



Deep Panuke

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ABBREVIATIONS

CEAA	Canadian Environmental Assessment Act
CNSOPB	Canada Nova Scotia Offshore Petroleum Board
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSR	Comprehensive Study Report
CWS	Canadian Wildlife Service
DFO	Fisheries and Oceans Canada
DND	Department of National Defense
EA	Environmental Assessment
EEMP	Environmental Effects Monitoring Plan
EHSMS	Environment, Health and Safety Management System
EPP	Environmental Protection Plan
IMO	International Maritime Organization
MARLANT	Maritime Forces Atlantic
MPA	Marine Protected Area
NOEC	No Observed Effect Concentration
PCB	Polychlorinated Biphenyls
PFC	Production Field Centre
ROV	Remotely-Operated Vehicle
TDG	Transportation of Dangerous Goods
UXO	Unexploded Ordnance
WHMIS	Workplace Hazardous Materials Information System

1 BACKGROUND

1.1 Regulatory and Management System Context

The Deep Panuke Project has been assessed in the Deep Panuke Environmental Assessment (EA) Report (Volume 4, 2006) under a *Canadian Environmental Assessment Act* (CEAA) Comprehensive Study process. The proposed flowlines installation program is part of the overall Deep Panuke scope of work.

As part of its environmental management system (see Figure 1.1, Encana's Environmental Management Framework), regulatory commitments (2006 EA Report), and conditions of approval (specifically Condition 25 and Condition 26 from the CNSOPB Decision Report), Encana is obliged to implement environmental protection and monitoring measures to mitigate potential environmental effects from its activities. This Environmental Protection Plan/Environmental Effects Monitoring Plan (EPP/EEMP) focuses on Encana's proposed 2010 flowlines installation program.

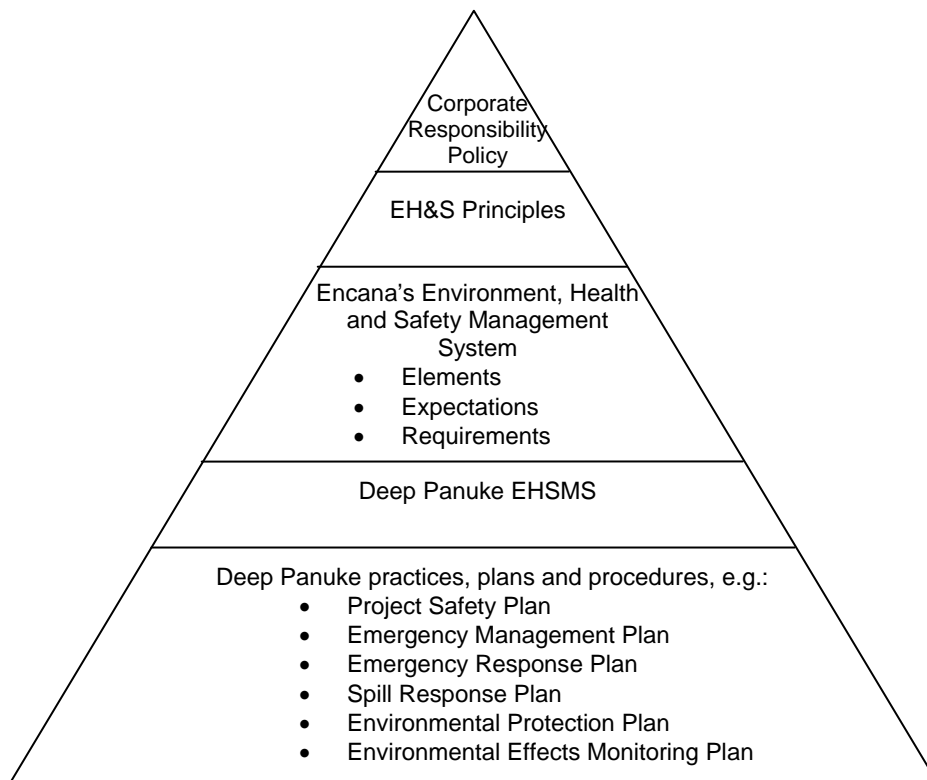


Figure 1.1 Deep Panuke Environmental Management Framework

1.2 Program Overview

The proposed flowlines installation program will be conducted by Acergy and consists of the following activities (see Figure 1.2, Deep Panuke Field Layout):

- install pipelay initiation anchors near wellhead locations using a supply vessel from the Deep Panuke drilling and completion program as anchor handling tug;
- conduct pre-lay video, bathymetry and scanning sonar survey along the centerline of the proposed four 8" production flowline routes and one 3" injection line route using the Acergy Falcon remotely-operated vehicle (ROV);
- lay production flowlines and injection line with the Acergy Falcon;
- trench production flowlines and injection line using an induction jetting trencher unit operated from the Deep Cygnus (trenching vessel);
- conduct pre-commissioning activities associated with flooding, cleaning, gauging and testing of the flowlines, including discharge of hydrotest fluid; and
- conduct as-built survey of the flowlines with the Deep Cygnus.

The installation of the initiation anchors was conducted from June 17 to June 19, 2010. The Acergy Falcon survey and pipelaying activities began on July 30, 2010, and will take approximately 45 days to complete. The Deep Cygnus trenching and as-built survey activities are anticipated to commence early September 2010, and will take approximately 20 days to complete.

This flowlines installation program is very unlikely to have significant effects on the marine environment because of the low risk aspects of the proposed activities and the environmental protection measures described in the following sections.

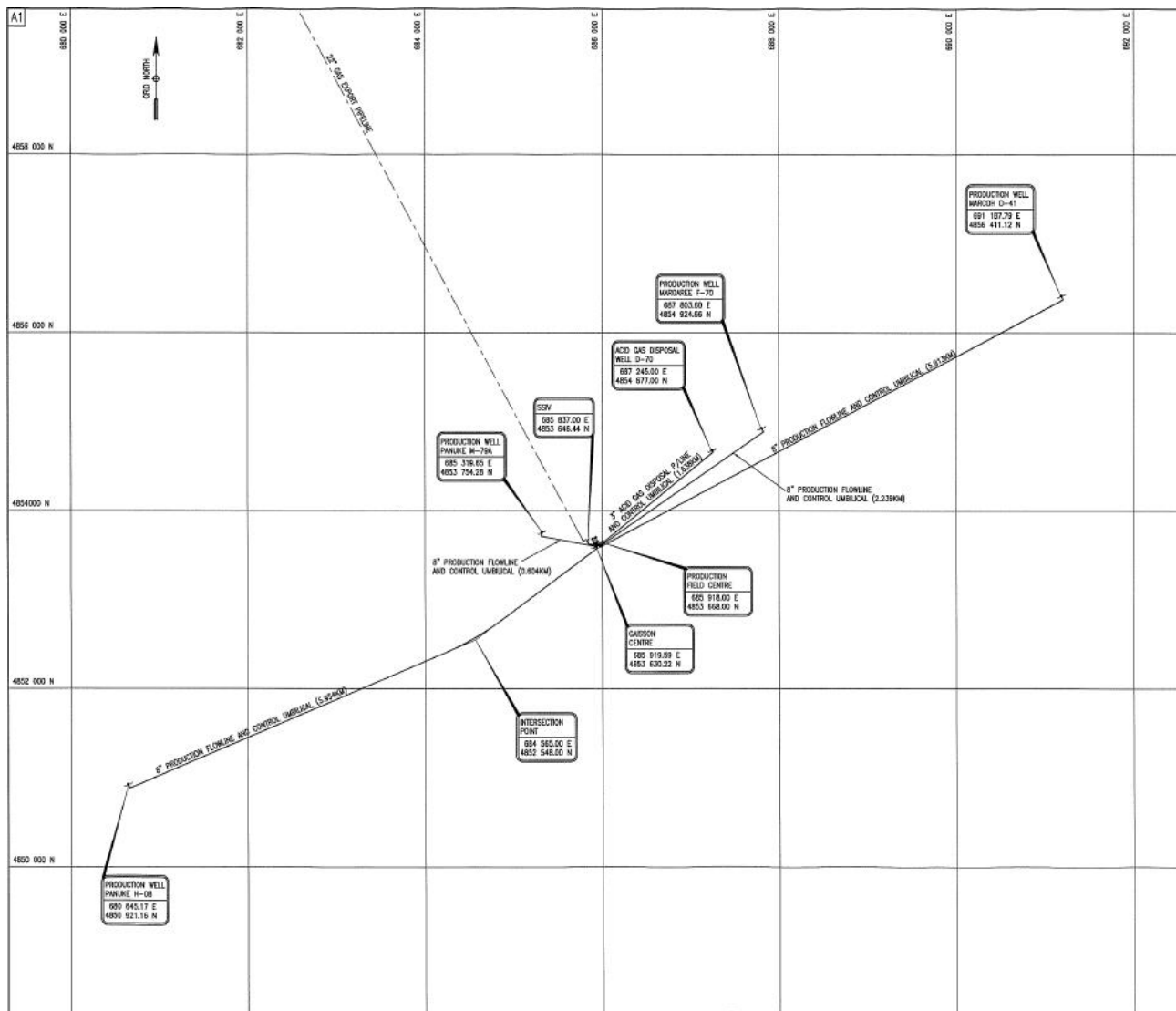


Figure 1.2 Deep Panuke Field Layout

2 SPECIAL AREAS

The flowlines installation program will follow Encana's Codes of Practice for Sable Island and the Gully Marine Protected Area (MPA), which include the following measures (see Appendix 1):

