AMENDMENT TO THE ENVIRONMENTAL ASSESSMENT OF THE PORT AU PORT BAY EXPLORATION DRILLING PROGRAM

Prepared by

LGL LIMITED
environmental research associates

for

SHOAL POINT energy

January 2013
Project No. SA1174

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Table of Contents

Page

List of Figures

Page

List of Tables

Page

1.0 Introduction

Shoal Point Energy Ltd. proposes to drill a side track to its current well at Shoal Point, NL and conduct a near-wellbore stimulation of the target Green Point Shale Formation (Figure 1). This initiative is intended to provide proper evaluation of the hydrocarbon potential of this well. If the side track proves inadequate for near-wellbore stimulation, Shoal Point Energy Ltd. proposes to drill a new well on the same well site (i.e., metres from 3K-39Y borehole) to the same target which would be used for near-wellbore stimulation. The drilling activities to be undertaken as part of this amendment were addressed in a previously approved environmental assessment (EA) (LGL 2007a), its addendum (LGL 2007b), and a subsequent update (LGL 2010) (**CEAR No. 07-01-27358**) (Figure 1). However, the proposed near-wellbore stimulation was not addressed in that approval hence the requirement for this Amendment.

The purpose of this Amendment is twofold: (1) to describe and evaluate near-wellbore stimulation activities, and (2) to extend the temporal scope of the original assessment.

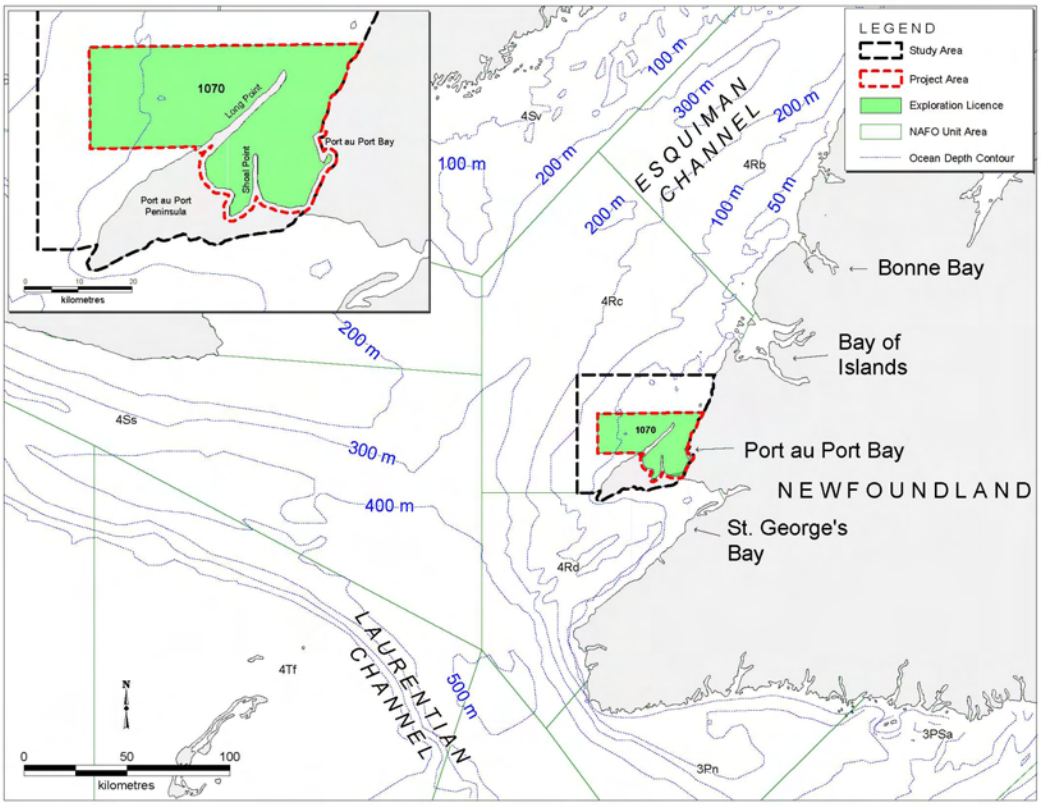


Figure 1: Location of Current Environmental Assessment Study and Project Area

2.0 Rationale for Near-wellbore Stimulation at Shoal Point

The Green Point Shale Formation is an approximately 2000m thick geological formation of various shales and siltstones mixed with carbonate rocks that overlays a larger carbonate rock formation underneath the Port au Port Peninsula. The formation itself runs up and down the west coast of the Island of Newfoundland as far as the Port au Port Peninsula to the south and Daniel's Harbour to the north (Figure 2).

