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2011 Environmental Assessment Review Hibernia Drill Centres Construction and Operations Program

Prepared for:

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Report

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1.0 INTRODUCTION

The preparatory subsea activities and technical work scope provided within, are part of the Hibernia Drill Centres Construction and Operations Environmental Assessment (EA) (CEAR No. 08-01-42279), which contained an overview of subsea equipment installation, Section 2.1.4).

This is an updated project description for the preparatory subsea activities to be undertaken in 2011 and contained within Jacques Whitford (2009). In addition to updating the project description and verifying that the scope and assessment predictions of the Hibernia Drill Centres Construction and Operations Program EA are still accurate and valid, the commercial fisheries and *Species at Risk Act* (SARA) species information that was provided has also been updated to reflect the most current information (as obtained on March 31, 2011).

2.0 PREPARATORY SUBSEA ACTIVITIES PROJECT DESCRIPTION

The following sections provide a more detailed and current project description for the preparatory subsea activities in support of the Hibernia South Extension (HSE) than originally was provided in Section 2.1.4 of the Hibernia Drill Centres Construction and Operations Program EA (Jacques Whitford 2009).

2.1 Preparatory Subsea and Platform Activities Objectives

Hibernia intends to enhance the production of the southern portion of the field by adding water injection and stimulation wells through a subsea tie-back from a new Excavated Drill Centre (EDC). The subsea water injection wells will require a water injection pipeline, as well as an umbilical complete with high-pressure stimulation lines. The lines will be tied back from the EDC via two existing J-tubes (Z1818 and Z1823) in the Hibernia Gravity-base Structure (GBS). The objectives of the preparatory subsea and platform activities in support of the HSE are:

- removal of existing blinds and metrology template structures from two nominated J-tubes (Z1818 and Z1823);
- installation of bell mouth and bridge structures by divers at nominated GBS J-Tubes (Z1818 and Z1823);
- support the internal inspection and metrology of two nominated J-tubes (Z1818 and Z1823);
- supply and installation assistance of pull-in messenger wires in two nominated J-tubes (Z1818 and Z1823);
- supply and installation of temporary plugs or blinds for two nominated J-tubes (Z1818 and Z1823);
- System Integration Testing (SIT) of temporary plugs/blinds with bell-mouth structures; and
- SIT of bridge structure with bell-mouth and support structures (optional).

Hibernia will use the existing platform contractor for all HSE activities undertaken on the platform to support the subsea preparatory activities, including the provision of engineering, procurement of equipment and labour for flooding of J-Tubes, replacement of messenger wires, inspection/metrology of J-Tubes and preservation of J-Tubes.

2.2 Preparatory Subsea Schedule

Hibernia intends on completing subsea and platform preparatory work required to support HSE between June and October, 2011.

2.3 Preparatory Subsea Activities

As part of the preparatory subsea activities in support of HSE J-Tube exit areas installation of the following structures will be undertaken:

- Bridge support structures including dropped object protection. The bridge structure must be designed to provide a safe transition as well as aid in the installation of the lines as they enter the J-tube.
- Bridge template support structures to allow for an efficient connection point between the bridge structure and the GBS base slab. The template structure is also designed as a structural element to safely transfer any potential load from installation or dropped objects back to the GBS base and not the J-Tube.
- Bell-mouth assemblies to act as an installation aid during pull-in operations and guide the pulling head of the product into the corresponding J-tube. Bell-mouths will also be designed to accommodate the future active seal plug and inhibitor injection as required.
- Temporary J-Tube seal/plug assemblies.
- Supply of messenger wires for each J-Tube.

In preparation for the removal of the blind flanges on the external portion of the J-tubes by divers, each J-tube will be pre-filled with seawater, which will contain a biocide agent and corrosion inhibitor. The top of the J-tube is located at an elevation of 110 m above the seabed while the external water depth is approximately 82 m. Upon removal of the blind flange by the divers, approximately 15 m³ of the fluid will be discharge to the ocean from each J-tube. Following completion of the installation campaign, a seal assembly will be installed on the newly installed bellmouth structure. When placed in the bell-mouth, the seal will ensure the containment of the preservation fluid. The J tube will be filled with water containing the corrosion inhibitor and biocide to a height of 30 m above sea level, thereby creating a positive pressure. When the flange is released, the 30 m of water will be released into the environment as it equalizes with the seawater pressure.

2.3.1 J-Tube Preparations

The seal may be an external blind cover over the bell-mouth or an internal plug arrangement. The nominated design must be removable without diver support during the future HSE installation program and must be connected to the messenger wire pre-installed in each J-tube for future retrieval by the installation vessel.

During initial construction of the Hibernia platform, the J-tube exits were equipped with bridge template metrology structures. The bridge template structures have been designed to be recovered intact and used as a jig in the fabrication and verification of a bridge support structure should the requirement for future riser pull-ins arise. Each template is connected to the GBS base slab by a padeye and pin system and also welded to each J-tube blind flange.

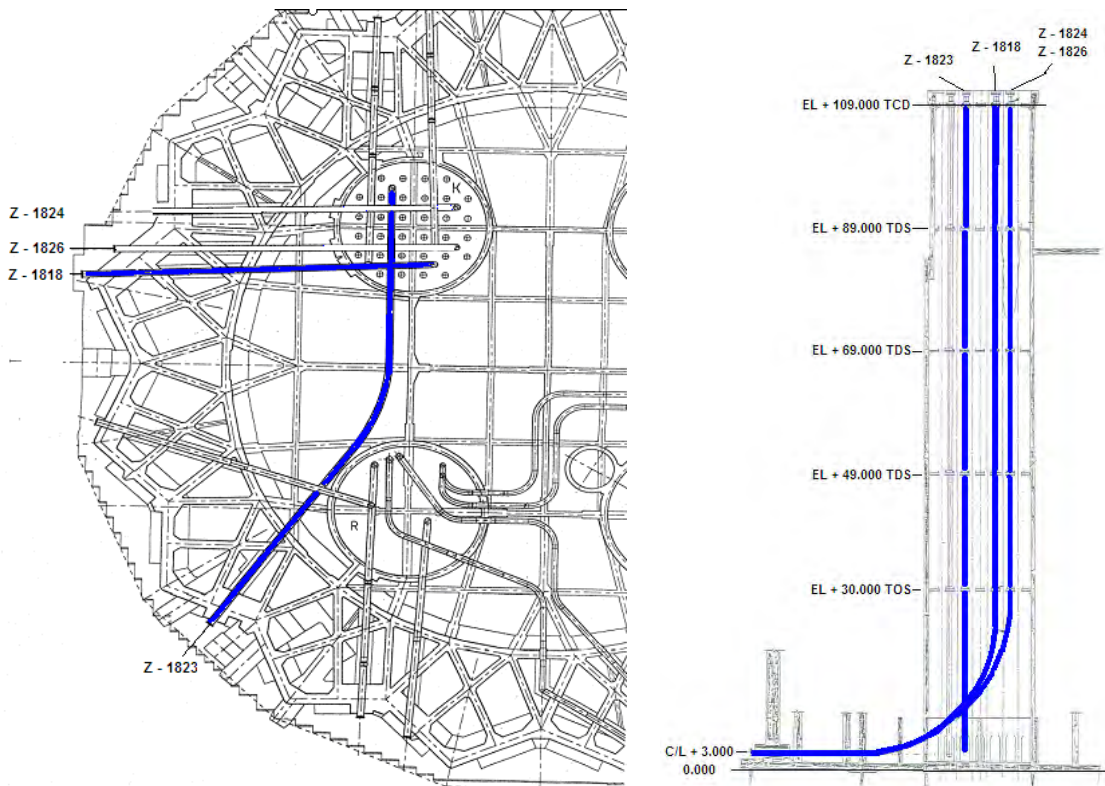
The connection pins must be removed to recover the template structure and re-use the padeye and embedded pad structure for the bell-mouth and bridge support. If pins can't be removed, the connection may be cut in order to remove the template structure from the GBS. The cutting of these connections may use Oxy Arc burning applications where practical and deemed safe to do so through formal Risk Assessment. The blind flanges are connected to the J-tube flange by way of 28 1¼" studs complete with two off 1¼" hex nuts per stud (front and back of flange). The blind flange and metrology template at each J-tube will be removed without damaging the remaining J-tube or nearby structures.

2.3.2 J-Tube Filling and Discharge

A portion of the preparation activities for the 2013 HSE Installation campaign will be undertaken as part of this year's Offshore Loading System replacement project.

During the 2013 HSE Installation campaign, one water injection riser and one controls umbilical will be pulled into the Hibernia GBS structure through two existing 30-inch J-tubes (Z1818 and Z1826). An illustration of the J-tube locations is show in Figure 2.1.

Figure 2.1 J-Tube Locations



To prepare for this work, the existing subsea flange on the exterior of J-tubes Z1818 and Z1826 (illustrated in Figures 2.2 and 2.3) must be removed and replaced with a new supporting structure, bellmouth and support bridge (see Section 2.3.4).

Figure 2.2 Existing J-Tube Support Flange

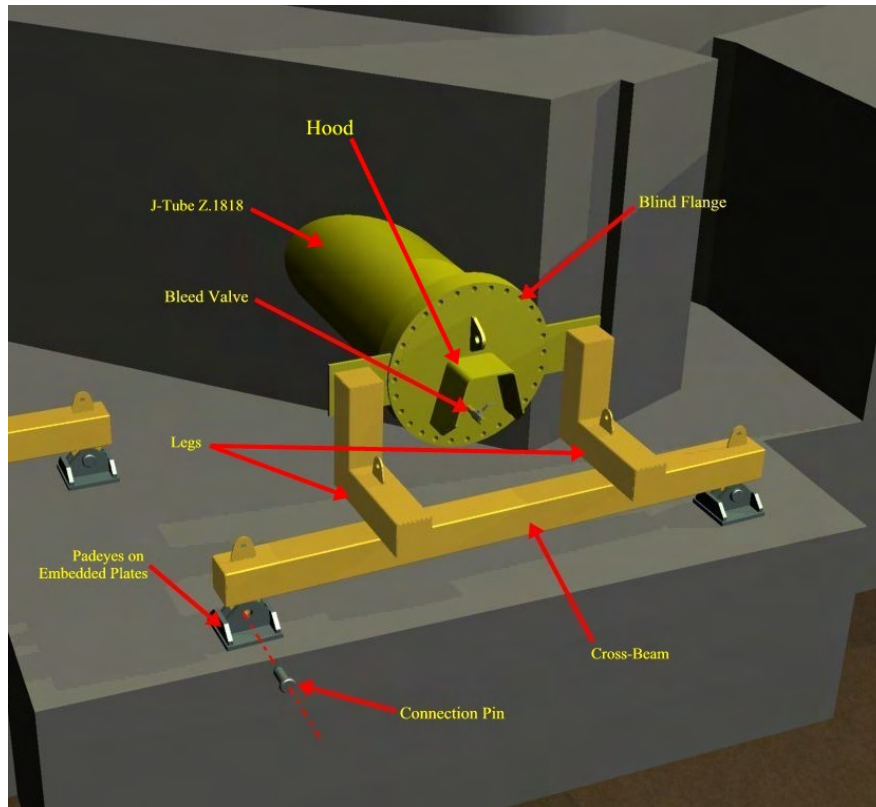
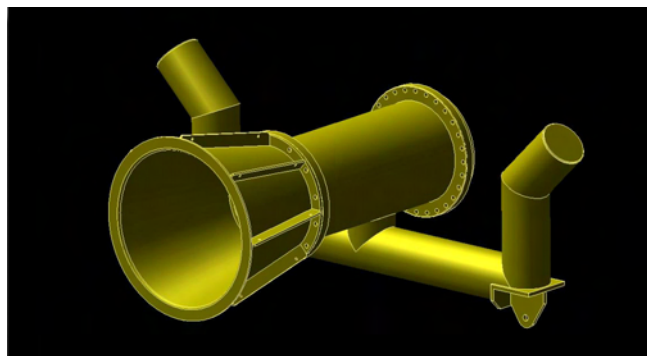


Figure 2.3 New J-Tube Support Structure and Bellmouth



To allow divers to remove the subsea flange safely, a positive pressure must be placed on the inboard side of the flange to prevent any potential risk of suction. To ensure adequate positive pressure, each J-tube will be filled to its top flange, which is located in the Hibernia K-shaft at elevation 110 m. The volumes of each J-tube are identified in the Table 2.1.