- No activities and no vessels and aircraft within 2 km (1 nautical mile) of Sable Island except in emergency situations, under an approved Environmental Monitoring Program or for special trips approved by the Canadian Coast Guard.
- No activities inside the Gully MPA, no vessels permitted within the Gully MPA, and aircraft flying at a height of at least 500 m above the Gully MPA; except for the purpose of safety or under an approved environmental monitoring program.

3 INTERACTION WITH FISHING ACTIVITY

Flowlines installation activities will take place within the Deep Panuke Safety Zone, which has been added to hydrographic charts (see Figure 3.1), and where no fishing activity is expected; therefore, no interactions with fishing vessels are anticipated.

Extensive consultation with the fishing industry was conducted as part of the Deep Panuke Environmental Assessment process and identified that the Deep Panuke field centre area was an area of very low fishing activity, with no catches reported in this area between 2002 and 2005 (refer to the commercial fisheries catch and effort maps provided in Appendix J of the 2006 Deep Panuke EA Report (Volume 4)), even before the Deep Panuke safety Zone was established.

Encana has contacted directly representatives of the fisheries expected to be active in the area surrounding the Deep Panuke field centre during flowline installation activities, including the following associations:

- Clearwater Seafoods Ltd.
- Eastern Shore Fishermen's Protective Association/ Eastern Fishermen's Federation
- Seafood Producers Association of Nova Scotia
- Native Council of Nova Scotia/Netukulimkewe'l Commission

In April 2010, these organizations were called and provided with an information package on Deep Panuke's planned 2010 offshore operations, including this flowlines installation program, which consisted of a summary of activities, schedule and location information. An updated information package was provided to them in June 2010. No issues or concerns were raised by fishing groups representatives.

As mentioned above, the proposed flowlines installation program is not expected to disrupt fishing activities since it will take place within the Deep Panuke Safety Zone, where no fishing is expected.

A Notice to Shipping will be issued with regard to the flowlines installation program (including installation of the initiation anchors).

In the unlikely event of an incident with a non-project vessel such as a fishing vessel or a spill, Encana will adhere to the CNSOPB *Compensation Guidelines Respecting Damages Relating to Offshore Petroleum Activity* and compensate and indemnify licensed participants in the fishing industry to the extent that the Deep Panuke Project may cause them damage or loss, including consequential damages during normal fishing operations.

As noted in Encana's Fisheries Liaison Program (DMEN-X00-RP-EH-00-0011-02U), Encana committed to having a Fisheries Observer in the field for at least 50% of the 45-day flowlines pipelaying activities and 100% of the 20-day flowlines trenching activities. However, due to space constraints on the Falcon, it will not be possible to have a Fisheries Observer onboard during the flowline pipelaying activities. Encana has agreed upon a replacement solution for this observer coverage with OGOP and the CNSOPB. Encana will have a Fisheries Observer onboard during the flowlines trenching activities.

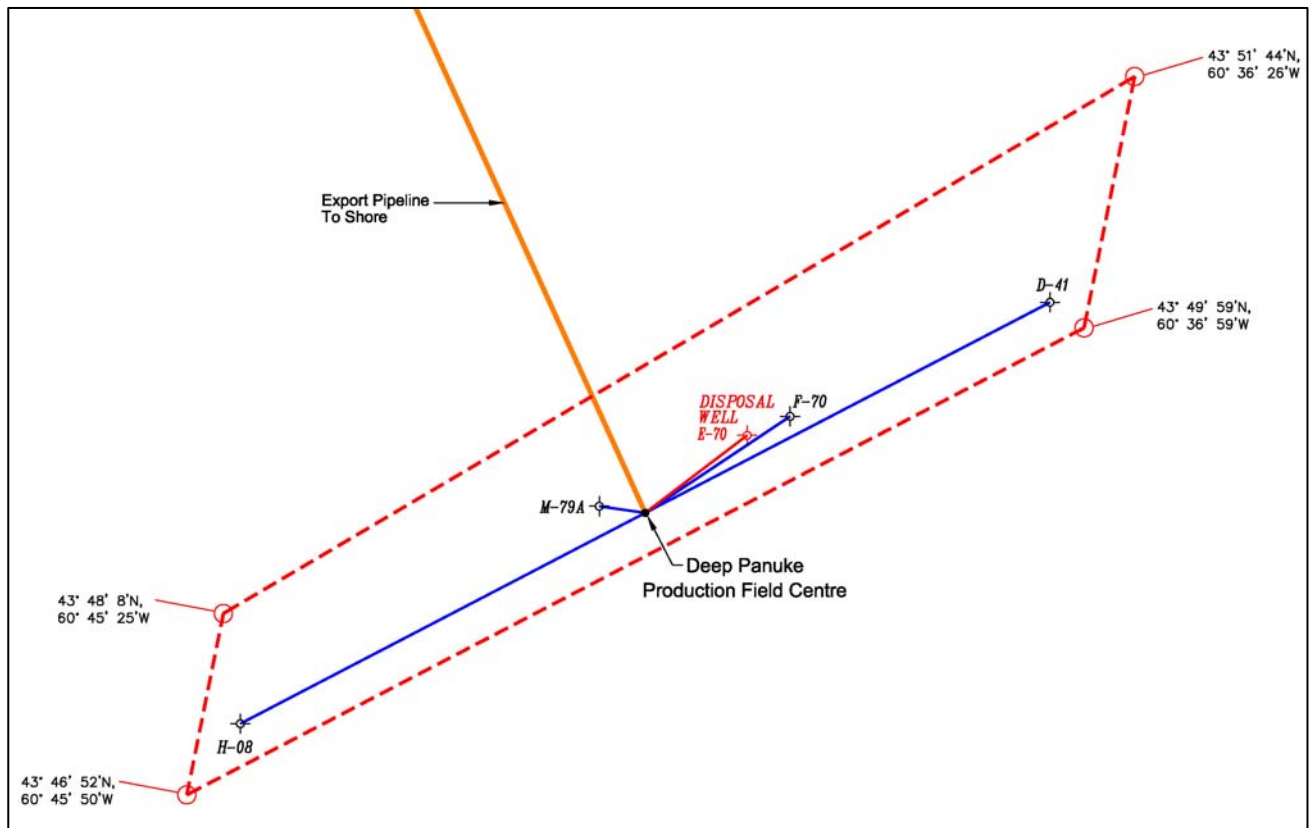


Figure 3.1 Deep Panuke Safety Zone

4 INTERACTION WITH MILITARY OPERATIONS

Encana has received confirmation from DND in August 2010 that there are no UXO (Unexploded Ordnance), chemical, biological, or radioactive material or operational issues or conflicts from the MARLANT perspective with the Deep Panuke Project, including this 2010 flowlines installation program.

5 IMPACT TO BENTHIC HABITAT

5.1 Pipelay Initiation Anchors

In order to facilitate the initiation of pipelay, anchors must be preinstalled on the seafloor to provide a fixed point for the pipelay vessel to act against during the pipe pulling process. Acergy has proposed the use of drag embedment anchors which will provide adequate holding power for this operation. No specific type of drag anchor has yet been selected. Acergy's planned operations involve installation of the initiation anchors near the wellhead locations with the direction of pipelay occurring towards the PFC. These anchors will be removed at the end of the flowlines installation program.