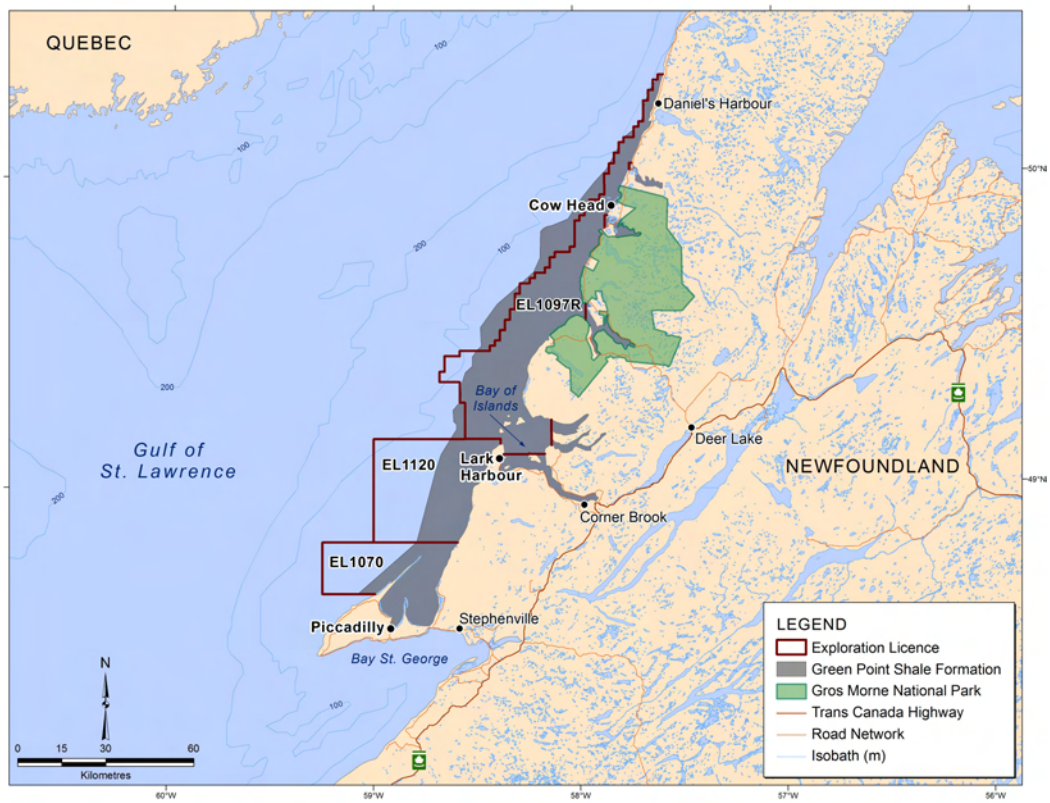
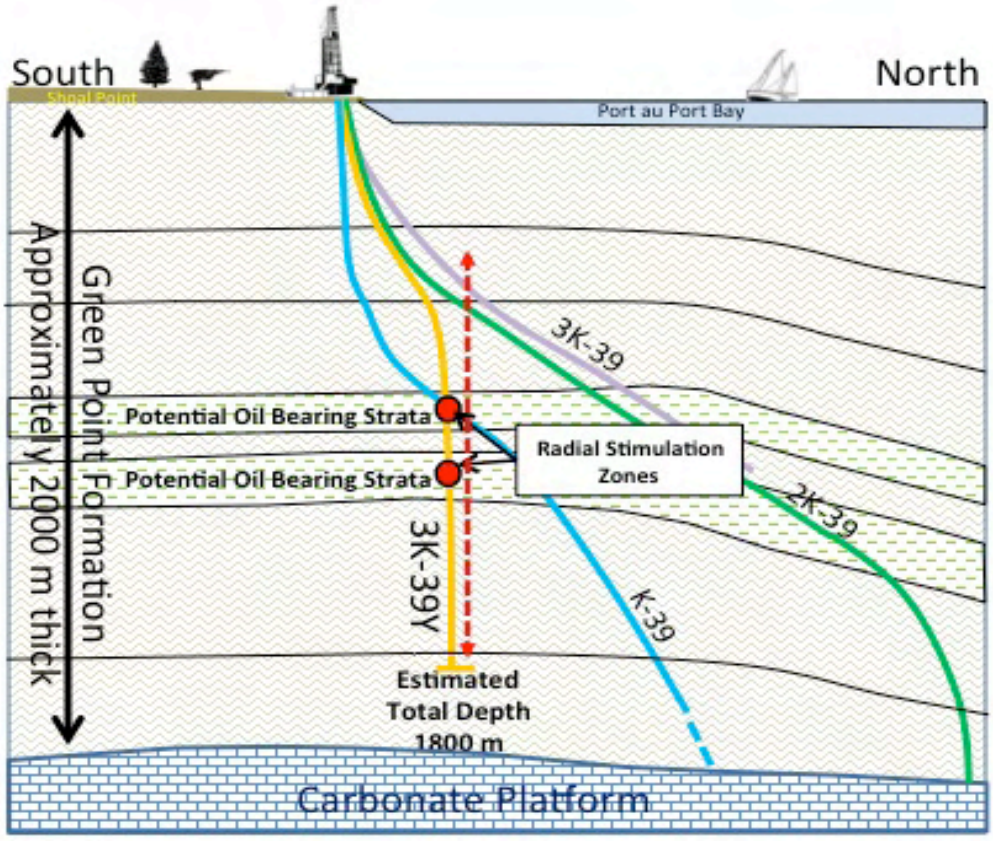


