Security Classification: BP Public	**BP Canada Energy Group ULC**	

Scotian Basin Exploration Project

Oil Spill Response Plan

Annex A -

Offshore Containment and Recovery Tactical Response Plan

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1.0 INTRODUCTION

This Tactical Response Plan (TRP) is intended for the BP Canada Incident Management Team (IMT) in case of an incident. It provides detailed information to support the IMT with the implementation of tactics associated with offshore containment and recovery. It identifies response activities and resources needed for the deployment of this response strategy. This is not a stand-alone document and it should be used in conjunction with the Oil Spill Response Plan (OSRP).

2.0 PLANNING

2.1 OBJECTIVES

Offshore containment and recovery tactics use various types of mechanical devices, including boom and skimmers, to collect, contain and recover oil from the sea surface that has been located by surveillance. Recovered oil is temporarily stored in support vessel in-built tanks, on deck storage containers or floating storage units. Spreading, sea state and weather conditions may decrease the effectiveness of these mechanical recovery methods; therefore, on water recovery activities rely on the Surveillance Group providing oil monitoring and targeting services direct to in-field recovery vessels.

The main objectives in using offshore containment and recovery is to remove as much oil from the surface of the water as soon as possible:

- to collect oil close to the spill site while oil slicks are recoverable and have not spread;
- to minimize the migration of the oil by containing and recovering at sea;
- to reduce shoreline habitat damage;
- to reduce offshore wildlife impact.

2.2 BENEFITS

Offshore containment and recovery has the following benefits in meeting these objectives:

- some resources will be on-site at the time of the incident, while others could arrive onsite within hours to days of activation;
- reduces the likelihood of shoreline oiling, therefore reducing the volume of waste and environmental impact;
- protection of sensitive wildlife that can enter in contact with surface oil slicks (birds, sea mammals, etc.) by removal;
- no application for governmental approval is required (as opposed to other counter-measures such as dispersant application that do require an application and approval process)

2.3 LIMITATIONS

Operational limitations of offshore containment & recovery are summarised in **Table 1**.

Table 1 - Operational Limitations of Offshore Containment & Recovery

Limitations	
Environment	• Daylight application only. • Do not use in wind speeds exceeding 15m/s (30kts). • Do not use in wave heights exceeding 3m (10ft). • Visibility must be >1 nautical miles (nm).
Equipment	• Mobilization, transit and deployment times. • Availability of suitable vessels and aerial support. • Encounter rates. • Containment boom must be suitable for prevailing environmental conditions. • Recovery skimmer device must be suitable for the oil type, environmental conditions and oil storage capacity. • Offshore temporary oil storage capability must be large enough to contain oil type and skimmer recovery capability. Storage limitations can cause a bottle-neck in operations. • Will require recovered oil transfer pump if at sea transfer operations are considered. • Time constraints if a shuttle system is required for storage units. • Maintenance downtime and repair.

Personnel	• Must be trained and experienced in offshore containment and recovery activities.
	• Containment and recovery activities must be led by subject matter expert.
	• Personnel and crew changes.
	• Supply of food, water and consumables.
	• Safety and health constraints.
	• Minimum of 2 Subject Matter Experts (SME) are required on the deployment vessel:
	  ○ 1 x deck coordination.
	  ○ 1 x vessel to vessel coordination.

Oil Type	• Suitable for all oil types.
Platform	• MOS Sweep systems may be towed up to speeds of 4 knots in 3m seas, based on manufacturer's instructions. These will be used in the offshore environment. Other conventional boom/advancing sweep systems may be used by the Standby Vessels offshore, or by other vessels (VOOs) in the nearshore environment (mainland NS). Towing speeds and sea states for use of these other systems will be determined by the responders and vessel master to ensure safe operations.

2.4 TACTICS FOR OFFSHORE CONTAINMENT AND RECOVERY

The key components of a containment and recovery system are: a boom or barrier to encounter and contain oil; a recovery device, most commonly a skimmer, to remove oil; and a pump to transfer the collected oil and/or oil and water mixture into temporary storage. This can be achieved by using specialized offshore sweep systems or by using boom in a variety of configurations including a J, U or V to contain the oil.

2.4.1 Sweep Systems

The term *Sweep System* is used to describe a vessel-based mobile system that utilizes a containment boom to collect oil and a skimmer/pump as a means to recover the oil. High-Speed Sweep systems are capable of being towed at higher speeds and therefore have an increased encounter rate. Some incorporate temporary storage units and an oil/water separator to increase response efficiency.

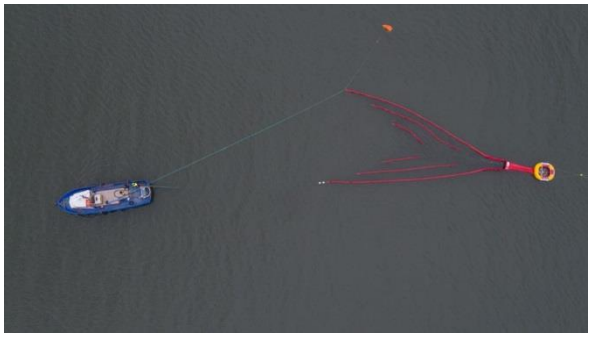
The primary Tier 1 Containment and Recovery Systems deployed by the Standby Vessel will consist of the following components:

- Sorbent Side-Sweep System – Sorbent boom (8") deployed using ship's crane as an outrigger to create a 10m swath system with a single vessel.
- Side-Sweep Recovery system (*Termite Kit*). Desmi Termite skimmer paired with 150ft of 24" containment boom which is towed with the vessel FRC to create a 15m swath system.

The primary Tier 2 containment and recovery option for the offshore environment is the Lamor Marine Offshore Sweeper (MOS) 15 with a paravane (**Figure 1**) which can be operated using a single vessel. Each of the 2 PSVs employed in the drilling operations will be able to deploy the BP-owned MOS 15 sweep system, including a skimmer, pumps, powerpack and ancillary equipment. These systems will be kept ready at the shore base for immediate deployment.

If additional resources are required, a third BP-owned MOS 15 system with paravane is available at the shore base to be fitted on a VOO for deployment. Additionally, ECRC will supply a Buster-4 system from the Dartmouth base that will use 2 Vessels of Opportunity (VOOs). Further, additional sweep systems are available from other ECRC bases in Canada, as well as through OSRL from their global supply bases. Any additional systems would be deployed utilizing VOOs.

Figure 1 Lamor MOS 15 Sweep System

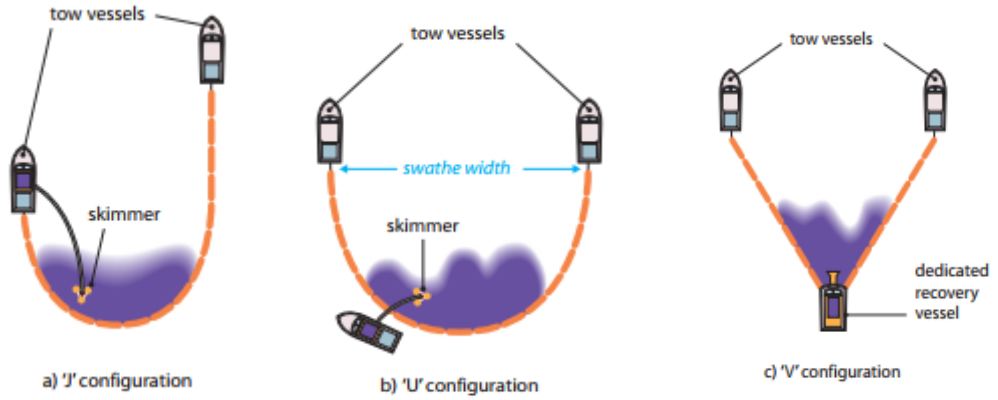


2.4.2 Booming configurations

In the nearshore environment, boom may be towed in a variety of configurations to contain oil for containment and recovery.

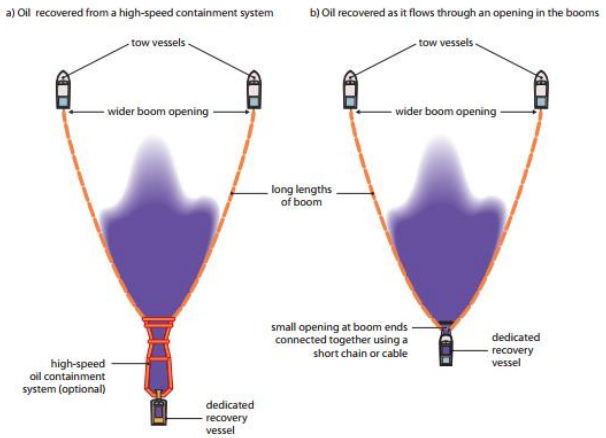
a) The 'J' configuration uses two vessels which tow the containment boom in a 'J' shape, with one vessel ahead of the other. The vessel that is further back in the configuration is closer to the apex of the boom and can skim during towing, while providing the temporary storage (**Figure 2a**).
b) The 'U' configuration uses a minimum of two vessels. However, the 'U' configuration allows for a wider swathe width compared to the 'J' configuration, which can serve to increase the encounter rate. Once oil has been contained in the apex of the boom, a 'J' configuration can then be adopted to recover the product using one of the two towing vessels. If a third vessel is available, the 'U' configuration can be maintained while this vessel recovers the product from the apex of the boom, thereby allowing continuous operations (**Figure 2b**).
c) The 'V' configuration uses two vessels to tow the containment boom in a 'V' configuration and a third, specialized vessel dedicated to recovery of the spilled oil is positioned at the apex of the boom. This configuration allows for a marginal increase in speed and an increased swathe width in comparison to the 'J' configuration, thereby increasing the encounter rate of the configuration. With a dedicated recovery vessel in place, this configuration can increase the duration of the operation and, hence, the amount of oil recovered, provided that sufficient temporary storage capacity is available (**Figure 2c**).
d) The enhanced containment method allows a wide front opening to the boom, and includes a dedicated vessel following behind to recover the oil (**Figure 3a**); it may also incorporate a high-speed oil containment system to provide enhanced oil containment and separation at increased towing speeds (**Figure 3b**). This method increases the encounter rate and requires close coordination of multiple vessels and competent response crews.

Figure 2a, 2b, and 2c - Booming Configurations



Source: IPIECA

Figure 3a and 3b - Enhanced Containment Configuration



Source: IPIECA

2.4.3 Single vessel side sweep with jib arm

A single vessel side sweep with jib arm uses one vessel with a jib arm (outrigger) that supports a length of boom extending out from the side of the vessel. This creates the apex for collection, and a skimmer may be deployed from the vessel using a crane/derrick to recover contained oil directly to storage onboard the vessel (**Figure 4**). A single-vessel system has fewer logistical constraints and greater maneuverability than systems employing two or more vessels. However, because of the narrower swath width, the encounter rate can be greatly reduced compared to that of more conventional boom configurations. Two side-sweep systems can be deployed from a single vessel with one jig arm on each side of the vessel to maximize the encounter rate.

Figure 4 - Example illustration of a single vessel sweep system with jib arm

Source: OSRL

2.4.4 Surveillance

Either vessel and/or aerial surveillance is needed during containment and recovery operations to:

- Guide the vessel/aircraft towards oil slicks;
- Ensure no wildlife is present (such as marine mammals, turtles);
- Conduct a visual evaluation of effectiveness.

See Section 6.5.2 and Appendix 2 of the OSRP for more details on surveillance.

2.4.5 Oil in Ice

The coastal and offshore waters of the project area may be ice-covered/ice-affected in winter months (note: both the T/V *Arrow* and M/V *Kurdistan* response operations off the coast of Nova Scotia involved oil-in-ice conditions).

The following should be considered for broken and solid ice conditions for open and sheltered waters:

- Containment booms, ice, and snow all provide barriers against the spread of oil and result in a thicker layer of oil available for recovery.
- The presence of ice may adversely affect recovery rates of skimmers. There are a variety of skimmers that have been developed specifically for recovering oil in ice that may include brush belts, drums, or ropes rotating through the slick that are capable of recovering oil while processing small ice pieces. Some skimming units are equipped with heating systems, ice deflection frames, and advanced systems for pumping viscous oil/water/ice mixtures.
- Environmental conditions and the oil's physical properties should all be considered when determining what type of mechanical recovery device is best suited for oil recovery in each situation.

Table 2 - Selection of a Mechanical Recovery System for Ice-Covered Waters Based on Concentration of Ice Cover

Ice coverage	Tactic	Comments
0-30%	• Conventional open water recovery techniques.	• Boom may have to be manoeuvred around ice floes.
30-70%	• Replace vessel towed booms with short sections of boom connected to outrigger arms on a skimming vessel.	• Small vessel can manoeuvre around ice floes. • May reduce damage to equipment.
>70%	• Ice strengthened vessels and specialized skimmers.	• Boom cannot be used however ice may prevent oil from spreading. • Recover oil from pockets between ice.

References for Oil in Ice:
2017 IMO "**Guide to Oil Spill Response in Snow and Ice Conditions".**
2017 EPPR **"Field Guide for Oil Spill Response in Arctic Waters"** (2nd Edition).

2.5 OPERATIONAL ASSUMPTIONS FOR THE SCOTIAN BASIN EXPLORATION PROJECT

Overall containment and recovery operations will be managed by the onshore IMT, while a "command vessel" on site coordinates the field activities and reports back to the IMT. For all operations (aerial, vessel) the priority will be to target oil slicks close to the source where slicks are thicker and to prevent spreading.

In the event of an incident, the initial containment and recovery will be conducted by the Standby Vessel utilizing the Tier 1 "termite" and/or boom sweep systems. The BP-contracted PSVs will be fitted with pre-staged Lamor MOS 15 sweep systems in Halifax. The third BP-owned Lamor MOS 15 system, as well as an ECRC Buster sweep system will be fitted on VOOs at the time of the incident. For larger spills that cannot be managed by these resources alone, additional VOOs will be activated and fitted with the required equipment in port. The IMT will escalate the response by cascading response equipment from the shore supply base, from ECRC response base in Dartmouth and/or St. John's, and/or OSRL, as required.

In the offshore environment, weather is a major factor in conducting any aerial or marine operations. Both safety and operational limitations of the equipment will be affected by sea state and weather. All containment and recovery operations will be conducted during daylight hours (approx. 12 hours in summer and 9 hours in winter). Mechanical recovery equipment should not be deployed in wind speeds exceeding 15m/s (30kts), wave heights exceeding 3m (10ft), or in visibility less than 1 nm. Air monitoring must also be conducted to ensure the safety of responders.

Safety of personnel is the priority during all response operations.

2.6 RESPONSE CAPABILITY

The estimated amount of oil that can be contained and recovered are important calculations in planning, and for activating assets and arranging for the delivery of equipment. The information provided in the Figures below will assist BP in deciding the number and types of aircraft and vessels to activate for an oil spill as well as the quantity of equipment required. It should be noted that the length of time oil will remain recoverable by skimmers depends on many factors including the oil composition, spreading, weather conditions, sea state, etc. Because encounter rates for skimmers vary, skimmers are de-rated to 20% of the nominal recovery rate (plate capacity) to account for these variables by the Canadian Response Organizations to ensure that they meet the planning standards and have adequate skimming capacity under realistic conditions. The calculations provided here use this logic and are estimates. Actual amounts of oil recovered may vary considerably from these estimates.

The calculations in **Table 3** below are provided to give an idea of how much oil can be recovered by a MOS 15 system based on capacity of the Lamor LWS800 skimmer and MST150 pump and a Desmi Termite skimmer with DOP 160 pump. This assumes that containment activities are successful and that the appropriate oil thicknesses within the boom is achieved for skimmers to operate effectively. The

table presents operations over a 12-hour operational period (summer) and 9-hour operational period (winter).

The Estimated Daily Recovery Rate is the Skimmer Nominal Recovery Rate provided by the manufacturer de-rated (to 20%) multiplied by the number of daylight hours that the skimmer could realistically be operated.

EDRR = T x E x t

EDRR (Estimated Daily Recovery Rate)

T = Nominal recovery rate or name plate capacity (m3/hr)

E = Efficiency factor or de-rating to 20%

t = Hours per day (hr)

Table 3 - Estimated Daily Oil Recovery Capability Per Termite and Lamor MOS 15 Skimming System

	Recovery Rates	
Operating Period	Summer Daylight hrs only (12hrs)	Winter Daylight hrs only (9hrs)
Nominal recovery rate – Termite/DOP160	$30m^3$/hr	$30m^3$/hr
De-rated recovery rate	$6m^3$/hr	$6m^3$/hr
Estimated daily recovery rate (EDRR)	$72m^3$/hr	$54m^3$/hr
Nominal recovery rate	$350m^3$/hr	$350m^3$/hr
De-rated recovery rate	$70m^3$/hr	$70m^3$/hr
Estimated daily recovery rate (EDRR)	$840m^3$/day	$630m^3$/day

Table 4 lists shows the on-site Tier 1 Termite system, along with the 3 BP-owned MOS 15 systems that would be available to respond initially and calculates the expected recovery capability of each over a 3-day period commencing with spill notification and immediate activation of assets at 0800 local time on Day 1. Additional resources would be mobilized as required.

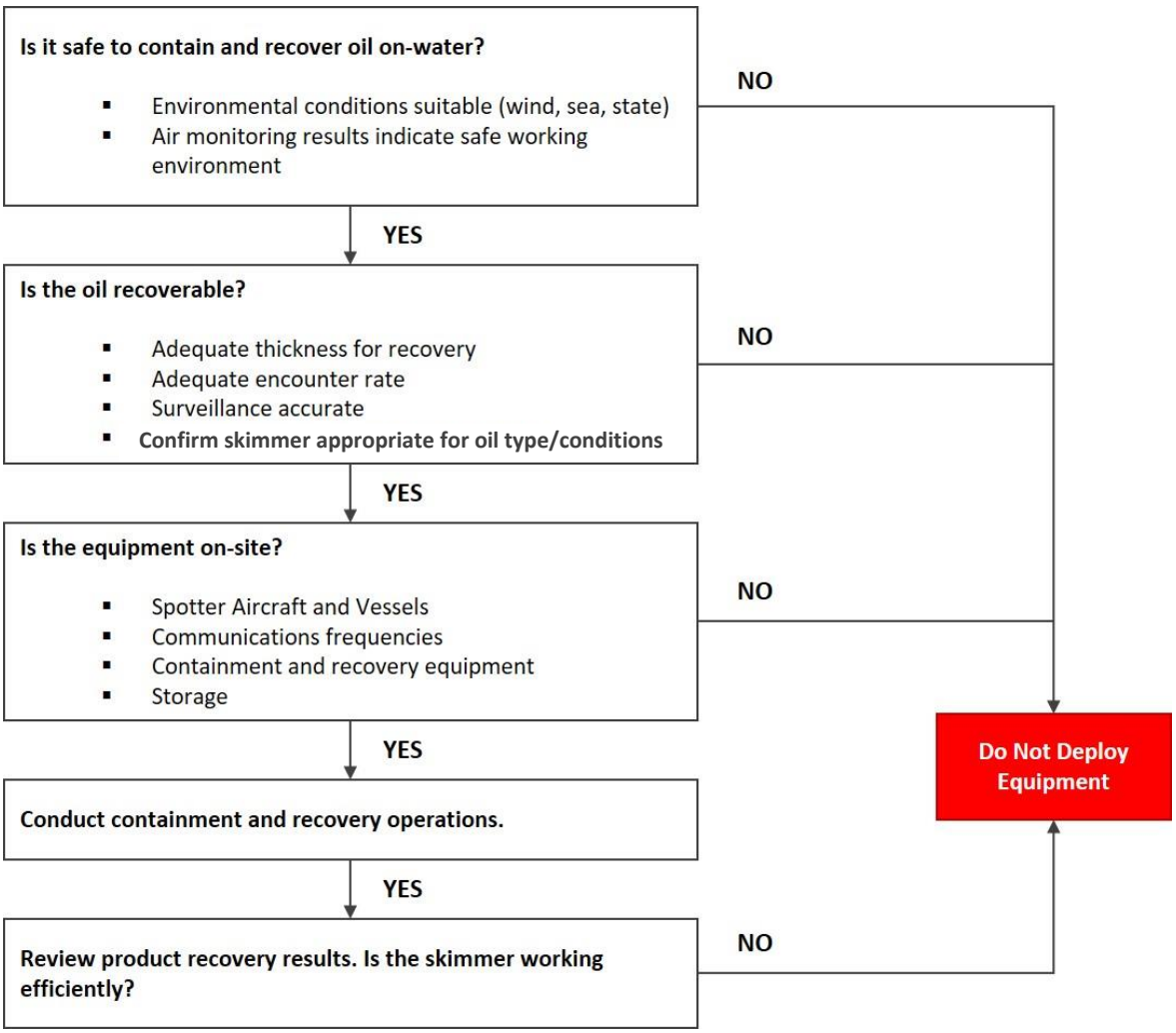
Operational assumptions used in the calculation are the following:

- Offshore containment and recovery analysis is for responding to a spill at BP Scotian Basin project, and is the furthest offshore operation from the staging airport and port.
- Halifax Stanfield International Airport is used as the staging airport for surveillance aircraft.
- Transit distance from the Port of Halifax is about 185 nautical miles.
- On-board storage will be used initially.

Table 4 - Estimated Recovery over 3 Days

Vessel	Estimated Daily Recovery Capability Summer (m^3)				Estimated Daily Recovery Capability Winter (m^3)			
	Day 1	Day 2	Day 3	Total	Day 1	Day 2	Day 3	Total
Standby Vessel w/Termite	72	72	72	216	54	54	54	162
PSV1 w/MOS15	0	840	840	1680	0	630	630	1260
PSV2 w/MOS15	0	840	840	1680	0	630	630	1260
VOO w/MOS15	0	0	840	840	0	0	630	630
TOTAL	**72**	**1752**	**2592**	**4416**	**54**	**1314**	**1944**	**3312**

2.7 CONTAINMENT AND RECOVERY: DECISION MAKING



2.8 RESOURCES

Table 5 identifies the resources applicable to offshore containment and recovery operations and their location. These resources include those available locally, regionally and internationally through contract and Memorandum of Understanding (MoU). Some or all of these will be activated during a spill response depending upon the severity and nature of the spill.

Table 5 - Resource Description, Supplier and Location

Description	Supplier	Location
Equipment		
4 x Termite skimmer systems with DOP 160 pumps, helix systems, power packs **2** x DOP 160 pumps 6 x Additional power packs *Note: Skimming systems come with ancillaries.*	BP	On-site /Dartmouth (1 Termite system on each Standby Vessel w/150' of 24" boom; balance of equipment in Dartmouth)
3 x Lamor Sweep Skimmer MOS 15 systems with LWS800 skimmer, MST150 & GTA140 pumps, powerpack and paravane fitted in 20' container.	BP	Dartmouth
2 x Offshore sweep systems. • 1 Current Buster • 1 NOFI V-sweep with 100m lead	ECRC	Dartmouth
3 x Offshore sweep systems. • 1 Desmi Speed Sweep 2000 with Ro-skim • 1 NOFI 1000 V-sweep • 1 NOFI 600 V-sweep	ECRC	St. John's
2 x Offshore sweep systems. • 1 Ocean Buster • 2 Current Busters • 1 NOFI 600 V-sweep	ECRC	Quebec
3 x Offshore boom systems. • 1 Ro Boom 1500 – 250m • 1 AMPOL 43" Inflatable – 762m • 1 Markleen Uniboom 1800 – 500m	ECRC	Dartmouth
4 x Offshore boom systems. • 1 Markleen Uniboom 1800 – 500m • 1 Ro Boom 1500 – 250m • 1 AMPOL 43" Inflatable – 762m • Auto Boom Deep Sea – 250m	ECRC	St. John's
4 x Offshore skimmer systems. • 4 GT185 (1 with brush system) – 45 m^3/hour capacity *Note: Skimming systems come with ancillaries*.	ECRC	Dartmouth

Description	Supplier	Location
Equipment		
6 x Offshore skimmer systems. • 1 Giant Octopus system – 250 m^3/hour capacity • 2 GT260 - 90 m^3/hour capacity • 3 GT185 - 45 m^3/hour capacity *Note: Skimming systems come with ancillaries.*	ECRC	St. John's
3 x Offshore skimmer systems. • 1 Giant Octopus system – 250 m^3/hour capacity • 2 GT185 - 45 m^3/hour capacity *Note: Skimming systems come with ancillaries.*	ECRC	Quebec
Storage Tanks • ERRV/PSV on board tanks – capacity 1100-2400 m^3 per vessel (~5000 m^3 total)	BP	On site
Storage Barges • John. P Oxley – 2000 m3 • 3 x 50Ton Barge – 50 m3	ECRC	Dartmouth
Storage Barges • ECRC-SIMEC 400 – 2000 m3 • 6 x 50Ton Barge – 50 m3	ECRC	St. John's
Personnel		
Trained responders from ECRC as required (other regions if required)	ECRC	Dartmouth
Subject matter experts (other regions if required)	ECRC	Dartmouth
Trained responder on board PSVs.	BP	On site
Vehicles/ Vessels/ Aircraft		
Various aircraft available on charter to be used as spotter aircraft during dispersants application.	Provincial Airlines	Halifax

Note: On-site refers to on vessels in the offshore area.

2.9 APPROXIMATE RESPONSE TIMES

Approximate response time for resources to reach the incident site are provided in **Table 6** as an indication only. Since every incident will occur under specific circumstances, it is not possible to provide accurate response times. Expected response times include mobilization and transit times.

Table 6 - Expected Time for Resources to Reach Incident Site

Resource	Expected response time	Comments
Standby Vessel in field	Immediate	Pre-fitted with containment and recovery equipment.
PSV at supply base	12 to 24 hrs	Will be dependent on operations.
PSV in the field	12-48 hrs	Will be dependent on location at time of incident and operations
VOOs in Halifax	24-48 hrs	Based on availability. ECRC maintains an "evergreen" list of VOOs.
Equipment resources at shore supply base and ECRC Dartmouth response base	6 to 12 hrs	Containment and Recovery Equipment/Storage Units.
BP subject matter experts from global locations	24 hrs	-

3.0 DEPLOYMENT

3.1 ORGANISATION

Roles and responsibilities within IMT are defined in the BP Incident Management Handbook or in the Operations section in the IMP.

3.2 GENERAL OFFSHORE CONTAINMENT AND RECOVERY DEPLOYMENT STRATEGY

Once an assessment has been done and it has been determined that offshore containment and recovery operations are safe and feasible, operations should commence as soon as possible. To use the available assets in the most effectively way, the following strategy may be implemented:

- Deploy tracking buoys to monitor oil movement.
- Activate BP offshore vessels (up to 3) equipped with containment and recovery equipment, and tracking buoys.
- Activate surveillance aircraft to map and photograph the oil spill as soon as possible after notification of an oil spill.
- Commence containment and recovery operations near the source of the spill before spreading makes collection difficult, and where the slick is the thickest.
- Depending on the magnitude of the spill and the expected duration, consider seeking additional vessels and storage capacity.
- Minimize the water in oil and monitor storage capacity.
- Refer to Wildlife Plan if hazing is required.

3.3 DECANTING

Decanting enhances recovery operations by maximizing the amount of oil and reducing the volume of water that is stored. This is especially important in the offshore environment, where storage capacity must be used as efficiently as possible. Decanting has benefits in terms of efficiency and safety because it results in more time spent recovering oil from the waters' surface rather than transiting to and from the intermediate waste handling facilities. The following decanting criteria (**Table 7**) provides guidance for decanting response operations. BP Incident Commander approval is required for decanting to proceed.

Table 7 - Decanting Criteria and Approval

The following criteria will be followed for decanting operations:
1) All decanting will be done within the designated “response area.”
2) When possible, decanting will be conducted within a collection area, vessel collection well or directly in front of a recovery system.
3) Vessels employing sweep booms with recovery pumps in the apex of the boom should decant forward of the recovery pump.
4) All vessels, motor vehicles and other equipment not equipped with an oil/water separator would allow retention time for oil held in internal or portable tanks before decanting commences.
5) Visual monitoring of the decanting area will be maintained, and documentation of decanting activities will be recorded for each operation.
6) Tanks used for decanting will be tested prior to use to ensure there are no contaminates from previous activities and that the water is safe to discharge back into the environment.
7) Additional conditions:
Approval: (check one) Yes_____ No_____
Environmental Unit (Planning): _____
Operations Section Chief _____
Incident Commander:_____
Reason for disapproval: _____

3.4 RESPONSE TERMINATION

Termination of response will be determined by the IMT in collaboration with government agencies and will consider many factors including the following:

- Safety of responders.
- Effectiveness of containment and recovery operations.
- Proximity of oil to shoreline and or bathymetry restrictions for vessel operations.
- Proximity of oil to marine installations, vessels, traffic zones etc.
- Transboundary migration of oil.
- Deteriorating weather conditions (visibility, sea state, wind speed).

3.5 DEMOBILISATION

The demobilisation and repatriation of resources shall be conducted in accordance with the Demobilisation Plan developed by the IMT either jointly for all OSR resources utilised on the oil spill or only resources specific to on water recovery activities. Resources will be demobilised in accordance with priorities and procedures set by the Incident Command.