There will be five anchors required for the operation (four production flowlines and one disposal line). Figure 5.1 shows the approximate location of the anchor relative to the wellhead. The distance from the anchor to the flowline flange face is expected to be 250 m, consisting of 232 m of initiation rigging to be installed by the anchor handling tug and 18 m of cable and initiation head to be installed by the Falcon.

A typical initiation rigging arrangement for a production flowline is shown in Figure 5.2. Anchor drag and penetration is expected to be minimal for the sandy conditions at the site with the anchor shank remaining at or close to the seabed.

Benthic studies conducted in the Deep Panuke field center area for the Deep Panuke environmental assessment process have shown that substrate and biota are homogeneous across this area. Substrate is primarily fine to medium well-sorted sand with ripples. Biota assemblages are sparsely distributed. The overall abundance and diversity of organisms in the Deep Panuke field center area is low, with sand dollars being the most common epibenthic species and no presence of sensitive habitats (e.g. corals).

This habitat is not expected to be significantly impacted by the use of the pipelay initiation anchors, which will have a very small footprint compared to similar available habitat on Sable Island Bank, therefore no specific mitigation measures are necessary.

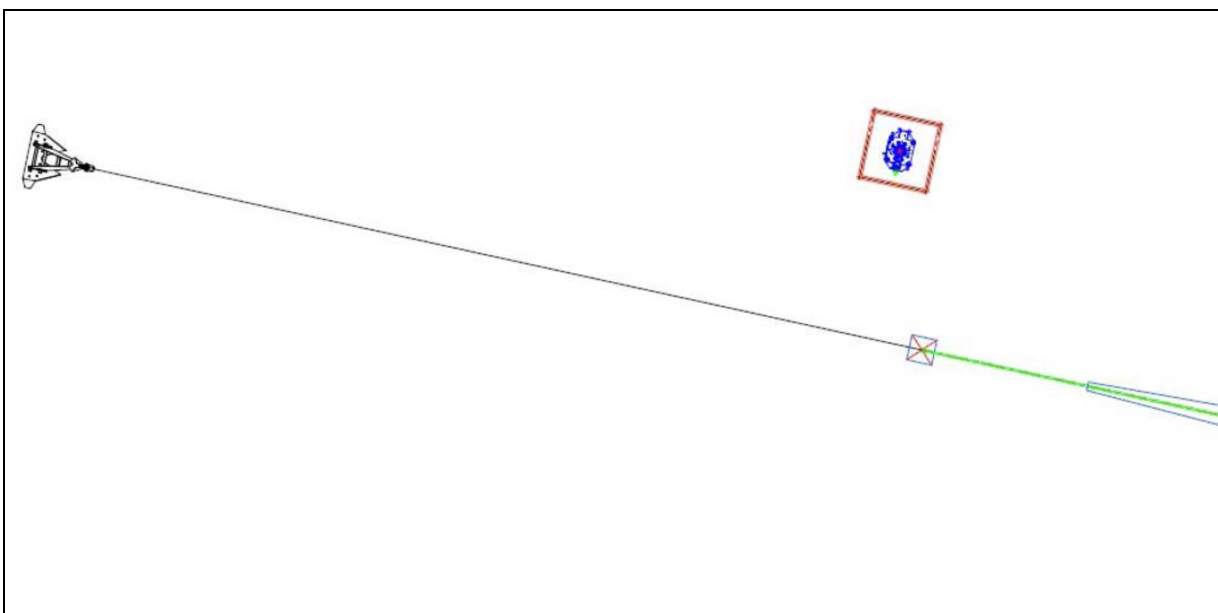


Figure 5.1 Initiation Anchor at Wellhead

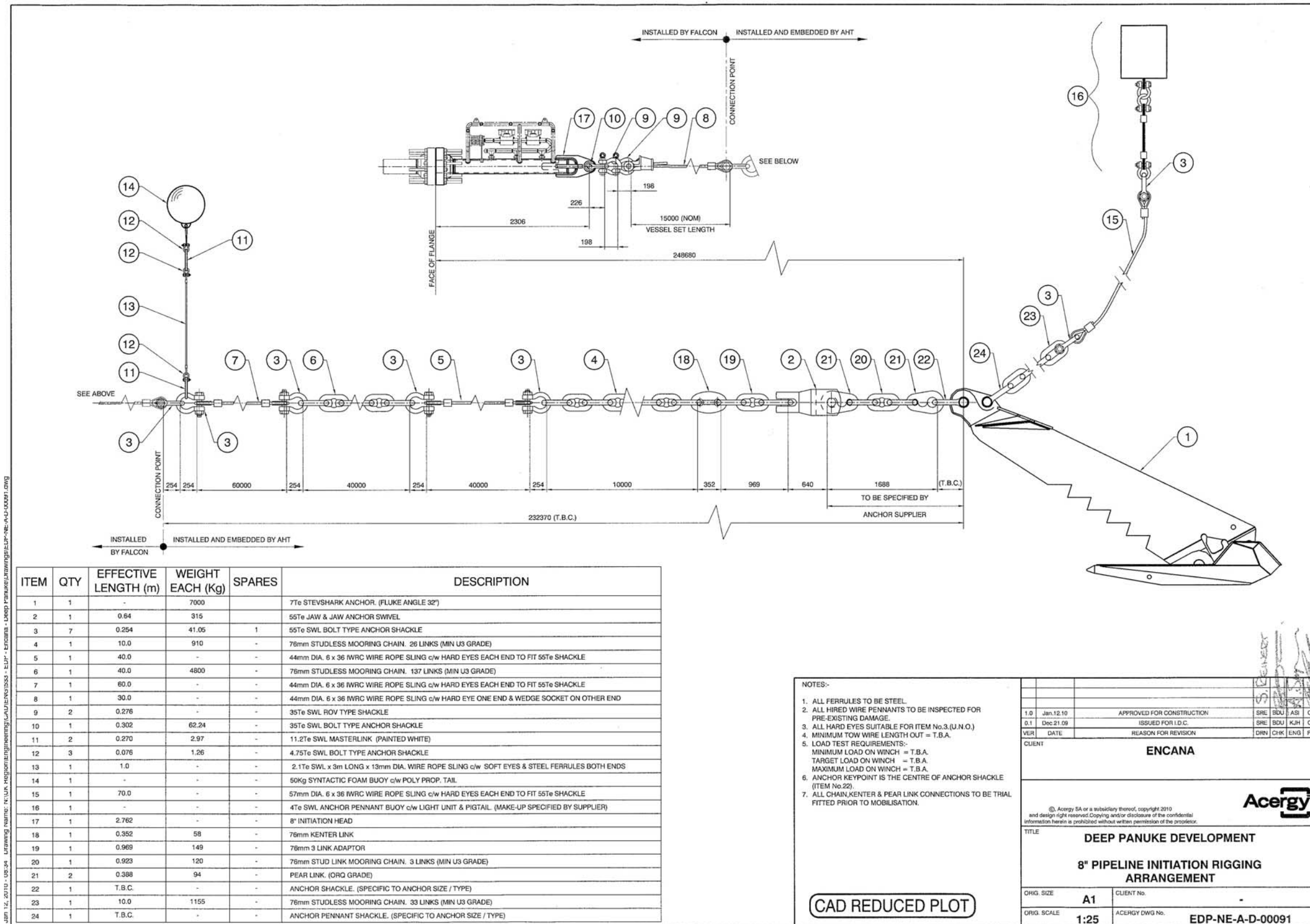


Figure 5.2 Typical Initiation Rigging Arrangement (8" Production Flowline)

5.2 Flowlines Pipelaying and Trenching

The potential impact from offshore pipeline and flowlines installation on benthic habitat was assessed in the 2002 Deep Panuke Comprehensive Study Report (CSR) (see Section 6.3.3.4 of the 2002 CSR for a detailed discussion related to the analysis, mitigation and residual environmental effects of pipeline installation on marine benthos) and 2006 EA Report (Volume 4) (see Section 8.3.4.1, impact from construction of subsea infrastructures on Marine Benthos).

