



# E&P – EAST COAST

Document Number: TN-PE-EV01-X00-001		
Document Type: Procedure		
Document Title: Terra Nova Field Environmental Assessment Update		
System: 00	Review Cycle: 5 Years	Next Scheduled Review Date: May 25, 2017

Revision	Date	Description	Originator	Checked By	Checked By	Approved By
M1	May 25, 2012	Issued for Use	Environmental Consultant	Team Lead, Env., ER & Security	Manager, EH&S	Asset Manager, Terra Nova

REVISION SUMMARY FORM		
Current Revision	Revision Description / Purpose	Pages Revised
M1	New document	N/A

STANDARD DISTRIBUTION LIST			
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<b>MANAGEMENT OF CHANGE FORM FOR PROCEDURAL DOCUMENTS</b>		
<b>1. Change Category / Description</b>	<b>Y</b>	<b>N</b>
a. Is this a new document (not previously issued) or are major changes being made (examples of <b>major changes</b> include changes in process, responsibilities, requirements, frequency, type)?	✓	
b. If Major Change or New, provide a description of the purpose of the changes/document: <i>In the context of the replacement of risers, flowlines and jumpers during the 2012 Off Station Project (OSP), the Terra Nova Environmental Assessment Update determines if there are any potential environmental effects arising from this project that were not addressed in the original environmental assessment approved pursuant to Decision 97.02 in 1997 as part of the Terra Nova Development Plan.</i>		
c. Are minor changes being made (examples of <b>minor changes</b> include clarifying intent, correction of terminology or format with no change to the process)?	✓	
d. Are the changes being made as a result of facility/design modifications? If yes provide the MOC notification number: <i>2012 Off Station Project Plan</i>	✓	
<b>2. Assessment of Change</b>		
a. Do the changes have the potential to introduce new hazards or impact Safety or Environmentally Critical processes?		✓
b. Do the changes impact regulatory requirements (e.g. documents under the License to Operate, documents in the East Coast Management System, SAP routines)?	✓	
c. If <b>YES to a or b</b> , have representatives of those responsible for processes impacted by the change reviewed and accepted the proposed changes?	✓	
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a. Are all changes clearly identified / marked and summarized in the Revision Summary?	✓	
b. Did the review/issue processes include all those impacted by the changes?	✓	
c. Is the Standard Distribution List up to date?	✓	
<b>Completed by:</b>	<u>Greg Janes</u> Name	<u>Team Lead, Environment, ER &amp; Security</u> Position

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## 1.0 INTRODUCTION

In 1997 the Terra Nova Project, then under development by Petro Canada<sup>1</sup>, received an approval to proceed by virtue of Canada – Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) Decision 97.02 subsequent to a Canadian Environmental Assessment Act Panel Review of the project.

This document considers the replacement of risers, flowlines and jumpers, which are essential to the integrity of Terra Nova's subsea infrastructure, during an Off Station Project (OSP). Its purpose to determine if there are any potential environmental effects arising from this project that were not addressed in the original environmental assessment approved pursuant to Decision 97.02 in 1997 as part of the Terra Nova Development Plan.

## 2.0 PROJECT RATIONALE AND DESCRIPTION

### 2.1 Rationale

In 2010 Suncor confirmed the presence of hydrogen sulphide (H<sub>2</sub>S) in the Terra Nova Field (Field). The Field was designed for sweet service (i.e., no H<sub>2</sub>S present in the production fluids) and therefore the subsea risers, flowlines and jumpers that run between well heads within the excavated drill centres were not designed for exposure to significant concentrations of H<sub>2</sub>S for extended periods. H<sub>2</sub>S can potentially increase hydrogen induced and sulphide stress cracking that may lead to steel embrittlement and subsequent cracking of the pipes. At present, only one riser/flowline and one jumper are affected; however, reservoir modelling predicts that the remaining production, gas injection and gas lift risers and flowlines will eventually be exposed to H<sub>2</sub>S.

The evolution of H<sub>2</sub>S in the Terra Nova reservoir means that the risers, flowlines and jumpers (collectively referred to as flexible subsea piping) need to be replaced with new ones that are designed for long-term exposure to production fluids containing significant concentrations of H<sub>2</sub>S. The preferred replacement method is to disconnect the FPSO, move it off location, and submerge the spider buoy through which the risers pass to the FPSO. The Terra Nova FPSO is scheduled to be taken off location for a planned maintenance turnaround between June/July and October/November 2012 providing a suitable construction window for replacing the flexible subsea piping that is vulnerable to H<sub>2</sub>S.