Figure 2: Extent of the Green Point Shale Formation

This formation has been explored by three previous wells (Shoal Point K-39, 2K-39 and 3K-39/3K39z) in recent years. After initial testing of the 3K-39Z wellbore in 2012 it was found that near-wellbore stimulation will be required in order to flow hydrocarbons into the wellbore and allow proper testing and evaluation of the economical and moveable oil and hydrocarbons reserves within the reservoir.

It is proposed that a sidetrack (3K-39Y) and possibly a new well on the same well site be drilled with the intention of running a near-wellbore stimulation at approximately 950 and 1200m depth (Figure 3). These stimulations will produce radial fractures of approximately 25-35m in extent, which will be well within the region of the potential oil-bearing zones as indicated in Figure 3.

Figure 3: **Geological Strata, Previous and Planned Well Bores, and Approximate Locations of Proposed**



Near-wellbore Stimulation Zones

3.0 Description of the Near-Wellbore Stimulation Operation

3.1 Conduct of the Operation

Shoal Point Energy Ltd. is proposing to carry out a low rate ($3m^3$/min) high viscosity near-wellbore stimulation that will use approximately 11 tonnes of a proppant, such as sand, meant to keep any induced fractures in the formation open once created, and approximately $100m^3$ of treated seawater. This planned near-wellbore stimulation job is 5–10% of the volume used for a typical shale stimulation job, which on average uses $2000m^3$ of fluid and 150 tonnes of proppant. The seawater and sand mixture used in the near-wellbore stimulation process will also contain several additional chemical additives that will constitute approximately 0.5% of the total volume. Table 1 provides a list of the typical chemical additives used in this kind of near-well bore stimulation operation.

Table 1: **Typical Chemical Additives Used in Near-wellbore Stimulations**

Additive	Purpose
Acid	To dissolve minerals to help initiate near-wellbore fractures
Polyacrlymide	To minimize friction between fluid and pipe
Ethylene glycol	To minimize scale deposits on drill pipe
Borate Salts	To maintain viscosity of the fluid as temperature increases
Sodium or Potassium carbonate	To help ensure stability of other additives
Biocide (e.g. glutaraldehyde)	To eliminate bacteria in seawater
Guar Gum	A thickener to maintain sand in the seawater
Citric Acid	To prevent deposition of metal oxides
Isopopanol	To increase the viscosity of the near-wellbore stimulation fluid

This mixture will be pumped down the wellbore to specific locations 950 and 1200m below the surface. The resulting pressure, exerted along those specific sections of the wellbore (Figure 3), will fracture the surrounding rock allowing hydrocarbons to flow into the wellbore. This will allow Shoal Point Energy Ltd. to properly test the mobility of the hydrocarbon while keeping a safety factor in place for fracture growth and minimizing the waste disposal of fluids used. This will also allow Shoal Point Energy Ltd. to further calibrate the models and properly assess plans for safe, economic and environmentally responsible production of hydrocarbons.