The assessment demonstrated that no significant adverse effects on the marine benthos are likely to result from flowlines installation as habitat disturbances will be localized and temporary during construction, and it is anticipated that disturbed areas will soon be re-colonized by benthic organisms from adjacent areas and that the dynamic sediment transport processes of the Project area will rapidly return surficial sediments to baseline conditions, hence no long-term changes to sediment quality or type are expected. Therefore, no additional sedimentation control measures are required during flowlines installation.

6 WASTE AND DISCHARGES

6.1 Flowline Hydrotest Fluid

Table 6.1 describes the pre-commissioning activities associated with flooding, cleaning, gauging and testing (FCGT) of the flowlines that will be associated with this program.

In the Deep Panuke EA (Volume 4, 2006), Encana committed to conducting a study to assess the impact of pipeline and flowlines hydrotest discharges into the marine environment, consisting of two components:

1. A lab-based toxicity bioassay program (first study component), which would employ samples of the proposed chemicals diluted in seawater to emulate the mixture of chemicals and concentrations proposed for the hydrostatic test program; and
2. A plume dispersion model (second study component), which would apply the results of the bioassay to confirm that there will be minimal impact to the marine environment around the platform.

This study was conducted for the hydrotest discharge from the offshore export pipeline and results were provided in the Deep Panuke 2009 Offshore Pipeline Installation EPP/EEMP (DMEN-P21-RP-EH-90-0002 02U, Appendix 5). The same chemical solution that was used for the offshore pipeline (i.e. Sicor 2007 with Purple Dye at 500 ppm) will be used for hydrostatic testing of the flowlines. It should be noted that the selected Sicor 2007 chemical is a gold-rated product according to the Centre for Environment, Fisheries & Aquaculture Science (CEFAS), i.e. most environmentally friendly rating. Tables 6.1 and 6.2 provide a comparison between Case 2-B from the export pipeline hydrotest discharge modeling (i.e. discharge of 3,823 m³ of pig separation and by-pass treated seawater at 500 ppm; which was selected as the most comparable case to the flowlines discharge scenarios), and the proposed flowline hydrotest discharges. The total discharged chemicals volumes and discharge rates are significantly smaller than for the export pipeline while other key discharge parameters are similar (see Table 6.2), therefore predicted impact from the flowlines hydrotest discharges is expected to be even lower than for the export pipeline, i.e. No Observed Effect Concentration (NOEC) values are met within 7 m of the outlet for Case 2-B (well within 500 m of the release site).

Table 6.1 Hydrotest Discharge Scenario Modeled Versus Flowlines Discharge Scenarios

Hydrotest Discharge Scenario	Description
<i>Case 2-B Used in Export Pipeline Modeling</i>	<i>Discharge of 3,823 m³ of pig separation and by-pass treated seawater at 500 ppm</i>
Flowlines 2010 Stage 1 Discharges (Overfill)	After pipelay, prior to trenching. Discharge equal to 20% of overall flowline volume of freshwater or seawater chemically treated at 500 ppm. Necessary to ensure line is completely filled and allows for any by-pass of pig train.
Flowlines 2010 Stage 2 Discharges (POTENTIAL Second Gauging - Full Flowline Volume)	After trenching. Discharge equal to 100% of flowline volume (except injection line) of freshwater or seawater chemically treated at 500 ppm. This will be necessary only if flowlines are gauged before and after trenching.
Flowlines 2010 Stage 3 Discharges (Hydrotest Depressurization)	After hydrotest. Small overall discharge (2-3% flowline volume) of freshwater or seawater chemically treated at 500 ppm when each flowline is depressurized following hydrotesting.
Flowlines 2011 Discharges (Full Flowline Volume)	Discharge equal to 100% of flowline volume of freshwater or seawater chemically treated at 500 ppm. Part of the flowline dewatering process during commissioning.

Table 6.2 Comparison of Key Parameters from Hydrotest Discharge Scenario Modeled Versus Flowlines Discharge Scenarios

Key Parameters	Hydrotest Discharges																					
	Export Pipeline Modeling	Flowlines 2010 Stage 1 Discharges (Overfill)					Flowlines 2010 Stage 2 Discharges (POTENTIAL Second Gauging - Full Flowline Volume)					Flowlines 2010 Stage 3 Discharges (Hydrotest Depressurization)					Flowlines 2011 Discharges (Full Flowline Volume)					
	Case 2-B	D-41	F-70	H-08	M-79A	E-70	D-41	F-70	H-08	M-79A	E-70	D-41	F-70	H-08	M-79A	E-70	D-41	F-70	H-08	M-79A	E-70	
Treated Discharge Water Volume (m ³)	3,825 ^a	38.3 ^b	14.5 ^b	38.6 ^b	3.9 ^b	1.5 ^b	191.5 ^b	72.6 ^b	193.1 ^b	19.6 ^b	n/a	4.35 ^b	1.65 ^b	4.38 ^b	0.45 ^b	0.08 ^b	191.5 ^b	72.6 ^b	193.1 ^b	19.6 ^b	7.5 ^b	
Chemical Volume (m ³) (Sicor + Dye)	1.9	0.019	0.007	0.019	0.002	0.0007	0.096	0.036	0.096	0.010	n/a	0.002	0.0008	0.002	0.0002	3.8E-05	0.096	0.036	0.096	0.010	0.004	
Concentration ppm (v/v)	500	500	500	500	500	500	500	500	500	500	n/a	500	500	500	500	500	500	500	500	500	500	
Water Draw-in Date	Jul 2009	Aug 2010	Aug 2010	Aug 2010	Aug 2010	Aug 2010	Sep 2010	Sep 2010	Sep 2010	Sep 2010	n/a	Sep 2010	Sep 2010	Sep 2010	Sep 2010	Sep 2010	Sep 2010	Sep 2010	Sep 2010	Sep 2010	Sep 2010	
Discharge Location	PFC Near seafloor	Flowline end away from PFC, near seafloor					Flowline end away from PFC, near seafloor					n/a	Flowline end away from PFC, near seafloor					PFC (at sea level)				
Discharge Date	Oct 2009	Aug 2010	Aug 2010	Aug 2010	Aug 2010	Aug 2010	Sep 2010	Sep 2010	Sep 2010	Sep 2010	n/a	Sep 2010	Sep 2010	Sep 2010	Sep 2010	Sep 2010	2011	2011	2011	2011	2011	
Discharge Duration (min)	576	20	8	20	2	6	197	75	199	20	n/a	230	230	230	230	101	197	75	199	20	55	
Discharge Rate (m ³ /min)	6.6	1.9	1.9	1.9	1.9	0.3	0.97	0.97	0.97	0.97	n/a	0.019	0.007	0.019	0.002	0.001	0.97	0.97	0.97	0.97	0.14	
Outlet Orientation	10 deg above horizontal	10 deg above horizontal (to be confirmed)					10 deg above horizontal (to be confirmed)					n/a	10 deg above horizontal (to be confirmed)					10 deg above horizontal (to be confirmed)				

Note a: Using seawater drawn in mostly from PFC area

Note b: Using freshwater or seawater drawn in from PFC end of the flowline

6.2 Other Wastes and Discharges

Hazardous wastes will be accumulated in suitable containers and placed in appropriate shipping containers for return to shore for disposal and collected by licensed waste haulers. Applicable codes and regulations for the handling, use, storage, transport and disposal of hazardous wastes will be followed, including Workplace Hazardous Materials Information System (WHMIS), the Nova Scotia *Dangerous Goods Management Regulations* and the *Transportation of Dangerous Goods (TDG) Act* and Regulations, as applicable.

In the event of an onboard spill, any used absorbent materials and any other oily wastes will be placed in sealed containers and returned to shore for treatment and disposal at an approved waste management facility.

The CNSOPB *Offshore Waste Treatment Guidelines* will be followed with respect to routine discharges (e.g., sanitary and food wastes, oily bilge/ballast water) from the Falcon and the Deep Cygnus. Both vessels have an approved sewage treatment plant compliant with MARPOL regulations.

All vessels involved in this program will comply with the *Ballast Water Control Land Management Regulations (2006)* under the *Canada Shipping Act*, including provisions to replace its ballast water before entering Canadian waters.