As the response transitions from emergency response phase to a planned recovery effort, the demobilisation of incident resources must be conducted in an efficient and safe manner and shall not interfere with ongoing incident operations.

All incident Unit Leaders are responsible for identifying surplus resources, receiving approval by the Section Chief, and submitting lists to the Demobilisation Unit Leader.

The Incident Commander will approve the demobilisation of critical resources identified by command staff prior to demobilisation from the incident. Those resources shall be identified daily in the daily operational period planning cycle. All releases from the incident will be initiated in the Planning Section, Demobilisation Unit after Incident Commander approval.

See **Annex G Decontamination and Demobilization** for more details

3.6 HEALTH AND SAFETY PLAN FOR OPERATIONS

An incident-specific Health & Safety Plan will be developed by the IMT Safety Officer, in conjunction with Operations.

3.7 WASTE MANAGEMENT

Recovered oil and oily water mixture will generate liquid waste. It is important that skimmer efficiency is monitored throughout the recovery operations and the amount of water being recovered is minimized. Decanting may be an option but requires IC approval. Contaminated PPE, sorbents, rags, cleaning agents and oily water run offs from decontamination activities etc. will be stored, cleaned and/or disposed of in accordance with the Waste Management Plan (Annex E of the OSRP).

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Scotian Basin Exploration Project

Oil Spill Response Plan

Annex B -

Surface Dispersant Tactical Response Plan

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1.0 INTRODUCTION

This Tactical Response Plan (TRP) is intended for use by the BP Canada Incident Management Team (IMT) in case of an incident. It provides detailed information to support the IMT with the implementation of tactics associated with the surface application of dispersants offshore. It identifies response activities and resources needed for the deployment of this response strategy. This is not a stand-alone document and it should be used in conjunction with the Oil Spill Response Plan (OSRP).

2.0 PLANNING

2.1 OBJECTIVES

Dispersants are applied to oil slicks to reduce the size of oil droplets. These droplets are dispersed into the water column (typically in the upper 0-10m for surface application) by wind and wave energy where their smaller size results in an increase in the rate of biodegradation and other weathering processes. The goal of dispersant use is to reduce the amount of oil on the ocean surface, thereby reducing impacts to sensitive near-surface biota and to shorelines.

2.2 BENEFITS

- Protection of sensitive wildlife that can encounter surface oil slicks (birds, sea mammals, etc.);
- Protection of sensitive shorelines;
- Minimise waste generation;
- Reduction of vapours generated by evaporation of surface oil slicks (safety benefit);
- Operate effectively over a much wider range of wind and wave conditions than mechanical recovery or in-situ burning;
- The encounter rate for treating spilled oil on the surface is much higher than for any other response method;
- Responds as a self-contained, all-inclusive operational unit of equipment and personnel that have been trained and exercised together.

2.3 LIMITATIONS

The following limitations are applicable to surface dispersant application:

- Regulatory (for details see section 1.4 Governmental approval)
  - Dispersant must be on the Canadian Spill Treating Agents list. Only Corexit EC9500A is currently approved for use in Canada.
  - Dispersant application must be approved by CNSOPB prior to any application.

- Oil type:
  - There is no universally accepted oil viscosity limit beyond which dispersants are deemed to be ineffective. It will depend on many factors such as weather conditions and nature of the oil. However, the following guidelines **(Table 1**) should be considered:

Table 1 - Dispersant Effectiveness

Oil type/viscosity	Dispersant effectiveness
Light distillate fuels (petrol, kerosene, diesel oil)	Dispersant use not advised These oils will evaporate and naturally disperse quite rapidly in most conditions.
Oils with viscosity up to 5,000 cSt	Dispersant use is likely to be effective
Oils with viscosity between 5,000 and 10,000 cSt	Dispersant use might be effective
Oils with viscosity above 10,000 cSt	Dispersant use is likely to be ineffective (though success is reported on oils with viscosity greater than 20,000 cP)

Source: IPIECA 2015.

  - In the field, dispersant effectiveness tests ("shaker bottle" and/or test spray) will be conducted prior to dispersants application to confirm that the oil will disperse;
  - Dispersants should not be used on refined products (gasoline, jet, diesel, etc.) or on sheen.

- Environmental:
  - Dispersants can have an impact on marine species if applied in shallow water that limits effective dilution;
  - Dispersants should not be applied less than 2.5 nautical miles from shore and in waters with less than 15m water depth;
  - Dispersants should not be applied around Roseway Basin due to the sensitivity of this area (area to be specified at the time of an incident as part of the Dispersants Operation Plan following discussion with relevant regulatory authorities).

- Weather:
  - Daylight application only;
  - Do not use in wind speeds exceeding 30kts;
  - Optimal sea conditions 0.3m – 3m wave height (Beaufort scale 2 – 5);
  - Visibility must be:
    - >1 nm (vessel application);
    - >3 nm (aerial application).

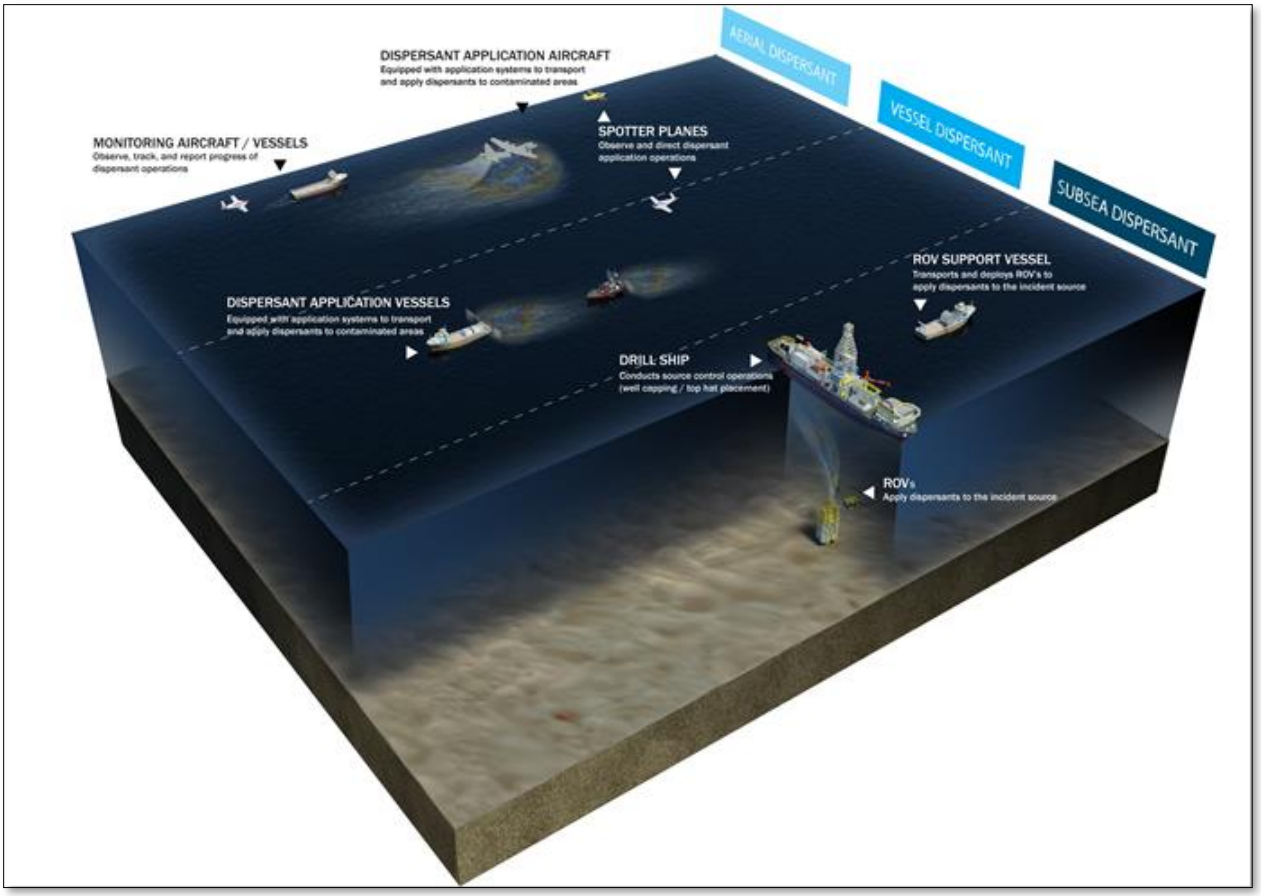
- Operational:
  - Only use trained personnel;
  - For vessel operations:
    - Optimal vessel speed 5kts (depending on pumping rate and oil thickness);
    - 1 vessel with $3m^3$ of dispersant at 1:20 application ratio is able to treat $60m^3$ of oil, at continuous application this equates to ~6-8 hrs of operation before resupply.
  - For aerial applications:
    - Optimal aircraft speed 125-175kts;
    - Optimal height (subject to aircraft type and configuration).

Tactics for offshore surface dispersants application

Two tactics are available for offshore surface dispersants application:

- vessel application; and
- aerial application of dispersants.

Figure 1 - Illustration of Dispersant Operations



- Vessel dispersants application

For this tactic, dispersants are applied using vessels fitted with a dispersant spray system. The spraying system consists of spraying arms fitted with adapted nozzles, a pump and a stock of dispersants. Systems using spray booms are mounted ahead of the bow wake or as far forward as possible in order to benefit from additional mixing energy provided by waves generated by the vessel and its propellers. The vessel must sail at speeds between 1 to 10kts targeting thicker areas (black/brown oil) of the oil slick. Vessels can carry larger supplies of dispersants and stay "on station" for longer periods than aircraft. However, they are less rapid and coverage is more limited.

Figure 2 - Vessel Dispersants Application

- Aerial dispersants application

For this tactic, dispersants are applied by aircraft fitted with dispersant application systems. Similar to vessel application, aircraft are fitted with spray booms, pump and dispersant tank. Dispersant capacity will vary depending on aircraft type and size. Aircraft will generally fly at a low altitude and at a speed of 125 to 175kts. Aerial application of dispersants enables large areas of oil to be dispersed in a relatively short time. However, they will need to be resupplied more frequently than vessels.

Figure 3 - Aerial Dispersant Application

Both vessel and aerial application of dispersant need the support of spotter aircraft. The spotter aircraft will:

- Guide the vessel/aircraft towards oil slicks;
- Ensure no wildlife is present at time of application (such as birds and marine mammals);
- Ensure that dispersants are applied on the thicker areas of oil slicks (black/brown oil) by providing spraying instructions to operators;
- Conduct a visual evaluation of dispersant effectiveness.

2.4 OPERATIONAL ASSUMPTIONS FOR THE SCOTIAN BASIN EXPLORATION PROJECT

All dispersant application operations **will begin only when and if approval is received** from CNSOPB and will be managed by the onshore IMT (see Section 2.7 of this Annex). All “in field” support vessels will have a dispersant test kit to conduct sampling and dispersant efficacy testing prior to any application of dispersants. The dispersant test kit consists of small bottles filled with oil and sea water where dispersant is added at the appropriate ratio. Efficacy is determined visually once the oil/dispersant mixture is shaken. If dispersion is observed during this simple test, BP will proceed with a vessel test spray, following approval by CNSOPB, before proceeding with dispersant operations.

For all dispersants application operations (aerial, vessel), the priority will be to target oil slicks moving in the direction of:

1. Sable Island; and
2. Nova Scotia shoreline.

In the event of an incident, the initial application of dispersants will be conducted by vessels assisting with drilling operations (ERRV/PSVs). Dispersant spraying systems and dispersants will be pre-staged on

3 vessels. Each vessel will carry 3-4m^3 of Corexit 9500A stored in 1m^3 IBCs. If additional capacity is required, one additional spraying system will be available at the shore supply base to be mounted on a fourth vessel or on a Vessel of Opportunity (VOO).

For larger spills that cannot be managed by resources on site, the IMT will escalate the response by cascading response equipment from the shore supply base or from ECRC and OSRL. Three additional vessels dispersant spraying systems that can be mounted on VOOs will also be available from the ECRC response base in Dartmouth. If aerial application of dispersants is implemented, two B727 aircrafts will be mobilised from OSRL in the UK. These can carry 15m^3 of dispersants and would operate from Halifax Airport where fueling and dispersant re-loading activities would take place. If necessary, additional aerial resources can be obtained from the US and other sources through the Global Alliance (a collaboration of major oil spill organisations).

All dispersant application operations will be conducted during daylight hours (approx. 12hours in summer and 8 hours in winter).

In addition to the dispersant on the vessels, BP will have a stock of ~40m^3 of Corexit EC9500A dispersant to re-supply vessels and/or aircrafts in the event of a spill. This stockpile will be located at the shore supply base stored in 1m^3 totes. Assuming a 1:20 application ratio, this stockpile of dispersants, along with that on the vessels, can be used to treat 1000m^3 of oil. If additional dispersants are required, they will be procured from global stockpiles in the UK, USA and Brazil (refer to **Section 2.6 Dispersant Logistics**).

2.5 DISPERSANT APPLICATION CAPABILITY

The estimated volume of dispersant that can be applied and the volume of oil that can be dispersed are important calculations in activating dispersant assets and arranging for the delivery of dispersant stockpiles. The information provided in **Table 2** below will assist BP in deciding upon the number and types of aircraft and vessels to be activated as well as the quantity of dispersants needed.

Table 2 - Dispersant Tactic Assumptions

Dispersant Tactic Assumptions				
	Vessel Application		Aircraft Application (per aircraft)	
Operating Period	Summer Daylight hrs only (12hrs)	Winter Daylight hrs only (8hrs)	Summer Daylight hrs only (12hrs)	Winter Daylight hrs only (8hrs)
Application ratio	1:20	1:20	1:20	1:20
Estimated consumption rate*	Initial 3-4m^3 on board will be consumed in <8hrs, assuming continuous application.	Initial 3-4m^3 on board will be consumed in <8hrs, assuming continuous application.	Assuming 4 sorties (spray operations) per day with B727 - 60m^3 per day.	Assuming 3 sorties (spray operations) per day with B727 - 45m^3 per day.
Estimated daily dispersant application capability	• 6.5 m^3 per vessel • 20 m^3 if 3 vessels in operation.	• 4 m^3 per vessel • 12 m^3 if 3 vessels in operation.	• 60 m^3	• 45 m^3
Estimated daily amount of oil treated	• 130 m^3 per vessel • 390 m^3 if 3 vessels in operation.	• 80 m^3 per vessel • 240 m^3 if 3 vessels in operation.	• 1200 m^3	• 900 m^3

*based on a 1m^3/hectare dosage (0.15l/sec application rate) for vessel. No estimate for effectiveness as this can
*based on a 1m^3/hectare dosage (0.15l/sec application rate) for vessel. No estimate for effectiveness as this can
range from 50 to 90% depending on oil, weather conditions, etc.

Notes:

- The length of time an oil will remain dispersible depends on many factors including the oil composition, weather conditions, sea state, etc.
- The calculations provided in Table 2 are estimates, and actual amounts of dispersant applied and the amounts of oil dispersed may vary considerably from these estimates.
- Table 2 shows calculations for spray aircraft and vessels during a full operational day. These calculations estimate the amount of dispersant that can be applied in a 12-hour operational period (summer) and 8 – hour operational period (winter).

2.6 DISPERSANT LOGISTICS

Sufficient quantities of Corexit 9500A will need to be transported from various BP and Global Dispersant Stockpile locations to Halifax in time to meet the operational demands. The information below outlines general dispersant logistics information and a plan for both surface and Subsurface Injection (SSDI). This indicates that dispersant supplies are sufficient to meet needs through at least day 25, which is the longest time estimated for capping stack installation. NB - each incident will be unique and actual dispersant needs and logistics will vary.

Table 3 provides an estimate of daily dispersant volume usage (m^3) and supply (m^3) (vessel, aerial and SSDI capability) for the Nova Scotia operating area over a 25-day period. By developing a plan for what the vessel, aerial and SSDI systems can accomplish over a 25-day period, BP Nova Scotia will have a tool to assist in activating surface dispersant assets should a spill occur. **Figure 4** depicts usage, supply demand, and supply available (all m^3) for Corexit 9500A over the 25-day period.

Table 3 - Estimated Daily Dispersant Volume Usage and Supply

Dispersant Usage (m^3)

Platform	Days 1-2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Days 14-25	Total
Vessel	1	12	20	20	20									73
Aerial	0	60	60	120	120	120	120	120	120	60	60	0	0	960
SSDI	0									60	60	60	720	900
Daily Total	1	72	80	140	140	120	120	120	120	120	120	60	720	1933

Dispersant Supply (m^3)

Source	Days 1-2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day 11	Day 12	Day 13	Days 14-25	Total
Halifax	50													50
OSRL – FTL	100	100		100	100		100							500
OSRL - BRZ		100		100		100		100		100				500
BP - Houma				200	400			200	200					1000
BP - BRZ													450	450
Daily Total	150	200		400	500	100	100	300	200	100			450	2500

Assumptions:

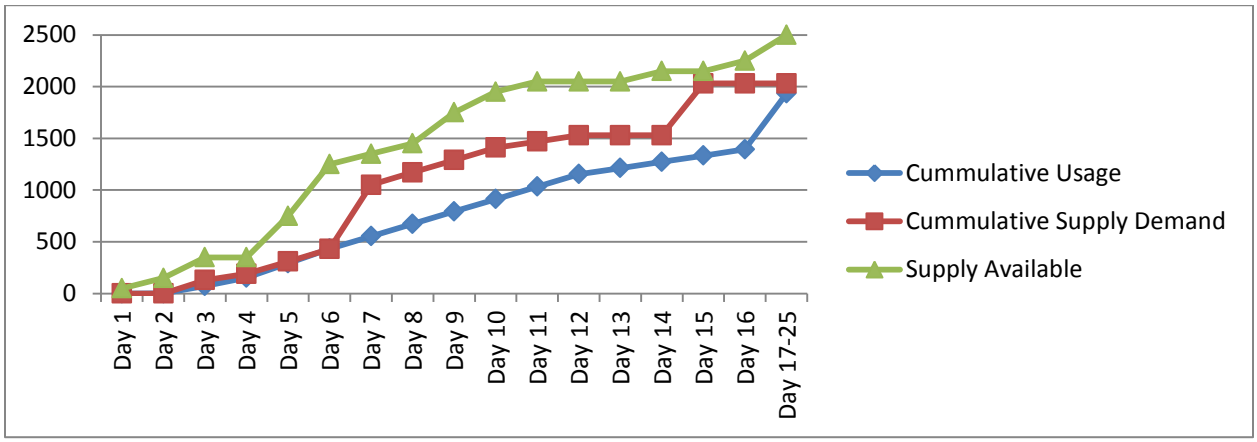
Usage

- Approval to us dispersants takes through Day 2, with operations beginning Day 3
- vessels available for surface application Days 3 through 6
- 1 Boeing 727 OSRL aircraft begins application Day 3, flying 4 sorties /day; second B727 aircraft beginning Day 5; sorties reduced to 4/day total for Days 11-12 (after SSDI) then stop
- SSDI begins Day 11, continues through Day 25

Supply

- OSRL supplies from Fort Lauderdale, Florida and Brazil via aircraft (Antonov 124) at 100 m^3/flight
- 33-hour rotation for dispersant from Fort Lauderdale, first arrival Day 2, last Day 8
- 54-hour rotation for dispersant from Brazil, first arrival Day 3, last Day, last Day 11
- BP supplies from Brazil on same Antonov 124 rotation following OSRL, first arrival Day 14
- BP supplies from Houma transported by land and air, arriving from Days 5-10
- Supply demand requires 500m^3 available at dock in Halifax beginning Day 7 and every 8 days thereafter for loading to shuttle vessel to support SSDI operations
- Nalco would be contacted immediately to begin production; additional supplies from other BP and non-BP stocks would be triggered as needed (neither included in **Table 3** above)

Figure 4 - Usage, Supply Demand and Supply Available (in m^3) for Corexit 9500A



Other operational assumptions include:

- Halifax Stanfield International Airport is used as the staging airport.
- Transit distance from Halifax Stanfield International Airport to the furthest spill site is 202 nautical miles and vessel transit distance from the Port of Halifax is about 195 nautical miles (see **Figure 5** below).

Figure 5 - Map showing the Distance from Halifax Airport and Port to BP project area

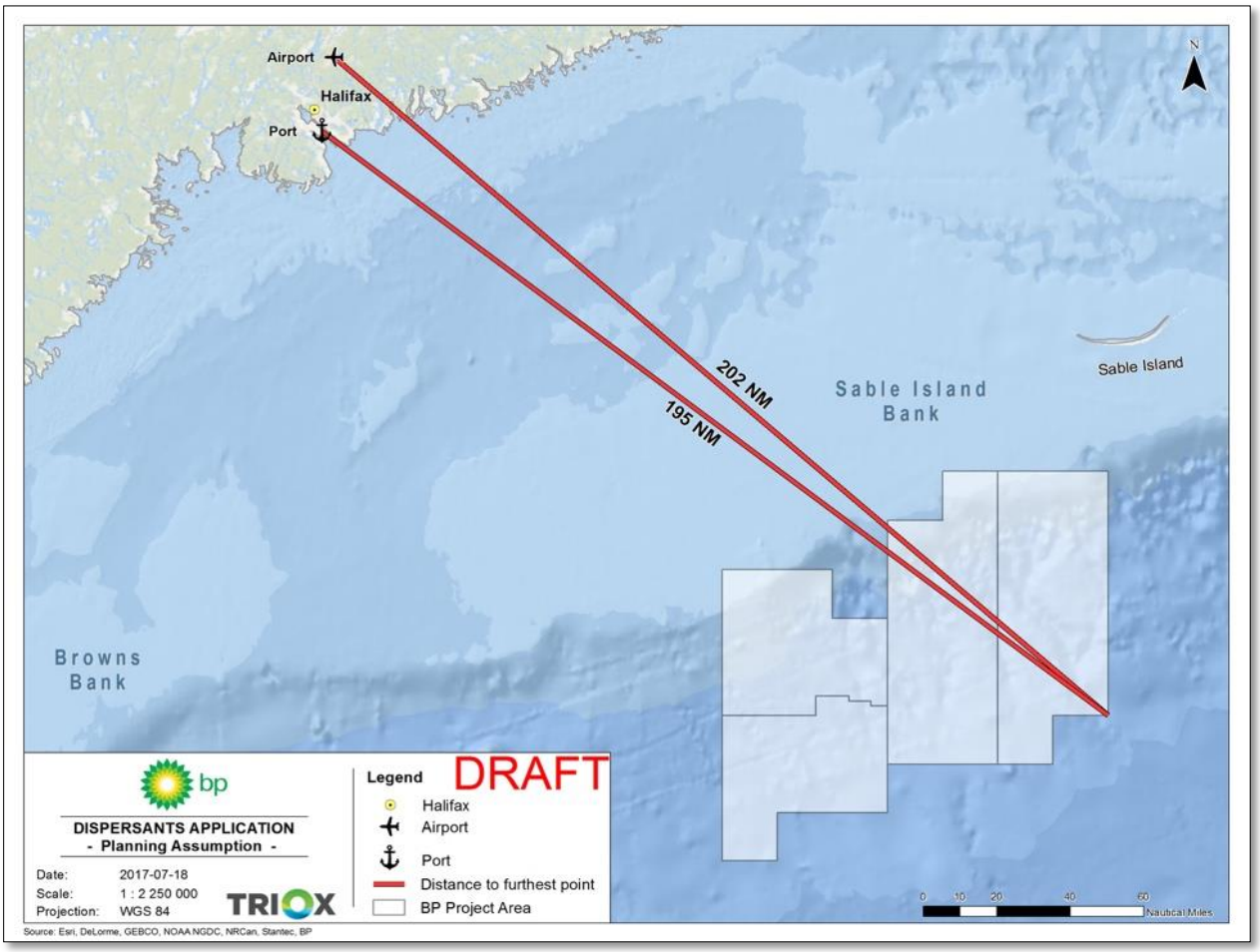


Table 4 provides additional information on available dispersants worldwide.

Table 4 - Dispersant Stockpile Summary

BP-owned - Upstream		Volume in cubic meters (m^3)	
Location (Country/City)	**Business**	**Corexit 9500A**	**Availability / Notes**
Brazil/Rio	Brazil	450	
Egypt/Alexandra	North Africa (Egypt)	~1,120	56 ISO tanks stored in Alexandria
Angola/Luanda	Angola	~1000	- 960m^3 stored in 48 ISO tanks at Sonils yard, and another 60m^3 stored in 1m^3 IBC's. - Subject to export restrictions of country where currently stored
Canada/Halifax	Nova Scotia	50	in 1 m^3 totes
Non-BP-owned - Upstream		**Volume in cubic meters (m^3)**	
Location (Country/City)	**Owner**	**Corexit 9500A**	**Availability / Notes**
US/Ft Lauderdale	OSRL - GDS	500	in 1 m^3 totes
Brazil	OSRL - GDS	500	in 1 m^3 totes
US/Ft Lauderdale	OSRL SLA	59	
Australia	AMOSC	90	
U.S - various (16)	MSRC	390	For aerial application only in 265 - 330 gal totes & 4 ~4000 gal ISO totes
Alaska	Alyeska	89	
UK/Various	UK MCA	11	UK National Stockpiles but may be open to use in order to rotate stock. Stored in 1m^3 IBC

Approximate response times for resources to reach the incident site are provided in the following **Table 5**. Since every incident will have its own circumstances, it is not possible to provide accurate response times. These expected response times include mobilisation and transit times.

Table 5 - Approximate Response Time

Resource	Expected Response Time	Comments
OSV in field.	Immediate	Depending on location at time of incident. Pre-fitted with dispersants and spraying kits.
OSV at supply base.	12 to 24 hrs	Depends on ongoing operations.
VOOs in Halifax.	48 hrs	-
Dispersant resources at shore supply base and ECRC Dartmouth response base.	6 to 12 hrs	Dispersants and spraying equipment.
B727 aircrafts from UK (OSRL).	Aircraft 1: 12 hrs Aircraft 2: 48 hrs	Include mobilisation and travel time to Canada.
Additional dispersants from stockpiles in the USA and Brazil.	48 hrs	Transport by cargo aircraft and truck.
Additional dispersants from manufacturer.	>20days	-
BP subject matter experts from global locations.	24 hrs	-

2.7 GOVERNMENT APPROVAL

CNSOPB approval ***must*** be obtained prior to any application of dispersants. Steps that need to be followed in order to get approval are indicated in **Table 6**. CNSOPB will accept or decline the use of dispersants based on assumed environmental impacts identified in a SIMA, and the specific circumstances at the time of an incident.

The Dispersant Use Request found in **Attachment A** should be used as a stand-alone document by IMT to request the use of dispersants.