### 2.2 Project Description

The purpose and scope of 2012 OSP is to complete the replacement of original production, gas injection and gas lift lines with appropriately rated H<sub>2</sub>S resistant risers, flowlines and jumpers (Figure 1). This program will require the in-field support of construction and diving support vessels.

The replacement of flexible subsea piping in the Terra Nova Field has been done in consultation with the St. John's, NL offices of Environment Canada (Marine Programs) and Fisheries and Oceans Canada (Habitat Protection Division), as well as the Department of Environment and Conservation (Waste Management Division) of the

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<sup>1</sup> In 2009, Suncor Energy merged with Petro-Canada, the operator of Terra Nova.

Government of Newfoundland and Labrador. Where necessary, required permits have been or will be obtained from the applicable Department.

### 2.2.1 Risers

After suspending oil production activities but prior to the Terra Nova FPSO disconnecting from the spider buoy, the hydrocarbon liquid and gas, chemicals, etc. normally in the flowlines, risers and jumpers will be recovered to the FPSO. The risers, flowlines and jumpers will be flushed back to the FPSO and the flowlines blinded or capped in accordance with requirements defined by the C-NLOPB.

After the flexible subsea piping has been flushed, the risers will be disconnected from the flowlines, which will require the removal and side casting of approximately 1,000 tonnes of protective rock berm, in total, from the connection points of the risers with the flowlines. All nine (9) existing production, gas injection and gas lift risers will be recovered and replaced during this construction program.

Once the risers are disconnected from the spider buoy and the flowlines on the seabed, they will be recovered to a construction vessel. The recovered risers will then be transported to and laid down within one of the two existing Terra Nova Waste Spoils Disposal Areas, which were originally established and permitted through the Environment Canada Ocean Disposal and Fisheries and Oceans Canada Fish Habitat Protection/Compensation processes for the disposal of marine sediments from the Project's drill centre construction program. Each disposal area measures 750 m by 750 m and they are located approximately two kilometres to the north and south of the Terra Nova Field respectively.

During the recovery of risers, buoyancy modules on the risers used to maintain the pliant S-curve in each riser to mitigate wave action, will be removed and placed on the vessel for disposal onshore. Marine growth on both the risers and the buoyancy modules will be removed prior to their recovery onto the vessel.

### 2.2.2 Flowlines

After the risers are disconnected, the existing flowlines will remain in situ on the ocean floor under their existing rock berms. There has been no decision regarding the final decommissioning and abandonment of these flowlines, but Suncor will ensure it is consistent with the Terra Nova development plan approval (C-NLOPB Decision 97.02) and other applicable C-NLOPB regulatory requirements.

Replacement flowlines will run parallel to the rock berms of each of the existing flowlines and will be self-stabilized, therefore not require trenching or stabilization by burial under a rock berm. However, the concrete mattresses, currently in the Field, will be reused and placed along the replacement flowlines at specific locations to be determined during final design review.

### 2.2.3 Jumpers

Eight (8) production and gas lift jumpers and nine (9) weak-link jumpers which connect the flowlines to subsea templates in the drill centres, will also need to be replaced during this construction program. As described for the risers and the flowlines, materials

contained in the jumpers (i.e., hydrocarbon liquid and gas, chemicals, etc.) will be recovered to the Terra Nova FPSO and the jumpers will be flushed and capped in accordance with requirements defined by C-NLOPB.

#### 2.2.4 Drill Centre Clean-Up

Prior to disconnecting and replacing the jumpers, drill centre clean-up will be required to relocate accumulated soft material (i.e., drill cuttings and sediments) from the existing jumper lines in the Northeast (NEDC), Northwest (NWDC) and Southwest (SWDC) Drill Centres. In total approximately 2,000 m<sup>3</sup> of soft material will need to be relocated from these three drill centres.

For the NEDC and SWDC, it is expected that the soft material will be relocated from inside the existing drill centre to one or more locations on the edges of the drill centres using a ROV with a subsea pump to a depth of approximately one metre.

Removal of this material is to permit divers to disconnect and reconnect the jumpers. For the NWDC, it is expected that the soft material can be relocated within the drill centre. As no activity is planned in the Southeast Drill Centre (SEDC), there is no requirement for material clean.

After drill centre clean up has been completed, the existing jumpers will be recovered to the construction vessel. As described for the risers and buoyancy modules, if marine growth is present on the jumpers, it will be removed prior to recovering the equipment to the vessel. After the jumpers have been recovered to the construction vessel, they will be transported to and laid down within one of the two Terra Nova waste spoils disposal areas described previously.

New production and gas lift jumpers will be installed in approximately the same paths as the existing jumpers to connect the new flowlines to the subsea templates in the drill centres.