Both the Falcon and the Deep Cygnus have an onboard incinerator. Incinerators will only be used to treat wastes that are non-recyclable. The units conform to MARPOL's specification MEPC76(40) for shipboard incinerators and their usage will conform with MARPOL 73/78/97 ANNEX VI Regulation 16 which provides specific guidance on personnel training and incinerator operations, notably the prohibition of shipboard incineration of waste materials containing PCBs, heavy metals, or similar contaminants. In addition, no waste containing chlorinated compounds will be incinerated. Encana will notify Environment Canada when the project starts and finishes for the purpose of the Sable Island Air Monitoring Program.

Any other wastes will be sorted and brought to shore for disposal according to the local regulatory regime of the shore base, including the Nova Scotia *Solid Waste - Resource Management Regulations*, and municipal requirements at the offloading location (likely Sheet Harbour or Halifax). Waste disposal will be managed by Acergy's marine logistics agent (Mathers Logistics) who are well versed with the legislative requirements having undertaken similar activities for Allseas during the Deep Panuke export pipeline installation activities.

7 STRANDED BIRD PROTOCOL

The protocol developed by Williams and Chardine (1999) for storm petrels (Appendix 2) will be implemented for any stranded bird species on the program's vessels.

A Seabird Salvage Permit has been obtained from Canadian Wildlife Service (CWS) to cover all Deep Panuke 2010 offshore activities. A report of birds "salvaged" onboard the program's vessels (and other offshore vessels/platforms used for Deep Panuke 2010 activities) will be submitted to CWS and to the CNSOPB before the end of January 2011.

Encana will immediately notify CWS if a dead bird or an oiled bird is found during the program. Any oiled bird will immediately be reported to the Canadian Coast Guard Operations Center. In case of a mass stranding (more than five dead birds in a 24-hr episode), or an oiled bird (see section 8.5.3 for oiled birds), the CNSOPB will also be contacted. Dead birds will be identified, recorded and disposed of at sea unless they are oiled (see section 8.5.3 for oiled birds). Please see Figure 8.1 for a detailed flowchart of bird handling procedures for the program.

8 SPILL RESPONSE

8.1 Spill Risk

The likelihood of an accidental spill into the marine environment during the program is very low because the program's vessels will comply with IMO standards and will have no specific onboard spill sources other than their own internal fuel tanks.

Furthermore, a spill response plan is in place to minimize the possible consequences of a malfunction or accident (refer to Sections 8.2 to 8.7 below).

The offshore pipeline installation program will include the deployment of an ROV to assist with the pre-lay survey, pipelaying operations and as-built survey. However, the risk of potential impact from hydraulic fuel spills from ROV cables is expected to be minimal due to typically very small volumes of such spills and the fact that the ROV will use a hydraulic fluid (Tellus T 32 and Tellus 46) that is practically non toxic to aquatic organisms.

8.2 Spill Response Logistics and Equipment

All program's vessels will be available for spill monitoring and response if required. The Falcon is conducting crew changes by helicopter (approximately 2-3 flights per week). The duration of the trenching campaign is short enough to not require a scheduled crew change.

All program's vessels will have a standard spill response kit capable of containing and cleaning up a small spill onboard the vessel.

8.3 Spill Monitoring

As per Encana's Spill Response Plan approved by and on file with the CNSOPB, the Canadian Coast Guard and DFO, in the unlikely event of a spill, Encana will conduct the following monitoring until the slick dissipates:

- estimate spill volume;
- estimate oil type; and
- visually assess the slick until it has disappeared by natural dispersion and evaporation.

8.4 Enhance Natural Dispersion

Spill modeling can be used to investigate the fate of a 'worst case' spill event – a diesel spill from a simultaneous rupture of the vessel hull and fuel tank, a very unlikely event for this program. Furthermore, diesel is a light oil which is highly evaporative and dispersive in the marine environment.

Spill dispersion modeling carried out for the 2006 Deep Panuke EA (Volume 4) gave the following results for 1.6 m³ (10-barrel) and 16 m³ (100-barrel) diesel spill scenarios at the Deep Panuke PFC location. A 1.6 m³ (10-barrel) batch spill will persist as a slick for about 13 hours and travel about 12 km prior to the complete loss of the surface oil. The maximum dispersed oil concentration for this spill will be about 2 ppmw and this will drop to 0.1 ppmw within about 16 hours. A 16 m³ (100-barrel) batch spill of diesel will persist as a slick for about 19 hours and travel about 18 km prior to the complete loss of the surface oil. The maximum dispersed oil concentration for this spill will be about 4 ppmw and this will drop to 0.1 ppmw within about 43 hours. The dispersed oil cloud will travel about 54 km and have a maximum width of about 4 km. Prevailing water currents would take the dispersed condensate cloud in a southwest direction away from Sable Island (located

approximately 48 km from Deep Panuke). Therefore, no diesel is predicted to reach the nearest landfall which is Sable Island (critical habitat for endangered Roseate terns). Any diesel spill will also not likely reach the Haddock Box since most spill scenarios result in a dispersed oil cloud traveling significantly less than the 49 km distance from the production field to the Haddock Box (for further details refer to Encana's Reply Evidence for the Deep Panuke Project dated February 26, 2007).

Based on the limited persistence of diesel on the sea surface, it is unlikely that a containment and/or recovery effort at sea or the use of chemical dispersants would be warranted. The most appropriate response would be to enhance natural dispersion processes by running vessels through the slick.

8.5 Spill EPP for Marine Birds

Figure 8.2 provides a summary flowchart of the proposed environmental protection plan (EPP) for the program in the event of a spill.

8.5.1 Bird Monitoring

In the unlikely event of a spill, any observations of spill and marine bird interactions will be reported to Encana immediately.

Marine bird species-at-risk are not expected to occur in the program area. The only marine bird species listed by COSEWIC as endangered or threatened offshore Nova Scotia is the endangered Roseate tern nesting on Sable Island between May and July, approximately 40 km away from the closest location of the project site.

8.5.2 Bird Dispersal

In the unlikely event of a spill, Encana will attempt to keep birds away from the slick area by hazing from the vessels, if logistical conditions permit. This effort will focus on dispersing congregations of birds. Potential hazing means include the vessels themselves, and the use of sound makers (e.g. vessel horns). No specific permit is required from Environment Canada for bird hazing.

8.5.3 Oiled Birds Handling

It is very unlikely that an oiled bird will be found at sea during the program because of the low risk of oil spill during the program (see section 8.1) and the difficulty to identify oiled birds in the water (small dark spot on dark water). In the very unlikely event that an oiled bird were found at sea during the program, Encana would not attempt to recover it because of safety concerns associated with an overboard recovery operation and the unlikelihood to save a live oiled bird if it can be recovered (onshore rehabilitation can cause distress to marine birds with no guarantee of successful re-entry into the breeding population, especially in Canada where waters are generally cold and the species generally affected do not respond well to cleaning).

It is also very unlikely that an oiled bird will be found onboard the vessels during the program because of the absence of specific spill sources on deck and of good housekeeping procedures. If a live oiled bird were found onboard the vessels during the program, the protocol developed by Williams and Chardine (1999) for storm petrels (Appendix 2) would be implemented. If the bird died or if any dead oiled birds were found onboard the vessels, the bird would be frozen and shipped to the CWS office in Dartmouth for confirmation of origin of the oil contamination, if logistics permits (CWS will be contacted beforehand). If shipping to shore were not possible, the bird would be disposed at sea.

Encana will immediately notify the CNSOPB, the Canadian Coast Guard Operations Center and CWS if an oiled bird (dead or live) is identified during the program and will confirm the course of action with them.

Beached bird surveys on Sable Island would only be implemented in the event of a catastrophic spill in which a large number of birds were expected to be oiled and oiled birds were expected to arrive on the island. As indicated in Section 8.4, such an occurrence is deemed to be highly unlikely based on spill dispersion modeling.

Figure 8.1 provides a detailed flowchart of oiled bird handling procedures for the program.