Table 6 - Steps to be Followed to Seek CNSOPB Approval for Dispersant Application

Step	Responsible (BP IMT)
• **Prepare dispersant request.** ***Note 1**: Use the Dispersant Use Request form (**Attachment A**) to provide the required information*. ***Note 2: Dispersant request will include an incident-specific SIMA.***	Environmental Unit and Dispersant Group
• **Submit request to use dispersants to the CNSOPB Chief Conservation Officer (CCO).** ***Note 3**: The CCO will then consult with Environment Canada's Environmental Emergencies Science Table.* ***Note 4**: Because of the limited window of opportunity for dispersants application, a request to use dispersants should be submitted as soon as the possibility of using dispersants arise.*	Incident Commander (IC)
• **Participate in meetings of the Science Table to provide expertise and additional information as required by the Science Table as requested.**	Environmental Unit and Dispersant Group
• **Get written confirmation of the CNSOPB decision.**	Incident Commander (IC)

2.8 DISPERSANT USE: DECISION MAKING

Only chemical dispersants listed on Environment Canada's Spill Treating Agents list (SOR/2016-108) will be used in cases where:

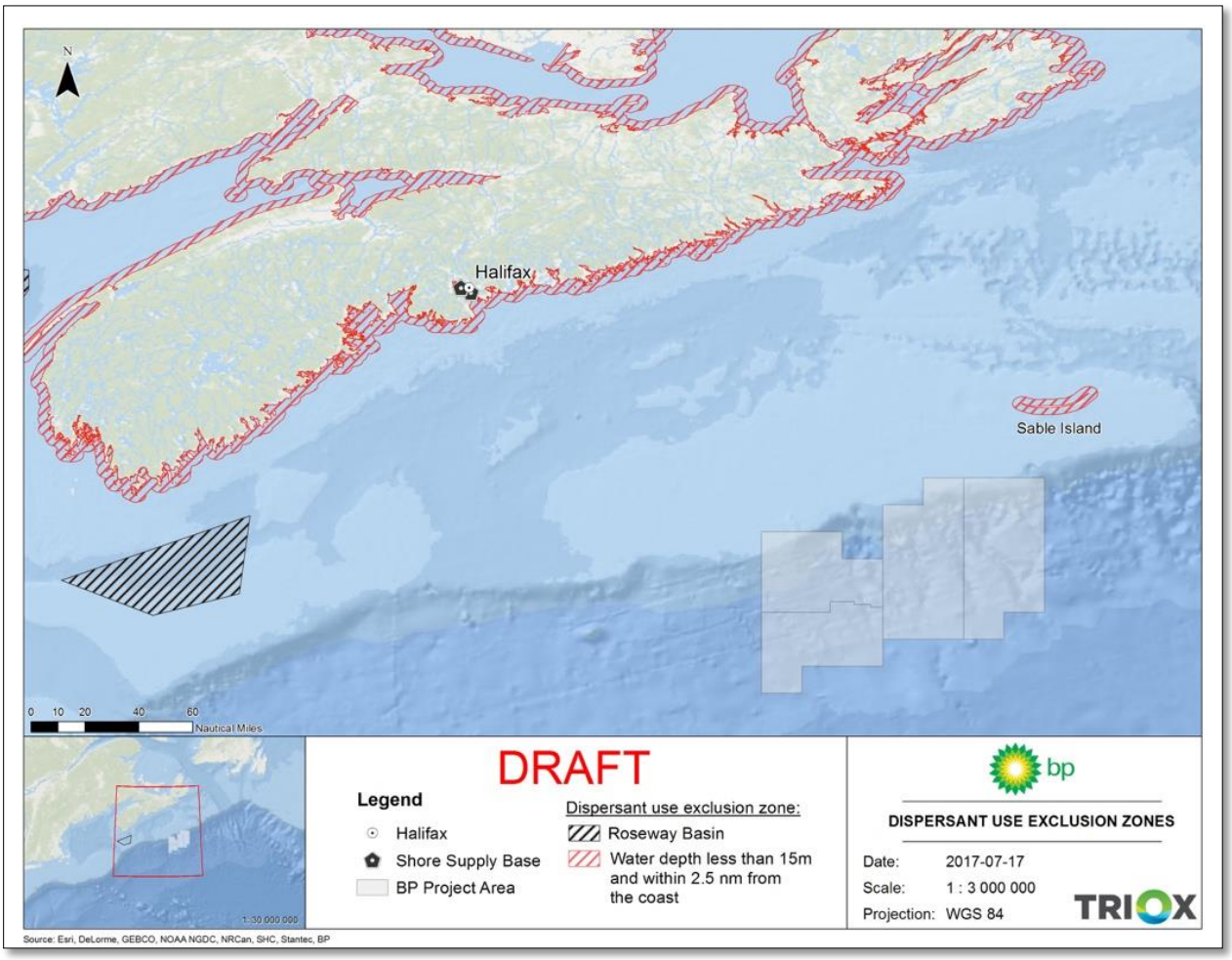
- there is an imminent risk of fire and danger to human life aboard offshore installations or surface vessels;
- other response techniques such as containment or mechanical recovery will not suffice; or
- the oil slick is moving towards environmentally sensitive areas such as Sable Island.

Dispersants can only be used if duly authorized by the CCO of CNSOPB and should only be applied when the marine environment has sufficient energy to reduce the interfacial tension of the oil/dispersant mixture. If the sea is calm, mechanical mixing should be conducted after applying the dispersant (e.g., use of boats and prop wash).

To minimise the possibility of environmental impacts, dispersants ***should not be used:***

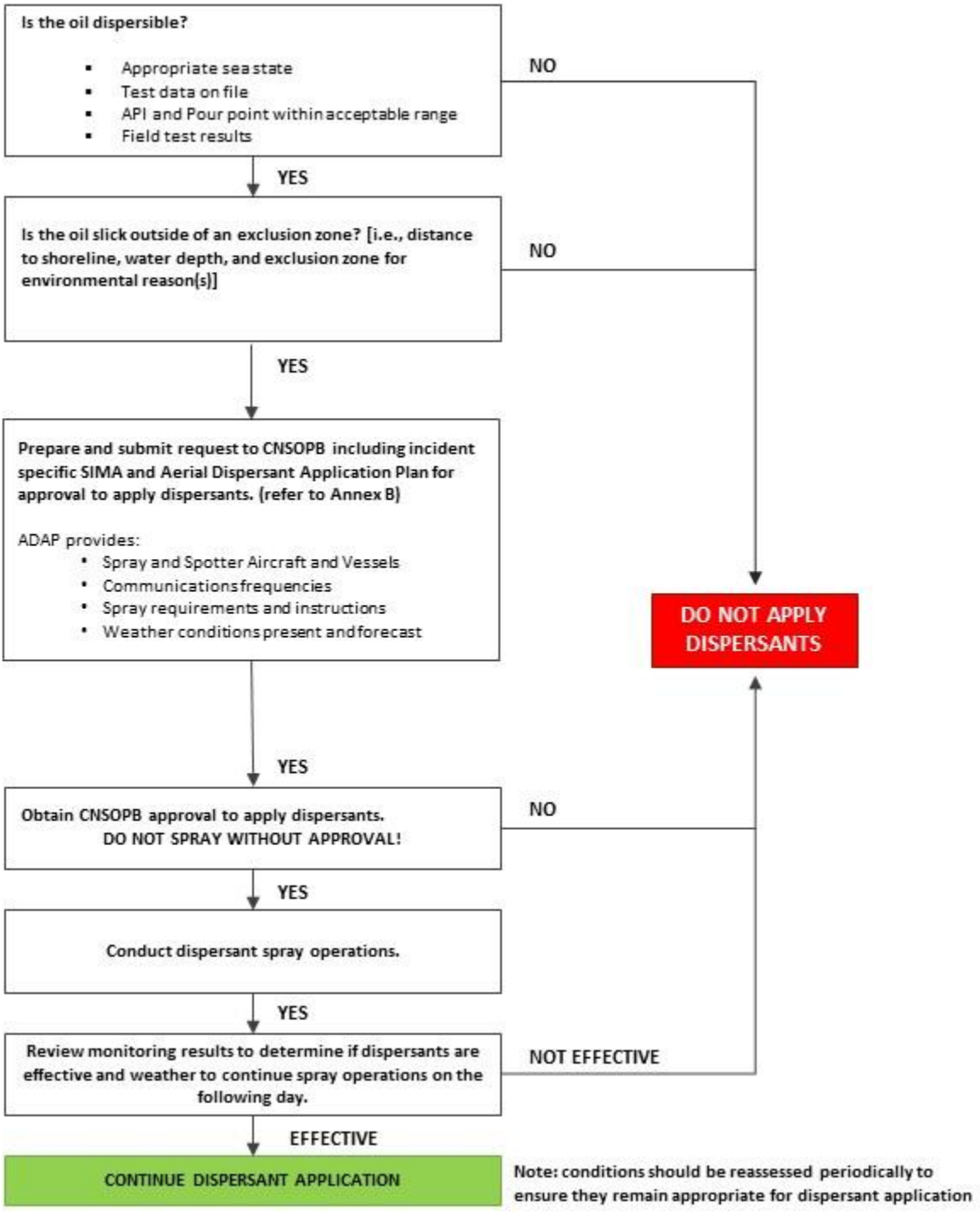
- At a distance less than 2.5 nautical miles (4.6 km) from any shoreline;
- In a water depth less than 15m; and
- In the Sensitive Area Dispersant Application Exclusion Zone, established around Roseway Basin (to be determined at the time of an incident in discussion with relevant regulatory agencies, an indicated in the Dispersant Operations Plan). See Fig. 6

Figure 6 - Map showing Dispersant Use Exclusion Zones



The following dispersant use decision tree will be followed to determine if dispersant should be requested as a response tool and to obtain CNSOPB approval for the dispersant application.

Figure 7 - Dispersant Use Decision Tree



2.9 RESOURCES

Table 7 identifies the resources applicable to Surface Dispersant Application and their location. These resources include Company owned and those available regionally and internationally through contracts and MOUs. Some or all of these resources will be activated during a spill response depending upon the severity and nature of the spill.

Table 7 - Resources, Suppliers, and Location

<table>
<tr><th>Description</th><th>Supplier</th><th>Location</th></tr>
<tr><td colspan="3">Dispersants</td></tr>
<tr><td>~40m^3 of Corexit EC9500A Dispersant is stored in 1m^3 IBCs.</td><td>BP</td><td>Shore supply base</td></tr>
<tr><td>~10 m^3 (3-4m^3 of dispersant on-board 3 PSVs). Dispersants are stored on vessels in 1m^3 IBCs.</td><td>BP</td><td>On vessels</td></tr>
<tr><td>Additional Corexit EC9500A dispersant stored at various bases across the world.
(Refer to Appendix C for details)

<table><tr><th>Type</th><th>Stock (m^3)</th><th>Location</th></tr><tr><td>COREXIT EC9500A</td><td>1000</td><td>USA (GoM)</td></tr><tr><td></td><td>450</td><td>Brazil</td></tr><tr><td></td><td>1120</td><td>Egypt</td></tr><tr><td></td><td>1000</td><td>Angola</td></tr></table></td><td>BP</td><td>Global</td></tr>
<tr><td>>1000m^3 of Corexit EC9500A dispersant stored at various bases across the world.
(Refer to Appendix C for details)

<table><tr><th>Type</th><th>Stock (m^3)</th><th>Location</th></tr><tr><td>COREXIT EC9500A</td><td>500</td><td>USA</td></tr><tr><td></td><td>500</td><td>Brazil</td></tr></table></td><td>OSRL</td><td>Global</td></tr>
<tr><td>COREXIT EC9500A could be produced by the manufacturer on demand if needed.</td><td>NALCO</td><td>USA</td></tr>
</table>

Description	Supplier	Location
Spraying Systems		
4 Ayles Ferni wide boat spray dispersant systems • pump units • spray arm sets • AFEDO nozzles sets Three of these spray systems are on board OSVs operating offshore and one is stored at the shore supply base.	BP	Offshore
3 Desmi Widespray boat spray dispersant system • 3 pump units • 3 x 6m spray arm sets	ECRC	ECRC Dartmouth response base
2 Tersus spraying system (15m^3 capacity) for aerial dispersant application Tersus system is loaded on board OSRL B727 aircrafts.	OSRL	UK
Vessels		
3 x PSVs mounted with dispersant spraying systems. An additional vessel could be used if necessary.	BP	Offshore
ECRC maintains an updated list of Vessels of Opportunity (VOOs) with some vessels for dispersants application.	ECRC	Atlantic region
Aircrafts		
2 x B727 mounted with Tersus application system.	OSRL	UK
Various aircraft available on charter to be used as spotter aircraft during dispersants application.	Provincial Airlines	Halifax
A number of specialised dispersants application aircrafts are available in the USA through the Global Alliance. Specific arrangements to bring these additional aircrafts in a Tier III incident would be made through BP IMT and ECRC.	Global Alliance	Various locations in USA.

Description	Supplier	Location
Personnel		
Minimum of 18 dedicated response Personnel will be mobilised from within OSRL's global pool of expertise by applying reasonable endeavours to provide the most appropriate competence and experience. OSRL maintains a minimum pool of 80 dedicated response staff. in the event that more than the contract number are required, this may be approved on a case by case basis.	OSRL	Global
Airports for Aerial Application		
Halifax Stanfield International Airport This airport is the only airport in Nova Scotia that can support an aerial application of dispersants using B727 aircraft. Runway length: 10,500 feet.	Halifax International Airport Authority	Halifax

2.10 MONITORING

BP will follow the Special Monitoring of Applied Response Technologies (SMART) protocol in case dispersants are used. Monitoring needs will also be discussed with the CNSOPB who will obtain advice from ECCC's Science Table (and appropriate technical experts) at the time of an incident.

To monitor the efficacy of dispersant application, SMART recommends three options, or tiers:

- Tier I: A trained observer, flying over the oil slick and using photographic job aids or advanced remote sensing instruments, assesses dispersant efficacy and reports back to the Incident Command.
- Tier II: Tier II provides real-time data from the treated slick. A sampling team on a boat uses a monitoring instrument to continuously monitor for dispersed oil 1m under the dispersant-treated slick. The team records and conveys the data to the Scientific Support Team, which forwards it, with recommendations, to the Incident Command. Water samples are also taken for later analysis at a laboratory.
- Tier III: By expanding the monitoring efforts in several ways, Tier III provides information on where the dispersed oil goes and what happens to it. Two instruments are used on the same vessel to monitor at two water depths. Monitoring is conducted in the center of the treated slick at several water depths, from 1m to 10m.

Additionally, BP will mobilize a portable water laboratory with the capability to provides data on water temperature, pH, conductivity, dissolved oxygen, and turbidity **(see Sec 6.7 of OSRP and Annex F Monitoring and Sampling for additional details).**

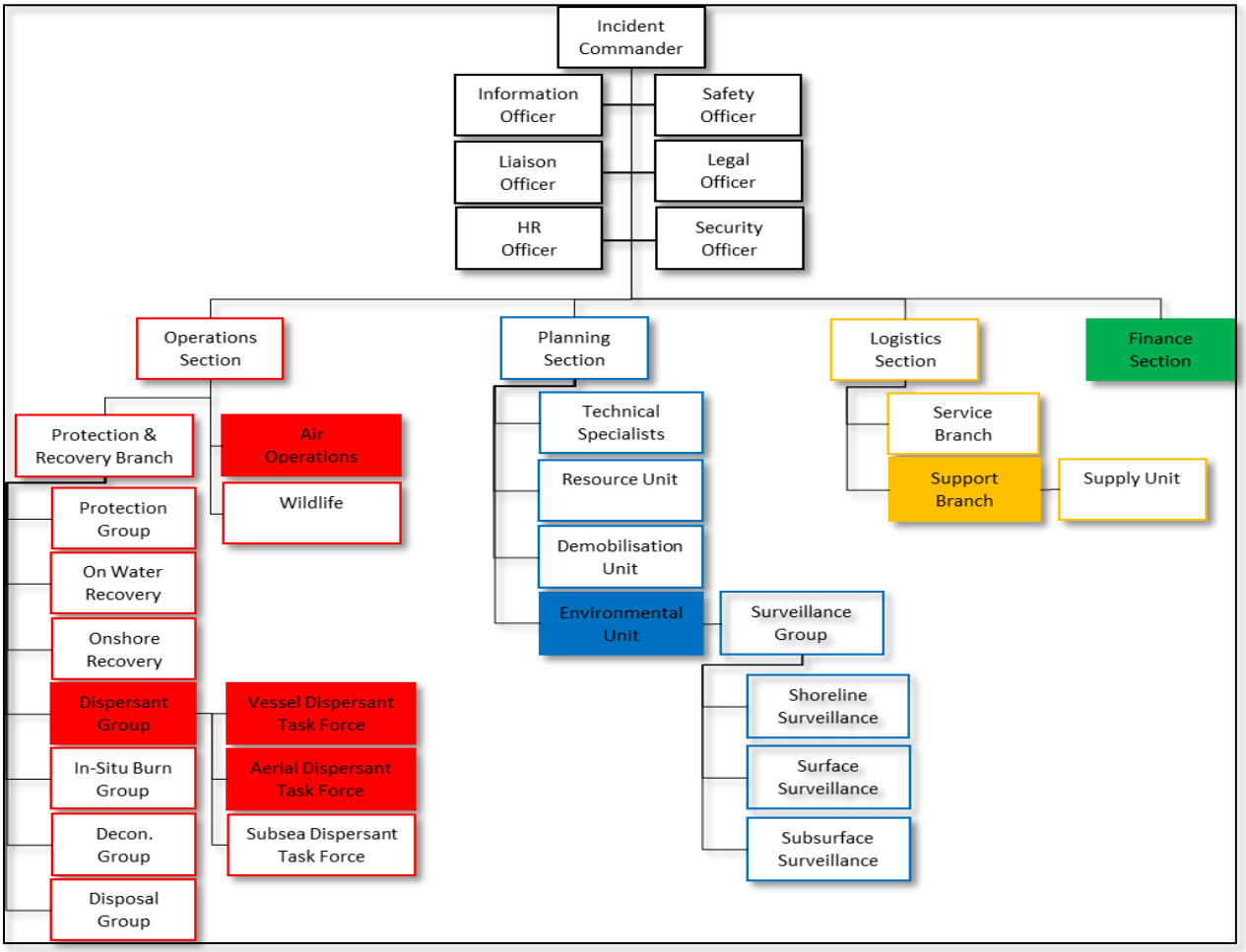
3.0 DEPLOYMENT

3.1 ORGANISATION

The response command and control organisation structure illustrated in this TRP follows the BP standard Incident Management System (IMS). The IMS provides a common organisation structure, with clearly defined roles and responsibilities, expanding and contracting depending upon the size of the incident (**Figure 8**).

A key to the functionality of an IMT is the lateral flow of information and coordination among the team members. No independent section of the IMT (e.g., section, group or unit) stands or operates alone; IMT sections must function as a team and engage in cross-section interactions, which are essential to effective response management.

Figure 8 - ICS Structure – Dispersant Group



The Dispersant Group (DG) is a functional group that operates within the Incident Management Team (IMT) under the Protection and Recovery Branch (PRB) of the Operations Section (OPS).

Note: IMT will determine the actual organisational structure at the time of an incident which can vary from this typical structure.

The DG is responsible for:

- Coordinating with the OPS and the Planning Section (PS) to conduct vessel and aerial surface application of dispersant;
- Working with the Environmental Unit (ENV) and the appropriate regulatory agencies;
- Assisting the PS in drafting dispersant plans and permits for approval by Incident Command (IC); and
- Coordinating with the Logistics Section (LOG) and the Finance Section (FS) to procure necessary resources for dispersant operations.

The following Table 8 summarises the people/ groups required to support the implementation of the tactic and their associated function.

Table 8 - Function of Group Personnel

Personnel	Function
Vessel Dispersant Task Force	Implementation of on-scene vessel dispersant operations.
Aerial Dispersant Task Force	Implementation of on-scene aerial dispersant operations.
Air Operations Branch	Manage air operations; scheduling, locating airports, air-to-air communications, air-to-ground communications, designating and enforcing air space restriction, air space priorities.
Environmental Unit	Provides oil fate and trajectory information, modelling data, establish surveillance and sampling & monitoring program, evaluate environmental impacts and trade-offs which allows for efficient dispersant operations before, during, and after operations are conducted. Assess potential wildlife impacts, prepare waste management plan.
Logistics Support Branch	Responsible for obtaining personnel, equipment, materials and supplies needed to mount and sustain the response. This will include such things as; vessels, aircraft, vehicles, cranes, forklift, dispersant supplies.
Finance Section	Oversee vendor contracts, service and rental agreements. Develop delegation of authority and expenditure approval limits.

Aerial and vessel dispersant tasks forces require management teams in the command centre and an operational team at each aerial and vessel staging base. Detailed organizational structures of each of these teams and responsibilities for each position are described in **Attachment B**.

3.2 GENERAL AERIAL AND VESSEL DISPERSANT APPLICATION DEPLOYMENT STRATEGY

Once surface dispersant operations have been approved by the CNSOPB, application operations will commence as soon as possible. To use the available dispersant assets in the most effective way, the following strategy will be implemented:

- Activate spotter/surveillance aircraft to map and photograph the oil spill.
  - This should be done as soon as possible after notification of an oil spill.
- Activate BP offshore vessels (3) equipped with dispersant spray systems and loaded with dispersants.
- Develop a dispersant application plan that delineates geographic boundaries for operations of dispersant spraying vessels and aircraft.
- Two vessels to commence dispersant application to oil slicks moving toward Sable Island or Nova Scotia shoreline.

- One vessel may be used to suppress volatile organic compounds (VOCs) near the spill source, if this is required. If not needed, the vessel will work with the other spray vessel and spotter aircraft.
- If needed, an additional vessel will be available at the shore supply base, and can be mobilized and on scene within 12 hours
- Activate OSRL's B-727 jets to deploy to Nova Scotia if necessary (see **Attachment C** for details).
- Dispatch a fixed wing spotter aircraft to direct vessel or aerial dispersant application operations.
- Depending on the magnitude of the spill and the expected duration, consider seeking additional spray aircraft.
- Dispatch B-727 to spill site to spray the freshest oil near the spill source, in accordance with the dispersant application plan.
- Always consider Simultaneous Operations (SIMOP) in area.

3.3 DISPERSANT ACTIVATION CHECKLIST

Table 9 provides sequential activities for the BP Nova Scotia IMT to activate dispersant resources. The checklist initiates both the dispersant approval process and the activation of dispersant equipment, stockpiles, and personnel simultaneously to commence dispersant application as soon as possible.

These activities are reminders of actions to be taken. Referral to other forms, computer programs, response plans, etc., will need to be made to complete the activities. The dispersant activities can be delegated, in whole or in part, to other knowledgeable responders or contractors who have been trained to complete each activity.

Table 9 - Dispersants Activation Checklist

Activity	Responsible (BP IMT)	Completed
Obtain initial spill info: - Spill Location (Lat/Long) - Amount & Source - Type of oil, API, Pour Pt.	Planning Section	
Determine if spill in area where dispersants can be applied.	Planning Section	
Initiate trajectory modeling and development of expedited SIMA	Planning Section	
Call dispersant vessel/aircraft/stockpile operators to alert of spill and possible need for dispersants.	Planning Section	
Contact CNSOPB's CCO to request the use of dispersants. - Send request form in Attachment A as soon as possible.	IC/Planning Section	
Activate Dispersant Group (DG).	IC	
Determine: - Spill in area where dispersants can be used? Prepare map.	Dispersant Group	

Activity	Responsible (BP IMT)	Completed
- Is oil dispersible? Document. - What spray assets are needed? - Prepare dispersant application request form.		
Contact Halifax Stanfield International Airport manager and verify ability to support dispersant operations	Dispersant Group	
Contact spotter aircraft operator and verify ability to support dispersant operations.	Dispersant Group	
Inform BP IMT of assets needed and submit to BP IMT Dispersant Application Request Form.	Dispersant Group	
Assist Canadian officials (Science Table) with approval information, as needed.	Dispersant Group/ Environmental Unit	
Activate & instruct: - consultants - spray vessel/ aircraft - stockpile - spotter/reconnaissance/monitor aircraft - aerial observers/monitors. **Confirm/adjust dispersant assets:** -- Alert -- Standby -- Activate (load dispersants?) **Obtain info for Aerial/Vessel Dispersant Application Plan (ADAP).**	Dispersant Group	
Verify CNSOPB has approved dispersant application.	Dispersant Group	
Ask dispersant operators to confirm in writing equipment activated for approval and the cost.	Dispersant Group	
Approve in writing: - assets activated to dispersant; - asset providers.	IC	
Obtain information to prepare & submit draft ADAP (Aerial Dispersant Application Plan) to BP IC.	Dispersant Group and Planning Section	
Estimate amount of dispersant and verify sufficient spray aircraft activated.	Dispersant Group	
Prepare Monitoring Plan (if required by CNSOPB). (Refer to Monitoring Plan for details)	Dispersant Group	
Submit ADAP to CNSOPB.	IC	

Activity	Responsible (BP IMT)	Completed
Obtain written approval (ADAP) /conditions for dispersant use from CNSOPB.	IC	
Obtain update aircraft and vessels arrive/start spray.	Dispersant Group	
Check air space restrictions set around spill site (10nm).	Dispersant Group	
Send Canadian Official signed ADAP to: - BP IC - DG members - Dispersant asset operators - BP Legal, Planning, Ops, etc.	Dispersant Group	
Review assets activated, and reconfirm, if sufficient. - Consider activating other dispersant aircraft and spotters.	Dispersant Group	
DG consider activating Nalco to manufacture Corexit 9500A if necessary.	Dispersant Group	

3.4 DAILY AERIAL AND VESSEL DISPERSANT GROUP ACTIVITY CHART

The chart of activities for the Aerial and Vessel Dispersant Group is shown in **Table 10**. These activities are completed daily to ensure coordination of operations and to accurately record and document the dispersant application operations for historical and legal purposes.

Table 10 - Aerial and Vessel Dispersant Group Daily Activities (Combined Activities in Command Center and Staging Areas)

Time (indication only)	Activity
Morning	• Aerial Dispersant Group members arrive on site at the staging airport: - conduct maintenance and equipment checks - obtain offshore wave and weather conditions - contact staging bases & update operations. ⇒ verify any changes in flight plans, application dosages, monitoring operations, etc.
	• Dispersant Group Morning Briefing (All team members).
	• Confirm government approval to apply dispersants is still valid.
	• Commence recording operations and continually update Aerial Dispersant Application Plan for the actual times of departure, return and amounts of dispersant sprayed.
	• Attend Operations Section Briefing.
	• Review Operation Period Objectives.

Time (indication only)	Activity
Morning	• Attend Air Operations Group/Branch Meeting.
	• Coordinate with monitoring and Science Team for the type of monitoring to be completed.
	• Confirm current arrangements for dispersant stockpiles and • commence arrangement for stockpiles for future dates.
	• Report to government officials on observations of spill and effectiveness of the first application of the day. Show photographs and videos.
	• Commence preparation of spray pass charts as Satloc files received and Sky Connect files or equivalent are available online.
	• Commence storage of all sortie files, photos and information.
	• Attend Tactics Meeting, as requested.
	• Prepare or update Dispersant Group organization charts.
Afternoon	• Attend Planning Meeting, as requested
	• Prepare and distribute the Aerial Dispersant Operations Plan for the next day's dispersant operations and to discuss at the aerial dispersant operations telephone briefing.
	• Meet with monitoring coordinators to plan next day's monitoring.
	• Review ICS 209 for Dispersant resources ordered and in operation to ensure the number of assets, personnel and dispersant stockpiles are accurately recorded.
	• Hold Operations Telephone Briefing for Command and Staging base personnel to review current and next day's operations.
	• Commence preparation of Aerial Dispersant Operations Plan for the next day's operations.
	• Prepare dispersant stockpile report on stockpiles ordered, expected deliveries and quantities remaining at each staging site.
	• Review and update dispersant aircraft assets.
	• Confirm operational status of dispersant spray, spotter, observer, and surveillance aircraft and vessels.
Evening	• Attend Air Operations meeting.
	• Obtain monitoring reports for inclusion in daily summary and QA/QC review and submission to government for approval of results and observations.
	• Prepare and submit the Aerial Dispersant Application Plan for the next day's operations. (Must be shared with CNSOPB)
	• Contact staging bases for update on dispersant stockpiles onsite and an update on delivery schedules.
	• Review and update Unit Log.
	• Complete Aerial Dispersant Application Plan for the operational Day.
	• Prepare and submit the Dispersant Group Summary Report for the day.
	• Ensure all documentation properly recorded and filed.

3.5 HEALTH AND SAFETY FOR AERIAL AND VESSEL DISPERSANT OPERATIONS

The key health and safety operational procedures and personal protective equipment for the various dispersant activities are provided in **Attachment D**. The IMT Safety Officer is responsible for completing the Health and Safety Plan forms. The supervisors of the staging airports and vessel ports are responsible for the safety of operations at their locations. The aircraft's Pilot in Charge, and the vessel's captain are responsible for operations under their supervision.

3.6 WASTE MANAGEMENT

Dispersant application activities generate minimal waste. However empty IBC containers, contaminated PPE, sorbents, rags, cleaning agents, and oily water run offs from rehabilitation activities etc. will be stored, cleaned and or disposed of in accordance with the Waste Management Plan.

(See Waste Management Plan for details)

3.7 RESPONSE TERMINATION

Termination of response will be determined by the IMT in collaboration with government agencies and will consider many factors including the following:

- safety;
- effectiveness of dispersant on the oil i.e. weathering condition of the oil;
- proximity of oil to shoreline and or bathymetry restrictions;
- proximity to or impact on environmental resources;
- proximity of the oil to marine installations, vessels, traffic zones etc.;
- transboundary migration of the oil;
- deteriorating weather conditions (visibility, sea state, wind speed);
- changes in governmental authorizations.

4.0 FIELD ACTIVITIES

4.1 AERIAL DISPERSANT DOCUMENTATION AND STANDARD FORMS

A brief description of each of the dispersant forms used to document dispersant operations is provided in **Attachment E** and an example of an Aerial Dispersant Application Plan (ADAP) is provided in **Attachment F**. Daily documentation of all aspects of the aerial and vessel dispersant operations is essential for managing and directing operations, providing evidence, and for assessing potential impacts.

4.2 DISPERSANT AFTER ACTION REPORT

An aerial and vessel dispersant after action report summarizing the dispersant activities conducted, the accomplishments of the operations and the lessons learned will be prepared. The Aerial and Vessel Dispersant Group will prepare the After Action and submit the report to the Operations Section Chief

within 60 days of the termination of surface dispersant operations. The report outline is provided in **Attachment G**.

4.3 JOB AIDS

A list of relevant job aids is provided in **Attachment H**.