#### 2.2.5 Ancillary Equipment

In addition to the risers, flowlines and jumpers, ancillary materials associated with this equipment, including but not necessarily limited to the following, must also be removed, replaced and/or recovered: end fittings, buoyancy modules on risers, dropped object protection, bend restrictors and stiffeners, and stabilization materials and mattresses. With the exception of the mattresses, all ancillary materials will be recovered and transported to shore for disposal. These materials will be disposed of in accordance with applicable legislation and in consultation with the Government of Newfoundland and Labrador.

There are also approximately 60 concrete mattresses that will be relocated during the construction program. Each mattress is 5 m x 3 m x 0.5 m and weighs 23 tonnes in air and 16 tonnes in water. These mattresses are typically located between the riser touchdown point and the riser / flowline connection point. Most of the relocated mattresses will be reused on the new flowlines; however, final and specific placement of these mattresses will depend on final engineering design.



#### 2.2.6 Southwest Drill Center Satellite Equipment

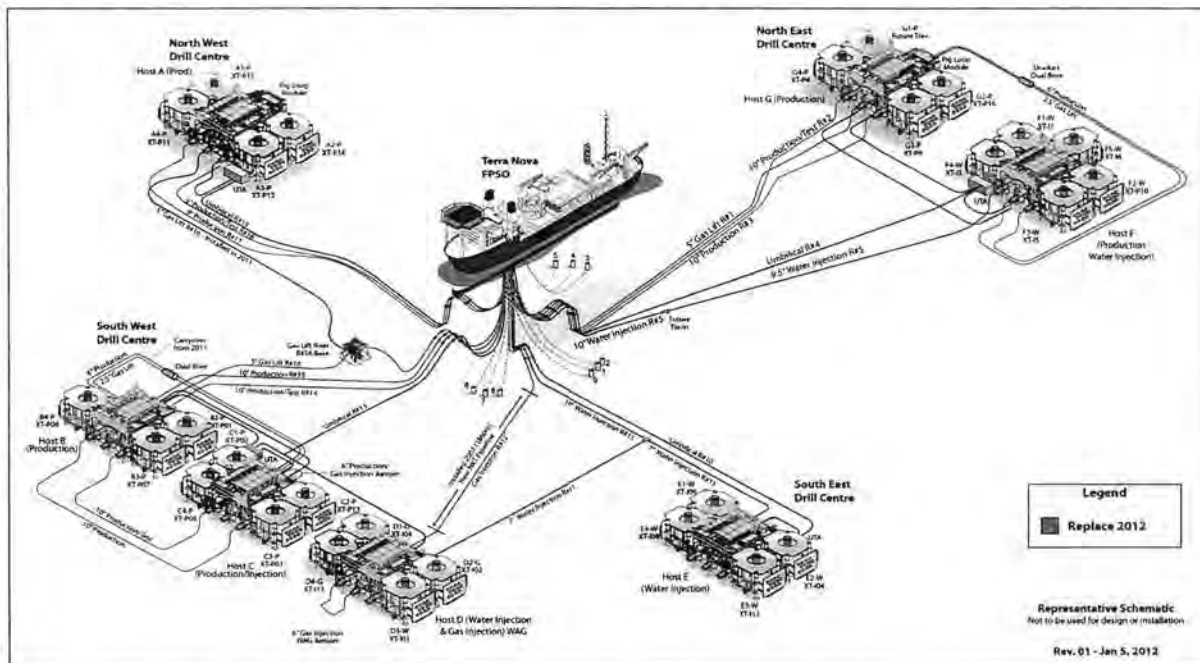
Finally, in addition to the riser, flowline and jumper replacements Suncor will also be installing additional satellite equipment in the SWDC to facilitate the continued development of the Terra Nova Field. Included in the installation will be new production and injection satellites, a subsea distribution unit, a gas lift supply module and a manifold extension module. The stand-alone satellite wells will be placed in the available space in the SWDC and connected to using existing hosts with flexible jumpers.

#### 2.2.7 Discharges from Subsea Equipment

As noted previously before disconnecting any of the flexible subsea piping it will be flushed back to the Terra Nova FPSO in accordance with direction from the C-NLOPB that will ensure minimal amounts of residual crude oil and associated chemicals remain. Notwithstanding this when piping disconnects are carried out there is a risk of residual amounts of seawater with entrained crude oil and chemicals (e.g., glycols, oxygen scavengers, corrosion inhibitors, biocides and dyes) being released until stabilized with the hydrostatic pressure of the water column.