Based on preliminary modeling, the proposed near-wellbore stimulation will be limited and controlled in terms of horizontal fracture propagation with an anticipated radial fracture of 25-35m of net height growth and length. At Shoal Point 3K-39Y, the Green Point Shale Formation, owing to its original

stratigraphic thickness and structural repetition, is anticipated to be many times thicker than the anticipated fracture propagation height discussed herein. Based on the structural interpretation that the beds are sub-horizontal or dipping gently to the southeast, it is expected that energy will be selectively propagated parallel to bedding planes and thus mainly in a horizontal or sub-horizontal direction. Furthermore, the Green Point Shale Formation is a highly cyclical, stratified unit with a highly planar fabric, which should serve to strongly concentrate fracturing energy along and parallel to the bedding planes rather than perpendicular to them.

Fracture growth will be monitored through observations and analysis of surface pressures and responses. Pressures will be monitored via an electronic data van that is capable of plotting real time data on pressures rates and thereby allow Shoal Point Energy Ltd. to estimate the fracture geometry. After stimulation is completed, Shoal Point Energy Ltd. will complete a “pressure match" on the simulators and verify the fracturing geometry. Initial smaller near-wellbore stimulations will allow Shoal Point Energy Ltd. to understand the geometry and rock properties.

The well design, its vertical depth and the horizontal offset of the stimulation make risk to groundwater negligible. The well will be designed using industry best practices for casing and cementing operations, ensuring the protection of groundwater sources. Boswarlos, the community closest to Shoal Point 3K-39Y, is about 8km from the drill site (see Figure 4.3 in the original EA [LGL 2007a]). Based on information related to domestic water wells that have been drilled in Boswarlos, the average depth at which groundwater is found (i.e., where the water table was intercepted or depth to the aquifer) is approximately 30m, and the average domestic water well depth is approximately 40m. According to the original EA (Section 4.1.4.2 in LGL 2007a), there were 173 listed groundwater wells on the Port au Port Peninsula, ranging in depth from six to 154m. Near-wellbore stimulation will occur at a lateral offset of several hundred metres offshore and well below the surface casing. The anticipated geology above and below the stimulation zone will act to contain the stimulation. The natural state of the rock above and below the stimulation zone makes it impermeable so that it can act as sealing units. The thickness of the zone of stimulation represents a small fraction of the total thickness of the Green Point Shale Formation that will be penetrated (see Figure 3).

Shoal Point Energy Ltd. will follow industry best practices with respect to testing of domestic water wells and participation in longer term regional groundwater monitoring programs. The company also plans to deploy geophones to monitor noise vibration levels during near-wellbore stimulation activities

The well site area will not have to be expanded beyond that of the previous drilling operations to accommodate the stimulation equipment.

3.2 Waste Management

Management of the typical waste streams associated with drilling of the side-track and possibly a new well contemplated in this Amendment is addressed in the previously approved EA (LGL 2007a), its addendum (LGL 2007b), and update (LGL 2010). All waste management will be conducted in accordance with the commitments provided in those documents.

The additional waste stream that will result from the near-wellbore stimulation activities described in this Amendment include the well stimulation fluids (primarily seawater) described above that would flow back to the wellhead as a result of the near-wellbore stimulation. Typical recovered volumes range from 15% - 50% of the total volume injected as part of a well stimulation. Any waste fluid will be recovered to bermed storage tanks. Specifics regarding transportation and final disposal of this waste will be determined by the composition of the fluid. Based on $100m^3$ injection volume and the higher end value of 50% return to surface (i.e., $50m^3$), it will be a single disposal. The disposal will be conducted as per local regulatory requirements by a certified waste management contractor.

3.3 Accidental Events

Shoal Point Energy Ltd. regards the environmental predictions and consequent mitigations in the original EA (LGL 2007a) and the associated addendum (LGL 2007a), and associated significance determinations as still valid. Shoal Point Energy Ltd. commits to implementing the mitigation measures described in the original EA (LGL 2007a), its addendum (LGL 2007b) and the update (LGL 2010) during the proposed drilling of the side track to its current well at Shoal Point and possibly a new well on the same well site, and the near-wellbore stimulation of the target Green Point Shale Formation.

