOC internally or contract for the service. The Operator will notify relevant entities of the designated SPOC and provide contact information prior to the seismic survey program start-up. Details of the SPOC will also be included in Notices to Shipping.

As the land-based fisheries contact for the Operator, the SPOC provides support to the offshore project as requested by the Operator. The role may include but is not limited to:

1. File Notices to Shipping;
2. For the purpose of determining fishing plans, if the FLO is unable to identify and/or contact a gear owner(s) the SPOC may be asked to assist;
3. In the event of a gear incident and the FLO is the initial contact, the SPOC may be requested to:
    a. Identify and/or contact owner and notify of damage;
    b. Use the FLO's Incident Report Form as a reference to investigate details of the incident (dates, location activities) with the fish harvester, FLO and/or onboard Client Representative and obtain information on other vessels in the area at the time;
    c. Provide fish harvester with relevant form for the claim and follow through on its submission;
    d. Provide a comprehensive report to the Operator.

4. In the event the SPOC is contacted directly by a fish harvester claiming gear loss/damage in relation to the seismic survey program, the SPOC will document information on the fish harvester and incident and contact the Operator. The SPOC may be requested to:
    a. Confirm if the FLO and/or onboard Client Representative are aware of the incident.

5. If the FLO has reported the incident, the SPOC may be asked to:
    a. Use the Incident Report Form as a reference to investigate details of the incident (dates, location activities) with the fish harvester, FLO and/or onboard Client Representative and obtain information on other vessels in the area at the time;
    b. Provide fish harvester with relevant form for the claim and follow through on its submission;
    c. Provide a comprehensive report to the Operator.

6. If the FLO and/or onboard Client Representative are unaware of the incident the SPOC may be asked to:
    a. Coordinate with the FLO and/or onboard Client Representative to obtain information on the seismic vessel location, timing and activity as well as details of other vessels in the area to determine if the incident is related to the seismic survey program;
    b. Provide fish harvester with relevant form for the claim and follow through on its submission;
    c. Provide a comprehensive report to the Operator.

The reporting of all fishing gear incidents to the C-NLOPB will be conducted by the Operator as stated in Section 5.0.

7.0 FREQUENTLY ASKED QUESTIONS ABOUT SEISMIC SURVEYS

7.1 How Does Seismic Surveying Work and how is the Information Used?

Seismic surveys to visualize rock strata below the seabed are a key component of the petroleum exploration industry. Marine seismic surveying applies the science of sound energy and seismology to map geological structures under the seabed. Towed devices produce bursts of acoustic (sound) waves that travel through the water and then bounce back to receivers that measure the strength and return time of each wave. These surveys are the first step in a process of physical exploration for oil and gas which can lead to exploration and delineation drilling and, if economically viable reserves of oil or gas are found, production and transportation of these reserves to market.

Seismic surveys of various types and extent have been taking place in the Newfoundland and Labrador offshore since the 1960's. Close to two million line kilometers of these surveys have been carried out around the island of Newfoundland and along the Labrador coast during that time. As elsewhere in the world, these surveys range from local and specialized surveys within a few kilometers or less of drilling or production platforms to surveys over thousands of square kilometers of seafloor in the search for promising geological formations.

In marine seismic surveys, reflected sound waves, called signals, are combined and interpreted electronically or reproduced on graphic paper recorders. This data gives the company information on the depth, position and shape of underground geological formations that may contain crude oil or natural gas.

To reach the desired depths below the seabed, seismic surveys use high energy, low frequency sound waves that can penetrate more than 6,000 meters (20,000 feet) below the sea floor. The survey results do not show definitely whether oil or gas is present, but they do indicate where hydrocarbons are likely to be found and can help narrow the search area. If the information indicates rock formations or geological structures that could contain hydrocarbons, a company may decide to seek approval to drill an exploratory well.