Suncor has submitted its Terra Nova Integrated Swivel Turnaround - 2012 Off-station Production Suspension Plan (TN-PE-OP02-X00-009) to the C-NLOPB that provides details of the expected discharges from the subsea infrastructure replacement program. In summary, the expected total liquid and gas discharge volume will be approximately 250 cubic meters, in increments over the course of the program. Of this amount, 75 cubic meters will be gas leaving 175 cubic meters of which 168 cubic meters will be treated sea water and the remaining volume being small amounts monoethylene glycol, methanol and as noted above residual amounts of crude oil entrained in water.

**Figure 1: Terra Nova Field Layout and Subsea Replacement Plan**



### 3.0 REVIEW OF ENVIRONMENTAL ASPECTS

#### 3.1 Approach to Review

The original Terra Nova Environmental Impact Statement, part of the Development Plan for the Terra Nova Project, was reviewed in light of the scope of work for the flowline replacement project. In addition, the approach to and conclusions of recent environmental assessments for the Jeanne d'Arc Basin were considered to determine if they contained information that needed to be considered given the age of the original environmental assessment. The scope of the flowline replacement project was reviewed as was the group of Valued Ecosystem Component used in the original assessment in relation to current practice was considered.

The review focused on determining if the current flowline replacement project engendered environmental effects that may not have been considered by the original environmental assessment.

#### 3.2 Scope of the Flowline Replacement Project

The area within which this project will take place is confined to the Terra Nova Field and hence, from a geographic perspective, entirely consistent with the original environmental assessment. Similarly, it is within the temporal scope of the original assessment, which was sanctioned for life of the field estimated at 15 to 18 years from inception of production. Furthermore, with the exception of vessel traffic to and from the Field, the construction activities will be confined to the Terra Nova Project Safety Zone, a controlled access area with no ongoing fishing activities.

The scope and nature of the construction activities themselves are a repeat of the original subsea infrastructure construction activities considered in the original environmental

assessment with the exception that new flowlines will not be trenched or rock dumped as they are self-stabilizing.

### 3.3 Valued Ecosystem Components

The valued ecosystem components (VECs) evaluated in the original assessment included the following:

- the fishery and commercial fish species;
- seabirds;
- marine mammals;
- rare or threatened species or habitats; and
- species or habitats unique to an area, or valued for their aesthetic properties.

Benthic species, although discussed in the original assessment, were not defined as a VEC. However, as part of the sediment component of the Terra Nova Environmental Effects Monitoring (EEM) Program, which has been conducted since 2000, benthic species and community structure are assessed for effects as related to the Terra Nova Development. To date, observed effects were either not detectable or are within predicted levels.

Since the original assessment was conducted, the VECs for oil and gas projects in the Jeanne d’Arc Basin have been refined but still encompass those defined for the purposes of the original assessment. Table 1 provides a concordance between the Terra Nova Project VECs and VECs currently used for projects similar to the Terra Nova flowline replacement project.

**Table 1:** VEC comparison between original Terra Nova Assessment and Recent Comparable Assessments

Terra Nova VECs	Current VECs for Comparable Projects
Fishery and Commercial Fish Species	Marine Fish and Fish Habitat Commercial Fisheries
Seabirds	Marine Birds
Marine Mammals	Marine Mammals and Sea Turtles
Rare or Threatened Species or Habitats Species or Habitats	Species At Risk Sensitive or Special Areas

The VECs considered for the Terra Nova assessment are comparable to current assessments with the variation being one of emphasis. Specifically, there is a clear emphasis on fish habitat in recent assessments as well as the specific focus on species-at-risk arising from the promulgation of the federal Species at Risk Act (SARA). The other VECs have readily recognizable parallels. Currently, air quality has been defined as a VEC for new production project assessments but this was not done for the original Terra Nova assessment. For the scope of work considered in this update, which is a short term in nature (i.e., less than four months), air quality effects are not of the same significance as a for a long-term production project.

The foregoing does not indicate that a new VEC needs to be defined and assessed for the purposes of the proposed flowline replacement project. For the purposes of this document, the implications of the flowline replacement project within the Terra Nova Field will be considered in

the context of the current formulation of VECs keeping in mind the above-noted concordance with the original assessment.

### 3.3.1 Commercial Fisheries

As noted previously in this document, no commercial fishery is prosecuted in the area where the flowline replacement project will be undertaken. Only the long term fate of the flowlines to remain in situ in the Field and the risers and jumpers that will be placed on one of the existing dredge spoil disposal piles potentially pose an issue for commercial fishing. However, as the physical presence of subsea infrastructure, and its final Field decommissioning and abandonment will be consistent with the Terra Nova development plan approval (C-NLOPB Decision 97.02) and other applicable C-NLOPB requirements (e.g., leave a production site in fishable condition upon project abandonment), the environmental effect of this project on the commercial fishery is deemed **not significant**.