4.0 Scope of the Original Environmental Assessment

4.1 Spatial Scope

The Project Area (i.e., the area within which all project activities were planned to occur during 2007-2012) of the original EA (LGL 2007a) was defined as the extent of exploration lease (EL) 1070) (Figure 1). The Study Area of the original EA (LGL 2007a) was primarily based on the oil spill trajectory modeling conducted for that EA. The spatial scope as defined by these two areas remains unchanged.

4.2 Temporal Scope

The original temporal scope of the drilling program was 'year-round' for the 2007-2012 period. The proponent requests that the temporal scope be extended to December 31, 2014 to allow for proper planning, mobilization of equipment and safe operational execution for the activities associated with the proposed drilling of the side track and possibly a new well on the same well site, and subsequent near-wellbore stimulation. The current anticipated start of these activities is April 2013.

4.3 Review of the Conclusions of the Original Environmental Assessment

Shoal Point Energy Ltd. has reviewed the information presented in the original EA (LGL 2007a) in consideration of the need to conduct the drilling of the sidetrack and possibly a new well on the same well site, and subsequent near-wellbore stimulation described in Section 3.0 of this Amendment.

4.4 Valued Ecosystem Components

The Valued Ecosystem Components (VECs) remain the same as defined in the original EA (LGL 2007a) remain unchanged, namely:

- Marine macro-invertebrate/fish habitat;
- Marine macro-invertebrates/fishes;
- Marine commercial fisheries;
- Marine-associated birds;
- Marine mammals and sea turtles;
- Rare terrestrial vegetation;
- Freshwater fish and fish habitat; and
- Species at Risk

The key issues related to these VECs remain the same as those discussed in the original EA (LGL 2007a), its addendum (LGL 2007b) and the update (LGL 2010). The addition of activities associated with near-wellbore stimulation does not raise any new issues or concerns related to the VECs listed above.

The following two sections briefly discuss the commercial fisheries and Species at Risk relevant to the Study Area, and whether there are any differences relative to their descriptions in the recent update (LGL 2010) to the original EA (2007a).

4.4.1 Commercial Fisheries

The 2009-2010 DFO commercial fishing landings data were analyzed using the same methods used for the 2004-2006 data in the original EA (LGL 2007a) and the 2007-2008 data in the update document (LGL 2010). The 2011 commercial fishing landings data for NAFO Unit Area 4Rc were not available at the time of writing this Amendment. Analysis of the 2009-2010 data indicated the same trends that were presented in the original EA (LGL 2007a) and the EA Update (LGL 2010). Pelagic species (mackerel, capelin and herring) dominated the commercial catches within the Project and Study Areas in terms of landings weight, followed by Atlantic cod, lobster and snow crab (Table 2). In terms of catch value during 2009-2010, the primary species were, in descending order, lobster, mackerel, herring, capelin, cod, snow crab and Atlantic halibut (Table 3)

Table 2: Reported Catch Weights of Predominant Commercial Species in NAFO Unit Area 4Rc, 2009 and 2010.

Species	2009		2010		2009+2010	
	Tonnes	% of Total Catch Weight	Tonnes	% of Total Catch Weight	Tonnes	% of Total Catch Weight
Atlantic herring	10,707	53.9	4,393	37.1	15,100	47.7
Atlantic mackerel	4,045	20.4	5,195	43.9	9,240	29.2
Capelin	4,116	20.7	1,442	12.2	5,558	17.5
Atlantic cod	423	2.1	270	2.3	693	2.2
American lobster	313	1.6	296	2.5	609	1.9
Snow crab	96	<1	100	<1	196	<1
Greenland halibut	62	<1	21	<1	83	<1
Atlantic halibut	48	<1	33	<1	81	<1
Total of 8 Species	**19,810**	**99.8**	**11,750**	**99.3**	**31,560**	**99.6**

Table 3: Reported Catch Values of Predominant Commercial Species in NAFO Unit Area 4Rc, 2009 and 2010.

Species	2009		2010		2009+2010	
	$K	% of Total Catch Value	$K	% of Total Catch Value	$K	% of Total Catch Value
American lobster	2,344	29.9	2,149	33.6	4,493	31.6
Atlantic mackerel	1,248	15.9	2,292	35.8	3,540	24.9
Atlantic herring	2,360	30.1	872	13.6	3,232	22.7
Capelin	635	8.1	175	2.7	810	5.7
Atlantic cod	462	5.9	282	4.4	744	5.2
Snow crab	309	3.9	298	4.7	607	4.3
Atlantic halibut	325	4.1	213	3.3	538	3.8
Greenland halibut	107	1.4	44	<1	151	1.1
Total of 8 Species	**7,790**	**99.4**	**6,325**	**98.8**	**14,115**	**99.1**

Based on available geo-referenced data, the three pelagic fish species indicated above accounted for most of the commercial catches in Port au Port Bay in 2009 and 2010 (Table 2), primarily with mobile gear. Lobster and scallop fisheries are also prosecuted within Port au Port Bay but these data are not geo-referenced. Lobster fishing within Port au Port Bay is conducted in the immediate vicinity of Shoal Point.