Table 2.1 J-Tube Volumes

J-Tube	Volume (m ³)
Z1818	58
Z1823	67
Z1826 (contingency)	56

Upon completion of the work, the J-tube will again be sealed subsea using a blind flange installed on the new bellmouth structure, leaving a stagnant column of water in the J-tube until the 2013 campaign. To protect against corrosion and bacterial growth over the next two years, a corrosion inhibitor (CWR9800) and biocide (X-CIDE 450) will be introduced into the J-tube as they are initially filled with water. The concentration of both the corrosion inhibitor and biocide is 200 ppm.

The corrosion inhibitor and biocide will be injected into the J-tubes during initial filling. As the divers remove the subsea flanges, the pressures will equalize, resulting in a discharge to the ocean of approximately 15 m³ of fluid from each J-tube. In addition, once the subsea flanges are removed, there may be some additional exchange of seawater and J-tube fluid, which is estimated to be 5 m³ per J-tube. Incidental releases may occur via the J-tube vent line as the J-tube is filled to capacity, as well as during equipment calibration.

As a project contingency, J-tube Z1826 has been identified as an alternate (if required due to inspections of Z1818 and Z1826). If this occurs, its J-tube flange structure must be replaced and would therefore also have to be flooded in preparation for divers' works. This J-tube will only be filled if either J-tube Z1818 or Z1823 are found to unsuitable for pull-in works.

In summary, should all three J-tubes require inspection, the estimate total volume of fluid which will be discharged to the ocean as a result of these operations is 60 m³. This fluid will include CRW9800 at a concentration of 200 ppm and X-CIDE 450 at a concentration of 200 ppm.

2.3.3 Replacement of Messenger Wires and J-Tube Inspection

Each J-tube is equipped with a pre-installed messenger wire. The intention of the messenger wire is to allow for recovery of a topsides pull-in winch wire to the deck of a construction vessel for subsequent pull-in operations.

The messenger wire is 22 mm in diameter and is connected to the blind flange at the seabed end of the J-tube with a 17Te Crosby G-2130 shackle c/w split pin, connected to a Crosby G416 open spelter socket on the wire. A similar connection exists at the topsides end of the J-tube to a blind cap. The messenger wire is currently under no tension in each J-tube.

Both existing messenger wires with new assemblies of equal or higher capacity to facilitate future pull-in of the riser and umbilical will be installed. New messenger wire assemblies will be secured at the topside exit of each J-tube and connected to the temporary seal at the subsea exit of each J-tube.

2.3.4 Installation of Bell-mouth and Bridge Structures

An as-found remotely operated vehicle (ROV) visual hazard survey (including digiquartz measurements) and required metrology of each J-tube exit and vicinity will be conducted upon arrival in the field before commencing any HSE installations.

Divers will be required to install the bell-mouth structure, including alignment and connection of the structure to the existing J-Tube flange and levelling the structure on the GBS slab. A diverless installation of the bridge structure (Figure 2.4) is planned using a work-class and an observation-class ROV while maintaining diver intervention as contingency. In the event it is demonstrated that one work-class ROV cannot safely or efficiently install the bridge structure, then divers will be deployed to assist as required.

Marine growth on the subsea facility structure will be removed with approved tooling as required for access and installation of structures.

Figure 2.4 Bridge Structure Installation at J-Tube Z1818



2.3.5 Material Relocation

Due to previous and ongoing drilling activities conducted from the GBS, cuttings piles have formed along the base slab of the platform, predominantly along the northwest side. The cuttings have accumulated just north of J-tube Z1818 (Figure 2.5) and partially covers J-tube Z1826. It is not anticipated that this will interfere with the new J-tube preparatory works or new structures, but divers need to be aware of the drill cuttings mound and plan accordingly. The bridge structure and seabed support footing were designed to suit the drill cuttings pile and the local seabed bathymetry survey.

In the event that the mound of drill cuttings interferes with the J-Tube preparatory work or the installation of the new structures, the mound will be relocated. Mound relocation may be required to allow level placement of clump weight as part of bridge structure (Figure 2.6). This may result in the necessity to relocate a base case volume of material approximately 4 m x 4 m x 0.5 m deep (8 m³) to another location on the existing cuttings pile (as illustrated on Figure 2.6). Material relocation will be required around J-tube Z1826, which is the contingency J-tube to be used for bridge installation if issues are found during UT examination of Z1818 or Z1823.

If material is required to be relocated, then a subsea suction pump will be deployed to the seabed with the vessel crane J-tubes Z1818 and Z1826 (as illustrated in Figure 2.5). Suction and discharge hoses will be deployed to depth with the vessel crane. The suction and discharge hoses will be connected to the pump by divers. The discharge hose will be positioned at the edge of the GBS on top of the existing cuttings pile by a diver. The relocation site may be monitored by the ROV. The pump will be started slowly and the rate increased or decreased as required to safely relocate material to new location (Figure 2.7). This will continue until material relocation is completed and the pump system is recovered to the deck.

Figure 2.5 J-Tubes Z1818 and Z1826

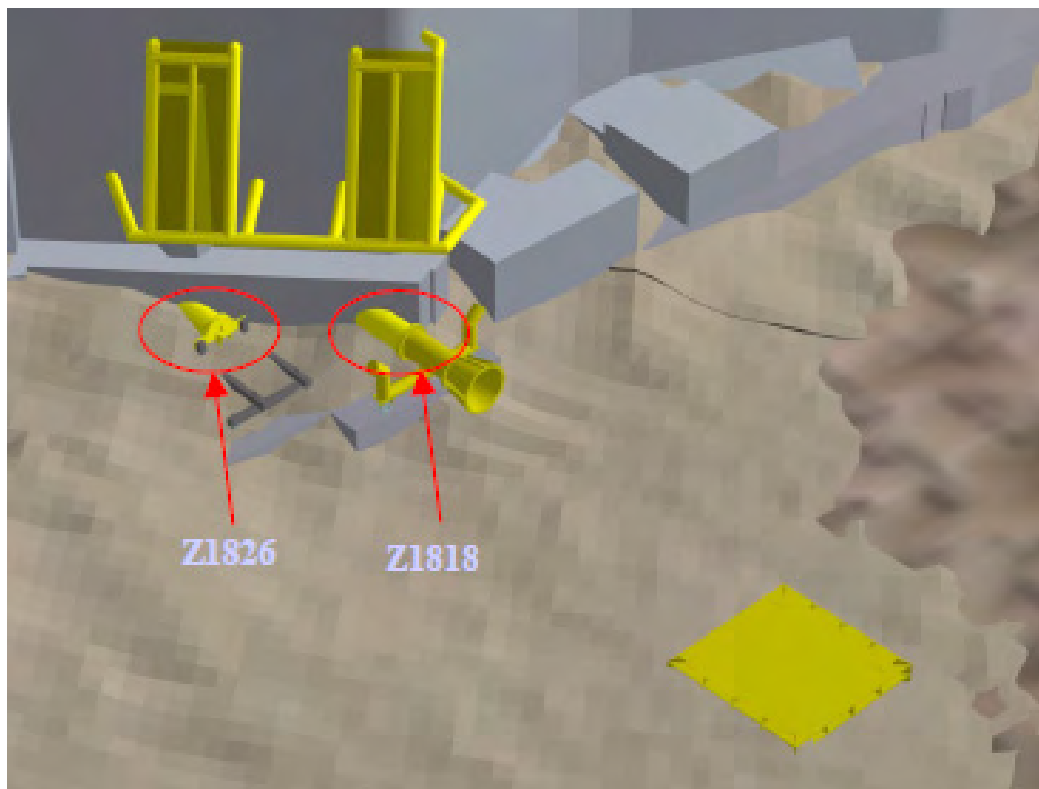


Figure 2.6 Material Relocation for J-Tube Bridge Structure

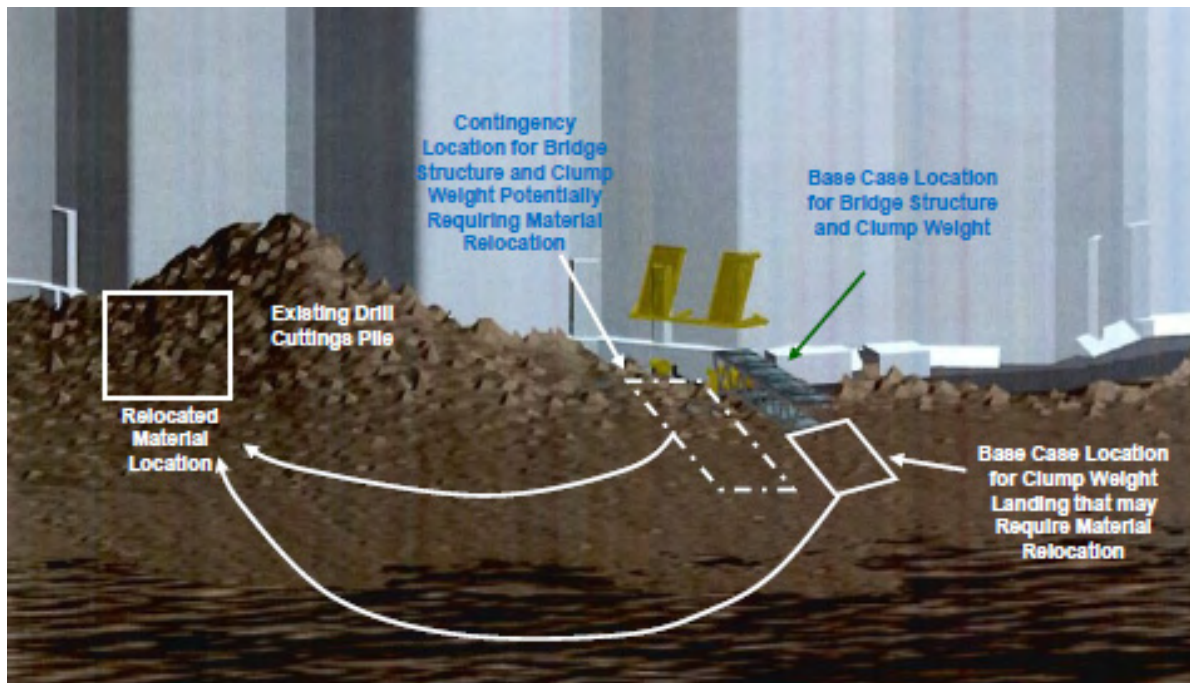
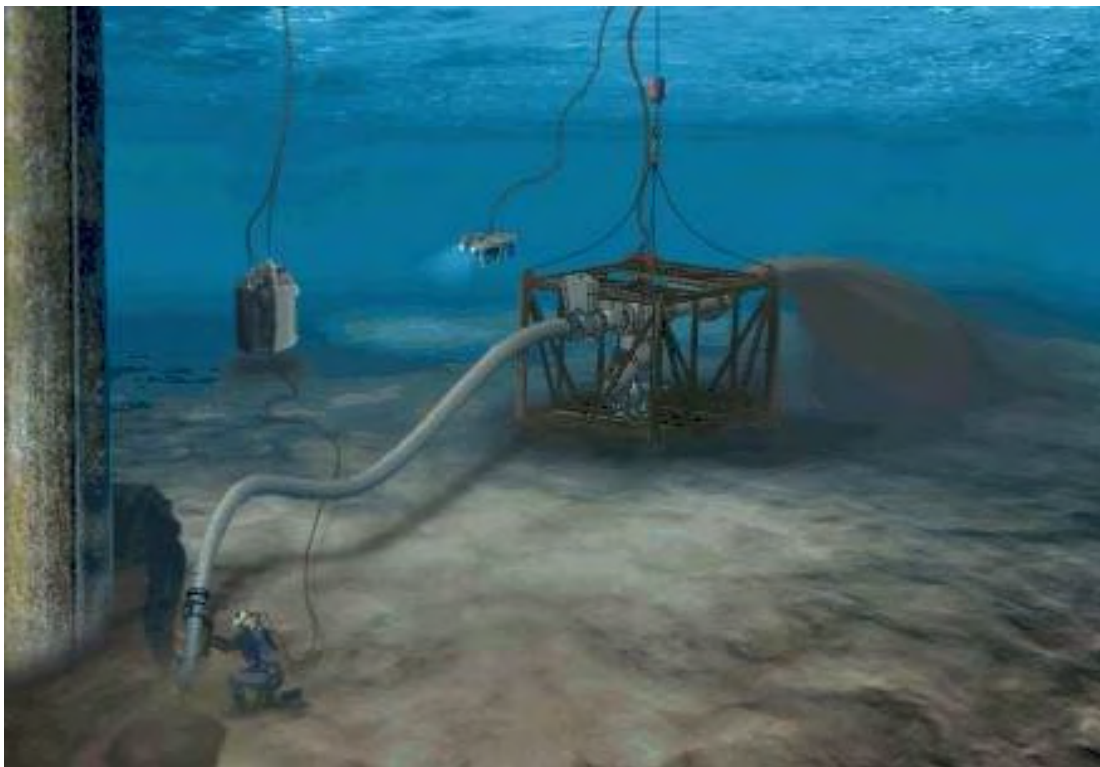