8.6 Spill EPP for Marine Mammals

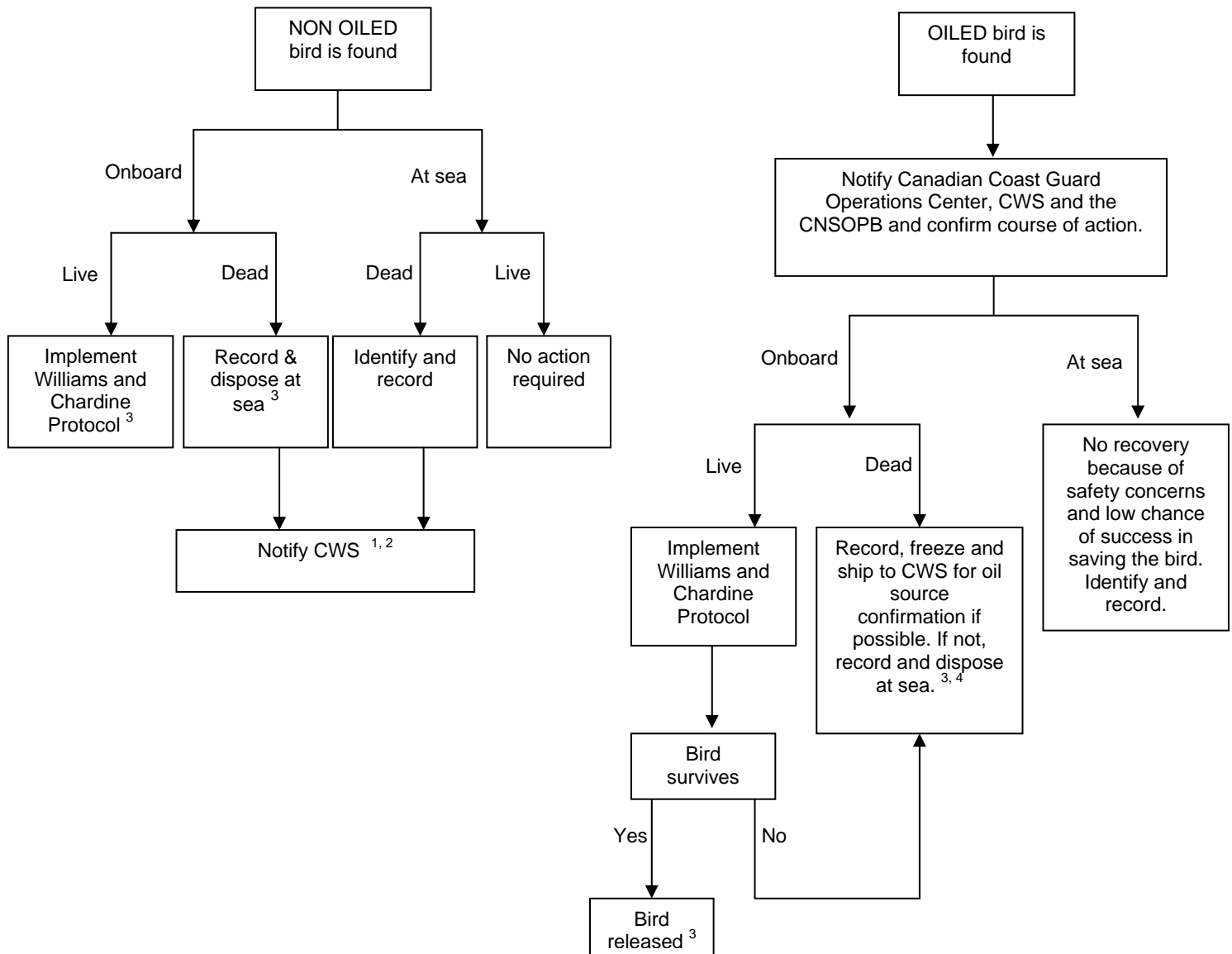
Marine mammals have body coverings, unlike those of birds, that are relatively unaffected by oiling. Hair seals for example are often observed with apparently untroublesome patches of heavy oil; light oils such as diesel are likely to evaporate and wash off more readily. Spills of light oil are likely to impair breathing in ways that would tend to repel animals from the area before they are adversely affected.

In the unlikely event of a spill, any observations of spill and marine mammal interactions will be reported immediately to Encana. Wildlife observations and any related action will be included in the spill incident report submitted to CNSOPB (see Figure 8.2).

8.7 Spill EPP for Sable Island

Dispersion modeling carried out for the Deep Panuke EA (Volume 4) shows that 10-barrel and 100-barrel spills of diesel are unlikely to occur during program activities or reach Sable Island due to prevailing currents away from the island – even with winds blowing directly towards the island (see Section 8.4).

While very unlikely, Encana will conduct beached bird surveys on Sable Island should a spill approach or reach Sable Island, to assist in determining the impact of the spill.



¹ If during non business hours or if during business hours and CWS has not responded within 2 hours of being contacted via cell phone and email, AND in case of 10 dead birds or more in a 24-hr episode, then notify Canadian Coast Guard Operations Center

² Also notify the CNSOPB in case of mass stranding (more than five dead birds in a 24-hr episode)

³ Birds handled during the program will be included in Encana's yearly Seabirds Salvage Permit report submitted to Environment Canada under the Migratory Bird Act and to the CNSOPB (before January 31 from the following year).

⁴ Oiled birds will be shipped to Canadian Wildlife Service, Environment Canada, 45 Alderney Drive, 16th Floor, Dartmouth, N.S. B2Y 2N6. CWS will be contacted beforehand.

Figure 8.1 Bird Handling Flowchart

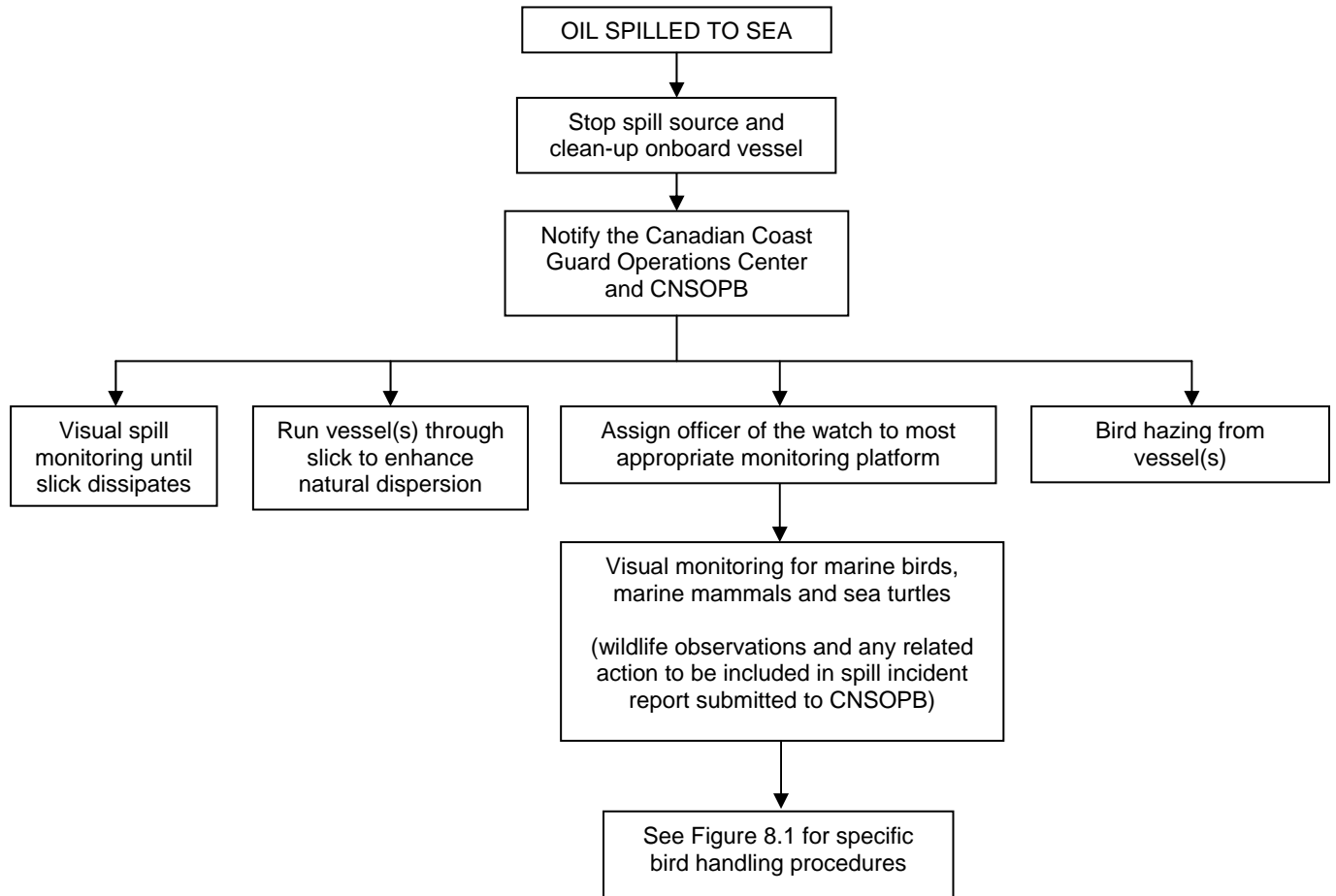


Figure 8.2 Spill EPP Flowchart

APPENDIX 1 CODES OF PRACTICE FOR SABLE ISLAND AND THE GULLY MPA

ENCANA CODE OF PRACTICE FOR SABLE ISLAND**A. OVERVIEW**

Encana has developed, as part of its environmental protection planning, a Code of Practice to protect the uniqueness and integrity of Sable Island (see attached map). This Code of Practice is intended to protect the sensitive environment of Sable Island and its Valued Environmental Components. This Code is not a regulatory requirement and is indicative of Encana's environmental stewardship philosophy and corporate policies. This Code of Practice applies to all Encana activities.