7.2 What Equipment is used for a Seismic Surveys?

Marine seismic surveys require special ships 75 to 90 meters long (250 to 300 feet) with a crew of between 30 and 65 mariners, survey engineers and technicians. During a survey, the seismic vessel travels approximately 5 knots (9 kilometers) per hour over a predetermined survey pattern and tows:

- One or two sets of underwater equipment immediately behind the ship to generate sound waves;
- One or several long cables or "streamers," each containing several hundred evenly spaced individual listening devices called hydrophones.

The position of the vessel and the signal recording equipment must be closely controlled to ensure geological features can be pinpointed accurately. Modern seismic vessels carry advanced navigation and acoustic systems that permit very accurate positioning. Each streamer can be up to 6000 meters (3.2 miles) long and is towed at a depth of 6 to 12 meters (20 to 40 feet) below the surface to reduce the effect of surface waves. Modern streamers carry multiple global positioning system (GPS) sensors to more accurately establish their position in relation to the earth's surface and the vessel. In the most technically advanced seismic surveys, up to eight streamers are towed at the same time, each about 50 to 120 meters (180 to 400 feet) apart.

7.3 Are There Different Types of Seismic Surveys?

Oil and gas companies routinely carry out two types of seismic programs. Two dimensional (2-D) surveys use one sound source and one set of receivers. These surveys are usually conducted along a grid with parallel lines up to five kilometers apart. The technology provides a general picture of the geological characteristics of an area, including type and size of structures present. Three-dimensional (3-D) surveys use two sound sources and multiple sets of receivers. They are usually carried out over a much smaller grid to get more detailed information about geological features. The pattern of survey lines used by industry is similar to a "racetrack" pattern to ensure the survey is efficient as possible and for control of the steamers towed behind the vessel.

Electromagnetic surveys are a relatively new technique used in deep water (>500m) to discriminate between water and petroleum in known reservoir formations. This involves placing a grid pattern of receivers, in degradable weights, on the seafloor and towing low frequency source of alternating current near the seafloor (~ 50 m) over the area and mapping the induced electrical resistivity.

Exploration for crude oil and natural gas is not the only reason for conducting seismic surveys. For example, natural gas under pressure in shallow geological formations could present a safety hazard during the early stages of drilling before blowout preventers are in place. Therefore, shallow seismic surveys (Well-site/Geo-hazard) are conducted around every proposed well site to find out if any subsurface features could cause problems. Well-site/Geo-hazard surveys use low sound sources and are usually a very short duration.

Four-dimensional (4D) seismic surveys have been conducted over a producing field at various stages of its producing life. The objective is to determine the changes occurring in the reservoir, over time, as a result of hydrocarbon production or injection of water or gas into the reservoir by comparing repeated datasets. 4D data indicates a shift from a purely geophysical interpretation tool to a reservoir management tool, which can be used to assess remaining hydrocarbon volumes and optimize the recovery strategy.

Vertical Seismic Profiling, (VSP) measures acoustic waves between a well bore and the surface. VSP permits calibration of surface seismic data and provides "images" within the vicinity of the well bore that could otherwise not be defined by surface seismic data. VSP consists of an airgun array sound source, typically less powerful than those used during routine seismic surveys, deployed at locations near a drill rig with receivers placed in the well. The purpose of the technique is to tie in or ground-truth the geological data with geophysical information. VSPs vary in type (Zero-offset; Offset, Walkaway) in the positioning of the sound source in proximity of the well bore and its distance from the receivers; zero-offset source is at the drill rig and a walkaway source is 1 or 2km from the drill rig as the survey progresses. VSP Acquisition times are dependent on the type of VSP and acquisition tool but they normally vary between 8-36 hours per well.

7.4 Why Do Seismic Survey Programs Occur During Peak Fishing Season?

The duration of a seismic survey program (2D, 3D) is typically 30 to 60 days. Since rough seas affect the quality of the data collected, programs are usually scheduled from June to September in optimal weather conditions as seismic vessels cannot operate effectively if waves are higher than about 3 meters (10 feet).

7.5 How is Seismic Data Collected?

As the vessel moves along the survey path, computers control the simultaneous discharge of a brief pulse of compressed air from the sound sources, (traditionally called air guns) usually once every 10 seconds. The generated sound waves travel down through rock formations under the sea floor. When they encounter a boundary between different formations, some sound waves are reflected toward the surface where individual hydrophones in each streamer intercept them. Signals from each hydrophone are sent back to high-capacity computers on board the vessel that record, check and store the large volumes of seismic data collected.