Figure 2.7 Schematic Representation of Material Relocation



2.4 Safety Measures

The location of platform inlets and outfalls should be noted and diving activities planned accordingly. The requirement to isolate the inlets and outfalls will depend on proximity, flowrate, existing protection grillage, and cross sectional area. Work on J-Tube Z1818 may be affected by the Shale Chute to the north at 52 m elevation. Work on J-Tube Z1823 may be affected by the west ballast water/seawater inlets and seawater outlet to the South at elevations varying from 8 to 65 m.

J-tubes Z1818 and Z1823 are both located within the platform west crane radius. If the platform west crane was to be used, or a supply boat required access to the west side of the platform, diving would be interrupted because of the dropped-object hazard. As the J-tubes are directly below the edge of the platform, there is a risk of dropped objects from the platform. When divers are to be deployed at the GBS, no over-the-side work will be conducted on the platform; and this will be included in the vessel's Permit-to-Work. Sufficient notification will be provided to safely suspend work and recover divers if required by the Platform.

It is possible that some air could be trapped in the horizontal part of the J-tubes as they are filled, or that the J-tubes may be unintentionally over-filled or under-filled, resulting in an unknown pressure differential when the diver operates the equalization valve on the subsea blind. A diffuser may be required to be retro-fitted on the valve inlet for diver protection.

2.5 Mitigations

The primary effect of this undertaking on the environment would relate to the relocation of materials during the installation of the bridge structure (if required). To reduce or eliminate potential adverse effects of material relocation, the drill cuttings pile was selected as the relocation site as it is a pre-existing waste disposal site. Any secondary dispersion of fines in the surrounding area is expected to be minimal and within the existing footprint (largely delineated by the EEM sediment program). Hibernia will be undertaking its EEM program in 2011 and therefore, any effects that might be associated with the material relocation would be captured in the 2011 EEM program.

The corrosion inhibitor (CRW9800) is a low-toxicity, water-based solvent formulation that is considered highly dispersible in produced waters/brines. The biocide (X-CIDE 450, a registered biocide) is a liquid, water-soluble, aldehyde-based formulation. Surplus product will be disposed via a licensed waste disposal contractor and will comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements (MSDS are provided in Appendix C).

3.0 BIOLOGICAL ENVIRONMENT UPDATES

As noted in Section 1.0, in addition to updates to Section 2.1.3 of the Hibernia Drill Centres Construction and Operations Program EA (Jacques Whitford 2009), the commercial fisheries and SARA species information has been updated to reflect the most current information (as of March 31, 2011). These updates are contained within Appendices A and B, respectively.

3.1 Commercial Fisheries

Fisheries activities within the Study Area are little changed since the EA report was accepted. The key fishery for the Northwest Atlantic Fisheries Organization (NAFO) Unit area 3Lt remains snow crab (*Chionoecetes opilio*). However, it should be noted that for 2008, 2009 and 2010, there were no snow crab catches (or any other species) from within the identified Study Area. Updates to section 4.2 (Commercial Fisheries) of the Hibernia Drill Centres Construction and Operations Program EA (Jacques Whitford 2009) are provided in Appendix A.

3.2 Species at Risk Updates

Since the submission of EA for the Hibernia Drill Centres Construction and Operations Program (Jacques Whitford 2009), the killer whale (*Orcinus orca*), basking shark (*Cetorhinus maximus*), American plaice (*Hippogloissoides platessoides*), American eel (*Anguilla rostrata*), roughhead grenadier (*Macrourus bewrqlax*), roundnose grenadier (*Coryphaenoides rupestris*), loggerhead sea turtle (*Caretta caretta*), deepwater redfish (*Sebastes mentella*) and Acadian redfish (*Sebastes fasciatus*) have been recently listed by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as either special concern, threatened or endangered.

Sowerby's beaked whale (*Mesoplodon bidens*) was not included in the EA and there were no sightings of Sowerby's beaked whales reported in the Fisheries and Oceans Canada (DFO) cetacean sightings database for the HSE Study Area. However, there were two unidentified beaked whale sightings during seismic monitoring in the Jeanne d'Arc Basin during 2005 to 2008 and it has been suggested that one of these sightings was likely a Sowerby's beaked whale (Stantec 2010). Therefore, Sowerby's beaked whale has been added to the list for completeness. Updates to section 4.5 of the Hibernia Drill Centres Construction and Operations Program EA (Jacques Whitford 2009) are provided in Appendix B.

None of the SARA/COSEWIC species updates have final recovery strategies, actions plans or associated critical habitat identified. None of the recovery or action plans that are available for the SARA species affect the mitigation measures committed to by HMDC in Hibernia Drill Centres Construction and Operations Program EA (Jacques Whitford 2009).

4.0 ENVIRONMENTAL EFFECTS ASSESSMENT

A review of the environmental effects assessment (Section 6.0) predictions and mitigations that were assessed as part of the Hibernia Drill Centres Construction and Operations Program EA (Jacques Whitford 2009) was conducted as a result of updated commercial fisheries data and new SARA/COSEWIC species information. The proposed activities fall within the scope of the Hibernia Drill Centres Construction and Operations Program EA (Jacques Whitford 2009) and the environmental effects predictions and significance determinations cited remain valid. The mitigations for the activities planned to be carried out under the scope assessed in the Hibernia Drill Centres Construction and Operations Program EA (Jacques Whitford 2009) are still appropriate and HMDC reaffirms its commitment to the mitigation measures cited in this assessment and the Screening Report (C-NLOPB 2009).

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APPENDIX A

Commercial Fisheries

A Commercial Fisheries

The following information is provided as an update to Section 4.2 (Commercial Fisheries) of the Hibernia Drill Centres Construction and Operations Program EA (Jacques Whitford 2009). Updates are provided for Tables 4.1 and 4.3, as well as Figures 4.6 and 4.7. Data for 2010 are provided in Figures A.3 to A.5 (Sections 4.2.3 and 4.2.4).

Table A.1 Study Area Harvest (2005, 2006, 2007, 2008, 2009 and 2010)

Species	Weight In Tonnes						Total Weight	% of Total Weight
	2005	2006	2007	2008	2009	2010		
Snow/Queen Crab	4,311.70	4,218.60	3,514.95	12,535.03	11,060.54	11,707.26	47,348.08	30.55
Clams (sp)	2,711.82	4,813.70	159.17	136.51	39.57	289.02	8,149.79	5.26
Cockles	4,394.89	9,864.11	726.93	0.00	1,006.45	687.45	16,679.83	10.76
American Plaice	1,008.28	5.51	189.10	610.71	704.64	625.01	3,143.25	2.03
Yellowtail	10,666.16	176.09	2,053.03	7,961.92	3,149.79	4,537.60	28,544.59	18.42
Turbot	540.26	290.44	477.02	485.84	968.47	932.46	3,694.49	2.38
Grenadier	39.57	18.87	5.42	0.16	4.60	7.41	76.03	0.05
Northern Shrimp	1,723.66	4,667.12	4,013.77	10,821.10	14,546.48	9,097.49	44,869.62	28.95
Other Ground Fish	220.52	3.60	68.38	726.92	764.15	145.17	1,928.74	1.24
Tuna (sp)	7.05	0.00	0.00	0.00	3.33	0.0	10.38	0.01
Swordfish	9.08	0.00	0.00	0.00	0.00	0.0	9.08	0.01
Shark/Skate (sp)	2.44	2.60	0.88	12.68	25.58	1.55	45.73	0.03
Iceland Scallop	123.22	346.08	0.00	0.00	0.00	0.0	469.3	0.30
Total Harvest in Study Area							154,968.9	100.00

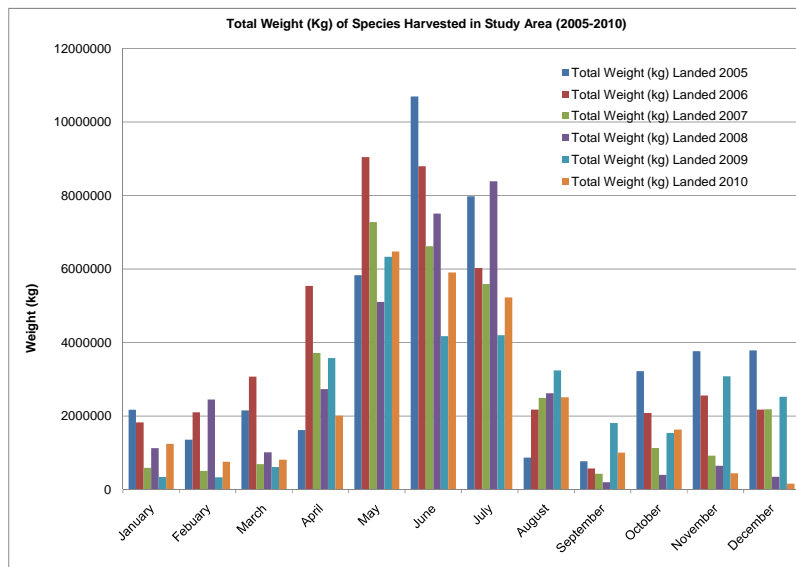
Update to Table 4.1 (Jacques Whitford 2009)

Table A.2 3Lt and Project Area Harvest Summary

Area	Species	Weight In Tonnes						Total	Percent of Total
		2005	2006	2007	2008	2009	2010		
3Lt Excluding Project Area	Snow/Queen Crab	2,503.19	2,868.84	2,826.33	1,771.7	1,783.9	1,895.5	13,649.45	99.1
	Stimpson's Surf Clams	0.00	84.73	0.00	0.00	0.00	0.0	84.73	0.7
	Cockles	0.00	18.21	0.00	0.00	0.00	0.0	18.21	0.1
	Total Harvest in 3Lt Excluding Project Area							13,752.39	
Project Area	Snow/Queen Crab	9.16	6.02	0.00	0.00	0.00	0.0	15.18	0.1
	Total Harvest in Project Area							15.18	
3Lt + Project Area	Total Harvest in Project Area and 3Lt							13,767.57	100.00