4.4.2 Species at Risk

The following points outline the changes to status designations of plants and animals on the federal *Species at Risk Act* (*SARA*) Schedule 1 and Newfoundland and Labrador's *Endangered Species Act* (*ESA*) presented in Table 5.1 of the Update document (LGL 2010).

- Addition of Olive-sided Flycatcher (*Contopus cooperi*) to *SARA* Schedule 1, designated as *threatened*, and to NL *ESA*, designated as *threatened*

Table A1-1 (Appendix 1) includes the change indicated above as well as the corresponding COSEWIC designations.

Numerous versions of relevant Recovery Strategies, Recovery Plans and Management Plans have been prepared since the Update to the EA (LGL 2010) was completed. Federal Recovery Strategies have been prepared for the beluga whale, St. Lawrence Estuary population (final version) (DFO 2012), the Piping

Plover, *melodus* subspecies (proposed version) (EC 2012a), American marten, Newfoundland population (proposed version) (EC 2012b), the woodland caribou, boreal population (proposed version) (EC 2011a), Long's braya (final version) (EC 2012c), and Fernald's braya (final version) (EC 2012c). Final versions of Federal Management Plans for the banded killifish, Newfoundland population (DFO 2011) and Fernald's milk-vetch (EC 2011b) were also released since completion of the Update (LGL 2010). In terms of Newfoundland and Labrador documents, a Recovery Plan for the American marten (NMRT 2010) and a Management Plan for the American eel (NLWD 2010) were released since completion of the EA Update (LGL 2010).

None of the above Recovery Strategies, Recovery Plans and Management Plans changes the mitigation measures to which the Proponent is currently committed for the proposed drilling of the sidetrack and possibly a new well on the same well site, and the subsequent near-wellbore stimulation.

The assessments of the potential effects on the Species at Risk VEC conducted in the original EA (LGL 2007a) remain valid for this Amendment. No critical habitat has been identified in the Study Area since completion of the original EA (LGL 2007a), its addendum (LGL 2007b) and subsequent update (LGL 2010).

4.4.3 Notable Areas

Biologically notable marine and terrestrial areas located within the Study Area were described in Section 5.2 of the original EA (LGL 2007a). Within or adjacent to Port au Port Bay itself, these areas include a lobster spawning area at the mouth of Port au Port Bay, wetlands on Shoal Point, salt marshes and old growth forest in coastal areas west of Shoal Point, and limestone barrens and salt marshes in coastal areas east of Shoal Point. No changes to these identified notable areas have been reported since the preparation of the original EA (LGL 2007a). More discussion of these areas as well as other biologically notable areas within the Study Area is presented in the original EA (LGL 2007a).

5.0 Consultations with Stakeholders and the Public

During September to November 2012, Shoal Point Energy Ltd. has met with various stakeholders and the public. Stakeholder groups/persons were consulted individually while the public was invited to attend a meeting at Piccadilly in November.

5.1 Stakeholder Consultation

Since September 2012 Shoal Point Energy Ltd. has held meetings with specific stakeholders and an open public meeting related to this Amendment. At all these meetings, Shoal Point Energy Ltd. presented a description of the activities to be addressed by this Amendment and then responded to questions and concerns raised by participants. Stakeholder organizations and key persons consulted, as well as dates of the meetings, are indicated in Table 4.