ATTACHMENTS

ATTACHMENT A: DISPERSANT USE REQUEST FORM

Form completed by: _____
Contact Information: _____
Date: _____
Time: _____

INCIDENT INFORMATION	
Incident name:	
Date and Local time at the beginning of the spill:	
Incident location: (provide map) Latitude: Longitude:	
Spill source:	
Spilled oil:	
Spilled quantity and/or release rate:	
OIL INFORMATION	**Completed**
Product name:	
Oil information: *(Provide Safety Data Sheet)*	
Oil weathering information: modelling results from ADIOS or OILMAP or OSCAR for evaporation, density, viscosity and emulsion formation.	
Estimated oil density at the time of applying dispersants: (g/ml) • using a surface water temperature of : °C • Reference: (ADIOS or OILMAP or OSCAR). ⇒ ***Estimated oil density should not exceed 1.03 g / ml as oil may not be on the water surface at the time of dispersant application.***	
Oil Pour Point: °C • Current water temperature: °C • Reference: (Safety Data Sheet, EC hydrocarbon catalogue, other) ⇒ ***If oil pour point is above the current water temperature, oil will be semi-solid or solid and will not be dispersible.***	

Oil Viscosity at the beginning of the spill : cSt • Reference: (Safety Data Sheet, EC hydrocarbon catalogue, other) **Estimated oil Viscosity at the time of applying dispersants: cSt** • Using a surface water temperature of : °C • Reference: (ADIOS, OILMAP, OSCAR) ⇒ ***Oil with a viscosity above 10,000 cSt is unlikely to be dispersible, oil with a viscosity between 5,000 and 10,000 cSt can potentially be dispersed, oil with a viscosity less than 5,000 cSt is readily dispersible.*** ⇒ ***This is dependent of dispersant type.***	
Is oil emulsified: If so, what proportion of the oil slick is emulsified? : % ⇒ ***Emulsified oil might not be dispersible.***	
DISPERSANT INFORMATION	**Completed**
Name of the dispersant:	
Dispersant application method:	
Is the dispersant on Environment Canada's Approved Treating Agents list?	
Dispersant information: *(provide Safety Data Sheet)*	
INFORMATION ON THE OIL SLICK TO BE TREATED AND APPLICATION AREA	
Estimated Date and Local time for dispersant application: (year/month/day) (24 hours)	
Estimated oil slick location at the time of applying dispersants: (Provide t*rajectory modelling map indicating area where dispersants will be applied)* Latitude : Longitude :	
Distance from coast at time of dispersant application: km	

Forecasted winds at the time of dispersant application **Local Time (24 hrs) Direction* Speed □ knots □ km/h** • .... • .... • .... *The wind direction indicates the origin of the wind.	
Forecasted sea state at the time of dispersant application: Beaufort	
Estimated oil slick area to be treated by: (km^2**)**	
Estimated volume of oil to be treated: (m^3**)**	
Estimated amount of dispersant to be applied: **(**m^3**)**	
Estimated oil/dispersant ratio : ...../..... ⇒ **Oil/dispersant ratio should be in the range of 20:1 to 25:1** ⇒ **Will depend on dispersant type**	
Water depth at the application area: m ⇒ **Water depth should be greater than 15 m.**	

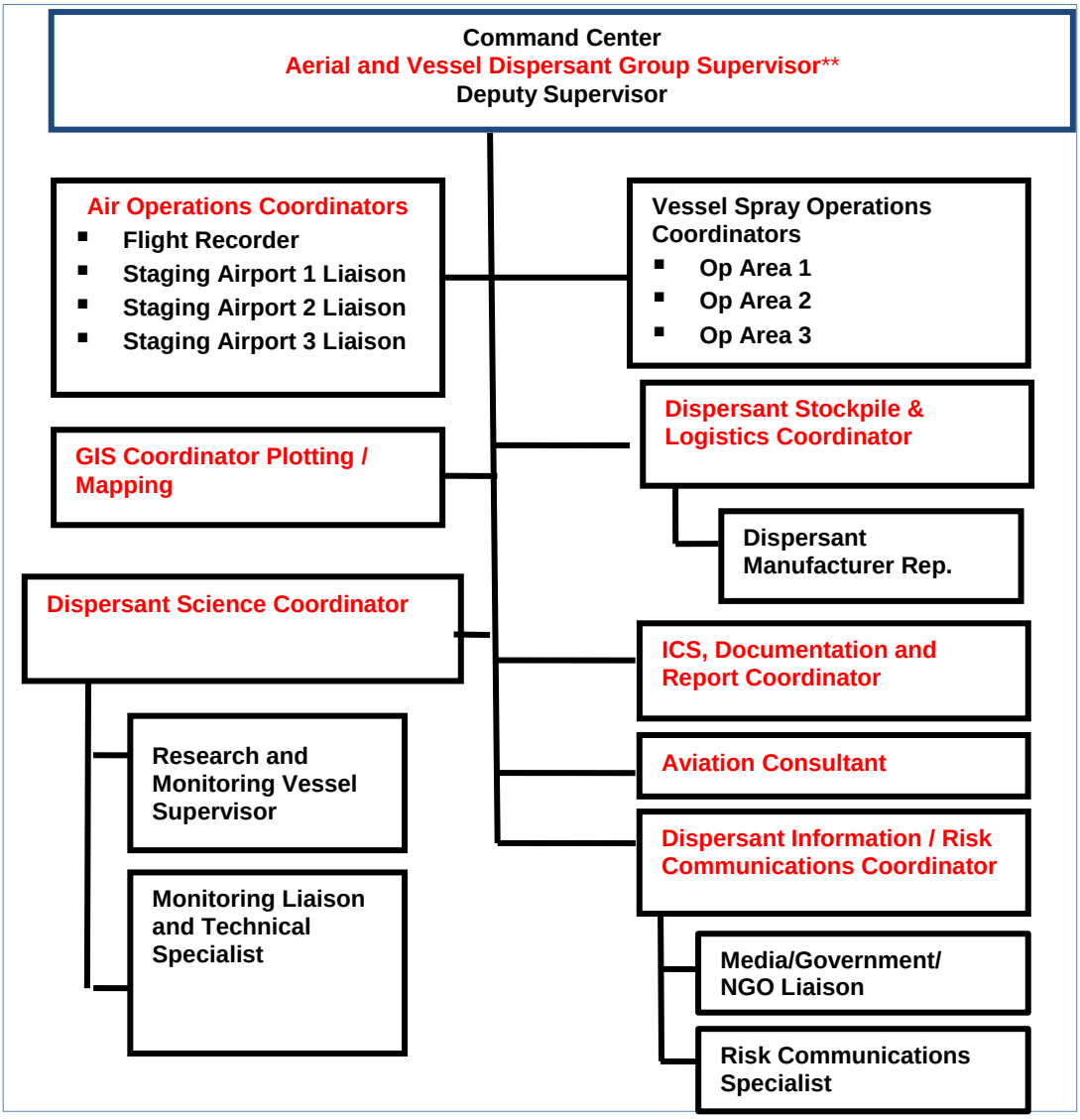
SIMA
Provide incident specific SIMA results showing potential impacts if using dispersants and potential impacts without dispersant use.

Documents to be provided with Dispersant Use Request Form	**Completed**
Map of incident location	
Oil Safety Data Sheet	
Oil Weathering Information	
Dispersant Safety Data Sheet	
Map of estimated oil slick location at the time of applying dispersants	
SIMA Matrix	
Dispersant Application Plan	

ATTACHMENT B: BP IMT DISPERSANT GROUP ROLES AND RESPONSIBILITIES

The following is a brief description of the responsibilities for each position in the Aerial and Vessel Group. organization (see **Figure 1** below). Additional duties and functions may be added to positions or if there are limited responders the duties and responsibilities may be combined.

Figure 1 - IMT Aerial and Vessel Dispersant Group Organization



** Red indicates a position that should be activated for all spills. Other positions should be activated based on the magnitude and complexity of the spill.

Aerial and Vessel Dispersant Group Supervisor

The Surface Dispersant Group Supervisor is responsible for the management of all aerial and vessel dispersant operations. Specific duties are:

- Coordinating and communicating with the BP Operations Section Chief, Incident
- Commander, and government representatives;
- Setting daily and long-term objectives;
- Ensuring the adequacy of spray and spotter aircraft and pilots, dispersant stockpiles, and management and support equipment and personnel;
- Preparing daily Dispersant Application and Operations Plans;
- Obtaining government approval to apply dispersants;
- Informing staging airports of when approval granted to apply dispersants and of any limitations on application operations;
- Responding to inquiries concerning all aspects of the dispersant operations;
- Ensuring all dispersant activities are documented and stored;
- Investigating reports of over spraying, accidents or inappropriate operations;
- Preparing the daily Aerial and Vessel Dispersant Group Summary Report;
- Preparing the Surface Dispersant After-Action report which will include lessons learned;
- Coordinating with the PS to prepare and update plans and situation reports.

Air Spray Operation Coordinators

The Air Operations Coordinators are responsible for managing and supporting the aerial operations at the staging airport assigned (see Figure 2). Specific duties include:

- Acting as the primary means of communication with the staging airport manager;
- Provide operational documents and coordinate operations with staging airport manager;
- Maintaining in the Command Center the updated spray and spotter flight schedule and providing an updated flight schedule for the Dispersant Group Summary Report;
- Supporting staging base with equipment, materials and personnel to ensure continuous operations and assisting the staging airport manager as requested.

Vessel Spray Operation Coordinators

The Vessel Spray Operations Coordinators are responsible for managing and supporting the vessel spray operations at the port(s) assigned (see Figure 3 below). Specific duties include:

- Acting as the primary means of communication with the staging port manager;
- Providing operational documents and coordinate operations with staging port manager;
- Maintaining in the Command Center the updated spray information for the vessels and providing an updated report on the amount and location of vessel spray operations that occurred during the day for the Dispersant Group Summary Report;
- Supporting the staging base with equipment, materials and personnel to ensure continuous operations and assisting the staging airport manager as requested.

GIS Plotting / Mapping Coordinator

Responsible for all graphic and data analysis and presentations. Specific duties include:

- Preparing daily maps of the exact location of each spray pass;
- Preparing and maintaining a data base of spray pass information to include;
  - Latitude and longitude of start and stop of each spray pass,
  - Type and amount of dispersant applied,
  - Aircraft tail number and pilots that made the spray pass,
  - Track of the aircraft from take-off to landing,
  - Sky Connect and Satloc files associated with the spray pass.
- Developing spray tracks and locations for investigation of over spraying reports;
- Preparing data, graphs, and charts supporting operations and as requested by the government or the company IC.

Dispersant Stockpile and Logistics Coordinator

The Dispersant Stockpile and Logistics Coordinator is responsible for the ordering, delivery and reporting of all dispersant stockpiles to ensure aircraft and vessels have sufficient dispersant for their daily operations. Specific duties include:

- Ordering all dispersant stockpiles from cooperatives or manufacturers;
- Arranging through the Logistics Section the transport of dispersant to timely arrive at staging bases to ensure daily application requirements are met;
- Preparing a daily report on the amounts of each type of dispersant at each staging base, the total onsite, and the amounts of stockpiles on order and their arrival date;
- Coordinating with the manufacturer's representative the ordering of dispersant to be made and the deliveries of dispersant from the factory;
- Coordinating the replacement of any off-spec dispersants;
- Arranging for the testing of dispersant stockpiles when the effectiveness of the dispersant is in question;
- Arranging for large storage tanks (stainless steel frac tanks);
- Assisting the staging base in the removal of empty storage tanks and trucks.

Dispersant Manufacturer Representative

- Arranges for the manufacturing and delivery of dispersant stockpiles from the factory to the staging sites designated;
- Coordinates with manufacturing representatives at the staging bases for the delivery and transfer of dispersant to storage containers.

ICS, Documentation and Report Coordinator

The Documentation and Report Coordinator is responsible for completing daily ICS forms and preparing and storing all documents and reports associated with the Dispersant Group:

- Reviews and revises daily all ICS forms and ensures corrections are made into the software systems used to manage the spill response;
- Attends daily ICS form meetings;
- Prepares daily reports, operational summaries, etc. and ensure all materials filed and archived;
- Maintains files of all equipment and personnel requests;
- Coordinates dispersant activities with Planning, Logistics, Environmental Unit, Monitoring, and other branches in the command center;
- Archives all Dispersant Group personnel files;
- Prepares special reports of dispersant data that are requested by the government or the company IC;
- Prepares the Dispersant Group Summary Report daily;
- Coordinates demobilization efforts.

Aviation Consultant

The Aviation Consultant is responsible for all aviation related operations, questions and investigations. Specific duties include:

- Preparing, reviewing, and revising dispersant air operation procedures assignment of operational areas for spraying, multi-aircraft operations, etc.;
- Preparing the Dispersant Operations Plan;
- Investigating any accidents or miss-haps involving aircraft;
- Coordinating dispersant operations with the Air Operations Branch and the aviation agency;
- Ensuring appropriate flight restrictions are published concerning dispersant operations;
- Coordinating aircraft issues with Air Spray Coordinators and staging bases;
- Making sure aircraft are maintained properly and kept in airworthy condition;
- Assuring pilots are properly trained and qualified;
- Assuring aircraft are operated under the appropriate regulations;
- Assuring the crews perform risk assessments during changing conditions;
- Making sure the aircraft are operated within the operating limitations set forth by the manufacturer;
- Making sure the quality and quantity of fuel meets safety standards;
- Encouraging the use of safety manuals and safety personnel;
- Developing and overseeing a flight following system;
- Making sure ramp and ground handling personnel are properly trained;
- Assuring crew (pilots, mechanics, ramp personnel) duty times and rest are maintained.

Dispersant Science Coordinator

The Dispersant Science Coordinator is responsible for determining the effectiveness and marine impacts of the dispersant operation. Specific duties include:

- Managing the science teams on research and monitoring vessels;
- Ensuring chain of custody and proper storage of all samples taken;
- Conducting sampling and analysis to evaluate the impact of the dispersant application on marine species in the top 1, 5 and 10 meters of the water column;
- Preparing analysis and reports of sampling conducted;
- Coordinating activities with the Environmental Unit, government agencies, and others involved in the environmental analysis;
- Coordinating and managing any special requests for sampling from the government or company IC;
- Establishing procedures for processing samples taken by responders or the public to determine the presence of dispersant.

Research and Monitoring Vessel Supervisor

The Research and Monitoring Vessel Supervisor is responsible for all sampling and analysis operations on the vessel. Specific duties include:

- Obtaining water samples from 1m, 10m and other depths and storing for future toxicity analysis;
- Operating fluorometer(s) to determine the effectiveness of the dispersant operations;
- Coordinating sampling and analysis operations with spray aircraft and arranging departure and rendezvous times and locations for monitoring.

Monitoring Liaison and Technical Specialist

The responsibilities of the Monitoring Liaison and Technical Specialist are to work closely with the government monitoring teams to obtain the best monitoring data possible. Specific duties include:

- Coordinating each monitoring operation (time and location of dispersant spray activities) with the spotter aircraft;
- Act as observer on visual monitoring operations to review dispersant operations;
- Reviewing monitoring data and photographs and assessing independently the effectiveness of the application;
- Preparing monitoring data for posting in response data bases and for publishing as part of the Dispersant Group Summary Report (See sample monitoring report format in Forms Section);
- Acting as technical expert on fluorometry operations and data analysis.

Dispersant Information and Risk Communication Coordinator

The Dispersant Information and Risk Communication Coordinator is responsible for disseminating information on dispersant to the media, government leaders, NGOs, and interest groups and for coordinating dispersant activities, meetings, etc. This position works closely with the Public Affairs Section and the Community Liaison Officer.

Risk Communications Specialist

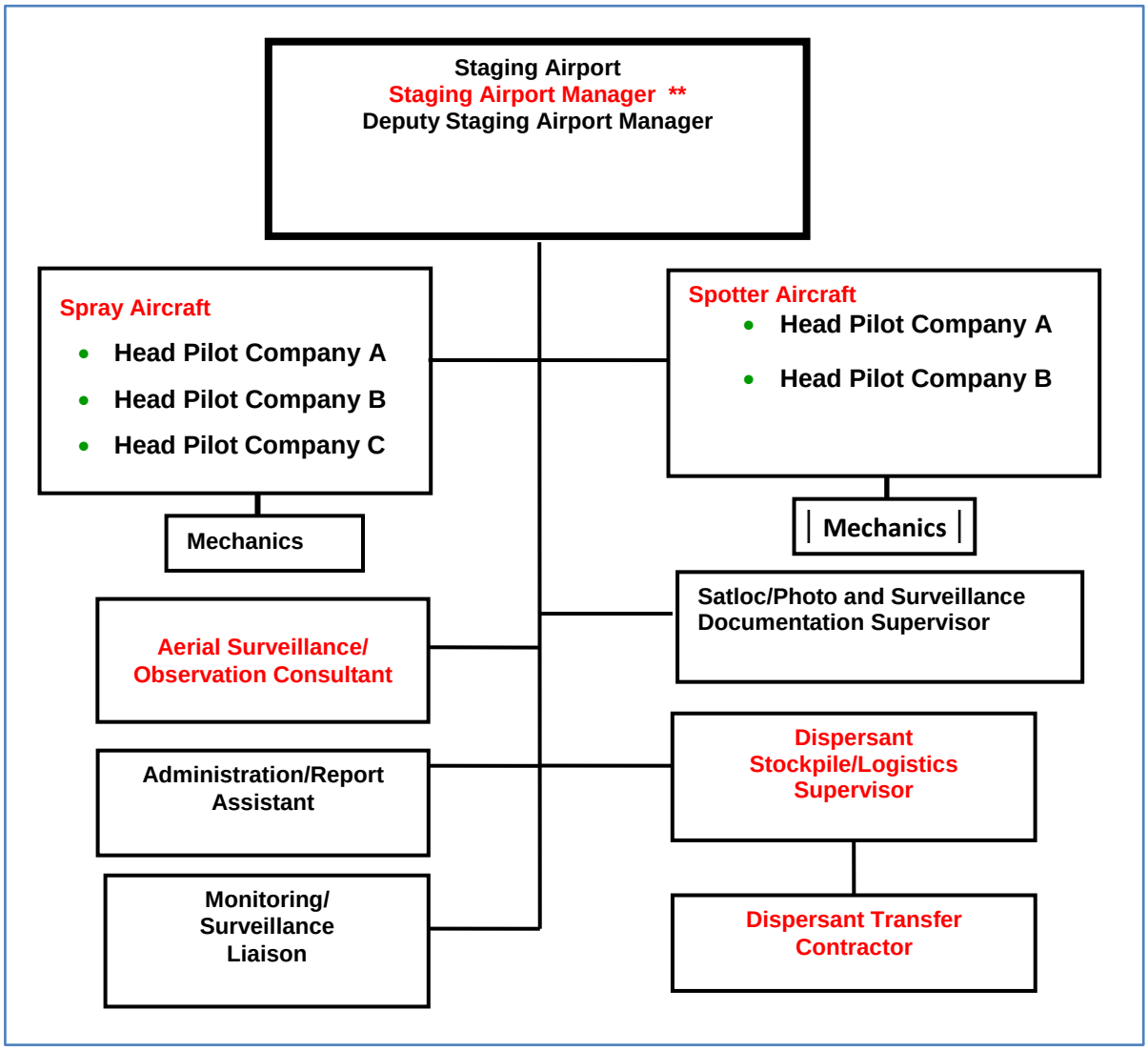
- Prepares and maintains short information handouts on dispersant topics such as:
  - Dispersant approval process,
  - Health and safety of dispersants,
  - Toxicity of dispersants and their components,
  - How dispersants work and the benefits of using dispersants,
  - How dispersants are operationally applied, etc.
- Arranges and participates in town hall meetings or presentations to the public about dispersants and dispersant operations;
- Coordinates and supports the Dispersant Information and Risk Communications Coordinator.

Media/Government/NGO Liaison

The Media/Government/NGO Liaison is responsible to pro-actively disseminate information on dispersants and dispersant operations to federal, state, and local government decision makers; affected associations such as fishermen, tourism and environmental NGOs; media and the general public. Specific duties include:

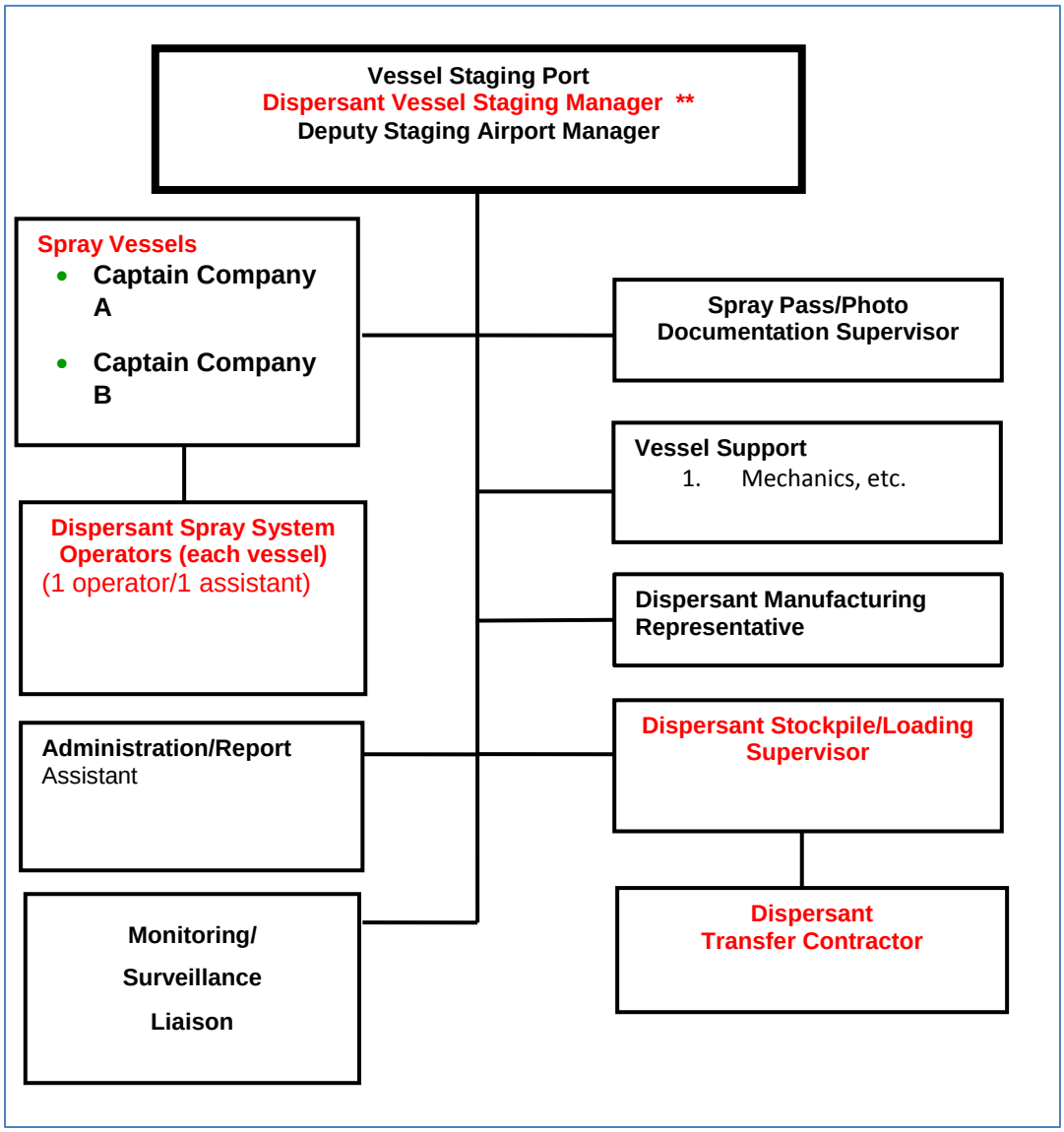
- Working closely with the Risk Communication Specialist to obtain and provide dispersant facts and information;
- Contacting and providing dispersant information to local and national news media and providing access to subject matter experts;
- Contacting and providing dispersant information to local, state, and federal officials as to the benefits of using dispersants, how they will be applied, etc.;
- Monitoring news channels and preparing information to assist reporters in developing their stories;
- Coordinating with hard copy reporters in obtaining the data and access to responders they need to develop their stories;
- Assisting the Public Affairs Officer in providing dispersant information for their news releases and for preparing company speakers to discuss the use of dispersants.

Figure 2 - Staging Airport Organizational Chart



**Red indicates a position that should be activated for all spill. Other positions should be activated based on the magnitude and complexity of the spill.

Figure 3 - Staging Port Organizational Chart



** Red indicates a position that should be activated for all spills. Other positions should be activated based on the magnitude and complexity of the spill.

ATTACHMENT C: SAMPLE B727 MOBILISATION AND LOGISTICS PLAN

Available from OSRL at https://www.oilspillresponse.com/globalassets/services/member-response-services/aviation-resources/727-mobilisation-and-logistics-plan.pdf

ATTACHMENT D: HEALTH AND SAFETY CONSIDERATIONS

A. Vessel Dispersant Application Health and Safety Procedures

- During vessel dispersant spray operations, all personnel should be in the vessel's cabin and not on deck.
- PPE includes:
  - Chemical resistant gloves for dispersant handling;
  - Inner vinyl or latex gloves;
  - Splash goggles;
  - Safety helmet or hard cap;
  - Polycoated Tyvek suit;
  - Non-skid safety shoes;
  - Air purifying respirator with organic vapor cartridges should also be available, and for fire monitor operations used;
  - Self-inflating personal flotation devices.
- Eye wash bottle should be available on board the vessel.

B. Spray and Spotter Aircraft Safety Procedures and Setbacks

To ensure that dispersant spray drift does not impact personnel on board vessels or offshore platforms or affect wildlife, the following procedures should be adopted:

- Prior to applying dispersants, the spotter aircraft should make a safety pass over the spill site to ensure the area is free of wildlife, vessels, platforms and obstructions:
  - Setbacks from vessels, platforms and wildlife should be a minimum of 1,000 ft. Greater setback distances may be instituted based on the specifics of the spill and at the direction of the IMT.
  - A second pass over the spill site should be made to take photographs of the area and to document it is clear for spraying prior to dispersant application.
- Contact vessels (including monitoring vessels) and platforms in the area and advise where and when dispersants will be applied.
- Send message to staging airport, "Area clear, preparing to spray," and announce commence spraying to vessels, platforms and aircraft in the vicinity.

C. Staging Airport Dispersant Transfer Operations

Personal protective equipment includes the following:

- Rubber steel toed/shank shoes or boots with textured soles;
- Rubber gloves (as needed); option: leather gloves (if no contact with dispersant);
- Full face shields are recommended and may be worn over safety goggles.
- Hard hats are required by safety officer. These may not be needed near aircraft;
- Tyvek suits may be used; however, in hot climates these may not be used due to heat exhaustion and dehydration concerns;
- Cloth coveralls or work clothes may be worn by personnel not exposed to liquid splashing;
- Eye wash and portable shower should be provided near the dispersant transfer area;

- Hearing protection should be worn in noisy areas;
- For loading dispersant onto B-727, all engines on the side where the dispersant loading will occur shall be shut down. Loading shall be done on the side opposite the operating engines, and an aircrew member shall be present to supervise the loading. The aircraft may be approached only when the aircrew member indicates it is safe to proceed towards the aircraft.

D. MSDS for Corexit EC9500A

MSDS for Corexit EC9500A can be obtained at the following web sites:

EC9500A: http://www.nalcoenvironmentalsolutionsllc.com/wp-content/uploads/COREXIT-EC9500A-GHS-SDS-USA.pdf

ATTACHMENT E: AERIAL AND VESSEL DISPERSANT OPERATIONS AND MANAGEMENT FORMS

Daily documentation of all aspects of the surface dispersant operations is essential for managing and directing operations, providing evidence or for assessing potential impacts.

Records should also be kept of all major decisions, meetings, directives, instructions, dispersant stockpiles and equipment, personnel, etc.

For recording this information, the following are examples of the forms have been developed and field tested and are in current use.

Template for these forms are provided below. These can be used or not used as determined by responders during a specific spill response.

A. ICS Forms

The following is the list of standard ICS forms that are prepared for each operational period. These forms are not provided here since they are reproduced in many other publications available to the IMT.

i. ICS 202

ii. ICS 203

iii. ICS 204

iv. ICS 207

v. ICS 209

vi. ICS 214

vii. ICS 215

viii. ICS 220

B. Mission Tasking Form

The Mission Tasking Form is designed to give each aircraft a check list of the operations they are to perform for each sortie. This form is completed by the staging airport manager and the pilots.

MISSION TASKING FORM

(Aircraft Tale #) MISSION TASKING

The following is a list of items that the aircrew can be requested to complete during a flight.

Instructions: Before commencing each sortie the staging airport supervisor should fill out the form by checking the first box of each item to request the mission objective for that particular flight ☐ ☐.

For items that will not be done a line should be drawn through the boxes to clearly indicate they should not be completed ☐ ☐.

Flight aircrew will check the second box as each item is completed ☐ ☐.