Coordination with fishing interests will be handled through both One Ocean and Suncor's regular liaison with the Fish Food and Allied Workers Union and Association of Seafood Producers. Suncor provides regular operational updates to the fishing industry through One Ocean. During OSP, fisheries and other marine interests will be kept informed of the commencement, progress and completion of the construction project through Notices to Shipping as necessary. Additional mitigation measures (e.g., use of a Fisheries Liaison Officer and/or Fisheries Guide Vessel) will be determined and implemented based on fishing activity and discussions with the fishing industry.

### 3.3.2 Marine Fish and Fish Habitat

Removal and temporary long-term placement of the subsea flexible piping and the removal of sediment and drill cuttings from some drill centres has been discussed with Fisheries and Oceans Canada. Fisheries and Oceans Canada has concluded that the construction program is not likely to result in impact to fish and fish habitat (DFO letter to Suncor, April 5<sup>th</sup>, 2012). Furthermore, Suncor will work with Fisheries and Oceans Canada and the C-NLOPB to develop and implement an additional monitoring program to determine the "*extent and intensity*" of ongoing drill cuttings deposition outside the drill centres in the Terra Nova Field to better "*inform decisions regarding the adaptive management of impacts at the Terra Nova development, and improve the prediction of impacts on fish and fish habitat associated with future offshore oil developments*". Given the foregoing, it is concluded that effects of the current flowline replacement project on marine fish and fish habitat is **not significant**.

Section 2.2.7 of this Update summarizes the expected discharges from the subsea infrastructure during the program. The chemical additives entrained in the discharges will be subject to screening and approval by Suncor in accordance with its Offshore Chemical Management System (TN-IM-EV03-X00-003) that was developed to meet the requirements of the *Offshore Chemical Selection Guidelines for Drilling & Production Activities on Frontier Lands April 2009* (NEB *et al.*, 2009). The purpose of these Guidelines is to minimize the toxicity of chemicals that must be used and discharged into the marine environment during production and drilling operations. Any residual chemicals that may be released upon cutting of existing lines after flushing will have already been screened pursuant to Suncor's Offshore Chemical Management System (TN-IM-EV03-X00-003). Any chemicals needed in the new lines (e.g., oxygen scavengers, biocides, corrosion inhibitors, glycols or dyes) will be screened before use. The proximate and acute toxicity of any of these additives will also be further reduced by the

discharge of low volumes over time as the project proceeds. As the use and low volumes are discharged over time, no significant effects on marine fish or the benthos are anticipated.

Physical disruption to marine fish will be minimal. Effects of construction noise and the physical placement of subsea infrastructure was addressed in the original assessment and its conclusion that fish might be displaced several tens to hundreds of meters is still valid and **not significant**.

### 3.3.3 Marine Birds

The conduct of the construction program will pose no additional risk to marine birds that would be expected from normal operations at the Terra Nova. Effects on marine birds will be limited to the risk of a hydrocarbon spill from a construction, dive or supply vessel in the Field, a spill during disconnecting the risers and flowlines or the risk of seabirds "pitching" on vessel decks either as resting places or due to attraction to lights at night. As part of its Environmental Protection Plans, Suncor has extensive policies, procedures and permits in place to deal with stranded or oiled seabirds and has been implementing these procedures for a number of years successfully. Furthermore, Suncor plans to maintain its Tier 1 vessel spill response capabilities on site in the Field during the program as per direction from the C-NLOPB. Given the foregoing, the environmental effects of the construction project on marine birds is deemed **not significant**.

### 3.3.4 Marine Mammals and Sea Turtles

Since the activities involved in the flowline replacement work are of the same nature as for the original construction of the Terra Nova Project, the risks to marine mammals and sea turtles has not changed. No blasting will be undertaken and the risk of a significant crude oil spill is substantially reduced with the halt to production operations. The noise generated by construction activities will be within what was described in both the original and subsequent environmental assessments and is deemed **not significant**.

### 3.3.5 Sensitive Areas and Species at Risk

The Terra Nova Field, in which the flowline replacement work occur, does not contain nor is it close to and any formally or informally recognized sensitive or special areas. Furthermore, the nature of the activities to be undertaken do not pose a risk to such areas that are remote from the construction area.

The Species at Risk Act (SARA), which is the means to both designate and provide protection to rare, endangered and threatened species, was not promulgated at the time of the original assessment of the Terra Nova Project. Appendix 1 provides a tabular summary of those species both designated under SARA and by COSEWIC (Committee on the Status of Endangered Wildlife in Canada) whose ranges include the area within which the flowline replacement project will take place.