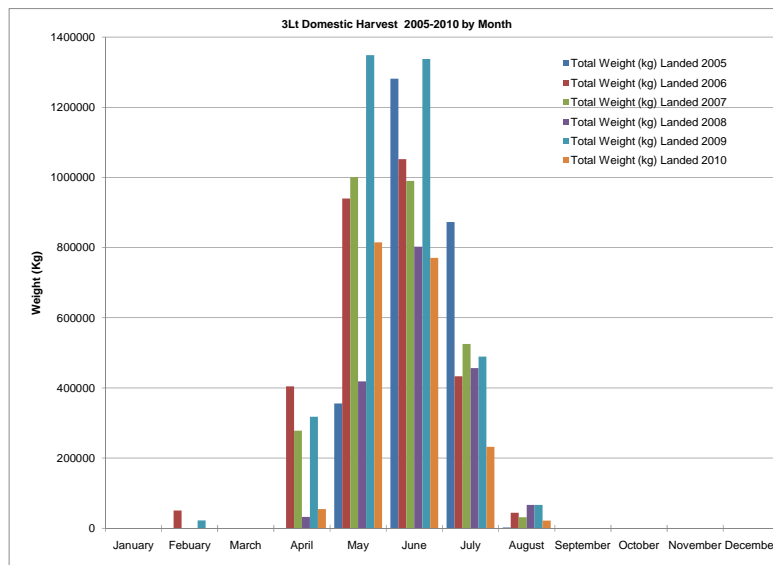
Update to Table 4.3 (Jacques Whitford 2009)

Figure A.1 Temporal Distribution of All Species Harvesting within the Study Area



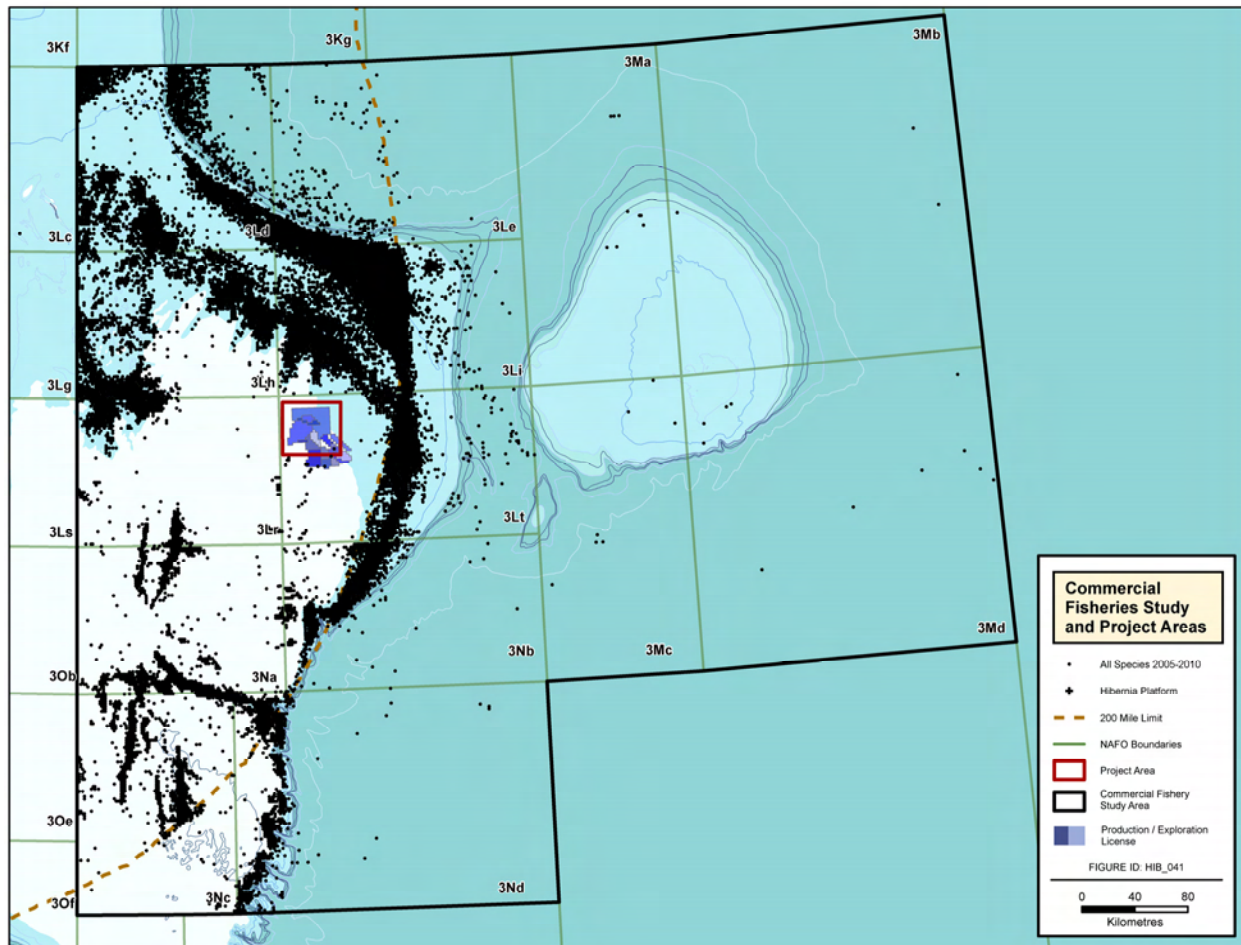
Update to Figure 4.6 (Jacques Whitford 2009)

Figure A.2 Temporal Distribution of All Species Harvesting within 3Lt



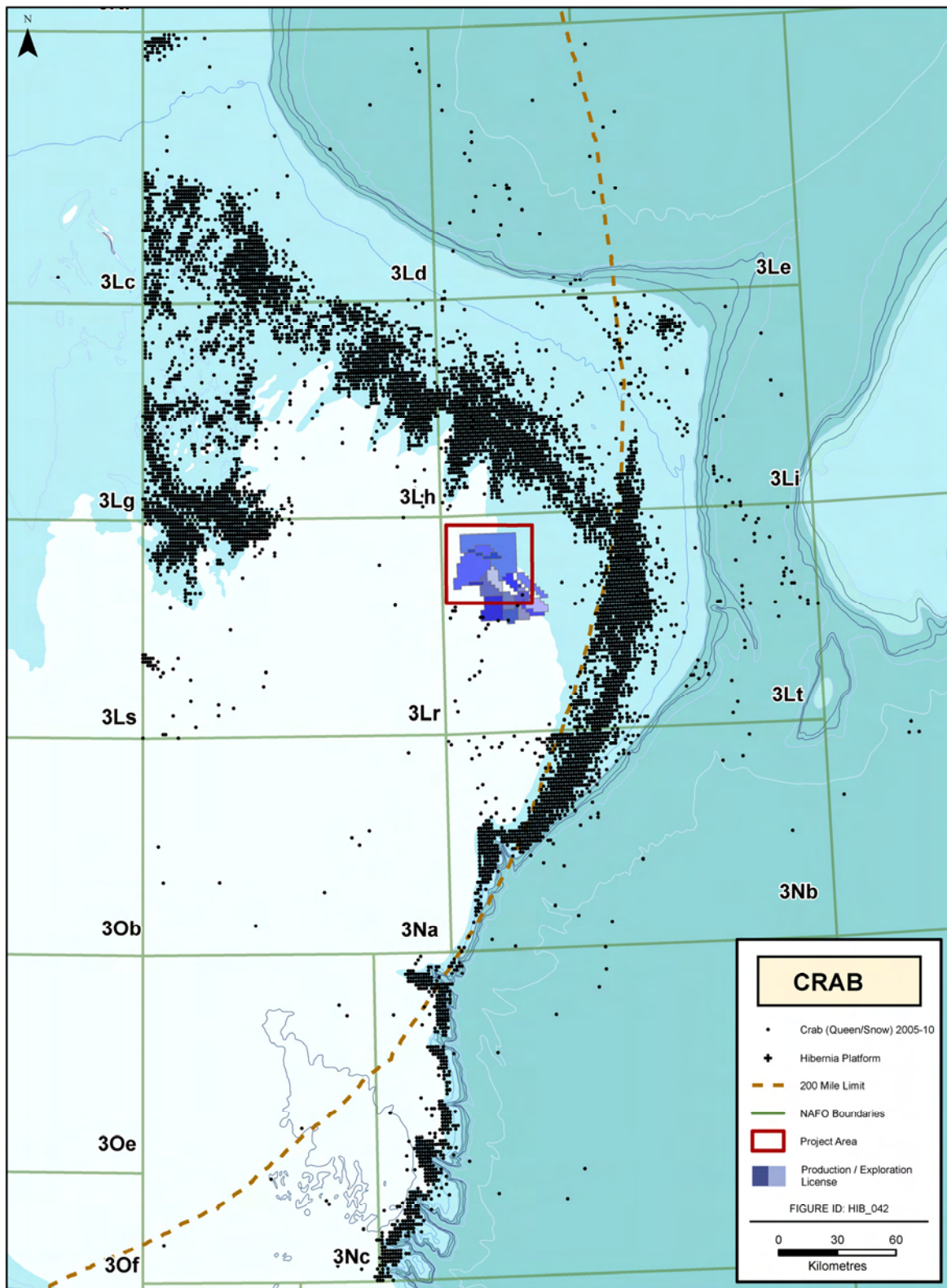
Update to Figure 4.7 (Jacques Whitford 2009)

Figure A.3 Study Area Commercial Fisheries all Species (2005 to 2010)



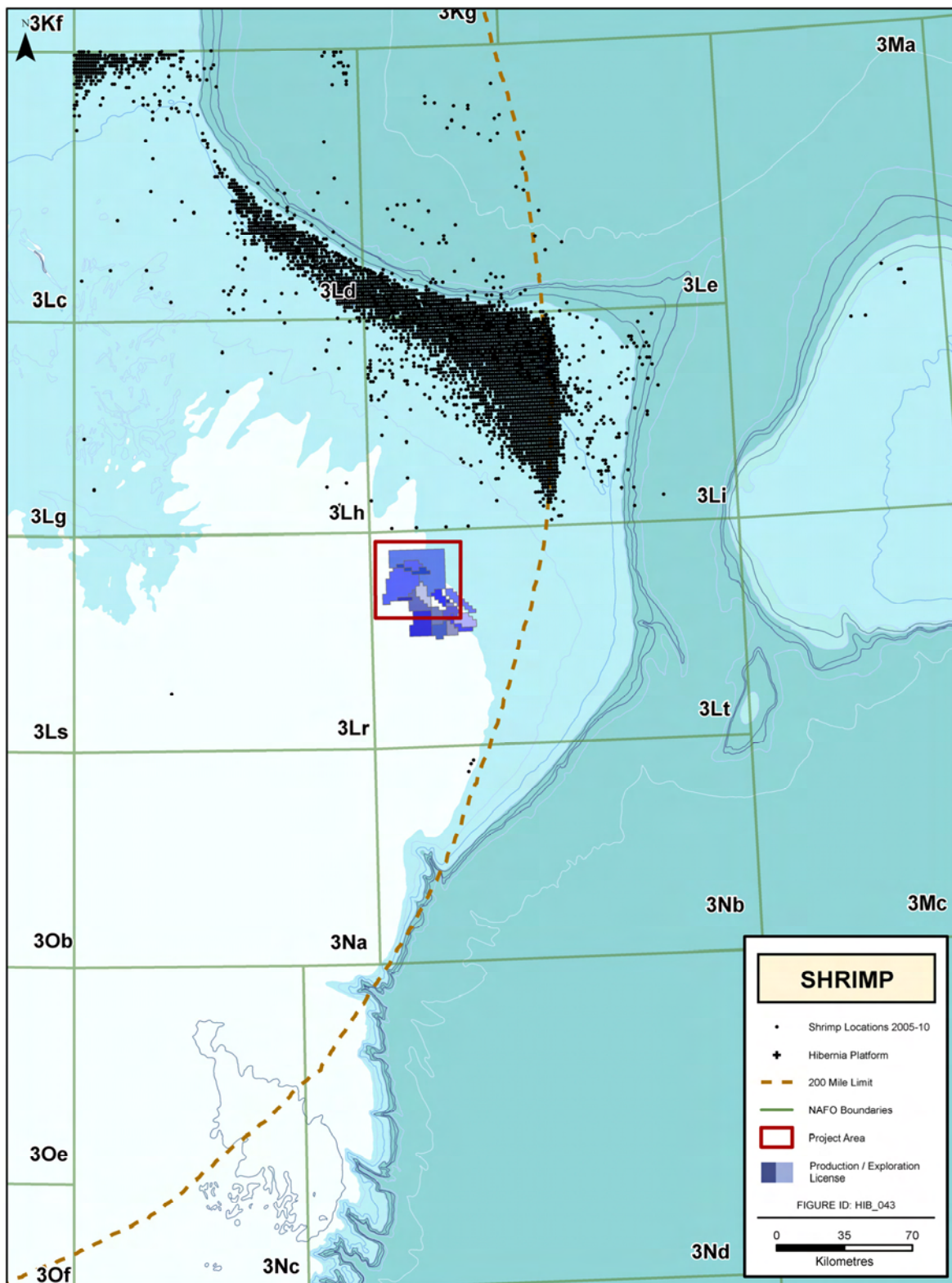
Update to Figure 4.8 (Jacques Whitford 2009)

Figure A.4 Snow Crab Harvesting Locations (2005 to 2010)



Update to Figure 4.9 (Jacques Whitford 2009)

Figure A.5 Northern Shrimp Harvesting Locations (2005 to 2010)



Update to Figure 4.10 (Jacques Whitford 2009)

APPENDIX B

SARA Species

B Species at Risk

The following information is provided as an update to Section 4.5 of the Hibernia Drill Centres Construction and Operations Program EA (Jacques Whitford 2009). The information contained within this section is current as of April 19, 2011. Table B.1 is an updated Table 4.10 (Jacques Whitford 2009) and has an additional three species that have either had a change to their SARA status or COSEWIC designation. A brief description of each of the added species is provided in subsequent sections.