DATE: _____ SORTIE # _____

REQUESTED BY: _____

PHONE: _____

TASKING GIVEN TO: _____

CALL SIGN: _____

BRIEFING BEFORE ENGINE START

- Aircraft in Passenger Configuration (Circle One): YES or NO
- Dispersant to be applied _____
- Dosage _____ Gallons per Acre (GPA)
- ETA at Spill Site: _____ local time
- List of conditions set by CN OSC for Dispersant Deployment: _____ _____
- CN OSC Approval to Spray Received (Circle One) YES or NO
- The pilots will calculate the fuel and dispersant load and the information will be provided to the Staging Airport Supervisor.
- Fuel on Board (gallons) _____
- Fuel on Board (hours) _____
- Dispersant Payload (gallons) _____
- W&B Checked (initials) _____

☐ ☐ **DISPERSANT SPRAY MISSION**

☐ ☐ Send message, "Area Clear, Preparing to Spray."
☐ ☐ Contact local vessels and inform them where dispersant will be applied
☐ ☐ When area is clean inform local vessels and aircraft that dispersant application is starting
☐ ☐ Verify conditions meet FOSC's approval conditions. (If conditions not met, abort mission and contact _____ for instructions.
☐ ☐ Record – spray Altitude _____ Ft
☐ ☐ Record – Indicated Air speed _____ Kts
☐ ☐ Record – Ground Speed _____ Kts
☐ ☐ Record – True Wind _____ Kts
☐ ☐ Send Msg, "En route (time) to staging airport:

☐ ☐ **OBSERVER/RECONNAISANCE MISSION – WHEN DISPERSANTS ARE APPLIED**

☐ ☐ Send Message, "Observing/reconnaissance"
☐ ☐ Loiter (<30 min) to note dispersant/slick interaction
☐ ☐ Take cockpit photos of dispersant/slick interaction
☐ ☐ Tank hand held video of the treated area
☐ ☐ Take belly cam video of the treated area
☐ ☐ Call _____ to describe dispersant/slick interaction
☐ ☐ Send message, "En route (time) to staging airport

BEFORE TAKEOFF

☐ ☐ Complete SatLoc or other recording procedures

AFTER TAKEOFF

☐ ☐ Send message, "En route, (time) to Spill Site"
☐ ☐ Verify SatLoc or other equipment is setup properly.
☐ ☐ Marine Radio – turn on and do a radio check
☐☐☐☐☐☐☐☐☐☐☐☐Call Staging Supervisor via Sat Phone every 30 min.☐

☐☐☐☐ **OBSERVER/RECON MISSION – OVER SPILL**

☐ ☐ Send message, "Observing / Reconnaissance"
☐ ☐ Record – Wind: _____ @ _____ Knots
☐ ☐ Record – Ceiling: _____ Feet
☐ ☐ Record – Visibility: _____ nm
☐ ☐ Record – Wave Height _____ Feet
☐ ☐ Record – Wave Direction: _____
☐ ☐ Create Polygon of slick with SatLoc
☐ ☐ Outline slick on marine chart (use Garmin cursor for Lat/Long coordinates, note oil thickness (colour) current and wind direction.
☐ ☐ Safety over flight (obstructions and animals)
☐ ☐ Take belly cam video through centre of slick
☐ ☐ Determine coordinates for centre of slick
☐ ☐ Take cockpit pictures through centre of slick
☐ ☐ Take perimeter video of slick
☐ ☐ Call for updated info or new instructions
☐ ☐ Send message, "En route, (time) to staging airport."

☐ ☐ **SPOTTER/AIR CONTROLLER MISSION**

☐ ☐ Send message, "Spotting Operations in Progress"
☐ ☐ Update, as necessary, the Aircrew Briefing Sheet
☐ ☐ Determine where to apply dispersants
☐ ☐ Determine spray pattern (race track or back/forth
☐ ☐ Determine "A" Start Point
☐ ☐ Determine and record true wind, direction & speed☐
☐ ☐ Determine the initial spray heading from the Start Point
☐ ☐ Monitor altimeter setting and update other aircraft, if there is a significant change
☐ ☐ Determine holding altitudes over the Entry Point
☐ ☐ Inform spray aircraft what the Lat/Long is for the "A" Start Point and the heading
☐ ☐ Clean aircraft into the Operational Area and direct them as they spray the oil slick
☐ ☐ Send message, "En route (time) to staging airport"

☐ ☐ Refuel and reload dispersant based on next mission Objectives
☐ ☐ Give SatLoc Job and Log files to the _____
☐ ☐ Give DVD video to the _____
☐ ☐ Give digital photos to the _____
☐ ☐ Give spray aircraft Job file and polygon showing oil spill Location and give them the Job file name and number
☐ ☐ Obtain a new Mission Tasking form and review with _____
☐ ☐ Provide aircraft flight hours and crew utilization time to _____
☐ ☐

C. Air Crew Briefing Sheet

The Air Crew Briefing Sheet is designed for the pilots to record key information that they will use for the flights during the day. This form is designed to be used on the pilot's knee pad so he can easily refer to it. The information provided are call signs, communication frequencies, slick locations, emergency codes and air ports, etc.

AIRCREW BRIEFING SHEET											
AIRPORT INFORMATION			**SPILL SITE COMMS**			**Gen'l Location (circle one)**			**Dispersant payload (gal):**		
Airport Name:			**Primary Air-Air:**			**NW N NE E Ctr W SW S SE**			**Dosage:**	**# Passes:**	
Airport ID:			**Secondary Air-Air:**			**Evaluation of Dispersant Application:**					
Alt. Airport ID:			**General Advisory:**								
AIRPORT COMMS			**Helicopter Air-Air:**								
ATIS:						**SECOND SPRAY OPERATION INFORMATION**					
Airport Ground:			**MISCELLANEOUS COMMS**			**Start/"A" Pt (Lat/Long)**			**Ending Pt (Lat/Long)**		**Heading**
Airport Tower:			**Emergency:**								
ENROUTE COMMS											
Approach/Departure:						**Spray Aircraft #:**			**Spray On time:**		**Photos?**
Centre:			**BOATS**			**Zone(s):**			**Spray Off time:**		**Y / N**
COMPANY COMMS			**Air to ship Channel ___ then**			**Gen'l Location (circle one)**			**Dispersant Payload (gal):**		
_____Base:			**Switch to agreed channel**			**NW N NE E Ctr W SW S SE**			**Dosage:**	**# of Passes:**	
						Evaluation of Dispersant Application:					
AIRCRAFT INFORMATION											
Purpose	**Tail #**	**Entry ETA:**	**Purpose**	**Tail #**	**Entry ETA**						
Spotter			**Spray**			**Notes:**					**TERMINOLOGY**
Spotter			**Spray**								**Turn right/left**
Spotter			**Spray**								**Stop turn**
Spotter			**Spray**			**SatLoc Job File #:**		**Lost Comms Procedure**			**Easy right/left**
SPILL LOCATION		**ENTRY/HOLD POINT**		**EXIT POINT**							**Time out**
						AIRCRAFT ALTITUDE ASSIGNMENTS					**Proceed Inbound**
SPILL SITE WEATEHR INFORMATION							**Aircraft Tail # or Call Sign**				**10 seconds to go**
Sunrise:			**Sunset:**				**#:**	**#:**	**#:**	**#:**	**Spray on/off**
Visibility (nm):			**Altimeter:**			**Altitude**					**Start climb**
Ceiling:			**Wave height (ft):**			**Altitude**					**Visual Oil**
Winds:			**Wave Direction:**			**Altitude**					**Blind**

D. Aerial Dispersant Group Morning Briefing Minutes

At the start of each day a meeting is held in the command center to review the issues and significant activities that are to be worked. The minutes of this meeting is recorded and forms the basis for the activity and issue section of the Aerial Dispersant Group Summary Report for the day.

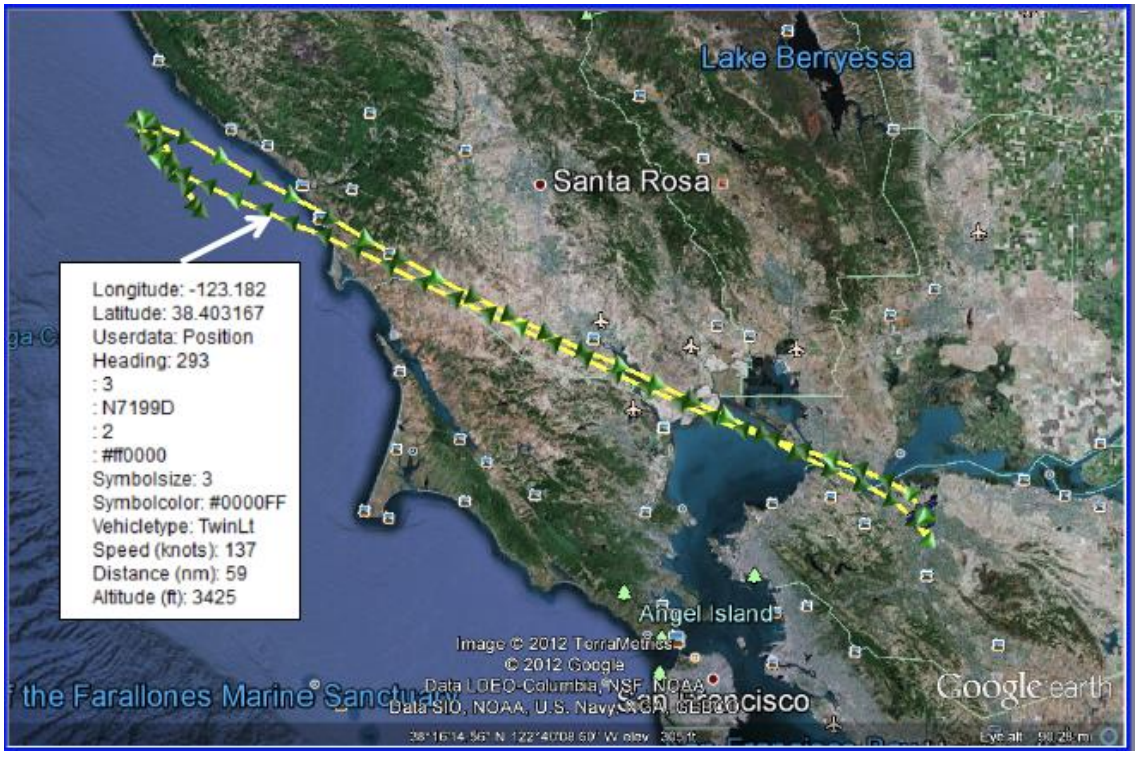
Aerial Dispersant Group Morning Minutes

- Safety Issues
- Weather
- Flight operations changes
- Monitoring Operations for the day
- Work focus and priorities to do today
- Other issues/activities of the day

E. Sky Connect Files

Sky Connect is a device installed on dispersant application aircraft that provides a web base view of the aircraft location and provides satellite phone and text communications. Additionally, Sky Connect records the flight of the aircraft that can be replayed on Google Earth. There are other systems that provide a similar service as Sky Connect and may be used. These systems should provide similar forms or printout.

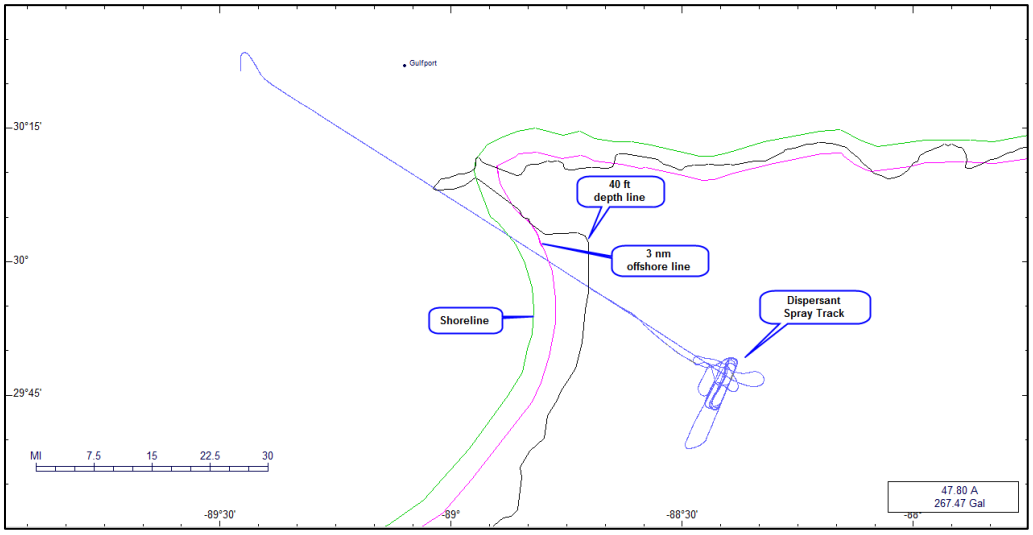
Sky Connect Flight Path File (SAMPLE)



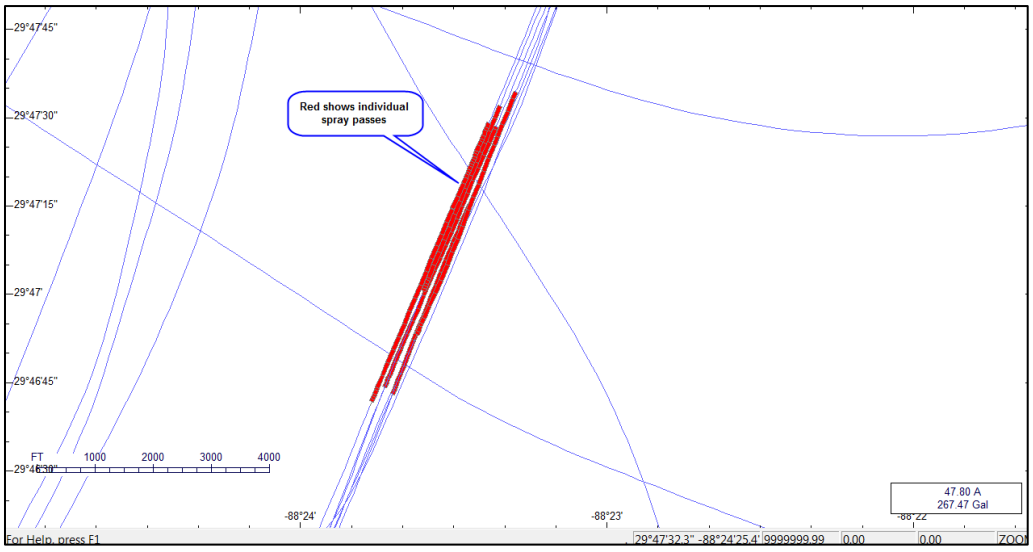
F. Satlock Files

Satloc is a flight and spray recording device that is installed in an aircraft or on a vessel and records a variety of data every second of the flight. Satloc automatically records the data, time, latitude, longitude, application speed and heading for each spray pass. This data can then be downloaded and sent to the command center for review and reporting. Satloc can also provide a report of the flight and spray passes reporting the area sprayed, dosages applied for each pass, etc. There are other flight recording systems in use. They should provide similar printouts and reports. GPS units with operators to record the start and stop of each spray pass may also be used to record spray data. Aircraft used by BP for aerial dispersant application are all equipped with Satlock.

Sortie Spray Pass Document (SAMPLE)



Spray Track File (SAMPLE)



Satloc Report (SAMPLE)

SPRAY REPORT Day Month Year
SORTIE 4
Company and Aircraft Tail #

LOG FILE SUMMARY

Date: Dy/Mo/Yr Time: 11:44:20.39
Pilot "CA"; Aircraft "tail #"; Job "20"
Log interval = 1.0 seconds; Min log speed = 44.7 MPH
Swath width = 100.0 feet; SV Mask = 5
GMT offset = 5 hours

FLOW CONTROL SETUP RECORD

Date: Dy/Mo/Yr Time: 11:44:20.39
Total Volume = xxx.00 Gallons
Application Rate = 5.0000 Gallons/Acre
Valve_cal = 13
Meter_cal = 16.40

SPRAY ACTIVITY

Pass #	Start Time	End Time	Spray Dist Ft	Acres	Ave Gal /Min	Gal /Sw	Gal /Ac	Ave Spd MPH	Ave Hdg Deg
1	12:34:08	12:34:15	1578.9	2.72	122.41	13.77	5.07	159.31	230
2	12:37:53	12:37:58	1157.2	1.99	123.97	10.04	5.04	162.32	228
3	12:41:26	12:41:32	1442.0	2.48	123.49	12.72	5.12	157.93	229
4	12:45:36	12:46:11	8115.3	13.97	122.54	71.03	5.08	159.11	236
5	12:50:12	12:50:33	4870.6	8.39	122.94	43.11	5.14	157.79	232
6	12:50:46	12:51:02	3809.9	6.56	122.57	33.12	5.05	161.02	241
7	12:54:04	12:54:46	9700.4	16.70	116.25	81.03	4.85	158.19	237

LOG SUMMARY

Log Start Time: Dy/Mo/Yr 11:44:20.39
Log End Time: Dy/Mo/Yr 13:08:30.44

Total Distance traveled:	237.86 mi
Distance sprayed:	6.31 mi
Area sprayed:	57.32 acres
Amount sprayed:	xxx.00 gallons
Average Application Rate:	4.97 gallons/acre
Average Speed while spraying:	158.78 MPH
Average Spray Rate:	119.58 gallons/minute

G. Air Surveillance Oil Slick Observation Report

Each aircraft crew should record information about the oil slick they are spraying. The location and shape of the oil slick should be recorded on charts and a description of the color of the slick, the size and shape, etc. should be made. Currently there is no standard report form in use. What is shown below are several types of reports that have been used. ASTM Standard F1779, Standards for Reporting Visual Observations on Water.

Oil Spill Observation Checklist

General Information

_____ Information filled out by (name/phone)

_____ Observers Names

_____ Observer's Affiliation

_____ Location of Source (if known)

_____ Percentage coverage

_____ Stage of tide (flood, ebb, slack)

_____ On scene weather (wind, sea state, visibility)

_____ Platform (fixed wing, helo, boat)

_____ Flight path/track line (from GPS)

_____ Altitude observations made from

_____ Areas no observed (fog, restricted air space)

Oil Observations

_____ Slick location(s)

_____ Slick dimensions (nm)

_____ Orientation of Slick

_____ Distribution of Oil (tar balls (tb), convergence line (cl), no structure (ns), Windrows (rw), streamers (st), patches (pat)

_____ Color and appearance (silver/gray (S), rainbow (R), metallic (M), Transitional (T), Dark black/brown (D), mousse

_____ Is oil recoverable? Black and transitional oil, mousse, heavy metallic slick

H. Photographs and video from sorties

Photographs and video from sorties

Visually recording the oil slicks that are being sprayed and recording the results of the spraying are essential for the IMT and government representatives to understand what is being seen and accomplished in the field.

All the visual data should be annotated with data and time stamps and latitude and longitude and those taking the data should provide comments on what is being recorded.

I. Aerial Dispersant Operations Plan

The Aerial Dispersant Operations Plan provides the staging airports and the pilots the operational information needed for dispersant application. This information includes assignment of operational areas to types of aircraft, safety setbacks from vessels, platforms and wildlife, application dosages, monitoring operational support, and communications changes, etc.

SAMPLE Aerial Dispersant Operations Plan

AERIAL DISPERSANT OPERATIONS PLAN

Mission targeting start of the day : _____

The following zones are assigned for early morning surveillance and initial spray targets. Expect early authorization for _____ gallons of dispersant. xxxx gallons for Stennis Base and xxxx gallons for Houma Base. (This is not a given authorization).

Communicate dispersible oil as soon as possible in assigned zones.
Spotter, provide a photo if possible with your reports.
Stennis: Primary zones AN, AC. Secondary zones AD, AO, AY, R, S (**Red** indicators on map)
Houma ASI: Primary zones AB & Z Secondary zones AK, AW, AV (**Blue** indicators on map)
Houma AT-802: Primary zones AB and Z Secondary zones Y, AL, AA, Q (Limited to within 40 nm from the shorelines. **Green** indicators on map)

Maintain **3 nm** boundary separation, if unable to coordinate air-to-air with other spotter or OMAHA 99.

Notes: Changes to previous orders are underlined.

1. Required Equipment: Functioning spray tracking units (GPS, SatLoc), if not equipped, do not fly.
2. As of _____ OSC approval is required each day for application of Corexit EC9500A dispersant in pre-approved areas.
3. Restrictions to aerial dispersant spraying:
   a. No aerial dispersant spraying within the greater of **3 nm** offshore or depths less than **10 meters**
   b. No dispersant spraying within **5 nm** of the spill source at surface: 28-45-12 N -99-18-53 W as defined in the FAA NOTAM **FOR DOCUMENTATION PRUPOSES (FUTURE REVIEW) WE WILL LIST THE FAA NOTAM 28-45-12 N -88-18-53 W AS THE OFFICIAL LOCATION**.
   c. No aerial dispersant spraying within **2 nm** of vessels, platforms, and **3 nm** from marine mammals.
   d. SMART and Scientific Support Missions may spray within **1 nm** of SMART/SSM vessel; positive ID required.
   e. Target black and brown oil. This is the freshest/most dispersible oil. /dosage is 5 gallons per acre. Quality no Quantity. Do not target Red/Reddish emulsified oil.
   f. Spotter aircraft remain on site to visually assess effects on dispersed area and document with photographs. Complete spotter debrief form and turn in to base operations daily.
   g. Report takeoff and landing times to assigned coordinators as they occur.
4. **Aircraft Communications:**
   - Primary air-to-air communication frequency in TFR West of 89° W is 135.65 and 132.6 in the source area. Secondary is 123.45 all zones
   - Contact P3 aircraft "Omaha 99" for flight advisories

AERIAL DISPERSANT OPERATIONS PLAN

- Discreet IFF codes are permanently assigned to each aircraft must be used to enter TFR. This removes need to file DVFR flight plans.
  It is absolutely essential that each flight each day calls tyndall to advise them prior to takeoff (850-282-0928)
- Advise SMART 1 prior to spray aircraft departure.
- Primary surface to air frequency is 122.9 Secondary is 123.45

ANCILLARY OPERATIONS:

1. SMART Team: will be working on defined and approved sites. Details to be developed with spotter findings.
2. In Situ Burning: the burn box is depicted on the operational chart. However, **note the burn box location is subject to change**. We will coordinate with the burn group in the morning and advise if any location adjustment has been made.
3. Skimmers: Normal operations are to be conducted with 2 nm separation for spray application.

TEMPLATE Aerial Dispersant Operations Plan

AERIAL DISPERSANT OPERATIONS PLAN

Mission targeting start of the day : _____

The following zones are assigned for early morning surveillance and initial spray targets. Expect early authorization for _____ liters of dispersant. xxxx liters for Area 1 and xxxx liters for Area 2. (This is not a given authorization).

Communicate dispersible oil as soon as possible in assigned zones.
Spotter, provide a photo if possible with your reports.

Area 1:

Area 2

Maintain **x nm** boundary separation, if unable to coordinate air-to-air with other spotter.

Notes: Changes to previous orders are underlined.

5. Required Equipment: Functioning spray tracking units (GPS, SatLoc), if not equipped, do not fly.
6. As of _____ OSC approval is required each day for application of Corexit EC9500A dispersant in pre-approved areas.
7. Restrictions to aerial dispersant spraying:
   h. No aerial dispersant spraying within the greater of **x nm** offshore or depths less than **x meters**
   i. No dispersant spraying within **x nm** of the spill source at surface:
   j. No aerial dispersant spraying within **x nm** of vessels, platforms, and **x nm** from marine mammals.
   k. SMART and Scientific Support Missions may spray within **x nm** of SMART/SSM vessel; positive ID required.
   l. Target black and brown oil. This is the freshest/most dispersible oil. /dosage is 5 gallons per acre. Quality no Quantity. Do not target Red/Reddish emulsified oil.
   m. Spotter aircraft remain on site to visually assess effects on dispersed area and document with photographs. Complete spotter debrief form and turn in to base operations on a daily basis.
   n. Report takeoff and landing times to assigned coordinators as they occur.

8. **Aircraft Communications:**
   - Primary air-to-air communication frequency in x is x. Secondary is x all zones
   - Contact x for flight advisories
   - Advise SMART 1 prior to spray aircraft departure.
   - Primary surface to air frequency is x Secondary is x

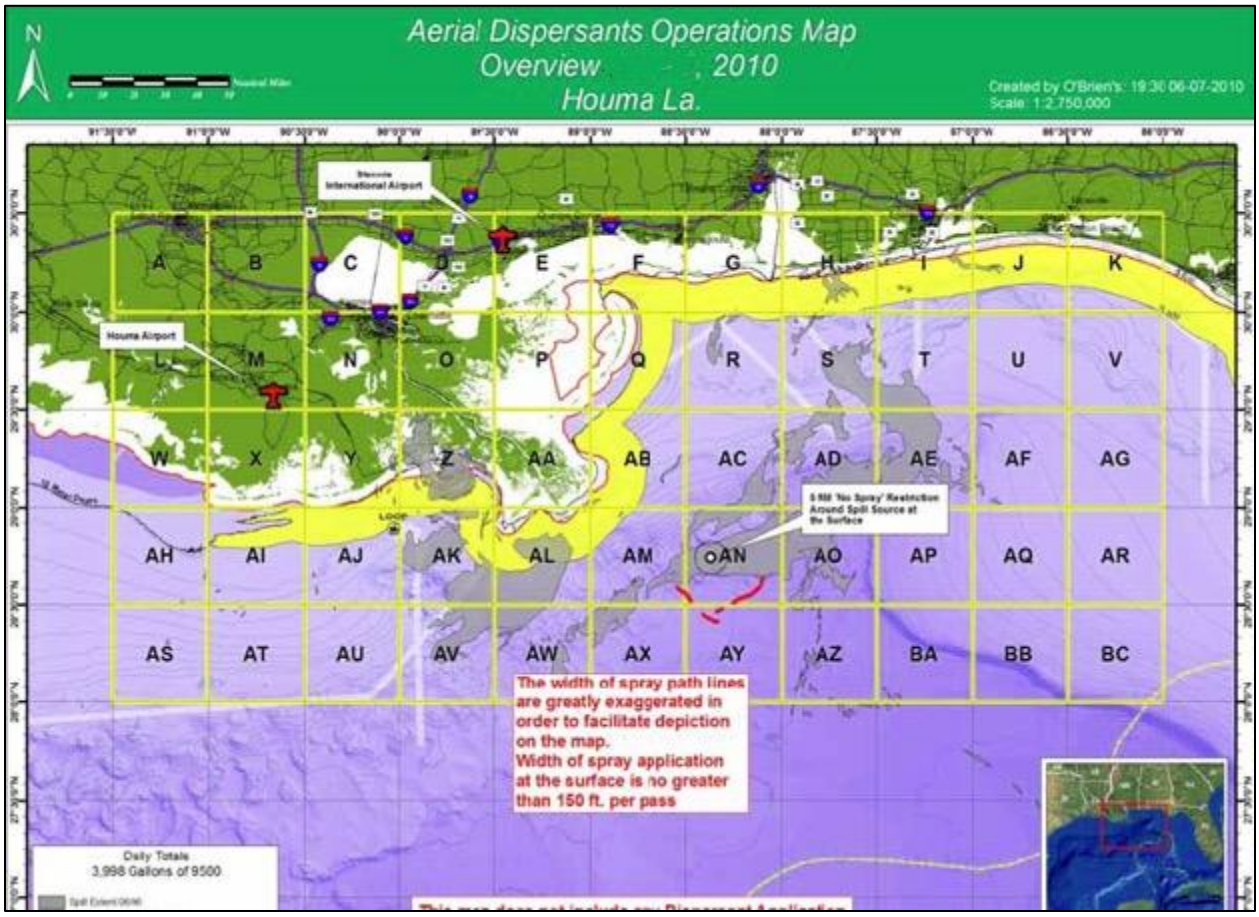
ANCILLARY OPERATIONS:

4. SMART Team: will be working on defined and approved sites. Details to be developed with spotter findings.
5. In Situ Burning:
6. Skimmers: Normal operations are to be conducted with x nm separation for spray application.

J. Spray Pass Maps

These maps show the location of where each spray pass was made during the operational day. Supporting the maps is a data base of spray passes which records the aircraft, pilots, date, time and latitude and longitude of each pass, the amount and type of dispersant applied, the swath width of the spray pass and the altitude and application speed.

Spray Pass Map (SAMPLE)



K. Monitoring QA/QC Form and Monitoring Results, Dispersant Application Observation Reporting Form, Photograph Log, and Unit Log (ICS 214-CG)

Monitoring QA/QC form is used to document the review of monitoring observations, photographs and fluorometry data by technical experts and the final confirmation of the results as to whether the dispersant operations continues to be effective by the government officials.

Name of Spill Incident and Command Center: _____

Visual data consists of observations summarized in an Activity Log (Unit Log ICS 214-CG) and pre- and post-application photographs and associated photo log of dispersant spray operations. This form documents the results of a preliminary quality assessment review of these documents.

Monitoring Air Team # _____ Date: _____

Operational Period _____ to _____

Data Review (Check the documents that were reviewed)

____ Unit Log – ICS 214-CG

____ Photographs (How many reviewed? _____)

____ Photo Log

____ Dispersant Observation Reporting Form 30

Assessment (Check appropriate box(s))

____ Concur with monitor findings (reasonableness of findings)

____ Issues of note from data review. Briefly describe.

_____

____ Dispersant is effective based on review of Activity Log, photographs, and photo log.

____ Results inconclusive with respect to dispersant effectiveness

____ Other. Briefly describe _____

_____

_____

Reviewed by Dispersant Assessment Group Member (Print name, sign, and date)

Name of Spill Incident and Command Center: _____

Visual data consists of observations summarized in an Activity Log (Unit Log ICS 214-CG) and pre- and post-application photographs and associated photo log of dispersant spray operations. This form documents the results of a preliminary quality assessment review of these documents.