Table 4: Stakeholder Organizations and Key Persons Consulted

Organization	Contact	Date
MHA for Humber West	Vaughan Granter	October 2, 2012
MHA for Port au Port	Tony Cornect	October 3, 2012
Long Range Regional Economic Development Board	John MacPherson	October 3, 2012
Port au Port Economic Development Association	Christina Kendall	October 24, 2012
ARCO - Francophone Association of Western NL	Katherine Fenwick	October 24, 2012
FFAW	Johan Joensen	October 30, 2012
One Ocean	Maureen Murphy-Rustad	October 30, 2012

The issues that arose during the meetings with stakeholders indicated in Table 4 were primarily related to the potential spinoffs from the proposed activities (e.g., employment, local contractor opportunities, etc.), additional information on near-wellbore stimulation, timing of proposed activities, and possible interactions with the fishing industry. Shoal Point Energy Ltd. indicated that it will make every effort to use local personnel and contractors provided they have the required certification and industry experience. A full presentation with video was made to thoroughly describe the entire drilling process including near-wellbore stimulation. Stakeholders were told that proposed activities will commence in April 2013. Shoal Point Energy Ltd. indicated that the level of interaction with the fishing industry would be minimal considering the location of the various proposed activities (i.e., onshore drilling rig and subsea drilling and completion activities).

5.2 Public Consultation

A public consultation meeting was held on 13 November 2012 at the Piccadilly Community Centre. This meeting was organized with the assistance of local agencies and groups including the Port au Port Economic Development Association, the Long Range Regional Economic Development Board and officials with the Roman Catholic Parish, and several Town Councils in the area. About 40 local residents and agency representatives attended the Piccadilly meeting.

Following a detailed presentation by Shoal Point Energy Ltd. representatives, project managers invited comments and questions from the audience.

Most of the comments and issues raised pertained to project-related local and area economic development spin-offs and future employment and training opportunities, as well as to a number of concerns regarding potential negative effects of proposed drilling and near-wellbore stimulation activities.

People asked how many jobs would eventually be available for local residents, if there would be employment opportunities for women in particular and what training programs might be put in place. People wanted to know what specific kinds of jobs might be available so that local residents could make plans to undertake the appropriate training in advance of these potential employment opportunities. Shoal Point Energy Ltd. indicated that during the exploration phase, the number of jobs available to local residents would be limited to the drilling rig personnel and local contractors, and that the majority of jobs during the exploration phase would be filled by external contractors and not directly by the proponent. Shoal Point Energy Ltd. will support the hiring of women by the external contractors provided that they meet the criteria for the position being advertised. Shoal Point Energy Ltd. will be willing to work with training providers to identify the potential job opportunities and determine whether there are relevant training courses offered in the area.

Questions and concerns were raised about the escape of natural gas (e.g., including possible hydrogen sulfide) from exploration and production drilling operations and about the potential effects on ground water of any toxic chemicals that Shoal Point Energy Ltd. planned to use in the near-wellbore stimulation process. Local fishers attending the meeting asked if drilling activities and/or or the proposed near-wellbore stimulation process would affect established harvesting operations or fisheries resources. Shoal Point Energy Ltd. indicated that there has been very little natural gas found in the wells that the company has drilled in the area to date. However, the company does follow industry best practices related to the management of natural gas, including hydrogen sulfide. A full presentation with video was made to thoroughly describe the entire drilling process, including near-wellbore stimulation and management of related chemicals. Shoal Point Energy Ltd. indicated that the level of interaction with the fishing industry will be minimal considering the location of the various proposed activities (i.e., onshore drilling rig and subsea drilling and completion activities).

There were also questions about the amount and source of the water that would be used in the fracturing process. It was noted that many local wells have been drying up, especially this past summer, and so there was a concern raised that drilling and fracturing activities could exacerbate this situation. In response to these particular concerns, representatives of Shoal Point Energy Ltd. noted that the near-wellbore stimulation process would be using treated seawater. When asked how any produced oil would be transported, Shoal Point Energy Ltd. indicated that this would be decided as part of a development plan but would likely be via tanker trucks during the early stages.

5.3 Follow-up Consultations

Shoal Point Energy Ltd. will continue to meet with the local communities leading up to and during the planned operational activities. The timing and location of these meeting will be communicated to key local stakeholders once the details have been finalized. The company believes that having a solid relationship with the communities in which it works and encouraging open exchange of information are key elements in the success of its operations.

6.0 Conclusion

Shoal Point Energy Ltd. commits to the mitigation measures contained in the original EA (LGL 2007a), its addendum (LGL 2007b) and subsequent update (LGL 2010) as well as those mitigation measures for near-wellbore stimulation activities discussed in this Amendment. The mitigations specific to near-wellbore stimulation are as follow:

- Adherence to Industry Best Practices;
- Maintenance of at least 250m distance between wellhead and domestic freshwater wells;
- Water quality (e.g., total petroleum hydrocarbons [TPH] or some other indicator) and water quantity testing of onshore domestic freshwater wells located within 1,000m of wellhead;
- Holding of stimulation waste fluids in bermed storage tanks until transport by tanker truck;
- Disposal of stimulation waste fluids by certified waste management contractor;
- Requirement for all service providers to either have ISO 14001 Environmental Management System Certification or be actively pursuing this certification; and
- Deployment of geophones to monitor drill-related vibrations at the seabed.