Table B.1 Occurrence of Species at Risk within the Study Area

SPECIES		SARA Status	COSEWIC Status	Occurrence in the Study Area
Common Name	Scientific Name			
Birds				
Ivory Gull	<i>Pagophila eburnea</i>	Schedule 1 – Special Concern	Endangered	May occur but area is not known to be critical habitat for the species
Marine Mammals				
Blue Whale	<i>Balenoptera musculus</i>	Schedule 1 - Endangered	Endangered	Occurs but area is not known to be critical habitat for the species
North Atlantic Right Whale	<i>Eubalaena glacialis</i>	Schedule 1 - Endangered	Endangered	Occurs but area is not known to be critical habitat for the species
Fin Whale	<i>Balenoptera physalus</i>	Schedule 1 – Special Concern	Special Concern	Occurs but area is not known to be critical habitat for the species
Sowerby's Beaked Whale	<i>Mesoplodon bidens</i>	Schedule 3 – Special Concern	Special Concern	May occur in small numbers but area is not known to be critical habitat for the species
Killer Whale	<i>Orcinus orca</i>	No Schedule – No Status	Special Concern	May occur in small numbers but area is not known to be critical habitat for the species
Harbour Porpoise	<i>Phocoena phocoena</i>	Schedule 2 – Threatened	Special Concern	Occurs but area is not known to be critical habitat for the species
Northern Bottlenose Whale (Davis Strait-Baffin Bay-Labrador Sea pop)	<i>Hyperoodon ampullatus</i>	No Schedule – No Status	Special Concern	May occur in small numbers but area is not known to be critical habitat for the species
Fish				
Atlantic Cod (NL Pop)	<i>Gadus morhua</i>	No Schedule – No Status	Endangered	Occurs but area is not known to be critical habitat for the species
Atlantic Wolffish	<i>Anarhichas lupus</i>	Schedule 1 – Special Concern	Special Concern	Occurs but area is not known to be critical habitat for the species
American Plaice (NL Pop)	<i>Hippoglossoides platessoides</i>	No Schedule – No Status	Threatened	Occurs but area is not known to be critical habitat for the species
American Eel	<i>Anguilla rostrata</i>	No Schedule – No Status	Special Concern	Occurs but area is not known to be critical habitat for the species
Blue Shark	<i>Prionace glauca</i>	No Schedule – No Status	Special Concern	Not likely to occur
Roughhead Grenadier	<i>Macrourus berglax</i>	No Schedule – No Status	Special Concern	Occurs but area is not known to be critical habitat for the species

SPECIES		SARA Status	COSEWIC Status	Occurrence in the Study Area
Common Name	Scientific Name			
Roundnose Grenadier	<i>Coryphaenoides rupestris</i>	No Schedule – No Status	Endangered	Occurs but area is not known to be critical habitat for the species
Basking Shark	<i>Cetorhinus maximus</i>	No Schedule – No Status	Special Concern	May occur in small numbers but area is not known to be critical habitat for the species
Northern Wolffish	<i>Anarhichas denticulatus</i>	Schedule 1 - Threatened	Threatened	Occurs but area is not known to be critical habitat for the species
Porbeagle Shark	<i>Lamna nasus</i>	No Schedule – No Status	Endangered	Occurs but area is not known to be critical habitat for the species
Shortfin Mako	<i>Isurus oxyrinchus</i>	No Schedule – No Status	Threatened	Not likely to occur
Spotted Wolffish	<i>Anarhichas minor</i>	Schedule 1 - Threatened	Threatened	Occurs but area is not known to be critical habitat for the species
Cusk	<i>Brosme brosme</i>	No Schedule – No Status	Threatened	Not likely to occur
White Shark	<i>Carcharodon carcharias</i>	No Schedule – No Status	Endangered	Not likely to occur
Deepwater Redfish (northern population)	<i>Sebastes mentella</i>	No Status	Threatened	Occurs but area is not known to be critical habitat for the species
Acadian Redfish (Atlantic population)	<i>Sebastes fasciatus</i>	No Status	Threatened	May occur in small numbers but area is not known to be critical habitat for the species
Atlantic Salmon (South NL pop)	<i>Salmo salar</i>	No Schedule – No Status	Threatened	Not likely to occur
Atlantic Bluefin Tuna	<i>Thunnus thynnus</i>	No Schedule – No Status	Endangered	May occur in small numbers but area is not known to be critical habitat for the species
Reptiles				
Leatherback Turtle	<i>Dermochelys coriacea</i>	Schedule 1 - Endangered	Endangered	Occurs but area is not known to be critical habitat for the species
Loggerhead Sea Turtle	<i>Caretta caretta</i>	No Status	Endangered	Occurs but area is not known to be critical habitat for the species

Update to Table 4.10 (Jacques Whitford 2009)

B.1 Fish

The following fish have been added to Section 4.5.1 of Hibernia Drill Centres Construction and Operations Program EA (Jacques Whitford 2009).

B.1.1 American Plaice

Detailed information for American plaice was originally provided in Section 4.1.5.2 (Jacques Whitford 2009) and is still relevant. American plaice (Newfoundland and Labrador population) was designated as Threatened by COSEWIC in April 2009 (COSEWIC 2009), but is not listed under SARA.

B.1.2 American Eel

American eel are assessed as Special Concern by COSEWIC and are found from northern South America to Greenland and Iceland. They breed at sea and return to fresh water to feed and grow; all spawners are part of a single breeding unit. Spawning and hatching takes place in the Sargasso Sea and spawning occurs only once per adult. The larval stages are completely physiologically dissimilar to the adult eel. Female silver eels exit Newfoundland freshwater systems between August to October (Gray and Andrews 1971, in COSEWIC 2006a).

The historic Canadian range includes accessible fresh water, estuaries and coastal marine waters connected to the Atlantic Ocean, up to the mid-Labrador coast. Continental shelves are used by juvenile eels arriving from the spawning grounds, and by silver eels returning to the spawning grounds. They are primarily benthic inhabitants, using substrate and bottom debris as protection and cover. Eels are not likely to occur in the Project Area. Freshwater habitat is protected by the *Fisheries Act* and other legislation; however, marine habitat is not exempt from exploitation (even those areas with special protection such as Marine Protected Areas (MPAs) (COSEWIC 2006a). While there has been no evidence of ongoing decline in elver abundance, there has been a recorded decline in adult American eel. Possible reasons include alteration of habitat, fishery, changing oceanic conditions and contaminants (COSEWIC 2010a).

B.1.3 Roughhead Grenadier

Roughhead grenadier are assessed as Special Concern by COSEWIC. Roughhead are primarily a deepwater species located on the slope of the northeast Newfoundland Shelf, the Flemish Pass and along the edge of the Grand Banks (Kulka *et al.* 2003). It is commonly found between depths of 800 to 1,500 m but can be found at depths of 2,700 m, preferring temperatures of -0.5°C to 5.4°C (González-Costas and Murua 2007). Roughhead grenadier have been reported near the HSE Study Area during DFO spring and fall surveys for several years (Kulka *et al.* 2003).

Biology and population dynamics are not well understood for roughhead grenadier (González-Costas and Murua 2007). Concentrations of roughhead have been higher in the Study Area during fall surveys. Spawning is thought to take place between late winter and early summer, and there is evidence of a prolonged reproductive period that could extend over an entire year (FAO 2007; COSEWIC 2006b). Age determination studies have shown the life span to be at least 25 years (FAO 2007); however, growth trajectories of male and females differ, with males growing slower than females from 9 to 10 years old (González-Costas and Murua 2007).

Roughhead grenadier are non-specialist predators, with food type being directly dependent on the size of the fish (COSEWIC 2006b). Diet for small fish is predominately comprised of amphipods; however, polychaetes, crustaceans, bivalves, echinoderms and ctenophores are also important (FAO 2007; COSEWIC 2006b). Large roughhead grenadier feed on active benthopelagic organisms such as larger bivalves, shrimp, squid and small fish (COSEWIC 2006b). Feeding is apparently seasonal and peaks during fall and winter, diminishing during the summer (Scott and Scott 1988). Due to their slow movements, they are potentially easy prey for larger predatory fish and have been found in the stomachs of cod (*Gadus* spp.) (COSEWIC 2006b). Predators of the roughhead grenadier include Greenland halibut (*Reinhardtius*

hippoglossoides), whales and redfish (*Sebastes* spp.) (Scott and Scott 1988). Little is known about the spawning time.

Limiting factors for roughhead grenadier are susceptibility to resource exploitation as result life history characteristics such as long life, late maturity, slow growth rates, low fecundity and long population turnover (COSEWIC 2006b).

B.1.4 Roundnose Grenadier

Roundnose grenadier are found in deep waters (400 to 1,000 m) of the North Atlantic continental shelves and slopes, with the greatest concentration off Newfoundland and Labrador occurring at depths greater than 503 m and 3.5°C to 4.5°C. The COSEWIC assessment was changed to Endangered in November 2008 based on a new status report which indicated that the species has experienced a sharp decline, first between 1978 to 1994, then another decline between 1995 and 2003 (COSEWIC 2008a). The spawning location is unknown and estimates of spawning time range from spring and autumn to late autumn to spawning intermittently throughout the year. Roundnose grenadier have a varied diet that includes squid, small crustaceans, euphausiids and small fishes (Scott and Scott 1988). The decline in abundance of greater than 95 percent in the past 10 years is due primarily to the fact that the fishery outside Canadian waters remain largely unregulated.

B.1.5 Basking Shark

The Atlantic population of basking shark has recently been assessed as a species of Special Concern by COSEWIC. The basking shark is found in the western North Atlantic from northern Newfoundland south to Florida and occurs in Canadian Waters from May to September (Scott and Scott 1988). It is the second largest fish, with a maximum length of 15 m (COSEWIC 2010a), but average from 5 to 7 m in the Atlantic region (Scott and Scott 1988). Females do not reach maturity until 16 to 20 years old and gestate to 2.6 to 3.5 years, resulting in extremely low productivity. The Canadian population ranges from approximately 5,000 to 10,000 individuals (COSEWIC 2010a).

The primary threat to the basking shark is incidental by-catch from trawl, longline and gillnet fisheries and collision with ships (COSEWIC 2010a).