Sable Island is approximately 41km in length and is located 290km southeast of Halifax. The Island is composed of sand and is the only emergent portion of the Sable Island Bank. It supports a fragile ecosystem consisting of diverse flora and fauna; the best known components being the feral horses, seal populations, the rare Ipswich (Savannah) sparrow (*Passerculus sandwichensis princeps*), and the endangered Roseate tern (*Sterna dougallii*).

Sable Island access and activities are administered by the Canadian Coast Guard on behalf of the Government of Canada, pursuant to the Sable Island Regulations of the Canada Shipping Act. It is also protected under Environment Canada regulations, specifically the Migratory Birds Convention Act. Encana is represented on the Sable Island Stakeholder Advisory Committee chaired by DFO. The Sable Island Green Horse Society website (<http://www.greenhorsesociety.com>) contains additional information on Sable Island.

B. DETAILS

As part of its environmental stewardship with respect to Sable Island:

Encana will not conduct activities within 2 km (1 nautical mile) of Sable Island. All Encana activities on Sable Island must receive approval from Encana senior management and the Canadian Coast Guard, and will comply with all applicable guidelines, including the 2005 Sable Island Visitors Manual.

Encana vessels and aircraft are not permitted within 2 km (1 nautical mile) of the Island. However, this restriction does not apply in the case of an emergency situation, for access required as part of an approved Environmental Monitoring Program or for special trips approved by the Canadian Coast Guard.

Encana will include discussion of this Code of Practice in its environmental awareness training program for its personnel and provide orientation for its visitors to the Island. Encana intends that this Code is a 'living document' and will review and update it as required. The Code of Practice will also be publicly available on the Encana Corporation web site (www.encana.com).

Encana Corporation

David L. Kopperson
Vice President
Offshore East Coast of Canada

ENCANA CODE OF PRACTICE FOR THE GULLY MPA**A. OVERVIEW**

Encana has developed, as part of its environmental protection planning, a Code of Practice to protect the uniqueness and integrity of the Gully Marine Protected Area (MPA) (see attached map). This Code is not a regulatory requirement and is indicative of Encana's environmental stewardship philosophy and corporate policies. This Code of Practice applies to all Encana activities.

The Gully is a large submarine canyon approximately 40 km east of Sable Island on the edge of the Scotian Shelf. It is unique among canyons of the Eastern Canadian margin because of its depth, steep slopes and extension back into the continental shelf. It is thought to be an area of high productivity and important marine mammal habitat. Fifteen species of whales and dolphins have been identified in the area and eight of them are commonly found there. The deepest part of the Gully supports a resident population of approximately 163 endangered Northern Bottlenose whales (*Hyperoodon ampullatus*). The Gully also contains the highest known density of corals in Atlantic Canada with a dozen species identified to date.

The Gully has been designated by the Federal Department of Fisheries and Oceans as a MPA under the Oceans Act in 2004, and comprises an area of 2,364 km². Encana is represented on the Gully Advisory Committee chaired by DFO.

B. DETAILS

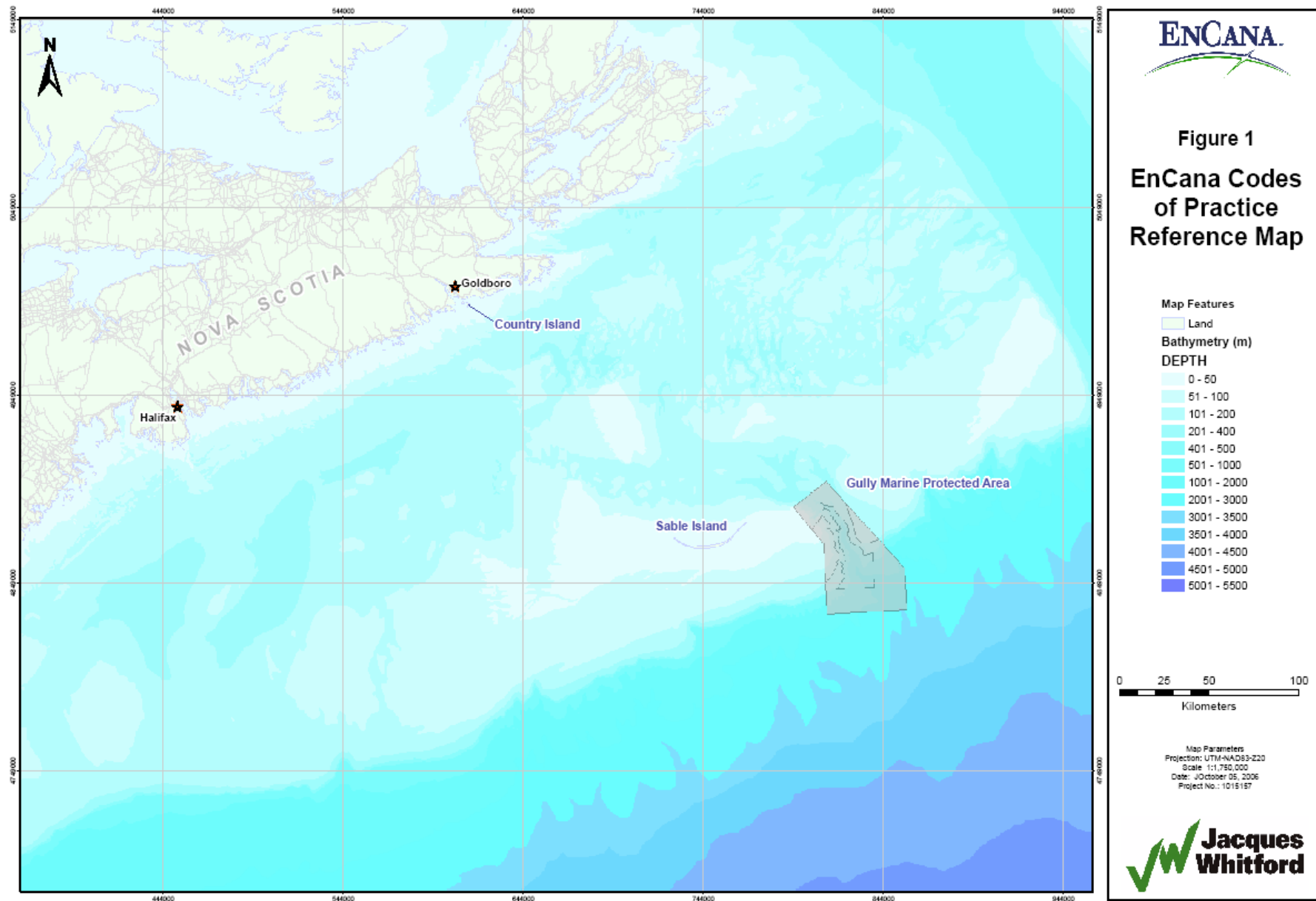
As part of its environmental stewardship with respect to the Gully MPA:

Encana will not conduct activities inside the Gully MPA. In addition, no vessels are permitted within the Gully MPA and aircraft in regular transit to and from any vessels, flowlines installation units, or facilities are restricted to flying at a height of at least 500 m. These restrictions apply unless it is required for purposes of safety or safe operation of a vessel/aircraft or as part of an approved Environmental Monitoring Program.