Shoal Point Energy Ltd. concludes that with the application of the mitigation measures noted above, the residual environmental effects of the activities discussed in this Amendment are predicted to be *not significant.*

7.0 Literature Cited

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EC (Environment Canada). 2011b. Management Plan for Fernald's Milk-vetch (*Astragalus robbinsii* var. *fernaldii*) in Canada. *Species at Risk Act* Management Plan Series, Environment Canada, Ottawa, iv + 14 pp. – FINAL

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Environment Canada. 2012c. Recovery Strategy for Long's Braya (*Braya longii*) and Fernald's Braya (*Braya fernaldii*) in Canada. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa. v + 38 p. – FINAL

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Appendix 1 : Species at Risk

Table A1-1: *SARA* Schedule 1 and *ESA* Listed Species with Likelihood of Occurrence in the Geographic Area of the Drilling Program

Species	*SARA* (Schedule 1)[1]			COSEWIC[2]			*ESA*[3]		
	Endangered	Threatened	Special Concern	Endangered	Threatened	Special Concern	Endangered	Threatened	Vulnerable
Marine Associated Species									
Mammals									
Blue whale (*Balaenoptera musculus*) (Atlantic population)	X			X					
North Atlantic right whale (*Eubalaena glacialis*)	X			X					
Beluga whale (*Delphinapterus leucas*) (St. Lawrence Estuary population)		X			X				
Fin whale (*Balaenoptera physalus*) (Atlantic population)			X			X			
Reptiles									
Leatherback sea turtle (*Dermochelys coriacea*)	X			X					
Fish									
Northern wolfish (*Anarhichas denticulatus*)		X			X				
Spotted wolfish (*Anarhichas minor*)		X			X				
Atlantic wolfish (*Anarhichas lupus*)			X			X			
American eel (*Anguilla rostrata*)					X				X
Birds									
Piping Plover (*melodus* subspecies) (*Charadrius melodus melodus*)	X			X			X		
Ivory Gull (*Pagophila eburnean*)	X			X			X		
Red Knot (*Calidris canutus rufa)*							X		
Harlequin Duck (*Histrionicus histrionicus*)			X			X			X

[1] *SARA* website (http://www.sararegistry.gc.ca/default_e.cfm) (December 2012)
[2] COSEWIC website (http://www.cosepac.gc.ca/index.htm) (December 2012)
[3] ESA (Government of Newfoundland and Labrador) website (http://www.env.gov.nl.ca/env/wildlife/wildlife_at_risk.htm) (December 2012)

Species	*SARA* (Schedule 1)[1]			COSEWIC[2]			*ESA*[3]		
	Endangered	Threatened	Special Concern	Endangered	Threatened	Special Concern	Endangered	Threatened	Vulnerable
Terrestrial & Fresh Water Species									
Mammals									
American marten (*Martes americana atrata*) (Newfoundland population)		X			X			X	
Woodland caribou (*Rangifer tarandus caribou*) (Boreal population)		X			X			X	
Fish									
Banded killifish (*Fundulus diaphanus*) (Newfoundland population)			X			X			X
Birds									
Red Crossbill (*percna* subspecies) (*Loxia curvirostra percna*)	X			X			X		
Rusty Blackbird (*Euphagus carolinus*)			X			X			X
Short-eared Owl (*Asio flammeus*)						X			X
Olive-sided Flycatcher (*Contopus cooperi*)		X						X	
Gray-cheeked Thrush (*Catharus minimus*)									X
Peregrine Falcon (*anatum* subspecies) (*Falco peregrinus anatum*)		X				X			X
Plants									
Long's braya (*Braya longii*)	X			X			X		
Barrens willow (*Salix jejuna*)	X			X			X		
Fernald's milk-vetch (*Astragalus robbinsii var. fernaldii*)			X			X			X
Low northern rockcress (*Neotorulia humilis*)							X		
Fernald's braya (*Braya fernaldii*)		X			X			X	