7.6 Why Do Seismic Vessels Request a Large At-Sea Berth During the Program?

Operators make every effort to communicate the presence of the seismic survey ship to other vessels in the area before and during the survey. Company representatives communicate the location of the planned seismic program through official radio broadcasts and notices to mariners. A wide berth is often requested as the survey ship cannot change direction quickly when it is towing equipment; deployed streamers can range from 6 to 8km in length and 1 to 2km in width.

7.7 How is the Seismic Survey Information Used?

The collected data go through several processing steps to improve the quality of the signals and filter out background "noise." Geophysicists then interpret the information to develop a detailed picture of the structures and rock formations in the survey area. The results of the survey are interpreted lines and maps showing geological features. Companies look for specific features that

indicate whether oil or gas might be present. These include former sedimentary basins, buried former beaches, faults and ancient reefs that can act as underground traps for crude oil and natural gas.

7.8 Why Do Operators Repeat Seismic Surveys in the Same Offshore Area?

Seismic surveying is an essential part of exploring for oil and gas. 2D surveys are typically the first step in the process and normally cover wide areas with wider line spacing between the streamers. The data collected will help Operators decide if the features found do not warrant further interest or additional surveys may be needed to better define the structures. Usually if more information is needed, Operators will conduct a 3D seismic survey program. A 3D survey is more localized and intense in terms of coverage and is focused on geological areas of interest identified through analysis of 2D data.

7.9 Who Authorizes Seismic Survey Programs and what is the Process? [1]

The Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) is the regulator for the offshore petroleum industry. Oil and Gas companies must obtain authorization from the C-NLOPB before conducting seismic survey work in provincial offshore areas. The regulatory board establishes the conditions for the survey program and the environmental protection conditions that must be followed.

Regulatory authority for seismic surveys (Geophysical Program Operation) in the Newfoundland and Labrador Offshore Area is pursuant to the *Canada-Newfoundland Atlantic Accord Implementation Act*, S.C. 1987, c.3 and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act*, R.S.N.L. 1990, c. C-2, (Accord Acts). Authorization for seismic survey programs (2-D, 3-D, Vertical Seismic Profiling, Electromagnetic and Well-site/Geo-hazard surveys) under the Accord Acts follow Section 138 (1) (b); Section 134 (1)(b) and Section 139 (4) (b).

7.10 How Do Fish Harvesters Communicate with the C-NLOPB Regarding Proposed Seismic Survey Programs and Mitigation Practices?

Public participation for seismic survey programs is at the discretion of the C-NLOPB. The Geophysical, Geological, Environmental and Geotechnical Program Guidelines, (GGEG) recommend Operators undertake consultation meetings at the early stage of the process with the fishing industry including the FFAW, ASP and One Ocean. The Operator must report on consultations and how issues, if any, were addressed; the C-NLOPB determines adequacy of consultation meetings.

[1] The *Canadian Environmental Assessment Act* does not apply to Seismic Survey Programs. References in this document pertaining to seismic authorization and environmental criteria reflect C-NLOPB legislation at the time this document was written and may require future amendments.

The GGEG lists mitigations to be employed to reduce/eliminate potential impacts to fish and commercial fishery operations. All mitigations a proponent will implement for a seismic survey program are outlined in the environmental document; examples include:

1. Avoidance of heavily fished areas;
2. Timing and spatial avoidance to reduce conflict with DFO Research Vessels surveys;
3. Notice to Mariners;
4. Fisheries Liaison Officer (FLO);
5. Communication with Fishing Industry;
6. Gear Compensation Program;
7. Single Point of Contact (SPOC);
8. Authorization may include additional, warranted mitigations:
    a. The C-NLOPB considers concerns/issues raised by fishers when issuing seismic survey authorization; concerns raised by fishers have resulted in changes to program design (e.g., timing delay to avoid spawning/migration times).