Monitoring Air Team # _____ Date: _____

Operational Period _____ to _____

Data Review (Check the documents that were reviewed)

____ Unit Log – ICS 214-CG

____ Photographs (How many reviewed? _____)

____ Photo Log

____ Dispersant Observation Reporting Form 30

Assessment (Check appropriate box(s))

____ Concur with monitor findings (reasonableness of findings)

____ Issues of note from data review. Briefly describe.

_____

____ Dispersant is effective based on review of Activity Log, photographs, and photo log.

____ Results inconclusive with respect to dispersant effectiveness

____ Other. Briefly describe _____

_____

_____

Reviewed by Dispersant Assessment Group Member (Print name, sign, and date)

PHOTOGRAPH LOG Case: _____

Photo #: 1	**DATE/TIME:**	**TAKEN BY:**	**ALT**
POSITION:		**PHOTO DOCUMENTATION:**	
COMMENTS:			

Photo # 2, 3, …. Same as above for Photo #1

1. Incident Name	**2. Operational Period (Date/Time)**	**UNIT LOG ICS 214-CG**
3. Unit Name/Designators SMART Group	**4. Unit Leader (Name and ICS Position)**	

5. Personnel Assigned		
NAME	ICS POSITION	HOME BASE
	Monitoring Aerial Observer	

6. Activity Log (Continue on Reverse)	
TIME	MAJOR EVENTS
0829	Depart Airport en route to monitoring Operation occurring at Lat: _____ Long: _____
0930	Arrive on scene. Current weather conditions: sea state ___ ft, cloud coverage ___% with _____. M/V Peace in addition to 01 spotter aircraft (tail #) and 01 sprayer aircraft (tail #) on scene. Targeted area is two parallel streamers of reddish/brown oil approximately __ mi x __ ft and approximately ___ ft apart. Some emulsified patches exist on the southern end of the steamers.
0940	Vessel spotted in the vicinity of the targeted spray zone (approximately 2 miles away). En route to retrieve vessel information. Vessel identified as M/V ____. Attempted to hail vessel to advise of proximity of spray operations. Vessel did not respond. Location: _____ N _____ W and is transiting at approximately __ knots in a southern direction.
1015	Spray operations commenced on the most western of the two streamers by M/V PEACE.
1018	Station time expired. En route to _____ to refuel.
1055	Arrive _____.
1141	Depart _____to return to _____ N _____ W.
1219	Arrive on scene _____ N _____ W, approximately 4 miles north of original spray location due to streamer movement. Vessels and aircraft have departed. Cloud coverage now at ____%, visibility reduced. Two parallel streamers still present. The western most streamer, which was treated with dispersant, appears to have broken up slightly and no longer resembles a solid streamer. Clean water is present between fringes of reddish/brown oil.
1232	En route to _____.
1330	Arrive _____.

7. Prepared by:	**Date/Time:**

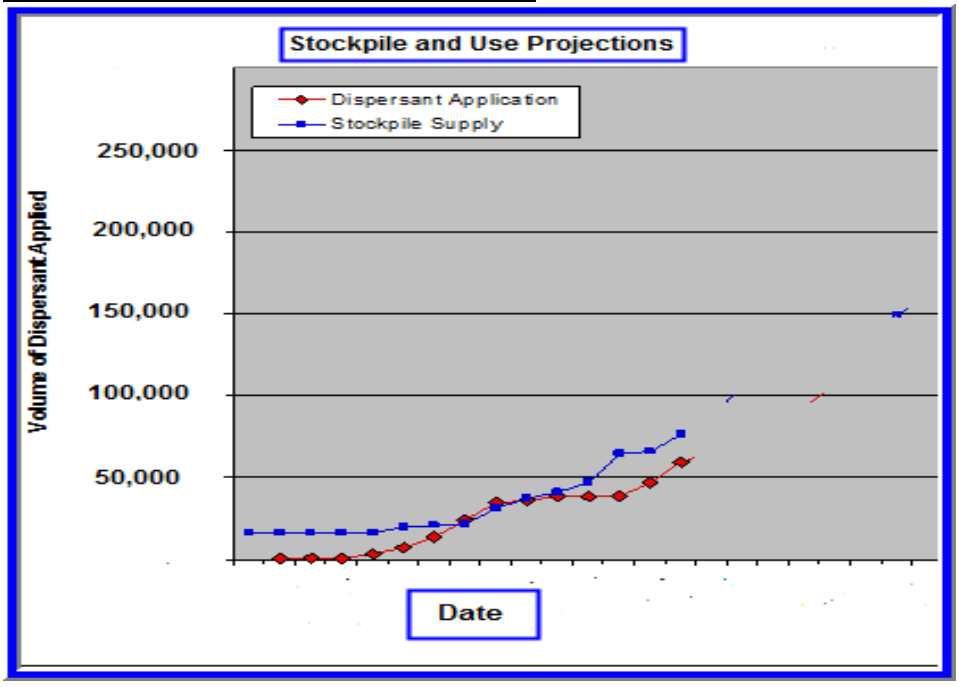
Aerial Dispersants Group - Summary Report
Date: _____

This report presents a snapshot of the aerial dispersant applications conducted on this date and summarizes the associated support activities. Aerial application of dispersants is being conducted under the direction of IMT and is targeted on dispersible oil to minimize surface oil slicks impacting the environmentally sensitive shoreline ecosystem.

Dispersant Aerial Spray Summary:

1. Total Amount of Dispersant Applied on Month Day, Year (litres):	
2. Total Sorties on _____:	
3. Total Amount of Dispersant Applied to date (litres):	
4. Total Sorties to date:	
5. Total Area Covered by Dispersant Applications to date (km2):	
6. Total Dispersant Stockpiles on the ground as of _____ 1200 PM (litres):	
7. Dispersant Stockpile Expected Arrival as of _____ – 1200 PM (litres):	
8. Estimated Total Dispersant as of _____ - 1200 PM (litres):	
9. Projected Days Operational at maximum rate of _____ l/day (days): The _____ gpd is the daily capacity for the current aerial spray assets and is modified according to daily operation requirements and direction of the UC	

Dispersant Stockpile Supply and Use Projections



Assets On Scene	
Spray Aircraft:	
C-130	
King Air	
BT-67	
King Air	
Total:	
Spotter Aircraft:	
King Air	
Aztec	
Total:	
Total Aircraft:	
PRIORITY Spray Assets Identified* **	
Spray Aircraft:	LEAD TIME
*** NOTE: These assets will not be activated until sufficient stockpile of dispersants are available for their use. Estimate that dispersant operations will need approximately _____ gallons per day of dispersant for these air craft spray systems	
Additional Spray Assets Identified	
1.	
2.	

Dispersant Key Activities and Issues
Daily Aerial Dispersant Operational Plan and Briefing
Map of Spray Passes Conducted During Operational Day

Dispersant Statistics Applied by Day						
Date	**Dispersant Type (gallons)**		**Daily Totals**	**# Sorties**	**Acres Covered** (5 gal/acre application rate)	**Square Miles covered**
	9500	**9527**				

Dispersant Spray Assets

Aircraft Information						
Type	Owner/ Operator	Tail #	Payload (gal)	Airport/ Status	Purpose & Altitude	Comments
Spotters						
Recon						
Sprayers						

Aerial Dispersant Application Plan (Actual Flights conducted)

ATTACHMENT F: AERIAL DISPERSANT APPLICATION PLAN (ADAP)

Dispersant Application Plan is a multi-sheet form that provides the following:

Sheet 1	General Response Plan - information on communications, safety setbacks, dosages to be applied, weather, aircraft/vessel involved in operations, etc.
Sheet 2	Schedule for each aircraft/vessel during the operational day
Sheet 3	Activity Schedule and Briefing Agenda
Sheet 4	Dispersant Stockpile Logistics Plan
Sheet 5	Dispersant Monitoring Plan

Use the following template to complete the Dispersant Application Plan

SHEET 1 - General Response Plan

DISPERSANT APPLICATION PLAN			
DATE:	**TIME:**	**STAGING AIRPORT/PORT:**	**AIRPORT ID:**
DISP. STAGING APT SPVSR (Name & Phone #):			
SPILL SITE INFORMATION:			
Spill Location:	Latitude: N	Longitude: W	Size:
Geographical Reference:			
SPILL SITE APPROACH INFORMATION:			
Entry point:	Latitude: N	Longitude: W	Altitude: ft.
Exit point:	Latitude: N	Longitude: W	Altitude: ft.
Holding area:	Latitude: N	Longitude: W	Altitude: ft.

SPILL SITE WX:	Wind:	CLG:	VIS:	Sunrise:	Sunset:

DOSAGE (GPA):		**ADD'L INST:**

COMMS	Primary VHF COM:	Secondary VHF COM:	Emergency VHF COM:
	Satellite Phone:		
	Marine Radio:		

AIRCRAFT INFORMATION:						
Type:	Tail #:	Call Sign:	Airport ETA:	Purpose & Altitude:	PIC/Crew:	Passengers:
					PIC:	
					PIC:	
					PIC:	
					PIC:	
					PIC:	
					PIC:	

VESSEL INFORMATION:						
Type:	Name:	Call Sign:	Port ETA:	Purpose:	Crew:	Passengers:

SHEET 2 – Application Schedule

APPLICATION SCHEDULE										
DATE:										
FLT # or vessel	**Tail #**	**Purpose**	**Dispersant**		**Fuel Load (HRS:MIN)**	**Transit Time EST/ACT**	**DPT Time EST/CT**	**Entry ETA EST/ACT**	**Exit ETA EST/ACT**	**RTRN ETA EST/ACT**
			Type	**Liters**						
1										
2										
3										
4										
5										
6										

SHEET 3 – Activity Schedule

ACTIVITY SCHEDULE	
Daily activity schedule for:	Dispersant Group Staging Airport/Port Supervisor (DGSAS):

TIME	ACTIVITY
	Report to Airfield/Port
	Team Daily Operational Briefing
	Commence Operations
	Terminate Operations
	Team Daily Debriefing on Operations

DAILY OPERATIONAL BRIEFING AGENDA

1. Safety Issues;
2. Weather;
3. Communications Air and Ground;
4. Application Dosage and Pattern to be used;
5. Approach Information;
6. Oil Spill Location and Description;
7. Operational Procedures and Changes;
8. Flight Schedule.

FUELING/ FBO	
Contact Name:	Business Hours Services:
Contact Phone:	After Hours Services:

DESIGNATED DISPERSANT LOADING AREA
Location:
Contractor Name:
Contractor Phone:

REPORTING REQUIREMENTS AND PROCEDURES
SatLoc Files:
Photographs and Videos:
Observation Logs:

AIRPORT SECURITY REQUIREMENTS

SHEET 4 – Dispersant Stockpile Logistics

DISPERSANT STOCKPILE LOGISTICS TABLE							
No.	**Stockpile Location**	**Stockpile Owner**	**Dispersant Type**	**Amount (liters)**	**Cascade Time to Staging Airport/ Port (hours)**	**Estimated Arrival at Staging Airport/ Port (Date/Time)**	**Running Total (liters)**
1			9500				
2			9500				
3			9500				
4			9500				
5			9500				
6			9500				
7			9500				
8			9500				
9			9500				
10			9500				

SHEET 5 – Dispersant Monitoring Plan

DISPERSANT MONITORING PLAN	
Name of Incident:	
Date:	
Purpose:	The purpose of this plan is to outline the surface dispersant monitoring process
Objectives:	The objective of this plan is to monitor the effectiveness of surface dispersant applications.

Visual	A trained observer, flying over the oil slick and using photographic job aids assesses visually the effectiveness of the dispersant application.
Fluorometry: (Single Unit)	A sampling team on a boat uses a fluorometer towed at a 1 meter depth under the oil slick before and after dispersant is applied to determine if there is an increase in hydrocarbons sufficient to show the dispersant is effective. Additionally, water samples may be obtained.
Fluorometry: (Two units)	A sampling team on a boat uses two fluorometers towed at usually 1m and 10m under the oil slick to determine if there is an increase in hydrocarbons at both depths. Water samples may be taken.

Schedule and Duration	
Visual	Commencing on _____ a _____ (tail number _____) will be operating out of _____ and will have (name) as the observer assigned.
	The observer flights will be coordinated with the Aerial Dispersant Group and the aerial staging base manager for safety and to ensure observers are in position for monitoring when the spray operations commence.
Fluorometer (1 unit)	Commencing on ____ the vessel _____ will be available at the port of _____. for the monitoring team to board and commence single fluorometry analysis. These operations will be coordinated with the Aerial Dispersant Group to arrange sampling to ensure the monitoring team is in the area where the dispersant application is taking place.
	Additionally, a vessel boom dispersant spray system will be installed and dispersant stockpiles provided on the vessel _____ operated by the Dispersant Science Team so that the they may initiate their own application and monitoring operations.
Water Sampling	If water samples are taken, they will be collected, retained and analyzed according to standard sampling procedures. Samples should be obtained from a depth of 1m before and after dispersant application along a transect of the fluorometry measurements.

Aerial Wildlife Observations
The _____ aircraft (tail number _____) operating from _____ staging airport will commence operations on _____ with (name/company or agency) as the observer.
The observers will notify the dispersant team should they observe wildlife that must be avoided. Wildlife observers and wildlife aircraft pilots will attend morning briefing at the staging airport and will coordinate their operations with the Dispersant Group and the staging airport manager.

ATTACHMENT G: AFTER ACTION REPORT SUGGESTED TABLE OF CONTENTS

This Appendix provides a suggested outline for the after-action report.

AFTER ACTION REPORT

TABLE OF CONTENTS

- Incident Overview
- Oil Slick Trajectory and Behavior
- Justification for Dispersant Use
- Chronology (Date and Time) of Dispersant-Related Events
- Overview of Dispersant Operations
- Completed Dispersant Application Approval form
- Lessons Learned from the Dispersant Application Process and Application

Suggested outline for report requirements: The report should be tailored to the complexity of the spill response. Not all of the sections identified below may be necessary.

Incident Overview

Description of initial report (date, time, source, etc.)
Spill source
Spill location
- Estimated quantity, potential quantity, and release rate (if applicable)

Environmental conditions

Oil Slick Trajectory and Behavior
Expected movement of slick
Expected weathering and behavior of product
Observations of same

Justification for Dispersant Use

Potential impact areas and their respective sensitivities to impact, with and without dispersant use.
Within offshore approval area
Potential for use of other recovery methods (e.g., mechanical recovery, in-situ burning)
Weather and sea state

Chronology (Date and Time) of Dispersant-Related Events

Government notification of spill
Reconnaissance aircraft requested
Reconnaissance aircraft "wheels up"
Monitoring initiated and monitoring assets
Reconnaissance aircraft on-scene and reports
Source and field sample requested
Dispersant use approved under guidelines
Dispersant asset operators notified
Dispersant stockpiles requested
Dispersant stock en-route
Dispersant stocks arrive at airport/dock
Spotter aircraft "wheels up"
Dispersant aircraft/boat "wheels up"/left dock
Spotter aircraft on-scene
Dispersant aircraft/boat on-scene
Source and "in-water" sample collected
First application
Spotter aircraft opinion of efficacy and continued reports
Additional applications, Spotter aircraft opinions, and sampling (as required)
Termination of dispersant operation

Overview of Dispersant Operations

Amounts and times of dispersants applied
Any extenuating circumstances affecting the deployment of any element (spotters, dispersant, etc.)
Estimates and observations of efficacy
Any discrepancies between estimates
Any discrepancies between observations
Any sightings of pelagic/migratory birds, sea turtles, or marine mammals

Lessons Learned from the Dispersant Application Process and Application

ATTACHMENT H: JOB AIDS

1. Estimated Dispersant System Potential Calculator (EDSP), Bureau of Safety and Environmental Enforcement (BSEE), https://www.bsee.gov/sites/bsee.gov/files/dispersants-cal.html

2. API Aerial and Vessel Dispersant Preparedness and Operations Guide (2015). API TECHNICAL REPORT 1148.

3. IPIECA-IOGP (2015). Dispersants: surface application, Good practice guidelines for incident management and emergency response personnel. IPIECA-IOGP Good Practice Guide Series, Oil Spill Response Joint Industry Project (OSR-JIP). IOGP Report 532.

Security Classification: BP Public	**BP Canada Energy Group ULC**	

Scotian Basin Exploration Project

Oil Spill Response Plan

Annex C -

Offshore In-Situ Burning Tactical Response Plan

B02	Issued for Use	Mike Condon	Allen Pere	April 9, 2018
B01	Issued Final	Mike Condon	Allen Pere	February 5, 2018
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Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

1.0 INTRODUCTION

This Tactical Response Plan (TRP) is intended for BP Canada Incident Management Team (IMT) in case of an incident. It provides detailed information to support the IMT with the implementation of tactics associated with offshore in-situ burning (ISB). It identifies response activities and resources needed for the deployment of this response strategy. This is not a stand-alone document and it should be used in conjunction with the Oil Spill Response Plan (OSRP).

2.0 PLANNING

2.1 OBJECTIVE

To eliminate surface oil slicks through combustion of oil vapours generated by heat from fire.

2.2 LIMITATIONS

The following limitations are applicable to ISB:

- Oil type:
  - ISB may be effective for all oil types. However, highly weathered oil or emulsions are relatively difficult to ignite and will require the addition of an accelerant (such as diesel fuel) for ignition (**Table 1**).

Table 1 - Burning properties of various oils

Please note that the expected oil type for this project is medium crude (red outline)

Oil	Overall burnability[a]	Ease of ignition	Flame spreading speed	Burning rate[b] (mm/min)	Sootiness of flame[c]	Efficiency[d] (%)
Gasoline	very high	very easy	very rapid	4	medium	95–99
Diesel fuel	high	easy	moderate	3.5	very high	90–98
Light crude	high	easy	moderate to rapid	3.5	high	85–98
Medium crude	moderate	easy	moderate	3.5	medium	80–95
Heavy crude	moderate	medium	moderate	3	medium	75–90
Weathered	moderate	add promoter	slow	2.5 to 3	low	60–90
Crude oil with ice	moderate	difficult, add promoter	slow	2	medium	50–90
Light fuel oil	moderate	difficult, add promoter	slow	2.5	low	50–80
Heavy fuel oil	moderate	add promoter	slow	2 to 3	low	60–90
Diluted bitumen (dilbit)	moderate	easy, if fresh	moderate	2 to 3	medium	40–60
Weathered dilbit	moderate	add promoter	slow	2 to 3	medium	50–70
Emulsified oil	low	add promoter	slow	2 to 3	low	30–70
Bitumen	low	add promoter	slow	2 to 3	low	30–50
Used oil	very low	add promoter	slow	1 to 2	medium	15–50

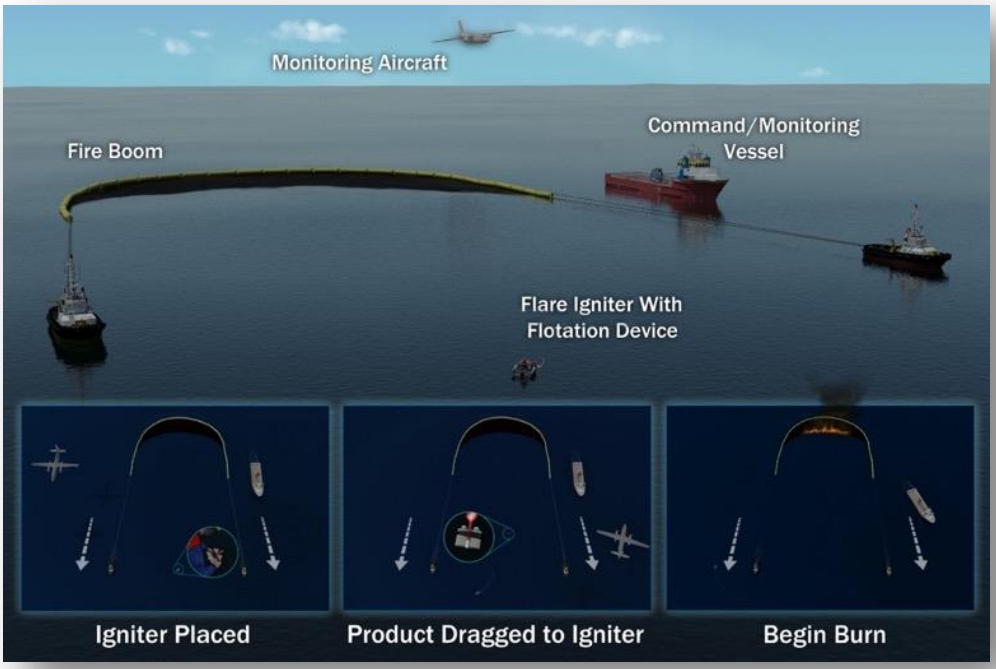
Extracted from IPIECA, 2016

- Environmental:
  - ISB will produce a black cloud of smoke mainly composed of soot, CO_2 and water. Particulate matter from soot is a health concern at ground level near the fire and under the plume.
  - Wildlife observers will be needed during ISB operations to ensure protection of wildlife;
  - Incomplete combustion may result in the formation of burn residues. These can be heavier than water and potentially sink (depending on oil type).
- Weather:
  - Daylight application only.
  - Do not use in wind speeds exceeding 20kts.
  - Do not use in wave height exceeding 1 m.
  - Visibility must be >1 nm.
- Operational:
  - Operational limitations are associated with the use of booms as oil must be contained for ISB operations:
    - An oil thickness >2mm is necessary for ignition to take place and to sustain the burn.
    - Only use fire resistant booms for ISB operations.
    - Optimal vessel speed: < 1kts.
    - If the vessel tow speeds or relative currents speeds exceed 0.4m/s (0.7knt), oil will be lost from the boom and burn will be extinguished.
  - ISB operations should be directed by subject matter experts.
  - Only use trained personnel.

2.3 TACTICS FOR OFFSHORE ISB OPERATION

Tactics to conduct ISB operations entail containing oil using fire resistant booms that are towed by response vessels in configurations similar to offshore containment and recovery operations. Once oil is contained, it will be dragged toward a lit ignition source and burning will begin upon contact with oil vapours. Oil thickness must be >2mm to sustain a burn. This operation requires fire resistant booms, an igniter, response vessels and spotter aircraft to guide vessels toward thicker oil slicks and monitor efficiency of burning operations (see **Figure 1**). Burn volume and burn efficiency can be estimated using the methodology provided in **Attachment A**.

Figure 1 - Illustration of ISB operations



2.4 OPERATIONAL ASSUMPTIONS

ISB operations will be managed by the onshore IMT. The priority will be to target oil slicks moving in the direction of:

1. Sable Island;
2. Nova Scotia shoreline.

If weather and sea state are favorable, up to 3 strike teams using Vessels of Opportunity (VOOs) in the area could be established. These would primarily deploy ECRC's pyro-boom located at the Dartmouth response base and ALERT pyro-boom located in Saint-John New Brunswick (a special authorisation must be granted by Transport Canada to mobilise ALERT's equipment). For larger spills that cannot be managed by resources on site, the IMT will escalate the response by cascading response equipment from OSRL and other BP global operations if necessary. OSRL has pyro-boom systems in Southampton (UK) and Singapore, as well as Fort Lauderdale (USA).

Each ISB strike team requires 2 boom tow vessels, 1 command and monitoring vessel (could be used by multiple burn teams), 1 igniter/safety small craft and 1 spotter aircraft. It is important to remember that pyro-booms are considered to have a limited life expectancy of 2 to 3 burns. Thorough inspection of equipment will be conducted prior to any burn being conducted. At sea, containment and recovery activities might also be necessary to recover any burn residues on the water surface (see Offshore Containment and Recovery TRP for details).

All ISB operations will be conducted during daylight hours (approx. 12 hours in summer and 8 hours in winter).

Environmental sampling and monitoring of air emissions will also be implemented to ensure responder health and safety and to document potential environmental impacts (see Monitoring Plan for details).

In approving this overall OSRP, the CNSOPB is approving use of ISB within the constraints and limitations outlined in this plan. Prior to initiating ISB, BP will advise CNSOPB. BP understands that the CNSOPB may solicit advice from the Science Table. Unless explicitly advised to halt the ISB by the CNSOPB, BP will proceed with ISB operations if it is determined to be an effective and feasible option for the specific incident.

2.5 ISB DECISION MAKING

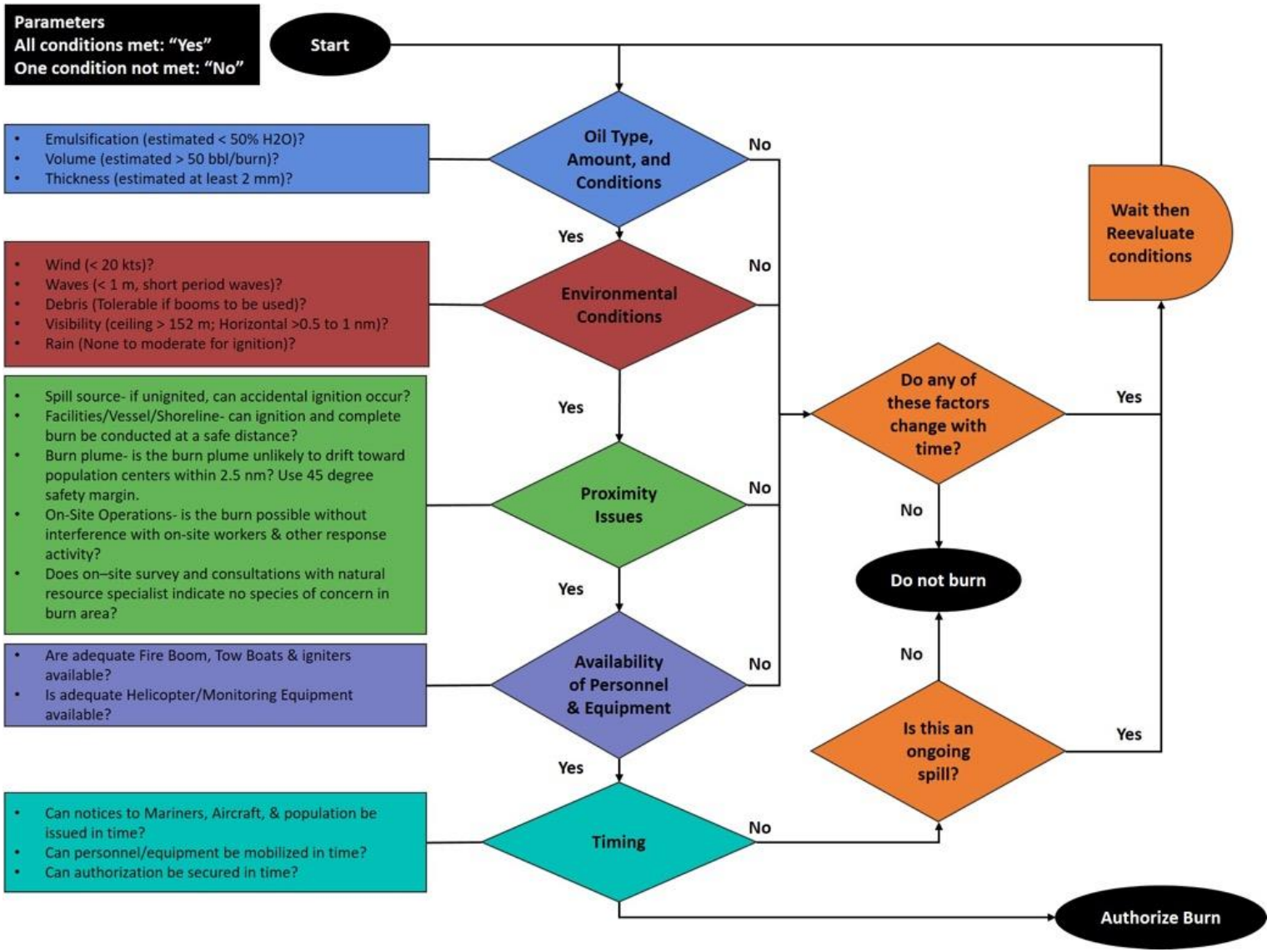
ISB should be considered a response option to complement offshore containment and recovery operations, especially if oil slicks are moving towards Sable Island. It may only be used when it is deemed safe for the population and for responders.

To minimise potential impacts on people, it is recommended to conduct ISB operations at a distance greater than 4 km (IPIECA, 2016) from any population. Air quality monitoring will be implemented to ensure safety of responders and residents. Key parameters to be measured are particulates, polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs).

Operational considerations for ISB are the following:

- daylight application only;
- do not use in wind speeds exceeding 20kts;
- do not use in wave height exceeding 1 m (or less than 3m if swells);
- visibility must be >1 nm;
- oil thickness >2mm for ignition to take place and to sustain the burn;
- must use fire resistant booms;
- need wildlife observers;
- need trained personnel and subject matter experts to lead the operation.

Figure 2 - ISB Technical Decision Flowchart



2.6 RESOURCES

Table 2identifies the resources for ISB operations and their location. These resources include BP owned and those available regionally and internationally through contract and MoU. Some or all of these resources will be activated during a spill response depending upon the severity and nature of the spill.