None of the species listed have critical habitats designated within or near the Terra Nova Field. The right whale has a critical habitat statement associated with it is very rare in the project area.

#### **4.0 SUNCOR'S OPERATIONAL EXCELLENCE MANAGEMENT SYSTEM**

The execution of the 2012 OSP is being conducted in a manner consistent with Suncor's Operational Excellence Management System (OEMS), which is our enterprise-wide management system that organizes and links all standards, systems and processes required to manage operational risks, prevent and mitigate environmental impacts and deliver safe, reliable operations. OEMS is based on the Plan-Do-Check-Act continual improvement cycle and follows the internationally recognized management system standards and specifications ISO 14001 and 9001.

The OEMS sets high-level, company-wide mandatory management system requirements with respect to the foundational non-financial risk management processes necessary for a business to achieve operational excellence. Each element of Suncor's OEMS describes the company-wide requirements and expectations for managing operational and asset integrity risks inherent in the business.

Each business area within Suncor accepts responsibility for managing the impact of its activities and products on people, the environment, property and corporate assets. To accomplish this, senior leaders in each organizational and functional unit must:

- develop, implement and maintain appropriate systems, processes, procedures and tools to enable organizational units to meet the OEMS requirements;
- understand the operational risks associated with its activities and products;
- regularly report performance against defined objectives and specific performance measures;
- seek input and feedback from internal and external stakeholders;
- self-assess and audit the integrity and effectiveness of its systems against OEMS requirements; and
- identify opportunities for continual improvement.

Risk factors and business requirements within some of Suncor's organizational units will require the development and implementation of issue-specific, dedicated systems, programs and models such as:

- Process Safety Management (PSM) Program - systems and controls that ensure process hazards are identified, understood and controlled;
- Suncor Project Implementation Model (SPIM) - a framework for consistent development, analysis and evaluation of projects in Suncor;
- business unit or business area specific management systems (e.g., East Coast Management System Manual (OD-PE-QM04-X00-001); and
- programs to ensure the effective implementation of Operational Excellence during non-routine projects like the 2012 OSP.

Through OEMS and OSP specific programs, Suncor has implemented numerous measures intended to minimize the environmental, health, navigational and aesthetic impacts. Examples of these programs include but are not limited to:

- completion of regulatory consultations with agencies such as the C-NLOPB, Environment Canada, DFO, Transport Canada, etc. to ensure regulatory expectations and requirements are understood and implemented into project planning, including obtaining necessary regulatory authorizations and permits;
- development and implementation of Environmental Protection Plans for Suncor's East Coast operations that include procedures relating to chemical management, effluent discharges, waste management, seabird handling/release and rehabilitation, oil spill response, fisheries liaison and compensation and environmental effects monitoring;
- development of the 2012 Subsea Riser/Flowline Project Safety Plan (TN-PE-SA15-U00-004) that outlines project specific organizational structure, roles and responsibilities, risk management procedures, legal and other requirements, environmental and health and safety commitments, goals and targets, management of change, learning and competence, contractor management including vessel selection and audit process, emergency management and response procedures, quality management processes, bridging processes to contractor management systems, diving procedures, vessel mobilization procedures and safety meetings;
- completion of risk management processes such as Process Hazard Analyses (PHA) and Hazard Identification and Risk Assessment (HIRA) before the project mobilizes for the offshore phase of the OSP;
- implementation of emergency management procedures relating to oil spill response, crisis management, operational emergencies, security and business continuity;
- implementation of simultaneous operations (SIMOPS) procedures to ensure identification of Terra Nova Field control and coordination of vessels working in and around the Field; and
- placement of Suncor Company Representatives on project vessels to ensure project oversight and effective implementation of Suncor policies and procedures, including OEMS.

## 5.0 FIELD ABANDONMENT

The execution of the 2012 OSP will include the disconnecting of existing risers, flowlines and jumpers within the Terra Nova Field, the installation of new flexible equipment, leaving existing flowlines in situ in the Field and the laying down of risers and jumpers in one of the existing dredge spoil disposal piles. In the context of this Project, all disposal activities are temporary and final Field decommissioning and abandonment will be consistent with the Terra Nova development plan approval (C-NLOPB Decision 97.02) and other applicable C-NLOPB requirements.

## 6.0 CONCLUSION

Based on the project description and the review of the original environmental assessment and more recent assessments that considered similar construction activities, Suncor has concluded that:

- the temporal and geographic scope of the flowline replacement project is consistent with the scope of the original environmental assessment; and
- there is no reason or new information to conclude that, given location of the proposed project and the season within which it will occur, the potential effects on the established VECs have materially changed nor is there a need to consider new VECs.