Encana will include discussion of this Code of Practice in its environmental awareness training program for employees and contractors. Encana intends that this Code is a 'living document' and will review and update it as required. The Code of Practice will also be publicly available on the Encana Corporation web site (www.encana.com).

Encana Corporation

David L. Kopperson
Vice President
Offshore East Coast of Canada



APPENDIX 2 WILLIAMS AND CHARDINE PROTOCOL

The Leach's Storm-Petrel:
General information and handling instructions

Urban Williams (Petro-Canada)
&
John Chardine (Canadian Wildlife Service)

The Grand Banks is an area that is frequented by large numbers of seabirds, representing a variety of species. Large populations are found in this area in both summer and winter, and come from the Arctic, northern Europe, and the south Atlantic, as well as from colonies along the Newfoundland Coast. One of the species found in the area of the Terra Nova Field is the Leach's Storm-Petrel (*Oceanodroma leucorhoa*).

The Bird:

Leach's Storm-Petrels are small seabirds, not much bigger than a Robin. They have relatively long wings and are excellent fliers. Leach's Storm-Petrels are dark brown in colour and show a conspicuous white patch at the base of the tail. In the hand, you can easily notice a small tube at the top of their bill, and you will also notice that the birds have a peculiar, not unpleasant smell (although some Newfoundlanders call these birds "Stink Birds"). Storm-Petrels are easy prey for gulls and other predators, and so to protect themselves from predation, Leach's Storm-Petrels are only active at night when on land at the breeding colonies.



Photo : Gilles Chapdelaine

Nesting Habitat:

Leach's Storm-Petrels are distributed widely in the northern hemisphere, however, their major centres of distribution are Alaska and Newfoundland. The bird breeds on offshore islands, often in colonies numbering tens or hundreds of thousands of pairs, even millions at one colony in Newfoundland. The nest is a chamber, sometimes lined with a some grass, located at the end of a narrow tunnel dug in the topsoil. Depending on the colony, burrows may be under conifer or raspberry thickets or open grassland.

Reproduction:

In Newfoundland, Leach's Storm-Petrels lay their single egg in May and June. The egg is incubated by both parents alternately, sometimes for stretches exceeding 48 hours. The egg is incubated for 41-42 days, which is a long time for such a small egg. The peak hatching period is in the last half of July. The young petrel remains in the tunnel for about 63-70 days. Once breeding is over in late-August or early September, the birds disperse from the colonies and migrate to their wintering

grounds in the Atlantic. September is the most important period for migration of Storm-Petrels to the offshore areas such as near the Terra Nova field.

Populations:

Canada alone supports more than 5 million pairs of Leach's Storm-Petrels. Most of them are found in Newfoundland. The Leach's Storm-Petrel colony located on Baccalieu Island is the largest known colony of this species.

Nesting sites for Leach's Storm-Petrels are found along the southeast coast of Newfoundland. These are - i) Witless Bay Islands (780,00 nesting pairs), ii) Iron Island (10,000 nesting pairs), iii) Corbin Island (100,000 nesting pairs), iv) Middle Lawn Island (26,000 nesting pairs), v) Baccalieu Island (3,336,000 nesting pairs), vi) Green Island (72,000 nesting pairs), and vii) St. Pierre Grand Columbier (100,000 nesting pairs).

Feeding Habits:

Leach's Storm-Petrels feed at the sea surface, seizing prey in flight. Prey usually consists of myctophid fish and amphipods. The chick is fed planktonic crustaceans, drops of stomach oil from the adult bird, and small fish taken far out at sea. Storm-Petrels feed far out from the colony and it would be reasonable to assume that birds nesting in eastern Newfoundland can be found feeding around the Terra Nova site.

The Problem:

As identified in the C-NOPB Decision 97-02, seabirds such as Leach's Storm-Petrels are attracted to lights on offshore platforms and vessels. Experience has shown that Storm-Petrels may be confused by lights from ships and oil rigs, particularly on foggy nights, and will crash into lighted areas such as decks and portholes. Fortunately, this type of accident does not often result in mortality, however, once on deck the bird will sometimes seek a dark corner in which to hide, and can become fouled with oil or other contaminants on deck.

Period of Concern:

Leach's Storm-Petrels are in the Terra Nova area from about May until October and birds could be attracted to lights at any time throughout this period. The period of greatest risk of attraction to lights on vessels appears to be at the end of the breeding season when adults and newly fledged chicks are dispersing from the colonies and migrating to their offshore wintering grounds. September is the most important period for migration of storm-petrels to the offshore areas. Past experience suggests that any foggy night in September could be problematic and may result in hundreds or even thousands of birds colliding with the vessel.

The Mitigation:

On nights when storm-petrels are colliding with the vessel, the following steps should be taken to ensure that as many birds as possible are safely returned to their natural habitat:

- All decks of the vessel should be patrolled as often as is needed to ensure that birds are picked up and boxed (see below) as soon as possible after they have collided with the vessel. After collision, birds will often "freeze" below lights on deck or seek dark areas underneath machinery and the like.
- Birds should be collected by hand and gently placed in small cardboard boxes. Care should be taken not to overcrowd the birds and a maximum of 10-15 birds should be placed in each box, depending upon its size. The birds are very easy to pick up as they are poor walkers and will not

fly up off the deck so long as the area is well-lit. They will make a squealing sound as they are picked up- this is of no concern and is a natural reaction to be handled (the birds probably think they have been captured to be eaten!).

- When the birds are placed in the box the cover should be put in place and the birds left to recover in a dark, cool, quiet place for about 5-10 minutes. The birds initially will be quite active in the box but will soon settle down.
- Following the recovery period, the box containing the birds should be brought to the bow of the boat or to some other area of the vessel that has minimal (if any) lighting. The cover should be opened and each bird individually removed by hand. The release is usually accomplished by letting the bird drop over the side of the vessel. There is no need to throw the bird up in the air at release time. If the birds are released at a well-lit part of the vessel they usually fly back towards the vessel and collide again.
- If any of the birds are wet when they are captured (i.e. they drop into water on the deck) then they should be placed in a cardboard box and let dry. Once the bird is dry it can be released as per the previous instruction. Also, temporarily injured birds should be left for longer to recover in the cardboard box before release.
- Any birds contaminated with oil should be kept in a separate box and not mixed with clean birds. Contact Canadian Wildlife Service at (709) 772-5585 for instructions on how to deal with contaminated birds.
- In the event that some birds are captured near dawn and are not fully recovered before daylight, they should be kept until the next night for release. Storm-Petrels should not be released in daylight as at this time they are very vulnerable to predation by gulls. Birds should be kept in the cardboard box in a cool, quiet place for the day, and do not need to be fed.
- Someone should be given the responsibility of maintaining a tally of birds that have been captured and released, and those that were found dead on deck. These notes should be kept with other information about the conditions on the night of the incident (moonlight, fog, weather), date, time, etc). **THIS IS A VERY IMPORTANT PART OF THE EXERCISE AS IT IS THE ONLY WAY WE CAN LEARN MORE ABOUT THESE EVENTS.**

Handling Instructions:

- Leach's Storm-Petrels are small, gentle birds and should be handled with care at all times.
- It is recommended that the person handling the birds should wear thin rubber gloves or clean, cotton work gloves. The purpose of the gloves is to protect both the Storm-Petrel and the worker.
- As mentioned Storm-Petrel's have a strong odour that will stick to the handler's hands. Washing with soap and water will remove most of the smell.
- Handling Leach's Storm-Petrels does not pose a health hazard to the worker, however some birds may have parasites on their feathers, such as feather lice. These parasites do not present any risk to humans, however, as a precaution we recommend wearing cotton work gloves or thin rubber gloves while handling birds and washing of hands afterwards.

Wilson's Storm Petrels:

A relative of the Leach's Storm-Petrel is the Wilson's Storm-Petrel. They breed in the south Atlantic and Antarctica and migrate north in our spring to spend the summer in Newfoundland waters. This species is very numerous on the Grand Banks in the summer, and shares the same nocturnal habits as the Leach's Storm-Petrel. Thus it is possible that Wilson's Storm-Petrels may also be attracted to the lights of a vessel at night. The two species are very similar and should be handled in the same way as described above for our Leach's Storm-Petrel.

Permits:

A permit to handle storm-petrels issued by the Canadian Wildlife Service will be held on board the vessel to cover personnel involved in bird collision incidents.