Table 2 - Resource description, supplier and location

Description	Supplier	Location
Pyro-Booms		
1 x Desmi Pyro-boom system • 150m pyro-boom	ECRC	ECRC Dartmouth response base
2 x Desmi Pyro-Boom systems* • 2 x 150m pyro-boom ***This equipment is only available if a special authorisation is granted by Transport Canada at the time of a spill through Mutual Aid Agreement with ECRC***	ALERT	Saint John, NB
7 x fire-boom systems • 4 x 150m Hydro Fire boom • 3 x 150m American Fire boom	OSRL	UK and USA
Ignition systems		
42 igniters* • EZFire version ***This equipment is only available if a special authorisation is granted by Transport Canada at the time of a spill through Mutual Aid Agreement with ECRC***	ALERT	Saint-John, NB
Vessels		
Vessels of Opportunity (VOOs)	ECRC	Atlantic region
4 work boats for ignition and safety • 1 x Polaris 15' • 1 x Zodiac Hurricane 470 (15') • 2 x Sillinger 525UM (18')	ECRC	ECRC Dartmouth response base
Aircrafts		
Various aircrafts available on charter to be used as spotter aircraft during ISB operations.	Provincial Airlines	Halifax
Personnel		
Minimum of 18 dedicated response personnel will be mobilised from within OSRL's global pool of expertise by applying reasonable endeavours to provide the most appropriate competence and experience. OSRL maintains a minimum pool of 80 dedicated response staff. In the event the number of response personnel required exceeds the number stipulated in the contract, OSRL can approve mobilization of additional staff on a case by case basis.	OSRL	Global

2.7 APPROXIMATE RESPONSE TIMES

Approximate response time for resources to reach the incident site are provided in the following Table as an indication only. Since every incident will occur under specific circumstances, it is not possible to provide accurate response times. Expected response times include mobilisation and transit times.

Table 3 - Expected time for resources to reach incident site

Resource location	Expected response time	Comments
Pyro-boom from ECRC Dartmouth response base	24-48 hrs	Depending on vessels sailing time to spill site.
Pyro-boom from ALERT Saint John, NB response base	48-72 hrs	Depending on vessels sailing time to spill site.
VOOs in Halifax	48 hrs	-
Work boats from ECRC Dartmouth response base	12 hrs	-
Additional ISB systems from stockpiles in the USA	48 hrs	Transport by cargo aircraft
BP subject matter experts from global locations	24 hrs	-

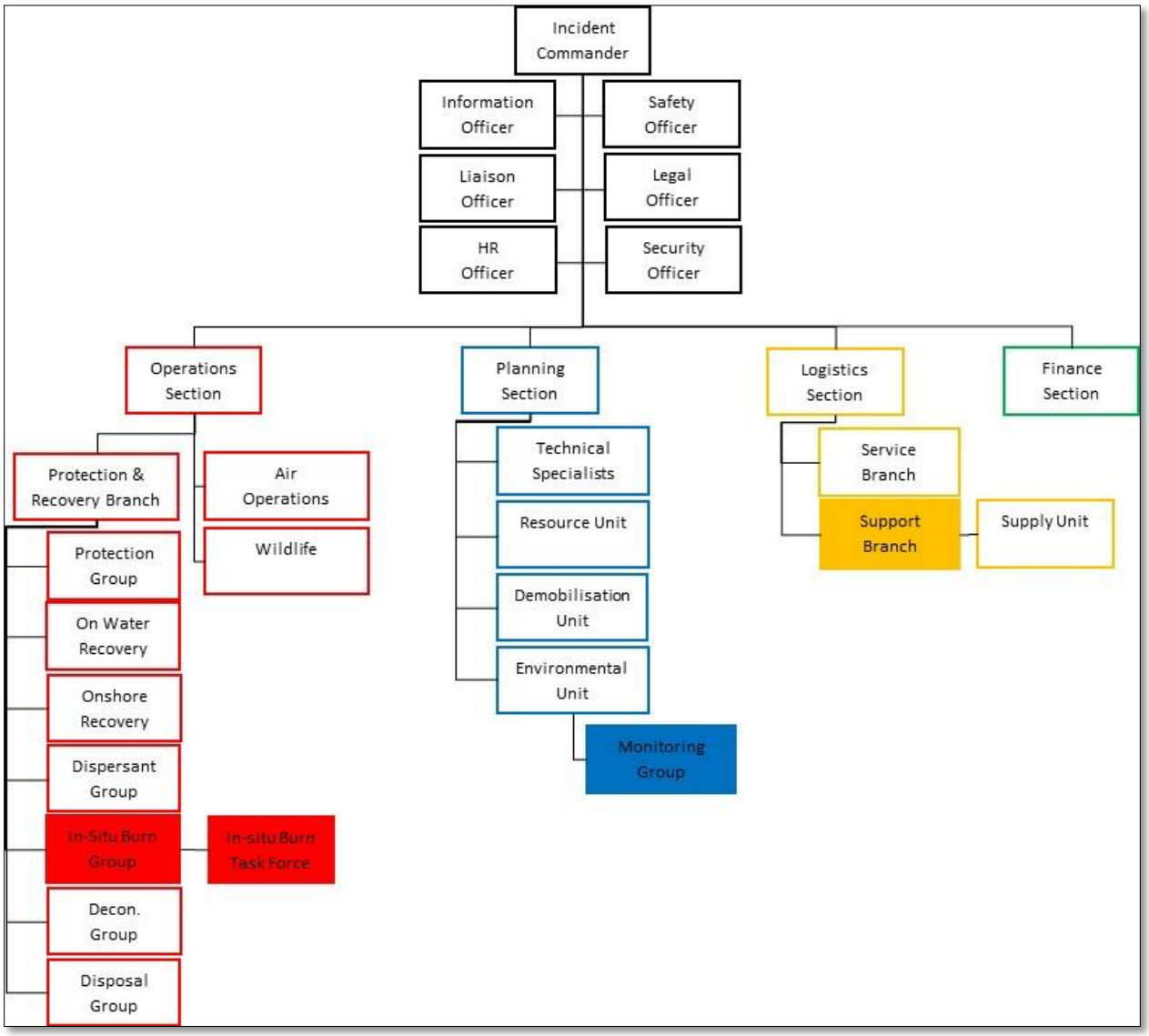
3.0 DEPLOYMENT

3.1 ORGANISATION

Roles and responsibilities within IMT

Offshore ISB operations require a management team in the command center and an operational team for the ISB Task Force Illustrated in **Figure 3** below.

Figure 3 - ICS Structure – In-situ Burn Group



The ISB Group (ISBG) operates under the Protection and Recovery Branch (PRB) of the Operations Section (OPS) of the Incident Management Team (IMT).

Note: IMT will determine the actual organisational structure at the time of an incident, which can vary from this typical structure.

ISBG is responsible for:

- Coordinating with the OPS, Environmental Unit (ENV), Monitoring Group (MG), and Planning Section (PS) to plan and conduct controlled burn operations.
- Working with the ENV, Wildlife Branch (WB), and associated regulatory agencies.

- Assisting in drafting ISB plans and permits for approval by Incident Command (IC) and regulatory agencies.
- Coordinating with the Logistics Section (LOG) to procure necessary resources for ISB operations.
- Working with the Surveillance Group (SG) and the MG to determine where burnable product is located, as well as monitoring the area for effects associated with burning product.
- Conducting the actual burn operations through the ISB Task Force.

The following Table summarises the groups and their associated function(s) required to support the implementation of the tactic.

Table 4 - Functions of groups personnel

Groups Personnel	Function
ISB Task Force	Implementation of ISB task.
Monitoring Group	Implementation of on-scene monitoring and sampling. Establish wildlife monitoring and coordinate protection and rehabilitation.
Air Operations Branch	Manage air operations; scheduling, locating airports, air-to-air communications, air-to-ground communications, designating and enforcing air space restriction, air space priorities.
Logistics Support Branch	Responsible for obtaining personnel, equipment, materials and supplies needed to mount and sustain the response. This will include such things as; vessels, aircraft, vehicles, cranes, forklift, ISB supplies.
Finance Section	Oversee vendor contracts, service, rental and procurement agreements. Develop delegation of authority and expenditure approval limits.

The ISB Group is supervised by an ISB Operations Group Supervisor. Each ISB Task Force is supervised by a Task Force Leader who manages the boom vessels, the ignition crews, and the wildlife and air quality monitoring teams (if required).

Table 5 - Task Force personnel respective functions

Task Force Personnel	Function
Ignition Coordinator	Ignite and monitor the ISB.
Fire/Safety Coordinator	Assist and monitor ISB operations for safety considerations.
Technical Specialist	Advise the ISB Group and IMT on ISB operations.
Aerial Spotter	Advise, guide, direct burn teams into burnable product to optimize operations effectiveness.
Wildlife Specialist/Spotter	Accompany all ISB Task Forces to spot and identify species of concern.

3.2 GENERAL ISB OFFSHORE RESPONSE STRATEGY

If ISB is selected as a response strategy, operations will commence as soon as possible. To use the available ISB nassets in the most effective way, the following strategy will be implemented:

- Activate spotter/surveillance aircraft to map and photograph the oil spill (this should be done as soon as possible after notification of an oil spill);
- Activate vessels equipped with ISB systems and deploy to approved burn zone;
- Coordinate vessel operations at the spill site with a fixed wing spotter aircraft to direct the operations;
- Consider Simultaneous Operations (SIMOP) in area;
- Monitor wildlife activity in the Burn Zone;
- Ignite oil and conduct burns in accordance with the ISB Safety Plan (**Attachment B**);
- Monitor air quality, if required;
- After ISB termination, recover burn residue, if possible;
- Dispose of recovered burn residue and spent fire boom.

3.3 ISB ACTIVATION ACTIVITIES CHECKLIST

The checklist in **Table 6** provides sequential activities for the BP Nova Scotia IMT to activate ISB resources. The checklist initiates both the ISB approval process and the ISB equipment and personnel activation simultaneously in order to commence ISB operations as soon as possible.

The activities listed in **Table 7** are reminders of actions to be taken by the ISB Task Force. Referral to other forms, computer programs, response plans, etc., will need to be made to complete the activities. The ISB activities can be delegated, in whole or in part, to other knowledgeable responders or contractors who have been trained to complete each activity.

Table 6 - Offshore ISB Checklist for ISB Group

No.	Action
1.	Obtain spill information from Situation Unit (location, type and amount of oil, weather forecast, direction of current, modelling forecast of spill trajectory).
2.	Establish clear area of operation (Burn Zone) – 4 km from populated areas – to conduct ISB activities and establish a safety exclusion perimeter of 2 km.
3.	Create the ISB Group in the Operations Section with supervision, ISB Technical Specialists, and ISB contractor representatives.
4.	Identify resources to be provided by Logistics Section for ISB and support activities; • Specialized local ISB equipment, vessels (deployment, command and monitoring) aircraft for surveillance. • Establish availability of ISB subject matter experts. • Liaise with equipment contractors to establish the availability and ETA of ISB boom, igniters materials, and deployment personnel.
5.	Evaluate the potential environmental impacts by conducting a Spill Impact Mitigation Analysis (SIMA) with the Environmental Unit and Regulators.
6.	Coordinate with Environment Unit to prepare an ISB plan.
7.	Coordinate with Safety Officer to create the Health and Safety Plan.
8.	Coordinate with Environment Unit and Wildlife Branch to conduct monitoring services.
9.	Coordinate with Logistics Section to establish a suitable reception and laydown area for incoming (new) and returning (used) ISB equipment.
10.	Coordinate with Logistics Section to establish communications channels to ensure various ISB and support activities can be in contact (vessel to vessel and vessel to air).
11.	Coordinate with Surveillance Group and Air Operations Branch to conduct aerial surveillance and location of burnable oil.
12.	Determine if conditions for ignition and a sustained ISB exist: • **Winds—**<20 knots (37 km/hr) for ignition; sustained burning possible with higher wind conditions. • **Wave Height—**less than 3-m swells or 1-m wind waves. • **Oil—**at least 2 to 3 mm thick. • **Emulsification—**typically less than 25% water content. • **Current—**typically < 0.75 to 1 knot relative velocity between the fire boom and the surface oil/water to avoid entrainment of oil. • **Ice—**ice cakes and floes with < 10% to 20% coverage
13.	Deploy ISB Task Force to conduct burns.
14.	Confirm absence of wildlife in burn area.
15.	Conduct a test burn.
16.	As conditions warrant, conduct ISB operations.
17.	Assess the success/failure of ISB operations and report to Operations and Planning Sections.

Table 7 - Offshore ISB Checklist for ISB Task Force

No.	Action
1	Confirm from ISB Group that ISB approval from IC is in place before commencing activities.
2	Advise and direct ISB activities in-field.
3	Liaise closely with aerial spotter to optimise operations effectiveness.
4	Receive weather forecast for operational period from Situation Unit.
5	Conduct final task briefings ahead of deployment.
6	Deploy ISB equipment according to Plan.
7	Collect and contain oil.
8	Maintain minimum combustion efficiency; • >2mm of thickness • Swath width between vessels ~50m • <1kts vessel speed
9	Confirm safety parameters are being adhered to; • >4km from populated area • 2km safety perimeter/ separation from other at-sea activities.
10	Deploy small craft with handheld igniters.
11	Monitor burn efficiency and modify operations accordingly. Be prepared to take evasive action to extinguish the burn if operations safety is compromised; • Tow vessels to accelerate above 1kts so that oil containment integrity of the boom is lost. • Release the tow of the boom from one vessel. Oil will spread, exceeding below minimum thickness.
12	Log burn data.
13	Report activities to ISB Group.
14	Liaise with on-water operations to establish containment and recovery of unburnt oil and burnt residue.
15	Liaise with Logistics Section to establish resources for next operating period.

3.4 RESPONSE TERMINATION

Termination of response will be determined by the IMT and/or the ISB Group Supervisor and the Task Force Leader(s). Factors to be considered include the following:

- Effectiveness of ISB;
- Possible flash back to spill source;
- Fire escapes boom;
- Emissions exceed permissible levels;
- Proximity of ISB activities to 4 km populated area perimeter;
- Proximity to or impact on environmental resources;
- Proximity of ISB activities to marine installations, vessels, traffic zones etc.
- Transboundary migration of the oil;
- Deteriorating weather conditions (visibility, sea state, wind speed);
- Safety.

3.5 ISB SITE SAFETY PLAN

The key health and safety operational procedures and personal protective equipment for ISB activities are found in the ISB Site Safety Plan provided in **Attachment B**. The IMT Safety Officer is responsible for completing the Health and Safety Plan forms. The supervisors of the vessel ports are responsible for the safety of operations at their locations and the aircraft's Pilot In-Charge and the vessels' captains are responsible for operations under their supervision.

3.6 WASTE MANAGEMENT

ISB activities can generate large volumes of waste. The most significant waste types generated are likely to be:

- Used/burned fire boom that is beyond economical repair and must be disposed of;
- Burned oil residue;
- Unburned oil and oil emulsion.

Eventually oil on water will be of insufficient thickness and/or volatility to sustain burning. Studies have shown that residue contains fewer volatiles than the initial oil, but heavier constituents [such as polyaromatic hydrocarbons (PAHs)] remain in the same relative proportion as in the initial spill. Residue often has the composition and appearance of highly weathered oil of the same type.

Upon completion of burning operations, burn residue should be collected and placed in suitable containers for subsequent transport to an approved storage site and ultimate disposal facility. Careful consideration should be given to the possible release of burn residue constituents without recovery:

- The residue of heavier oils will result in heavy residues that may sink in surface waters. Recovery may be possible using nets.
- Medium oil burn residues may form mats or sticky accumulations that can be recovered using nets, boom and manual tools.

- Lighter oil burn residues that are still liquid can be recovered using mechanical skimmers and sorbents.

All waste generated from ISB activities will be stored and disposed of in accordance with the Waste Management Plan. (**see Waste Management Plan for details**).

4.0 FIELD ACTIVITIES

4.1 ISB DEPLOYMENT

Boom Deployment:

- Ensure that the boom is properly stored in the tray or storage container as specified so deployment is feasible without snagging or twisting. A single twist of the boom can render it nearly useless for oil containment at or near the twist. Attempting to untwist the boom by hand after deployment presents a hazard to personnel. During deployment, anticipate drag forces induced by vessel movement and natural currents.
- Ensure that all tie-downs, tow lines, tow posts, etc., are strong enough to withstand the average and peak drag forces that may be experienced by the fire resistant boom in tow.
- Provide adequate communications between the boom-towing vessels and the personnel tending the boom out of its container or tray. Dedicated radio links and hand signals should be pre-designated in case of an emergency.

Boom Towing:

- To avoid overexposure to the intense heat of the flames, all vessels must remain at least 5 fire diameters from the flame perimeter.
- Ensure that qualified aerial support is prepared with established communication lines to inform all responders of the location of boom-towing vessels relative to the target oil slick; other oil slicks in the same general area; other vessels in the area; and the anticipated region of influence from combustion products.
- Prior to ignition, ensure that all personnel on-site are positioned upwind or crosswind from the target slick.
- If response operations commence at or near the spill source, personnel and equipment will be positioned at a safe distance from any potential explosion or premature ignition of oil at or within the source.

Boom and Boat Handling:

- The designated boom commander ensures effective communication between the boom towing vessels and other vessels. Proper attention to the status of the burn, the speed and positions of the towing vessels, and the proximity of the burn to other vessels, slicks, etc., must be maintained for quick response to dangerous situations.
- The boom-towing vessels will have a pre-determined plan of communication and action for defined situations, such as modification of the rate of burn and termination of the burn.

Ignition and Fire Control:

- Weather and sea conditions should be kept in mind, and proper safety distances adhered to at all times.
- Given the range of igniter types and ignition methods, manufacturer specifications for proper deployment will be followed.
- The rate of combustion is directly controlled by the forward velocity of fire resistant boom-towing vessels. A slower velocity will increase the burn rate by increasing the spread of the oil, thus increasing the fire diameter. On the other hand, a faster velocity will decrease the overall rate of combustion. Care must be taken when manipulating the burn rate. Too thin of a slick will cease to burn, while too fast of a tow will cause oil splash-over.

Burn Effectiveness Monitoring:

- The dedicated safety vessel assists with monitoring the burn's effectiveness. The safety vessel crew monitors the status of the burn in relation to the proximity of the burn to towing vessels and other response vessels. It also monitors and maintains pre-designated "fire-free" zones as needed between response vessels or between the burn and specified sensitive areas.
- Aerial surveillance should continue, as available, throughout the burn to enhance status updating capabilities. Aerial surveillance should also provide early warning for wind and weather shifts which may impact the direction of the smoke plume.

Termination of Burn:

- Premature termination of a burn may be necessary if the wind or weather shifts unexpectedly, or if secondary ignition of another slick is a possibility.
- The fire may be extinguished prematurely by releasing the tow line from one of the towing vessels while the other moves ahead at several knots. This allows the oil to spread out quickly to a thinness that cannot support combustion. A second alternative is to move both towing vessels ahead at several knots, forcing the oil beneath the boom and removing it from the combustion zone.

4.2 ISB FIELD BURN FORM

Burn information must be collected in order to inform IMT and regulators about the effectiveness of all burns carried out. Daily documentation of ISB operations is essential for managing and directing operations, providing evidence and for assessing potential impacts. An example of a Field Burn Form is provided in **Attachment C**.

4.3 JOB AIDS

A list of relevant job aids is provided in **Attachment D**.

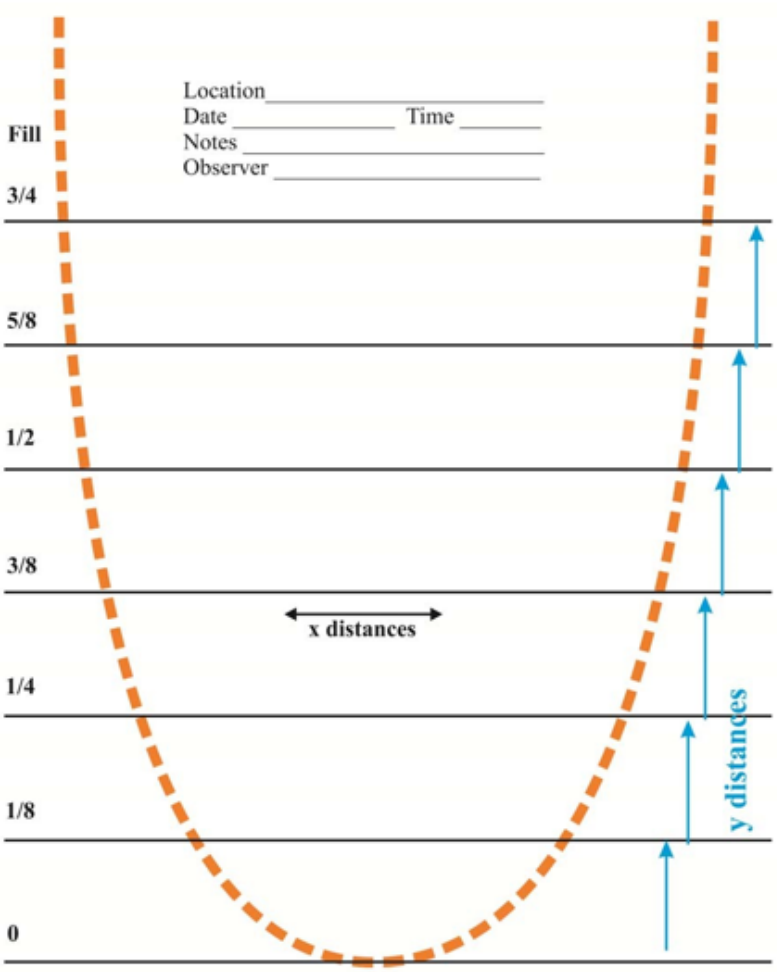
ATTACHMENTS

ATTACHMENT A BURN VOLUME AND BURN EFFICIENCY CALCULATIONS

Burn Volume Calculation

Use the following steps to calculate the volume of oil burned for each ISB activity. The rate of burning is dependent on the oil and conditions to a certain degree. The procedure is as follows:

1. Use Boom Fill Chart to estimate the oil in the boom:



2. Estimate the oil area (m2) from the Burn Area Calculator:

Burn Area Calculator			
Boom Length 150m – 50m Opening			
Fill	Length (m)	Width (m)	Area (m^2)
3/4	51	48	2020
5/8	43	46	1610
1/2	34	44	1220
3/8	26	41	860
1/4	17	38	530
1/8	9	32	220

3. Estimate the burn rate (mm/min) for the oil type from the Burn Rate Calculator:

Burn Rate Calculator		
Oil Type	Burn Rate (mm/min)	Burn Efficiency (%)
Diesel	3.5	90 - 98
Crude Oil	3.5	80 - 95
Fuel Oil	2.5	50 - 90
Emulsion	2	30 - 70

4. Multiply the various units to establish the burn volume, use the Burn Volume Calculator:

Burn Volume Calculator							
Burn volume	=	Area	X	Time	X	Rate	X	Conversion Factor
m^3		m^2		min		mm/min		0.001

Burn Efficiency Calculation

Calculations of burn efficiency provide a means to determine whether a repeat burn may be appropriate, for performance assessment, and to improve conduct of burns. Burn efficiency is measured as the percentage of oil removed compared to the amount of residue left after a burn.

For oil spills on water or other relatively even and flat surfaces, Efficiency (E) can be calculated by Equation #1.

Equation #1 $$E = \frac{V_i - V_f}{V_i}$$

Where: Vi is the initial volume of oil that was burned,
Vf is the volume of residual oil remaining after burning.

The initial volume of oil, Vi, may be known from inventory measurements. If that is not available or reliable, then the area of an oil slick can be estimated visually using objects of known dimension (e.g. a response vessel or a structure) or using timed over-flights, aerial photographs, or remote sensing. The surface area of the spilled oil can be multiplied by an estimate of average slick thickness to yield an estimated slick volume. Thickness can be estimated by taking samples, visually using objects of known dimension, or by remote sensing.

The volume of residual oil remaining after burning, Vf, can be estimated by observation in the same manner. If residue remains afloat, it can be recovered either by skimmers or sorbents and estimated by measuring the volume or weight recovered. If residue cannot be recovered, its volume can be estimating in the same way as for the initial volume of oil. It should be noted that Equation #1 does not account for the volume of oil lost through soot released in a smoke plume during a burn, which is a small amount and difficult to measure, or any residue that has sunk or cannot be collected.

ATTACHMENT B ISB SITE SAFETY PLAN (SSP)

Site Safety Plan (SSP)

A comprehensive SSP must be prepared prior to the operation, recognizing the unique elements of both ISB in general and the planned operation specifically. As in spill response operations, safety is the top priority. All personnel involved must understand their respective roles in the operation. They must also understand the elements of the SSP and that they are responsible for their own safety and for the safety of their co-workers.

The key elements of a SSP are:

- Site description, including distance to shore and sensitive areas.
- Current and forecast weather, and sea conditions.
- Hazard evaluation.
- Safe working distances.
- Burn operations checklist.
- Means for controlling access to the burn site.
- Communications procedures.
- Specific safety requirements and personal protective equipment.
- Emergency response procedures.
- Prevention of unwanted fires.
- Methods for controlling and/or extinguishing the burn.

Safety Zone Guidelines

Establishing a safety zone(s) involves defining areas that are acceptable for burning operations. Furthermore, the guidelines also need to specify areas where ignition and sustained burning operations will not be permitted. The safety zone(s) must be established with consideration for the key hazards for personnel involved in an ISB response:

- Flashback during ignition.
- Risk of secondary or unintentional fires.
- Heat from the fire.
- Exposure to smoke emissions.

Flashback during ignition is a potential hazard when dealing with volatile fuels such as gasoline and fresh crude oil. These products produce sufficient vapors to allow flames to spread as fast as 300 feet/second (200 knots). For crude oils, this risk quickly diminishes over time as the oil weathers and loses its volatile components to the atmosphere. Monitoring with combustible gas detectors should be employed on each vessel involved in the burn operation to confirm that explosive atmospheres are not present prior to any consideration of igniting the slick.

Secondary or unintentional fires are possible when slicks are thick enough to support combustion, even when they are not contained by boom. For vessels involved in towing containment boom, adequate lengths of towing line (200 to 500 feet each) will allow a safe operating distance between the vessel and

accumulated oil. Spotter aircraft should be used to direct these vessels to ensure that they do not enter other slicks in the area that may be thick enough to support combustion.

Guidelines for maintaining a safe distance in order to avoid heat from the fire are presented in Table 1, based as multiples of the estimated diameter of the burning slick. The risk of exposure to smoke emissions should be minimal or non-existent by ensuring that all vessels are positioned upwind or crosswind to the target slicks prior to ignition and during the burn. Using a crosswind configuration will ensure that a crippled tow vessel will not drift back into the burn.

Safe working distances from the fire

Exposure Time	Distance from Fire (burn area diameters)
Infinite	**4**
30 minutes	**3**
5 minutes	**2**

For each of these potential hazards, consideration should be given to both existing and forecast wind and sea conditions. Throughout the burn, conditions must be closely monitored to allow for an ongoing assessment of the effectiveness of the burn plan and of the safety issues. Surveillance will be required to monitor the overall oil conditions in the area and in particular, the location of thick slicks that should be avoided by tow vessels.

Two surveillance tactics should be considered; aerial surveillance and surveillance from a larger vessel. The increased visibility from aircraft, particularly helicopters, ensures the safety of the ISB operation; however, a larger vessel not only provides a good view of the tow operation from the surface but also can be equipped with extra fire monitors for firefighting capability. This capability would be in place in case of an accidental vessel fire; it is extremely difficult to position a vessel close enough to a fully involved ISB to extinguish the fire. This large vessel could also provide a means of rescue if one of the tow vessels should experience difficulties.

Safe Practices for Vessels

Personnel on vessels involved in tow operations may be exposed to heat, flames, and smoke if the fire should move up the boom. This could occur if thick patches of oil are encountered and the flame spreads along this thicker patch. The flame-spreading velocity is normally only a few feet per minute (less than 0.3 knots), so the flames will not spread toward the tow vessels if the boom is moving in an upwind direction. Because winds can change rapidly, however, this fact should not be taken as an assurance of safety. In highly variable winds, caution must be taken to ensure that thick concentrations of oil are not encountered at low boom-tow speeds (less than 0.5 knots).

Any crews working alongside the burn could be exposed to high concentrations of particulate matter, PAHs and volatile organic compounds (VOCs) if the wind changes and blows toward them. For this reason, operational vessels should not operate behind the tow boat positions. Interference with other vessels may be a concern with operations involving multiple deployments. The burn plan should address this, recognizing safe distances between vessels and allowing for potential shifts in the wind and currents. Spotter aircraft should be used to direct operations and to identify areas of thick oil in the path of tow vessels.

In addition, actively cooled booms use hoses to supply water to the boom, and these hoses present an additional entanglement hazard for vessels. Care must be taken during towing operations to avoid backing down on tow lines and hoses.