## 7.0 REFERENCES

### 7.1 Original Suncor Environmental Assessments and Updates

- Christian, John R. 2008. Environmental Assessment of Petro-Canada Jeanne d'Arc Basin Exploration Drilling Program, 2009-2017. LGL Rep. SA993. Prepared by LGL, St. John's, NL prepared for Petro-Canada, St. John's, NL 258 p. + Appendix.
- Christian, John R. 2009. Environmental Assessment of Petro-Canada Jeanne d'Arc Basin Exploration Drilling Program, 2009-2017 Addendum. LGL Rep. SA993. Prepared by LGL, St. John's, NL prepared for Petro-Canada, St. John's, NL 22 p.
- LGL Limited. 2006. Environmental assessment of Petro-Canada's vertical seismic profiling program at the Terra Nova Development. LGL Rep. SA890a. Rep. by LGL Limited, St. John's, NL, for Petro-Canada, St. John's, NL. 92 p + appendix.
- Petro-Canada. 1996. Terra Nova Development Application - Terra Nova Development Environmental Impact Statement.
- Suncor, 2010. Suncor I&O East Coast Operations Newfoundland & Labrador Offshore Area Environmental Assessment Review for 2010. Doc. No. TN-PE-EC15-X00-155.
- Suncor, 2011. Suncor I&O East Coast Operations Newfoundland & Labrador Offshore Area Environmental Assessment Review for 2011. Doc. No. TN-PE-EC15-X00-155.

### 7.2 Recent & Relevant Environmental Assessments Reviewed

- Stantec. 2010. Hebron Project Comprehensive Study Report. Prepared by Stantec Ltd. on behalf of ExxonMobil Canada Properties
- Stantec. 2009. Screening Report Hibernia Drill Centres Construction and Operations Program Hibernia Management and Development Company (HMDC) (December 16, 2008), and the revised final report "Screening Report Hibernia Drill Centres Construction and Operations Program Hibernia Management and Development Company (HMDC)" (July 24, 2009)
- LGL Limited. 2006. Husky White Rose Development Project: New Drill Centre Construction & Operations Program Environmental Assessment. LGL Rep. SA883. Rep. by LGL Limited, St. John's, NL, for Husky Energy Inc., Calgary, AB. 299 p. + App.

### 7.3 Species at Risk Recovery Strategies<sup>2</sup>

- Atlantic Leatherback Turtle Recovery Team 2006. Recovery Strategy for Leatherback Turtle (*Dermochelys coriacea*) in Atlantic Canada. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa, vi + 45 pp.

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<sup>2</sup> Documents referenced in Section 4.4 are available on the Environment Canada Species at Risk website

- Kulka, D., C. Hood and J. Huntington. 2007. Recovery Strategy for Northern Wolffish (*Anarhichas denticulatus*) and Spotted Wolffish (*Anarhichas minor*), and Management Plan for Atlantic Wolffish (*Anarhichas lupus*) in Canada. Fisheries and Oceans Canada: Newfoundland and Labrador Region. St. John's, NL. x + 103 pp.
- DFO (Fisheries and Oceans Canada). 2008. Recovery Strategy for the Atlantic walrus (*Odobenus rosmarus rosmarus*), Northwest Atlantic population, in Canada. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa, ON. x + 11 pp.
- Beauchamp, J., Bouchard, H., de Margerie, P., Otis, N., Savaria, J.-Y., 2009. Recovery Strategy for the blue whale (*Balaenoptera musculus*), Northwest Atlantic population, in Canada [FINAL]. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa. 62 pp.
- Brown, M.W., Fenton, D., Smedbol, K., Merriman, C., Robichaud-Leblanc, K., and Conway, J.D. 2009. Recovery Strategy for the North Atlantic Right Whale (*Eubalaena glacialis*) in Atlantic Canadian Waters [Final]. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada. vi + 66p.

## 8.0 APPENDICIES

### APPENDIX 1: Current Listing of SARA and COSEWIC Listed Species in the Terra Nova Flowline Replacement Project Area

### Appendix 1 - Current Listing<sup>3</sup> of SARA and COSEWIC Listed Species in the Terra Nova Flowline Replacement Project Area<sup>4</sup>