B.1.6 Redfish

Two species of redfish could occur near the Study Area, Acadian redfish (*Sebastes fasciatus*) (Atlantic population) and the deepwater redfish (*Sebastes mentella*) (northern population). These species are very similar in appearance and are managed together and not separated in the fishery (DFO 2004). Redfish are typically found at depths ranging from 100 m to 700 m. Mating takes place in the fall and larvae hatch within the female and are released during April to July (LGL 2005). In the early 1990s, the landings of redfish in Unit 1 (NAFO Divisions 4RST) dropped from approximately 60,000 tonne in 1993 to approximately 19,500 tonne in 1994 (DFO 2001); the directed redfish fishery was closed in 1995 as a result of low stock levels (DFO 2001). The deepwater redfish has decline by 98 percent since 1984 and the Acadian redfish has declined by 99 percent, in areas of historical abundance over two generations. The major threats to both species are directed fishing and incidental harvest (COSEWIC 2010b).

B.1.7 Atlantic Bluefin Tuna

COSEWIC recently assessed the Atlantic bluefin tuna as Endangered. Bluefin tuna are a warm-blooded pelagic species that is distributed from the Gulf of Mexico to the Gulf of St. Lawrence. The large, endothermic bluefin tuna are adapted for migration to colder waters while maintaining a high metabolic rate, which is evident in their migration into the Gulf of St. Lawrence in search of food stocks (National Oceanic and Atmospheric Administration 2005). The bluefin tuna generally follow food stocks that aggregate in the Gulf from July through November. There are two populations of bluefin tuna based on their distinct spawning areas, the Eastern Mediterranean population and the Western Gulf of Mexico population; either population can be found within the Gulf (Walli et al. 2009). The western Atlantic bluefin tuna spawn between mid-January and late March, with the eastern population spawning in late May. Eggs incubate for two days before emerging in a larval state (DFO 2009). Maturity is expected to occur around age eight (DFO 2009) with habitat range expanding with age. Adults follow Atlantic herring and Atlantic mackerel fishing grounds and are known to forage on Atlantic herring in late summer and switch to Atlantic mackerel in the fall (Walli et al. 2009).

B.1.8 Atlantic Salmon

COSEWIC recently assessed the South Newfoundland population of Atlantic salmon as Threatened. The South Newfoundland population breeds in rivers from the southeast tip of the Avalon Peninsula, Mistaken Point, westward along the south coast of Newfoundland to Cape Ray. The numbers of small and large salmon have both declined over the last three generations, for a net decline of all mature individuals of approximately 36 percent (COSEWIC 2002a website). This decline has occurred despite the fact that loss due to commercial fisheries in coastal areas has greatly declined since 1992. In addition to illegal fishing in some rivers, the decline may be due to poor survival in the marine environment (COSEWIC 2002a website).

B.2 Marine Mammals

The following marine mammals have been added to Section 4.5.2 of Hibernia Drill Centres Construction and Operations Program EA (Jacques Whitford 2009).

B.2.1 Sowerby's Beaked Whale

The Sowerby's beaked whale is found only in the cold temperate waters of the North Atlantic, where just one record in the Northwest Atlantic occurs outside the area between Labrador and New England (MacLeod 2000; MacLeod *et al.* 2006). The number of Sowerby's beaked whales in eastern Newfoundland is unknown, and the best population estimate for the Northwest Atlantic (of 3,513 individuals) combines sightings of all *Mesoplodon* spp. and Cuvier's beaked whale (*Ziphius cavirostris*) (but these other species have more southerly distributions) (Waring *et al.* 2009). Sowerby's beaked whales are assessed as Special Concern by COSEWIC and on Schedule 3 of SARA (COSEWIC 2006c).

Little is known, in general, about beaked whales, but most information on Sowerby's beaked whales in Newfoundland is based on stranding records or a few opportunistic sightings (Lien and Barry 1990). Sowerby's beaked whales are also relatively difficult to detect at sea due to

their short surface durations, apparently offshore distribution and barely detectable blows (Hooker and Baird 1999). They have most often been observed in deep waters and continental shelf edges or slopes (Kenney and Winn 1987; COSEWIC 2006c) and presumably make deep dives to forage on medium to large-bodied squid (COSEWIC 2006c).

There were two unidentified beaked whale sightings during seismic monitoring in the Jeanne d'Arc Basin during 2005 to 2008. One of these sightings was deemed a species other than a northern bottlenose whale (*Hyperodon ampullatis*), and the observer suggested that it was likely a Sowerby's beaked whale (Stantec 2010). There was only one confirmed sighting of a Sowerby's beaked whale during four years of monitoring in the adjacent and deeper Orphan Basin; the sighting of four individuals occurred in 2,500 m of water during September (Stantec 2010). There were no sightings of Sowerby's beaked whales reported in the DFO cetacean sightings database for the HSE Study Area (DFO 2007).

B.2.2 Killer Whale

Killer whales have a cosmopolitan distribution, occurring in oceans from polar pack-ice to the equator, but seem to be most common in coastal waters at higher latitudes (Jefferson *et al.* 2008). It is unknown how many killer whales occur in the Northwest Atlantic (Waring *et al.* 2009). In Newfoundland and Labrador, at least 63 animals have been individually identified to date (Lawson *et al.* 2007). Killer whales in Atlantic Canada have been assessed as Special Concern by COSEWIC (COSEWIC 2008b).

Killer whales exhibit marked sexual dimorphism, with adult males having a much more pronounced and taller dorsal fin and being generally larger than females (Ford *et al.* 2000). Generally, killer whale movements are linked to the distribution and abundance of their primary prey, which can include fish, marine mammals, seabirds and cephalopods (Ford *et al.* 2000). Sympatric killer whales populations in some regions have developed prey strategies that target different prey species, presumably as a mechanism of resource sharing (Baird 2000). Killer whales in Atlantic Canada have been observed approaching, attacking, and/or consuming other cetaceans, seals, seabirds and several species of fish; it is not known if local populations specialize on particular prey groups (Lawson *et al.* 2007). Most groups in Newfoundland and Labrador are comprised of three to seven individuals, and some individuals have been documented moving as much as hundreds of kilometres between re-sightings from year to year (Lawson *et al.* 2007).

Killer whales are considered a year-round resident of eastern Newfoundland, although they occur in relatively low densities (Goff and Lien 1988; Lawson *et al.* 2007). In the Jeanne d'Arc Basin, there were four killer whale sightings (totalling 21 individuals) during the 2008 seismic monitoring program; two sightings occurred in each of June and September, group sizes ranged from 1 to 12 individuals, and water depths ranged from 65 to 153 m (Stantec 2010). There was also one sighting of three individuals in August 1999 during a supply vessel transit between oil platforms in the Jeanne d'Arc Basin and St. John's (Wiese and Montevicchi 1999).

Whitehead and Glass (1985) recorded two sightings (one of 15 individuals and the other of 12) during surveys of the Southeast Shoal (southeastern Grand Banks) during June and July in 1982 and 1983. The available information suggests that killer whales occur year-round at low densities in the Hibernia South Extension Study Area, but are most common during summer.

B.2.2 Northern Bottlenose Whale

COSEWIC recently assessed the Davis Strait-Baffin Bay-Labrador Sea population of Northern Bottlenose Whale as Special Concern. The northern bottlenose whale is confined to the waters of the northern Atlantic Ocean, with population centres off the Davis Strait / northern Labrador, Nova Scotia (a distinct population), Iceland (to which the Davis Strait / northern Labrador population s genetically linked (COSEWIC 2002b website)) and Norway (Reeves et al. 1993). trends in population size since then are uncertain but Survey sighting rates have been low, so t here are no population size trends nor abundance estimate (COSEWIC 2002b website). The major threats to the abundance of the northern bottlenose whale include impacts from historical whaling, entanglement with fishing gear, oil and gas activities, acoustic disturbance, contaminants, changes to food supply and vessel strikes.

B.3 Sea Turtle

The following sea turtle have been added to section 4.5.3 of Hibernia Drill Centres Construction and Operations Program EA (Jacques Whitford 2009).

B3.1 Loggerhead Sea Turtle

Loggerhead sea turtles occur in temperate and tropical areas of the Atlantic, Pacific, and Indian oceans, with the majority of nesting occurring along the western rims of the mid- and equatorial Atlantic and Indian oceans (Spotila 2004). Globally, there are an estimated 43,000 to 45,000 nesting females (Spotila 2004). Its distribution is largely constrained by water temperature and it does not generally occur where the water temperature is below 15°C (Brazner and McMillan 2008), which limits its northern range. Loggerhead sea turtles are assessed as Endangered by COSEWIC (2010c). This species is listed as Endangered on the Red List of Threatened Species (IUCN 2009).

Loggerheads can migrate considerable distances between near-equatorial nesting areas that are occupied from late April to early September (Spotila 2004) and temperate foraging areas, some moving with the Gulf Stream into eastern Canada waters during the summer and fall (Hawkes *et al.* 2007). Information to date indicates a seasonal population of juvenile loggerheads in Atlantic Canada (COSEWIC 2010c; Witzell 1999) but the number occurring in Canadian waters is unknown. While foraging at sea, loggerheads likely consume gelatinous zooplankton and squid (Spotila 2004); there is no diet information available for Canadian waters (DFO 2010).

Loggerheads may be seen in the open seas during migration and foraging. They have not been reported in the Project Area but have been reported south of the Flemish Cap (COSEWIC 2010c). Most loggerhead records offshore Newfoundland have occurred in deeper waters south of the Grand Banks and sightings have extended as far east as the Flemish Cap (Figures 6 and 7 in COSEWIC 2010c). None were sighted during summer and fall seismic monitoring programs

in the Jeanne d'Arc Basin, although one was observed 237 km south of that area in early September 2008 (Abgrall *et al.*, in Stantec 2010). While the available information suggests that loggerhead sea turtles do occur in the eastern portion of the Study Area, their presence is likely limited to small numbers and during late summer to fall.

APPENDIX C

CRW9800 and X-CIDE 450 MSDS

1 . Product and company identification

Product name : CRW9800 CORROSION INHIBITOR
Supplier : Baker Petrolite
 A Division of Baker Hughes Canada, Inc.
 5050 47th Street S.E.
 Calgary, Alberta, T2B 3S1, Canada
 For Product Information: 403-537-3850 or 281-276-5400
 (8:00 a.m. - 5:00 p.m. cst, Monday - Friday)

Material Uses : Special: Corrosion Inhibitor.
Code : CRW9800
Validation date : 12/3/2009.
Print date : 12/3/2009.
Version : 3
Responsible name : Global Regulatory Affairs - Telephone 281-276-5400 or 800-231-3606
In case of emergency : CANUTEC 613-996-6666 (Canada 24 hours)
 Baker Petrolite 800-231-3606 (North America 24 hour)
 (001)281-276-5400
 CHEMTREC 800-424-9300 (U.S. 24 hour)
 CHEMTREC Int'l 01-703-527-3887 (International 24 hours)

Canada

WHMIS (Canada) : Class B-2: Flammable liquid
 Class D-1B: Material causing immediate and serious toxic effects (Toxic).
 Class D-2A: Material causing other toxic effects (Very toxic).
 Class D-2B: Material causing other toxic effects (Toxic).

WHMIS (Pictograms) :



2 . Hazards identification

Physical state : Liquid. [Clear.]
Odor : Mild.
Color : Amber.
Emergency overview : WARNING!
 FLAMMABLE LIQUID AND VAPOR. INHALATION CAUSES HEADACHES, DIZZINESS, DROWSINESS AND NAUSEA AND MAY LEAD TO UNCONSCIOUSNESS. CAUSES RESPIRATORY TRACT AND EYE IRRITATION. MAY CAUSE BLINDNESS IF SWALLOWED. MAY CAUSE SKIN IRRITATION. PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
 Keep away from heat, sparks and flame. Do not breathe vapor or mist. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling. Vapors may form explosive mixtures with air. Vapors can travel to a source of ignition and flashback. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material.