7.11 What is the Role of DFO in Seismic Survey Programs?

The C-NLOPB may request DFO to provide expert advice on environmental criteria related to marine seismic exploration projects. The *Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment* (SOCP) was developed by federal and provincial experts in marine regulatory policy and practice and is based upon a DFO sponsored peer review of seismic surveys by Canadian and international science experts with the objective to develop scientific conclusions and advice on the potential impact of seismic sound on marine life. The SOCP specifies the mitigation requirements that must be met during the planning and conduct of marine seismic surveys to minimize impacts on life in the oceans.

APPENDIX A: ONE OCEAN FISHING AND PETROLEUM MEMBERS

A.1 Association of Seafood Producers

ASP is a not-for-profit corporation representing the interests of seafood producers generally in Newfoundland and Labrador. ASP provides effective input into policy decisions and regulatory matters at all levels of government, engages in media relations on matters of interest to industry, and participates in programs of direct benefit to the fishing industry including research and development. ASP is also the lead processors' representative for collective bargaining negotiations for fish prices under provincial legislation. ASP Members operate processing plants throughout rural Newfoundland and Labrador and source raw material mainly from independent harvesters in the NL inshore fishery, as well as externally. Members are also involved in directed harvesting activities in the offshore fishery. Most NL seafood is sold in international markets including the US, Europe, Africa, and Asia.

A.2 Fish, Food and Allied Workers Union

Fish harvesters and fish plant workers in Newfoundland and most of Labrador are represented by one organization – the FFAW. The fishing industry provides over 22,000 direct employment opportunities in the province and has an annual value of $ 1 billion. There are 40 species of fish harvested in NL; the most lucrative being snow crab and shrimp. Together, these fisheries represent close to 80% of the provincial landed value and are harvested in close proximity to existing petroleum installations and areas of exploration.

A.3 Canadian Association of Petroleum Producers

The Canadian Association of Petroleum Producers (CAPP) represents companies, large and small, that explore for, develop and produce natural gas and crude oil throughout Canada. CAPP's member companies produce more than 90 per cent of Canada's natural gas and crude oil. CAPP's associate members provide a wide range of services that support the upstream crude oil and natural gas industry. Together CAPP's members and associate members are an important part of a national industry with revenues of about $100 billion-a-year. CAPP has offices in St. John's, Newfoundland and Labrador, Halifax, Nova Scotia, Calgary, Alberta and Ottawa, Ontario.

A.4 One Ocean Working Group

To enhance the functioning of the One Ocean organization, a Working Group was formed in 2009. One Ocean Working Group members are representatives of the fishing and petroleum entities on the One Ocean Board and appointed by its Directors. At the direction of the Board, the Working Group reviews joint industry initiatives providing insight and perspective at the working level and brings its considerations and recommendations to the Board. This process optimizes the Board's ability to make informed decisions in a timely and comprehensive manner when it convenes four times a year.

APPENDIX B: RESEARCH ENTITIES

There are several entities which facilitate and fund petroleum related research and development projects. The scope of the research varies from international, national to local initiatives and includes health and safety, security, social responsibility and physical and biological environmental studies. For more information on these organizations and to access reports on seismic research, the following links are provided for reference:

- Petroleum Research Newfoundland and Labrador: http://www.pr-ac.ca
- Environmental Studies Research Funds: http://www.esrfunds.org
- Offshore Energy Environmental Research: http://www.offshoreenergyresearch.ca
- International Association of Oil and Gas Producers: http://www.ogp.org.uk