Species		SARA Status noted as Schedules 1, 2 or 3			COSEWIC Status			
		Endangered	Threatened	Special Concern	Endangered	Threatened	Special Concern	Candidate <sup>5</sup>
Common Name	Scientific Name							
<b>Birds</b>								
Ivory Gull	<i>Pagophila eburnea</i>	1			X			
<b>Marine Fish</b>								
Northern wolffish	<i>Anarhichas denticulatus</i>		1			X		
Spotted wolffish	<i>Anarhichas minor</i>		1			X		
Atlantic wolffish	<i>Anarhichas lupus</i>			1			X	
Atlantic cod	<i>Gadus morhua</i>			3				
Atlantic cod (Newfoundland & Labrador population)	<i>Gadus morhua</i>				X			
Atlantic Salmon (various regional populations)	<i>Salmo salar</i>				X	X	X	
Porbeagle shark	<i>Lamna nasus</i>				X			
White shark	<i>Carcharodon carcharias</i>	1 <sup>6</sup>			X			
Roundnose Grenadier	<i>Coryphaenoides rupestris</i>				X			
Cusk	<i>Brosme brosme</i>					X		
American Shad	<i>Alosa sapidissima</i>							MPC
Alewife	<i>Alosa pseudoharengus</i>							MPC
Capelin	<i>Mallotus villosus</i>							MPC
Haddock	<i>Melanogrammus aeglefinus</i>							MPC
Shortfin mako shark	<i>Isurus oxyrinchus</i>					X		
Blue shark	<i>Prionace glauca</i>						X	

<sup>3</sup> May 2012

<sup>4</sup> Green Shade means a final Recovery Strategy is in place but no Critical Habitat has been identified nor have Action or Management plans been finalized for these species with the exception of the North Atlantic Right Whale (see footnote 8). Note that two other species that have recovery strategies, the Atlantic Walrus and Grey Whale, have been extirpated from Eastern Canadian waters and therefore are not listed in the above table.

<sup>5</sup> Candidate COSEWIC species are classified as High (H), Medium (M) or Low (L) Priority Candidate (PC) species

<sup>6</sup> June 2011

Species		SARA Status noted as Schedules 1, 2 or 3			COSEWIC Status			
		Endangered	Threatened	Special Concern	Endangered	Threatened	Special Concern	Candidate <sup>5</sup>
Common Name	Scientific Name							
American Eel	<i>Anguilla rostrata</i>						X	
Roughhead grenadier	<i>Macrourus bergla</i>						X	
Bluefin Tuna	<i>Thunnus thynnus</i>				X			
Spiny eel	<i>Notacanthus chemnitzii</i>							MPC
Pollock	<i>Pollachius virens</i>							MPC
Spinytail Skate	<i>Bathyraja spinicauda</i>							MPC
Ocean pout	<i>Zoarces americanus</i>							MPC
American Plaice (Newfoundland & Labrador Population)	<i>Hippoglossoides platessoides</i>					X		
Acadian Redfish ( <i>Atlantic Population</i> )	<i>Sebastes fasciatus</i>					X		
Deepwater Redfish ( <i>Northern Population</i> )	<i>Sebastes mentella</i>					X		
Spiny Dogfish	<i>Squalus acanthias</i>						X	
Basking Shark	<i>Cetorhinus maximus</i>						X	
<b>Marine Mammals</b>								
Blue whale	<i>Balaenoptera musculus</i>	1			X			
Humpbacked whale	<i>Megaptera movaeanglia</i>			3				
North Atlantic right whale <sup>7</sup>	<i>Eubalaena glacialis</i>	1			X			
Fin whale (Atlantic population)	<i>Balaenoptera physalus</i>			1			X	
Killer Whale (NW Atlantic & Eastern Arctic Populations)	<i>Orcinus orca</i>						X	
Sperm whale	<i>Physeter macrocephalus</i>							LPC
Cuvier's Beaked Whale	<i>Ziphius cavirostris</i>							MPC
Sowerby's beaked whale	<i>Mesoplodon bidens</i>			3			X	
Northern Bottlenose whale (Davis Strait/Baffin Bay/Labrador Sea)	<i>Hyperoodon ampullatus</i>						X	
Harbour porpoise	<i>Phocoena phocoena</i>		2				X	
Hooded seal	<i>Cystophora cristata</i>							LPC

<sup>7</sup> A critical habitat statement exists for this species however it is rare in the study area considered in this assessment with one sighting of two individuals recorded in the DFO cetacean database.

Species		SARA Status noted as Schedules 1, 2 or 3			COSEWIC Status			
		Endangered	Threatened	Special Concern	Endangered	Threatened	Special Concern	Candidate <sup>5</sup>
Common Name	Scientific Name							
Harp seal	<i>Phoca groenlandica</i>							LPC
Ringed seal	<i>Pusa hispida</i>							HPC
<b>Reptiles</b>								
Leatherback sea turtle	<i>Dermochelys coriacea</i>	1			X			
Loggerhead sea turtle	<i>Caretta caretta</i>				X			
Kemp's Ridley sea turtle	<i>Lepidochelys kempii</i>							LPC