Routes of entry : Dermal contact. Eye contact. Inhalation.
Potential acute health effects

2 . Hazards identification

- Inhalation** : Can cause central nervous system (CNS) depression. Irritating to respiratory system.
- Ingestion** : Can cause central nervous system (CNS) depression. May cause blindness if swallowed.
- Skin** : Moderately irritating to the skin.
- Eyes** : Irritating to eyes.

Potential chronic health effects

- Chronic effects** : Contains material that may cause target organ damage, based on animal data. Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis.
- Target organs** : Contains material which may cause damage to the following organs: the nervous system, gastrointestinal tract, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.

Over-exposure signs/symptoms

- Inhalation** : respiratory tract irritation, nausea or vomiting, coughing, headache, drowsiness/fatigue, dizziness/vertigo, unconsciousness
- Ingestion** : None known.
- Skin** : irritation, redness, dryness, cracking
- Eyes** : pain or irritation, watering, redness
- Medical conditions aggravated by over-exposure** : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

3 . Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>%</u>
Methanol	67-56-1	30 - 60
Organic ester salt	154730-82-2	5 - 10
Amine derivatives	61790-69-0	1 - 5

4 . First aid measures

- Eye contact** : Get medical attention immediately. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

5 . Fire-fighting measures

Flammability of the product : Flammable liquid. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Extinguishing media

Suitable : Use dry chemical, CO₂, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Hazardous thermal decomposition products : carbon dioxide, carbon monoxide, nitrogen oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Methods for cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Absorb with an inert material. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Dike spill area and do not allow product to reach sewage system or surface or ground water. Notify any reportable spill to authorities. (See section 12 for environmental risks and 13 for disposal information.) Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not breathe vapor or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

7 . Handling and storage

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in a dry, cool and well-ventilated area, away from incompatible materials (see section 10). Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			Notations
Ingredients:	List name	ppm	mg/m ³	Other	ppm	mg/m ³	Other	ppm	mg/m ³	Other	
Methanol	US ACGIH	200	262	-	250	328	-	-	-	-	[1]
	OSHA PEL	200	260	-	-	-	-	-	-	-	
	OSHA PEL 1989	200	260	-	250	325	-	-	-	-	[1]

[1] Absorbed through skin.

Consult local authorities for acceptable exposure limits.

Only components of this product with established exposure limits appear in the box above.

If OSHA permissible exposure levels are shown above they are the OSHA 1989 levels or are from subsequent OSHA regulatory actions. Although the 1989 levels have been vacated the 11th Circuit Court of Appeals, Baker Hughes recommends that these lower exposure levels be observed as reasonable worker protection.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. Use explosion-proof ventilation equipment.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location. Take off contaminated clothing and wash before re-use.

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Chemical-resistant gloves: Nitrile or Neoprene gloves. 4H gloves. Butyl rubber gloves.

Eyes : Wear chemical safety goggles. When transferring material wear face-shield in addition to chemical safety goggles.

Skin : Wear long sleeves and other protective clothing to prevent repeated or prolonged skin contact.

9 . Physical and chemical properties

Physical state : Liquid. [Clear.]

Flash point : Closed cup: 18°C (64.4°F) [TCC]

Auto-ignition temperature : Not available.

Flammable limits : Not available.

Color : Amber.

Odor : Mild.

pH : 7.8

: Neat - without dilution.

9 . Physical and chemical properties

Boiling/condensation point	: Not available.
Initial Boiling Point	: Not available.
Melting/freezing point	: Not available.
Relative density	: 0.96 (15°C)
Density	: 8 (lbs/gal)
Vapor density	: >1 [Air = 1]
Odor threshold	: Not available.
Evaporation rate	: Not available.
VOC	: Not available.
Viscosity	: Not available.
Solubility (Water)	: Soluble
Vapor pressure	: Not available.
Pour Point	: -40°C (-40°F)
Partition coefficient (LogKow)	: Not available.

10 . Stability and Reactivity

Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.
Materials to avoid	: Reactive or incompatible with the following materials: oxidizing materials and reducing materials. Methanol is incompatible and may react with acetyl bromide, alkyl aluminum solutions, beryllium hydride, boron trichloride, nitric acid, cyanuric chloride, dichloromethane, diethylzinc, metals (granulated forms of aluminum and magnesium – including aluminum and zinc salts), phosphorus III oxide, and potassium tert-butoxide.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Conditions of reactivity	: Highly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Methanol	LD50 Dermal	Rabbit	15800 mg/kg	-
	LD50 Oral	Rabbit	14200 mg/kg	-
	LD50 Oral	Rat	5600 mg/kg	-
	LC50 Inhalation Gas.	Rat	64000 ppm	4 hours
	LC50 Inhalation Vapor	Mouse	50000 ppm	4 hours

Chronic toxicity Remarks

11 . Toxicological information

1) Methanol

Methanol is a component of this product. Because methanol is eliminated from the body more slowly than ethanol, it can have cumulative toxicity with repeated exposures (ACGIH, 1992).

Acute dermal, oral, and inhalation exposure to methanol can cause Central Nervous System effects, optic nerve effects, diminished vision, and brain effects (necrosis and hemorrhaging). (Bennett, I.L. et al, 1953)

Ingestion of methanol can cause Central Nervous System depression, metabolic acidosis, blurred vision and blindness, gastrointestinal effects, and coma and death. (Clayton, G.D. and Clayton, F.E., 1982, Patty's Industrial Hygiene and Toxicology, Vol2C) Dermal exposure to methanol can cause Central Nervous System depression, blurred vision, and gastrointestinal effects. (Downie, A et al, 1992, Occupational Medicine, 42, pp 47-9) Chronic inhalation of methanol can cause Central Nervous System depression, blurred vision, and gastrointestinal effects. (Frederick, L.J. et al, 1984, AIHA Journal, 45, pp 51-5) Chronic inhalation of methanol has caused liver effects in laboratory animals. (Poon, R et al, 1994, Toxicology and Industrial Health 10: 231-245) Chronic oral exposure has caused Central Nervous System effects and eye effects in laboratory animals. [Youssef, A. F. et al (1993) Neurotoxicology and Teratology 15: 223-227; Baumbach, G.L. et al (1977) Archives of Ophthalmology 95: 1859-1865; Hayreh, M.S. et al (1977) Archives of Ophthalmology 95: 1851-1858; Hayreh, M.S. et al (1980) Ocular toxicity of methanol: An experimental study – Raven Press, New York, pages 35-53; and Martin-Amat, G. et al (1977) Archives of Ophthalmology 95: 1847-1850]

Methanol has produced in vivo mutagenicity in animal studies. (Pereira, M.A. et al, 1982) and (Ward, J. B. et al, 1983)

Methanol was mutagenic in yeast (RTECS). Methanol has caused chromosome aberrations in yeast (RTECS) and grasshoppers (Saha & Khudabaksh, 1974).

Methanol has caused birth defects in rats exposed by the oral (Infurna et al, 1981) and inhalation (Nelson et al, 1984; Nelson et al, 1985) routes. Exencephaly (a defect in the skull bone structure that leaves the brain exposed) and cleft palate (a fissure or unformed bone structure in the roof of the mouth (palate), lip, or facial area, occurring during the embryonic stage of development) were increased in fetal mice exposed to methanol at an airborne concentration of 5,000 ppm or higher for 7 hours/day on days 6 to 15 of gestation.

Embryotoxicity and fetotoxicity were seen with maternal exposure to airborne concentrations of 7,500 ppm and above, and reduced fetal weights with concentrations of 10,000 ppm or greater. The NOAEL was 1,000 ppm. Effects similar to those seen in the 10,000 ppm dosage group were also seen in offspring of mice given a dose of 4 g/kg orally (Rogers et al, 1993).

2) Organic ester salt

Not available.

3) Amine derivatives

Not available.

12 . Ecological information

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.




13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	UN1993	FLAMMABLE LIQUID, N.O.S. (Contains: Methanol)	3	II		-
TDG Classification	UN1993	FLAMMABLE LIQUID, N.O.S. (Contains: Methanol)	3	II		-
IMDG Class	UN1993	FLAMMABLE LIQUID, N.O.S. (Contains: Methanol)	3	II		Emergency schedules (EmS) F-E S-D

PG* : Packing group

DOT Reportable Quantity : Methanol, 1838 gal of this product.

Marine pollutant : Not applicable.

North-America NAERG : 128

15 . Regulatory information

WHMIS (Canada) : Class B-2: Flammable liquid
Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Canada (CEPA DSL): : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Canadian NPRI : The following components are listed: Methanol

United States inventory (TSCA 8b) : All components are listed or exempted.

U.S. Federal regulations SARA 313 : **United States inventory (TSCA 8b):** All components are listed or exempted.

Product name

CAS number

Concentration

Supplier notification : Methanol

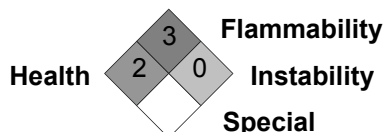
67-56-1

30 - 60

16 . Other information

Label requirements : FLAMMABLE LIQUID AND VAPOR. INHALATION CAUSES HEADACHES, DIZZINESS, DROWSINESS AND NAUSEA AND MAY LEAD TO UNCONSCIOUSNESS. CAUSES RESPIRATORY TRACT AND EYE IRRITATION. MAY CAUSE BLINDNESS IF SWALLOWED. MAY CAUSE SKIN IRRITATION. PROLONGED OR REPEATED CONTACT MAY DRY SKIN AND CAUSE IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

National Fire Protection Association (U.S.A.) :



Date of printing : 12/3/2009.

▣ Indicates information that has changed from previously issued version.

Notice to reader

NOTE: The information on this MSDS is based on data which is considered to be accurate. Baker Hughes, however, makes no guarantees or warranty, either expressed or implied of the accuracy or completeness of this information.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

This MSDS was prepared and is to be used for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

1 . Product and company identification

Product name : X-CIDE™ 450 Microbiocide
™ a trademark of Baker Hughes, Inc.

Supplier : Baker Petrolite
A Division of Baker Hughes Canada, Inc.
5050 47th Street S.E.
Calgary, Alberta, T2B 3S1, Canada
For Product Information: 403-537-3850 or 281-276-5400
(8:00 a.m. - 5:00 p.m. cst, Monday - Friday)

Material Uses : Special: Biocide

Validation date : 1/28/2011.

Print date : 1/28/2011.

Version : 5

Responsible name : Global Regulatory Affairs - Telephone 281-276-5400 or 800-231-3606

In case of emergency : CANUTEC 613-996-6666 (Canada 24 hours)
Baker Petrolite 800-231-3606 (North America 24 hour)
(001)281-276-5400
CHEMTREC 800-424-9300 (U.S. 24 hour)
CHEMTREC Int'l 01-703-527-3887 (International 24 hours)

Canada

WHMIS (Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
Class E: Corrosive material

WHMIS (Pictograms) :



2 . Hazards identification

Physical state : Liquid.

Odor : Fruity.

Color : Colorless.

Emergency overview : DANGER!
CAUSES RESPIRATORY TRACT, EYE AND SKIN BURNS. HARMFUL IF INHALED.
MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF ABSORBED
THROUGH SKIN. HARMFUL OR FATAL IF SWALLOWED. CAN ENTER LUNGS
AND CAUSE DAMAGE. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN
DAMAGE, BASED ON ANIMAL DATA. ASPIRATION HAZARD.
Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing.
Use only with adequate ventilation. Keep container tightly closed and sealed until ready
for use. Wash thoroughly after handling.

Routes of entry : Dermal contact. Eye contact. Inhalation.

Potential acute health effects

Inhalation : Toxic by inhalation. Corrosive to the respiratory system.

Ingestion : Toxic if swallowed. Aspiration hazard if swallowed. Can enter lungs and cause damage.
May cause burns to mouth, throat and stomach.

Skin : Corrosive to the skin. Causes burns. Harmful in contact with skin. May cause
sensitization by skin contact.

2 . Hazards identification

Eyes : Corrosive to eyes. Causes burns.