Appendix C: Seismic Survey Program Contact List

SEISMIC SURVEY PROGRAM CONTACT LIST	
PROGRAM	
Program Name:	
Program Date: (day/month/year) Start:	To:
SEISMIC VESSEL	
Name:	Master:
Bridge Cell:	Master Cell
Fax Cell:	Inmarsat:
SCOUT/CHASE VESSEL	
Name:	Master:
Bridge Cell:	Master Cell
Fax Cell:	Inmarsat:
OTHER VESSEL	
Name:	Master:
Bridge Cell:	Master Cell
Fax Cell:	Inmarsat:
FISHERIES LIAISON OFFICER (FLO)	**ONBOARD CLIENT REPRESENTATIVE**
Name:	Name:
Email:	Email:
Contact Number:	Contact number:
Vessel Aboard:	Vessel Aboard:
SINGLE POINT OF CONTACT (SPOC)	**PETROLEUM INDUSTRY LIAISON**
Name:	Name:
Email:	Email:
Contact Number:	Contact number:
OPERATOR ENVIRONMENTAL LEAD	**OPERATOR REGULATORY ADVISOR**
Name:	Name:
Email:	Email:
Contact Number:	Contact number:
Address:	Address:

Appendix D: Seismic Survey Program Check List

SEISMIC SURVEY PROGRAM CHECK LIST		
PROGRAM		
Program Name:		
Program Date: (day/month/year) Start:	To:	
CHECKLIST: Onboard Client Representative (OCR) and Fisheries Liaison Officer (FLO)		
Contract Agreement for FLO services complete; required certification confirmed	FLO □	OCR □
Confirm FLO Objectives, Operational Responsibilities, Protocols and Communications	FLO □	OCR □
Confirm reporting protocol for fishery gear observations and incidents with Operator and Client Representative		
Confirm FLO has required equipment: Laptop Binoculars Camera Fisheries Summary Report Seismic Survey Contact List Daily and Weekly Report Forms Incident Report Forms One Ocean Seismic Protocol One Ocean Matrix	FLO □	OCR □
Review Summary Report prepared by PIL	FLO □	OCR □
Confirm the provision of daily VMS data to the CR and FLO by the Operator	FLO □	OCR □
Participate in pre-departure orientation/safety meeting	FLO □	OCR □
Confirm Seismic Survey Program Contact List has been received and information verified		
Confirm FLO has been introduced to Vessel Master and CR	FLO □	OCR □
Participate in CAPP, FLO Video presentation at pre-departure	FLO □	OCR □

Appendix E: The Daily Report Spreadsheet

1. Name of FLO
2. Date and time of entry (three specific times 0600, 1200 and 1800)
3. Name of Seismic Vessel
4. Seismic Program
5. Latitude
6. Longitude
7. Activity of Seismic Vessel
8. Fishing Activity
9. Name of Fishing Vessel
10. Number of Fishing Vessel
11. Vessels Contacted
12. Activity of Fishing Vessel
13. Water Depth
14. Gear Type
15. Weather/Wind
16. Visibility
17. Sea State
18. Incidents
19. Comments

Fishing Gear Observations:

20. Time of sighting
21. Gear Type and Quantity (if known)
22. Latitude and Longitude
23. Owner (if known)
24. Condition of gear (active, abandoned or adrift)
25. Type of Communication made (observation, radio, information relayed from a project vessel).

Appendix F: Fishing Gear Incident Report Form

1. Exploration Vessel Name:
2. Did fishing gear appear to be damaged by the contact? Y N
3. Person completing report:
4. Position
5. E-mail/Phone No:
6. How was incident discovered and by whom:
7. Date of incident:
8. Time of incident/discovery:
9. Location of the incident: Lat: Long:
10. Name of fishing vessel (if known):
11. CFV No (on gear/buoy):
12. Vessel Skipper/Owner:
13. Address:
14. Telephone/Fax No:
15. Wind / weather / visibility / sea state at time of incident or discovery:
16. Describe the type and quantity gear recovered (including any identifying marks / numbers, etc.):
17. Describe what the exploration vessel was doing at the time of the incident and retain any data on the ship's positions during the preceding 24 hours:
18. Describe what the fishing vessel was doing at the time of the incident:
19. Draw a sketch/diagram showing the position of the exploration vessel/gear in relation to the gear, fishing vessel:
20. Note if photographs were taken:
21. Describe any measures the exploration vessel took to recover gear, or to stop or limit the damage or loss:
22. Names of any other vessels in the area before/during the time of the incident:
23. Describes steps taken to notify fishing vessel or others:
24. Other pertinent information / remarks (use extra sheets if necessary):