Potential chronic health effects

Chronic effects : Contains material that may cause target organ damage, based on animal data. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Target organs : Contains material which may cause damage to the following organs: upper respiratory tract, skin, eye, lens or cornea.

Over-exposure signs/symptoms

Inhalation : respiratory tract irritation, coughing

Ingestion : stomach pains, nausea or vomiting

Skin : pain or irritation, redness, blistering may occur

Eyes : pain, watering, redness

Medical conditions aggravated by over-exposure : Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

3 . Composition/information on ingredients

<u>Name</u>	<u>CAS number</u>	<u>% by weight</u>
Glutaraldehyde	111-30-8	30 - 60
Methanol	67-56-1	0.1 - 1

4 . First aid measures

Eye contact : Get medical attention immediately. Immediately flush the eye(s) continuously with lukewarm, gently flowing water for at least 20-60 minutes while holding the eyelid(s) open.

Skin contact : Wash affected area with soap and mild detergent for at least 20 - 60 minutes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wear suitable protective clothing and gloves. Remove contaminated clothing and shoes.

5 . Fire-fighting measures

Flammability of the product : In a fire or if heated, a pressure increase will occur and the container may burst.

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

5 . Fire-fighting measures

- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
- Hazardous thermal decomposition products** : carbon dioxide,carbon monoxide
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Water polluting material. May be harmful to the environment if released in large quantities.
- Methods for cleaning up**
- Small spill** : Stop leak if without risk. Move containers from spill area. Absorb with an inert material. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Dike spill area and do not allow product to reach sewage system or surface or ground water. Notify any reportable spill to authorities. (See section 12 for environmental risks and 13 for disposal information.) Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid release to the environment. Use only with adequate ventilation. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			Notations
Ingredients:	List name	ppm	mg/m³	Other	ppm	mg/m³	Other	ppm	mg/m³	Other	
Glutaraldehyde	US ACGIH	-	-	-	-	-	-	0.05	-	-	[3]
	OSHA PEL 1989	-	-	-	-	-	-	0.2	0.8	-	
Methanol	US ACGIH	200	262	-	250	328	-	-	-	-	[1]
	OSHA PEL	200	260	-	-	-	-	-	-	-	
	OSHA PEL 1989	200	260	-	250	325	-	-	-	-	[1]

[1]Absorbed through skin. [3]Skin sensitization

Consult local authorities for acceptable exposure limits.

Only components of this product with established exposure limits appear in the box above.

If OSHA permissible exposure levels are shown above they are the OSHA 1989 levels or are from subsequent OSHA regulatory actions. Although the 1989 levels have been vacated the 11th Circuit Court of Appeals, Baker Hughes recommends that these lower exposure levels be observed as reasonable worker protection.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location. Take off contaminated clothing and wash before reuse.

Personal protection

- Respiratory** : If a risk assessment indicates it is necessary, use a properly fitted, air purifying or supplied air respirator complying with an approved standard. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : Chemical-resistant gloves: Butyl rubber gloves.
- Eyes** : Wear chemical safety goggles. When transferring material wear face-shield in addition to chemical safety goggles.
- Skin** : Wear long sleeves and chemical resistant apron to prevent repeated or prolonged skin contact.

9 . Physical and chemical properties

- Physical state** : Liquid.
- Flash point** : Closed cup: >93.4°C (>200.1°F)
- Auto-ignition temperature** : Not available.
- Flammable limits** : Not available.
- Color** : Colorless.
- Odor** : Fruity.
- pH** : 3.1 to 4.5 [Conc. (% w/w): 1%]
: Neat-without dilution.
- Boiling/condensation point** : 101°C (213.8°F)
- Initial Boiling Point** : Not available.
- Melting/freezing point** : Not available.
- Relative density** : 1.13 (15.6°C)
- Density** : 9.41 (lbs/gal)
- Vapor density** : >1 [Air = 1]
- Odor threshold** : Not available.

9 . Physical and chemical properties

Evaporation rate	: Not available.
VOC	: Not available.
Viscosity	: Not available.
Solubility (Water)	: Soluble
Vapor pressure	: Not available.
Pour Point	: Not available.
Partition coefficient (LogKow)	: Not available.

10 . Stability and Reactivity

Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	: No specific data.
Materials to avoid	: Reactive or incompatible with the following materials: oxidizing materials, acids and alkalis.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Conditions of reactivity	: Slightly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and heat.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Methanol	LD50 Dermal	Rabbit	15800 mg/kg	-
	LD50 Oral	Rabbit	14200 mg/kg	-
	LD50 Oral	Rat	5600 mg/kg	-
	LC50 Inhalation Gas.	Rat	145000 ppm	1 hours
	LC50 Inhalation Gas.	Rat	64000 ppm	8 hours
	LC50 Inhalation Gas.	Rat	64000 ppm	4 hours
	LC50 Inhalation Vapor	Mouse	50000 ppm	4 hours
	LD50 Dermal	Rabbit - Male	1749 mg/kg	-
X-CIDE™ 450 Microbiocide	LD50 Oral	Rat - Male, Female	200 mg/kg	-
	LC50 Inhalation Vapor	Rat	>27 ppm	4 hours

Product/ingredient name	Result	Species	Score	Exposure	Observation
Glutaraldehyde	Eyes - Severe irritant	Rabbit	-	-	-
	Skin - Severe irritant	Human	-	-	-
	Skin - Mild irritant	Rabbit	-	-	-
	Skin - Severe irritant	Rabbit	-	-	-
	Eyes - Moderate irritant	Rabbit	-	-	-
Methanol	Eyes - Moderate irritant	Rabbit	-	-	-

11 . Toxicological information

Skin - Moderate
irritant

Rabbit

-

-

-

Carcinogenicity

Classification

Product/ingredient name

ACGIH

IARC

EPA

NIOSH

NTP

OSHA

Glutaraldehyde

A4

-

-

-

-

-

Chronic toxicity Remarks

1) Glutaraldehyde

Glutaraldehyde is a component of this product. In long-term experimental animal studies, glutaraldehyde caused liver damage in mice (ACGIH, 1992), but it was not neurotoxic in rats (Spencer et al, 1978).

Female rats had increased large granular lymphocytic leukemias after receiving glutaraldehyde in the drinking water at levels up to 1,000 ppm for 2 years (Andersen, 1996).

The results of genetic studies have been mixed with no conclusive evidence of positive effects.

In 2-year inhalation studies, there was no evidence of carcinogenic activity in male or female rats exposed to 250, 500 or 750 ppb, or in male or female mice exposed to 62.5, 125, or 250 ppb glutaraldehyde. Incidences of nasal and respiratory lesions were increased in both male/female rats and mice. Reduction in body weight, as compared to the controls was also noted.

2) Methanol

Methanol is a component of this product. Because methanol is eliminated from the body more slowly than ethanol, it can have cumulative toxicity with repeated exposures (ACGIH, 1992).

Acute dermal, oral, and inhalation exposure to methanol can cause Central Nervous System effects, optic nerve effects, diminished vision, and brain effects (necrosis and hemorrhaging). (Bennett, I.L. et al, 1953)

Ingestion of methanol can cause Central Nervous System depression, metabolic acidosis, blurred vision and blindness, gastrointestinal effects, and coma and death. (Clayton, G.D. and Clayton, F.E., 1982, Patty's Industrial Hygiene and Toxicology, Vol2C) Dermal exposure to methanol can cause Central Nervous System depression, blurred vision, and gastrointestinal effects. (Downie, A et al, 1992, Occupational Medicine, 42, pp 47-9) Chronic inhalation of methanol can cause Central Nervous System depression, blurred vision, and gastrointestinal effects. (Frederick, L.J. et al, 1984, AIHA Journal, 45, pp 51-5) Chronic inhalation of methanol has caused liver effects in laboratory animals. (Poon, R et al, 1994, Toxicology and Industrial Health 10: 231-245) Chronic oral exposure has caused Central Nervous System effects and eye effects in laboratory animals. [Youssef, A. F. et al (1993) Neurotoxicology and Teratology 15: 223-227; Baumbach, G.L. et al (1977) Archives of Ophthalmology 95: 1859-1865; Hayreh, M.S. et al (1977) Archives of Ophthalmology 95: 1851-1858; Hayreh, M.S. et al (1980) Ocular toxicity of methanol: An experimental study – Raven Press, New York, pages 35-53; and Martin-Amat, G. et al (1977) Archives of Ophthalmology 95: 1847-1850]

Methanol has produced in vivo mutagenicity in animal studies. (Pereira, M.A. et al, 1982) and (Ward, J. B. et al, 1983)

Methanol was mutagenic in yeast (RTECS). Methanol has caused chromosome aberrations in yeast (RTECS) and grasshoppers (Saha & Khudabaksh, 1974).

Methanol has caused birth defects in rats exposed by the oral (Infurna et al, 1981) and inhalation (Nelson et al, 1984; Nelson et al, 1985) routes. Exencephaly (a defect in the skull bone structure that leaves the brain exposed) and cleft palate (a fissure or unformed bone structure in the roof of the mouth (palate), lip, or facial area, occurring during the embryonic stage of development) were increased in fetal mice exposed to methanol at an airborne concentration of 5,000 ppm or higher for 7 hours/day on days 6 to 15 of gestation.

Embryotoxicity and fetotoxicity were seen with maternal exposure to airborne concentrations of 7,500 ppm and above, and reduced fetal weights with concentrations of 10,000 ppm or greater. The NOAEL was 1,000 ppm. Effects similar to those seen in the 10,000 ppm dosage group were also seen in offspring of mice given a dose of 4 g/kg orally (Rogers et al, 1993).

11 . Toxicological information

Additional information

Glutaraldehyde can cause allergic contact dermatitis, asthma and rhinitis and may aggravate existing asthmatic conditions. Glutaraldehyde may stain skin and nails to brown or golden brown color.

12 . Ecological information

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.







13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.




Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	UN2922	CORROSIVE LIQUID, TOXIC, N.O.S. (Contains: Glutaraldehyde)	8 (6.1)	II	  	Marine pollutant
TDG Classification	UN2922	CORROSIVE LIQUID, TOXIC, N.O.S. (Contains: Glutaraldehyde)	8 (6.1)	II	  	Marine pollutant

14 . Transport information

IMDG Class	UN2922	CORROSIVE LIQUID, TOXIC, N.O.S. (Contains: Glutaraldehyde)	8 (6.1)	II	  	Emergency schedules (EmS) F-A S-B Marine pollutant
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PG* : Packing group

DOT Reportable : Not applicable.

Quantity

Marine pollutant

Glutaraldehyde.



North-America NAERG : 154

15 . Regulatory information

WHMIS (Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
Class E: Corrosive material

Canada (CEPA DSL): : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

Canadian NPRI : None of the components are listed.

United States inventory (TSCA 8b) : All components are listed or exempted.

U.S. Federal regulations : **United States inventory (TSCA 8b):** All components are listed or exempted.

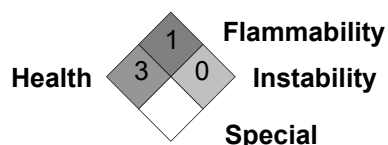
Additional information

Pest Control Products Act Registration No. 26965. In Canada, this product is subject to regulation under the Pest Control Products Act (PCPA) and is therefore exempt from Environment Canada's Domestic Substance List (DSL) Inventory requirements.

16 . Other information

Label requirements : CAUSES RESPIRATORY TRACT, EYE AND SKIN BURNS. HARMFUL IF INHALED. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. HARMFUL OR FATAL IF SWALLOWED. CAN ENTER LUNGS AND CAUSE DAMAGE. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. ASPIRATION HAZARD.

National Fire Protection Association (U.S.A.) :



Date of printing : 1/28/2011.

▣ Indicates information that has changed from previously issued version.

16 . Other information

Notice to reader

NOTE: The information on this MSDS is based on data which is considered to be accurate. Baker Hughes, however, makes no guarantees or warranty, either expressed or implied of the accuracy or completeness of this information.

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of this product.

This MSDS was prepared and is to be used for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