Boom Handling

Fire-resistant booms are generally much heavier and more cumbersome than conventional containment booms and, in some cases; they are less rugged than conventional booms. These factors may present additional difficulties to those directly involved in boom deployment and retrieval. Additional care should be taken when lifting the boom, when in the area of the boom under tension and when overhead work is involved.

Retrieval of the boom following a burn may be difficult, particularly for booms made of refractory fabric, as the fabric may be waterlogged and damaged from the effects of the fire. Retrieval will also be messy, as the boom may be covered with unburned oil and tar-like residue. Workers should wear protective gear with neoprene gloves, rubber boots, and goggles. Cuffs should be taped with duct tape. Cleaning personnel require appropriate decontamination materials to use after the work is completed. Sorbent materials, rags, paper and fabric towels, citrus cleaners, soap and warm water, hand cream, garbage bags and containers should all be available onboard the vessel. Any cleaning materials used should be collected after the burn for proper disposal.

(see Waste Management Plan for details)

Fire Control

The methods below may allow for some control over the burn area and burn rate, but it will be difficult, if not impossible, to quickly extinguish a large oil fire on the water. The overriding safety philosophy in preparing for an ISB operation must be the assumption that, once the slick is ignited, it cannot be quickly put out until it burns itself out.

The primary method of fire control will be to manage the containment operation effectively. If the towing speed is too slow, the oil and, therefore, the fire will slowly spread toward the towing vessels. This can also occur if oil is encountered at a rate greater than the burning rate. Continuous monitoring of the burn area is required to assess the need for adjusting the course and the tow speed as well as to determine the potential need for extinguishing the burn. Oil will be lost from the boom apex due to entrainment under the boom at excessive tow speed or over the top of the boom in rough seas. In some cases, the oil may continue to burn, or may be re-ignited by the contained fire, but in most situations, will extinguish quickly if the losses are small.

For the main burn area, extinguishment may not be immediate. Several control methods have been suggested but have not been proven in experimental or operational use. One proposed method is to release one end of the boom tow, allowing the burning oil to spread out until it is too thin to support combustion. The second proposed method is to increase the tow speed to greater than 1 knot, causing the oil to entrain under the boom. In both of these methods, the fire may not extinguish immediately, particularly if the slick is relatively thick to start with. As neither method has been proven, caution is advised in including them as a primary method of control.

Depending on the scale of the intended burn, consideration should be given to a dedicated fire extinguishing capacity stationed at the burn site. This would consist of fire monitors of sufficient capacity to break up uncontained, burning slicks. In any case, small fire-fighting packages should be available on all vessels.

Aircraft

All aircraft associated with an ISB operation should be chosen carefully to suit the required tasks. Flight plans should be prepared with due consideration of current and forecast conditions of the wind, visibility, cloud types and height, fog, precipitation, and sea state.

For Heli-torch operations, the helicopter must have sufficient lift capacity for the pilot, co-pilot, the Heli-torch system, and a full load of fuel. It must have a cargo hook suitable for a sling load and the ability to jettison if necessary. The jettison mechanism should be tested before each mission. A twin-engine helicopter should be selected for operations over water. If a single engine helicopter must be used, it must be equipped with floats to facilitate emergency landings.

Only the pilot, co-pilot, and Heli-torch operator should ride in the helicopter during the Heli-torch operation. Follow aircraft procedures for use of personal flotation devices (PFDs) or survival suits. During nearshore operations, updraft and downdraft winds against cliffs must be considered when transiting these areas. In case of mechanical difficulty, emergency landing locations for the helicopter should be identified in advance through site surveillance. These sites may include landing decks on vessels, drilling rigs, or barges.

Igniter Operations

Handheld igniters should have a delay mechanism that postpones the ignition of the device for at least 10 seconds from the time of activation. This delay allows time to activate and throw the device as well as for the slick to stabilize around the igniter after the splash. A longer activation delay is required if the device is deployed upstream of the boomed area and allowed to drift into the slick. Devices intended for deployment from a helicopter should not require the use of open flames or sparks.

For Heli-torch systems, specific helicopter safety precautions must be followed. Additional precautions specific to the Heli-torch are included in operating manuals for the device and are addressed in comprehensive training for Heli-torch operation. The following is a summary of the key safety issues and is not intended to replace the specified training requirement.

Personal Protective Equipment Considerations

Appropriate personal protective equipment (PPE) must be worn by all personnel involved in the ISB operation. PPE includes: safety boots, hard hats, goggles, neoprene gloves, life jackets, fire and chemical-resistant clothing, and foul-weather gear.

Identification of Potential Public Health and Safety Concerns

Smoke plumes can cause temporary reductions in aesthetic values in human use activities. Humans may also be put at risk by:

- Flames and heat from the burn;
- Emissions generated by the fire;
- Inhalation of smoke particulate in the plume;
- Reduction in visibility caused by the smoke plume;
- Risk of secondary fires.

Plume Particulate Exposure

The smoke plume emitted by a burning oil slick on water is the main ISB concern. The concentrations of smoke particles are of concern to the public and they can persist for a few miles downwind of an ISB but rarely at ground level. The smoke plume is composed primarily of small carbon particles and combustion gases. Smoke particles pose the greatest risk in a plume. Carbon smoke particles are responsible for providing the characteristic black color of the plume rising from a burn. The smoke is unsightly, but more important, the smoke particles can cause severe health problems if inhaled in high concentrations. Smoke particulates and gases, however, are quickly diluted to below levels of concern. The amounts of PAHs in the smoke plume are also below levels of concern. Approximately 5 to 15 percent, by weight, of the oil burned is emitted as smoke particles.

Particulate concentrations in the plume are greatest at the burn site and decrease with increasing distance from the burn site, primarily through dilution, dispersion, fallout, and also through washing out by rain and snow. Concentrations of PM-10 in a smoke plume are not easy to predict accurately because they are a function of many factors including soot yield, fire size, burn efficiency, distance downwind from the burn, terrain features, and atmospheric conditions (e.g., wind speed). Real-time monitoring of the plume is conducted to measure concentrations to confirm safe distances. If this monitoring is not possible, smoke plume trajectory models can be used, with a safety factor applied, to determine safe distances. These models are sophisticated tools that require detailed spill and meteorological inputs and should be run by experts only. As an interim planning measure, general examples can be used as guides.

Proximity to Shorelines, Towns, Airports, etc.

Smoke plumes are also of concern because they obstruct visibility, and may pose a safety hazard to operators of ships, aircraft, and motor vehicles in the immediate vicinity and downwind of the fire. The visibility reduction is caused primarily by light scattering from the smaller smoke particles, in the 0.3 to 0.6 micron size range. A rough estimate of the visibility in a smoke plume (measured in statute miles) is 700 divided by the concentration of particulate in micrograms/cubic meter. For a concentration of 150

micrograms/cubic meter, the visibility will be about 5 miles; in a plume with a concentration of 500 micrograms/cubic meter, the visibility will be reduced to about I mile. It is unlikely that serious visibility effects will be caused at ground level if the appropriate upwind separation distances for PM-10 are maintained.

The smoke plume may also cause limited spatial and temporal aesthetic impacts. Even though the concentrations of particulate in the smoke plume are well below levels of concern, they can still be detected by the human nose and may cause concern in the public.

Traffic Control

The smoke plume may require changes in air traffic routing and the imposition of an aircraft exclusion zone through a Notice to Aviators. Human use activities, such as fishing (commercial and sport), recreation, and tourism, may be temporarily affected by both the smoke plume and any requirements for safety zones around ISB operations implemented through a Notice to Mariners and the use of enforcement vessels. Local police should also be notified of possible visibility reductions on public roads and highways.

Coordination with Local Authorities

Coordination with public health and safety officials of local government agencies that will be affected by ISB operations is critical to ensuring a safe and successful ISB operation. These agencies are often not completely aware of ISB technology, and they have concerns for the health and welfare of their constituents who might come in contact with the ISB operations or smoke plume. Getting the agency representatives involved as soon as ISB is considered as a response option is a prudent action to take. The IMT should seek out local expertise on health and safety issues through the Liaison Officer and assign them to appropriate positions on the IMT.

Establishment of Exclusion and Safety Zones (Air, Land, and Water)

Appropriate exclusion, safety, and traffic control zones must be established in the vicinity of and prior to ISB operations to provide for the safety of recreational boaters, commercial maritime activities, the media covering response activities, and the general public. These zones should be considered for the land, water, and air space that are likely to be impacted by the smoke plume and waterborne operations.

Air Exclusion Zones are established and enforced by NAV Canada. A request for an appropriately sized Air Exclusion Zone should be coordinated with NAV Canada in accordance with established procedures.

Exclusion Zones on land are the responsibility of local government authorities but they will not usually be needed for ISBs beyond 5km. Establishment of appropriate zones should be coordinated with agency representatives on the IMT or through the Liaison Officer if local representation is not present on the IMT.

Safety Zones on the water are the responsibility of the Canadian Coast Guard. Appropriate safety zones should be established, announced to the public through established means, and enforced if there is reason to expect that individuals may not comply with the Safety Zone provisions.

Notification and Public Education

It is essential that the public be notified during the planning phase of an ISB operation. An informed public is more likely to support the operation. The purpose of the burn, the net environmental benefits of ISB compared with other alternatives, and the safety precautions that are in place to protect the public, the responders, and the environment must be communicated to the public.

Since ISB operations, especially when viewed from a distance, may be mistaken for a fire on a vessel, structure, or woodland, it is imperative to ensure that all surrounding communities are alerted to the planned burn. Participating agencies in the ICS should be tasked to help identify potentially impacted communities to be alerted about the planned ISB operations.

Notification and public education can be accomplished through several means, including press releases, press conferences, public meetings, notice to mariners, notice to aviators, and radio broadcasts. At several recent major incident responses, incident Internet Web sites were developed. They are an excellent method to educate the public and provide appropriate response information.

ATTACHMENT C ISB FIELD BURN FORM

Date/Time		ISB Group	
Project #		Burn #	
Latitude		Sea State	
Longitude		Visibility	
First Observed Time/Condition		Last Observed Time/Condition	

ESTIMATED AMOUNT OF OIL BURNT				
Observed Time	**Area of Fire (m^2)**		**Estimated amount of oil burnt (m^3)**	**Comments/Observations**
	Inside Boom	Outside Boom		

ATTACHMENT D JOB AIDS

1. Estimated Burning System Potential Calculator (EBSP), Bureau of Safety and Environmental Enforcement (BSEE), https://www.bsee.gov/sites/bsee.gov/files/insituburn-cal.html
2. OSRL Offshore ISB Operations Field Guide (2011).
3. API Field Operations Guide for In-Situ Burning of On-Water Oil Spills (2015). API TECHNICAL REPORT 1252.
4. IPIECA-IOGP (2016). Controlled In-Situ Burning of Spilled Oil. IPIECA-IOGP Good Practice Guide Series, Oil Spill Response Joint Industry Project (OSR-JIP). IOGP Report 523.
5. U.S. Coast Guard. Oil Spill Response Offshore, In-Situ Burn Operations Manual (2003).

Security Classification: BP Public	**BP Canada Energy Group ULC**	

Scotian Basin Exploration Project

Oil Spill Response Plan

Annex D -

Shoreline Response Program Tactical Response Plan

B02	Issued for Use	Mike Condon	Allen Pere	April 9, 2018
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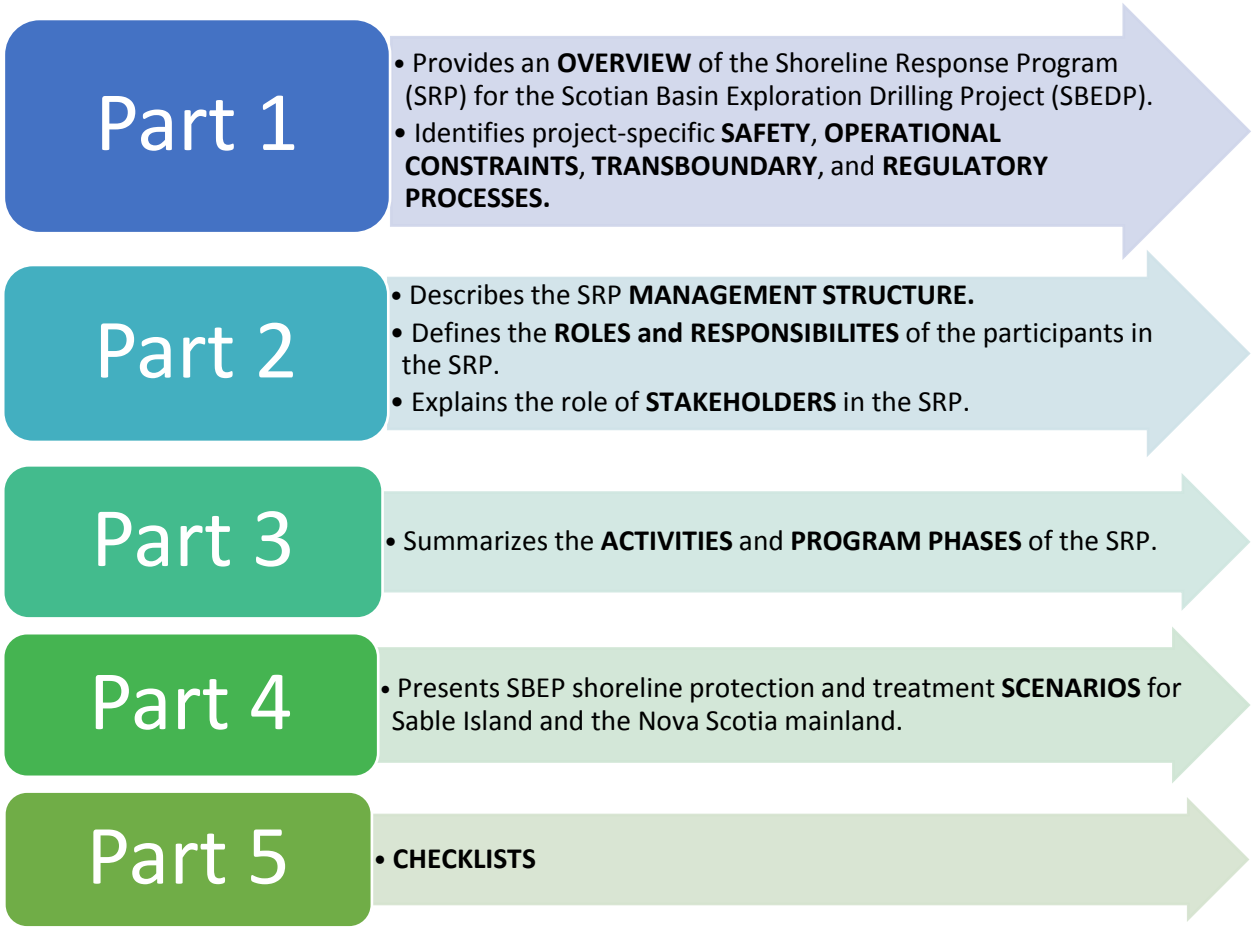
ACRONYM TABLE

ASMAP	Atlantic Region Shoreline Mapping Program
BMP	Best Management Practice
CNOSPB	Nova Scotia Offshore Petroleum Board
ECCC	Environment and Climate Change Canada
ECRC	Eastern Canada Response Corporation
EMC	Environmental Monitoring and Compliance
EU	Environmental Unit
EUL	Environmental Unit Leader
IAP	Incident Action Plan
ICP	Incident Command Post
ICS	Incident Command System
IMT	Incident Management Team
NEBA	Net Environmental Benefit Analysis
NEEC	National Environmental Emergencies Centre
PA	Protected Area
PPE	Personal Protective Equipment
PSC	Planning Section Chief
SBEP	Scotian Basin Exploration Project
SCAT	Shoreline Cleanup Assessment Technique
SCAT-OPS	SCAT-Operations Liaison
SIMA	Spill Impact Mitigation Assessment
SIR	Shoreline Inspection Report
SRP	Shoreline Response Program
SRPU	Shoreline Response Program Unit
SRPUL	Shoreline Response Program Unit Leader
STAG	Shoreline Treatment Technical Advisory Group
STR	Shoreline Treatment Recommendation
TRP	Tactical Response Plan
TWG	Technical Working Group

QUICK GUIDE


Part 1
• Provides an **OVERVIEW** of the Shoreline Response Program (SRP) for the Scotian Basin Exploration Drilling Project (SBEDP).
• Identifies project-specific **SAFETY**, **OPERATIONAL CONSTRAINTS**, **TRANSBOUNDARY**, and **REGULATORY PROCESSES.**
Part 2
• Describes the SRP **MANAGEMENT STRUCTURE.**
• Defines the **ROLES and RESPONSIBILITES** of the participants in the SRP.
• Explains the role of **STAKEHOLDERS** in the SRP.
Part 3
• Summarizes the **ACTIVITIES** and **PROGRAM PHASES** of the SRP.
Part 4
• Presents SBEP shoreline protection and treatment **SCENARIOS** for Sable Island and the Nova Scotia mainland.
Part 5
• **CHECKLISTS**

1.0 OVERVIEW

- The Shoreline Response Program (SRP) integrates all aspects of the decision process that relate to the shore zone.
- The SRP focuses on strategic planning to support the Operations Section in meeting the objectives set by Command.
- The SRP is implemented under the Environmental Unit of the Planning Section. In an escalated response, the SRP may transition into a standalone Shoreline Response Program Unit (SRPU) in the Planning Section.
- The objective of the SRP is to provide a comprehensive spill management approach to shoreline response that enables a rapid and coordinated effort from the planning and preparedness stages through to the initiation of a response, the implementation of shoreline protection measures, and the completion of shoreline assessment and treatment operations.

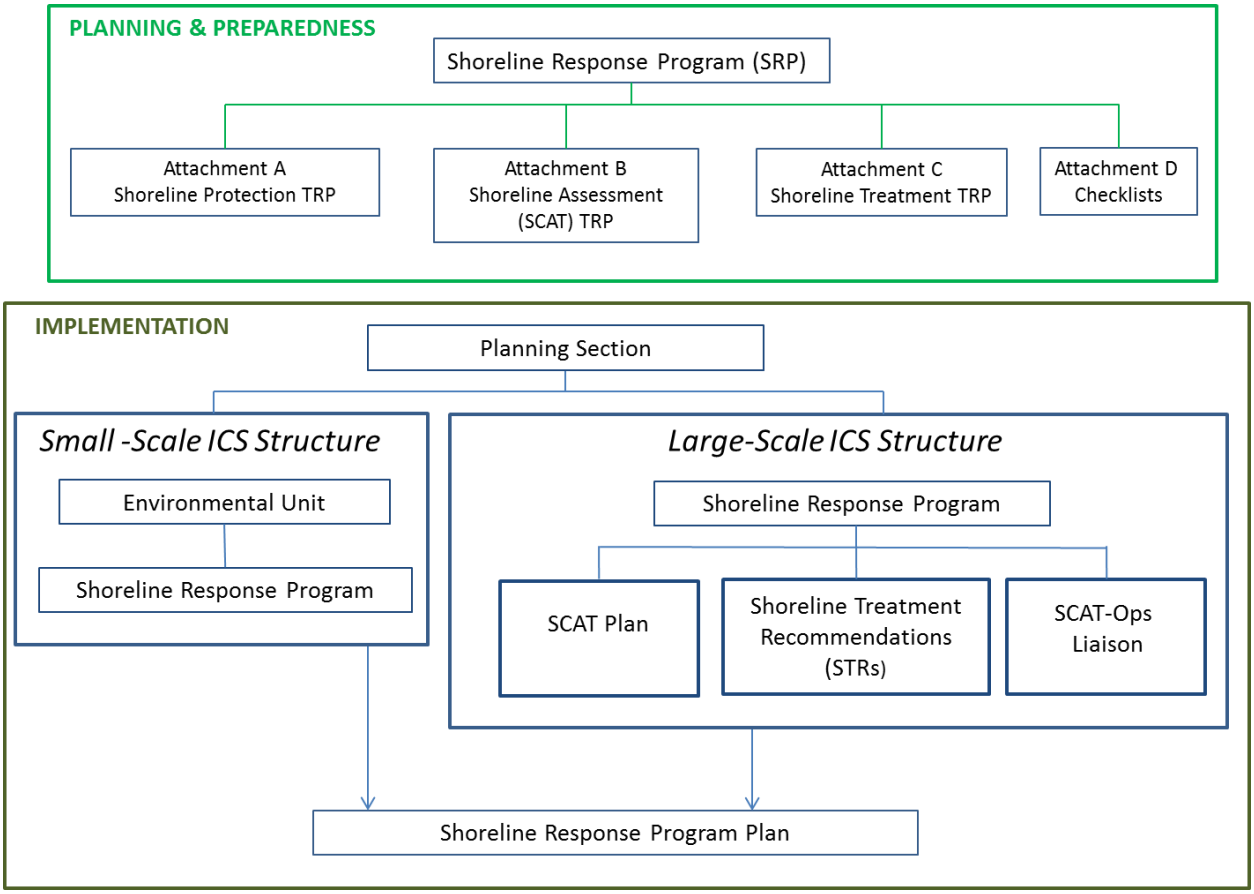
This Tactical Response Plan provides a summary of the Scotian Basin Exploration Project (SBEP) Shoreline Response Program (SRP). The SRP provides a comprehensive spill management approach to shoreline response, from the planning and preparedness stages through to the initiation of a response and the completion of shoreline assessment and treatment operations. It is part of the Planning Section of the Incident Management Team. The SRP is implemented under the Environmental Unit. In an incident with potentially extensive shoreline impact, the SRP may form a Shoreline Response Program Unit (SRPU)(Figure 1).

The SRP is activated at the beginning of a spill incident to provide strategic planning and recommendations for shoreline protection, treatment and operational closure. The SRP organisation is initially scaled to the projected needs of the response based on spill trajectory and shoreline, keeping in mind that early activation of the SRP will minimize or prevent potential shoreline impact, reduce cleanup impact, and reduce duration of the cleanup. Early activation will support a safer and more efficient response. The SRP clearly defines the roles and responsibilities of the spill management team and the actions that must be taken to activate a rapid response to potential shoreline oiling. Responding rapidly to oil that has reached shorelines is critical to minimize risk to resources, including a wide range of organisms, many of which have limited mobility.

- The SRP focuses on strategic planning for shoreline response.
- The SRP works within or closely with the Environmental Unit (EU) to develop the decisions that define the shoreline response and with the Operations Section (OS) to understand and implement those decisions.
- These decisions are developed, to a large degree, based on data and information generated by the SCAT Program field surveys.
- The focus of the EU is on the decision process that addresses environmental and cultural resource issues and on achieving consensus within the IMT and with stakeholders regarding decisions that define the shoreline response objectives, priorities, constraints, good practices, and end points.

- The focus of the SRP is to (a) generate information and recommendations for the EU on shoreline protection and treatment issues, (b) create Shoreline Treatment Recommendations (STRs) as part of the Shoreline Response Program Plan for shoreline segments that do not meet the treatment endpoint criteria, and (c) liaise with and support Operations to ensure that the STRs and the Plan are understood and implemented.

Figure 1 - The SRP planning and preparedness documents, and the SRP implementation via the Planning Section.



The small-scale ICS structure is appropriate for an initial response and an incident with local scale shoreline impact. The large-scale ICS structure is an Optional SRP structure for a spill response with potential extensive shoreline impact.

(Attachments A-D refer to the BP SRP Manual, not this Annex)

1.1 OBJECTIVES

SHORELINE RESPONSE PROGRAM OBJECTIVES

This Shoreline Response Program (SRP) is designed to:

- Describe the potential shoreline oiling risks associated with the Scotian Basin Exploration Project (SBEP).
- Understand the operational constraints, safety issues and regulatory requirements for implementing a shoreline response program along the outer coast of Nova Scotia.
- Outline the incident management structure for a shoreline response program.
- Identify key stakeholders and a strategy for their engagement in the planning and implementation stages of a shoreline response program.
- Present a summary of the tactical response planning for Shoreline Cleanup Assessment (SCAT) and Shoreline Treatment. Optional: Planning for Shoreline Protection may be moved into the SRP after Open Water Response activities scale down. Support Documents are included in this Plan.

1.2 AREA OF POTENTIAL IMPACT

- It is estimated that oil from this offshore project could (a) reach Sable island in summer months as quickly as 4 days but (b) could take in the order of 20 days to reach the Nova Scotia mainland coastal zone

The Scotian Basin Exploration Project (SBEP) location is approximately 230 to 370 km southeast of Halifax and as close as 48 km from Sable Island National Park Reserve. The regional current processes offshore Nova Scotia are dominated by the cold Labrador current that flows from the north along the continental shelf-break, and the warm North Atlantic current that flows towards the northeast and is located further offshore. In winter, winds are predominantly from the W to WNW and in the summer from the W to SW.

Modelling data predicts shoreline oiling at Sable Island is possible for both the summer and winter seasons, with the summer season resulting in the most oil stranded and the earliest arrival time of approximately 4 days.

There is a low potential (0 to 10%) for shoreline oiling along the mainland Nova Scotian coastline. The minimal arrival time is 20 days. Shoreline oiling may occur along portions of the Eastern Shore and Southern tip of Nova Scotia including the Yarmouth, Barrington, Shelbourne regions, Brier Island and the Canso Coastal Barrens, although the likelihood of this occurring is low (less than 5% in most cases). The only heavy oiling (>10 mm thickness of emulsified oil on the shoreline) that potentially occurs on the mainland is associated with the summer season and is predicted to take place around Riverport, Kinsburg, La Have Islands and West Dublin areas.

Figure 2 - Statistical map showing the maximum accumulated emulsion thickness on the shoreline in accumulated amounts that exceed the minimum thickness threshold of 1 micron (1 g/m2).

Map sourced from BP Upstream HSE, Technical Report: Fate and Effects Oil Spill Trajectory Modelling Report for Scotian Basin Exploration Drilling Project: Well NS-1.

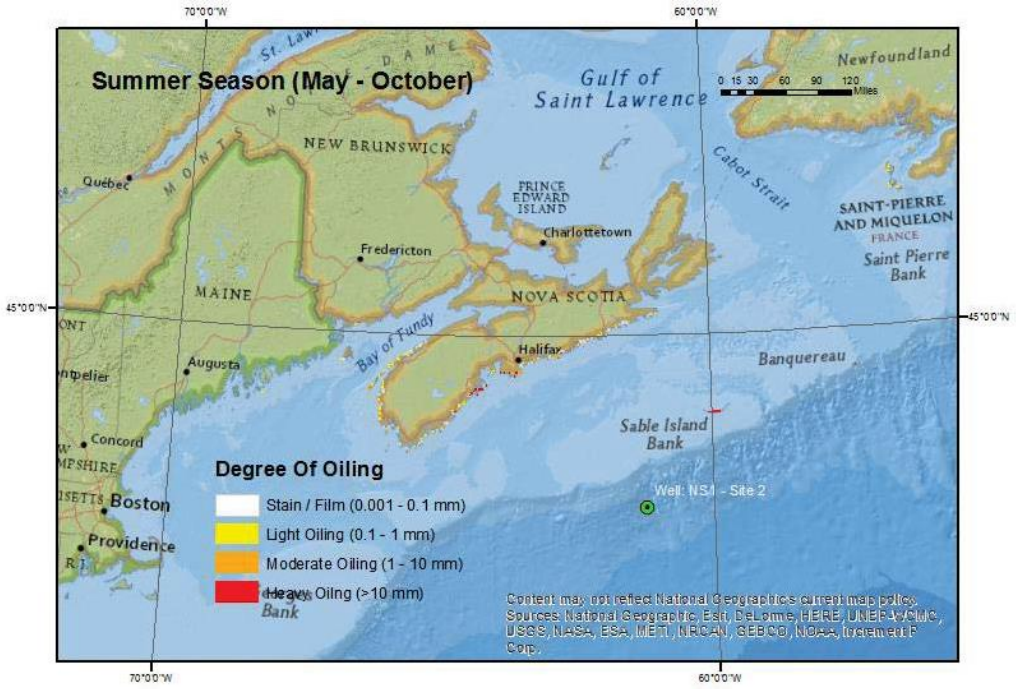


Figure 2 Protected Areas (PAs) in the zone of potential shoreline impact include:

- Sable Island (National Park Reserve, Migratory Bird Sanctuary, and Important Bird Area)
- Southwest Nova Biosphere Reserve
- Bras d'Or Lake Biosphere Reserve and St. Peters Canal
- Old Town Lunenburg, UNESCO World Heritage Site
- Kejimkujik National Park Seaside

1.3 PRIORITIES

- SRP priorities would be developed at the time of an incident based on the projected oil pathway(s) and the potential seasonal resources at risk within those areas.
- Tools are available to facilitate the development of priorities, such as the Environment and Climate Change Canada (ECCC) eeMAP database and the Atlantic Region Shoreline Mapping Program (ASMAP) GIS data base that is managed by ECRC.

With a lead time of more than two weeks to nearshore and shoreline impact, other than Sable Island, there is ample time to evaluate the oil transport direction and therefore identify the shoreline resources that may be at risk. The Environment and Climate Change Canada (ECCC) eeMAP database provides

information for an initial broad-scale assessment of the shoreline area(s) that may be affected so that an initial prioritization can be developed with the appropriate agencies involved in the decision process.

At the time of a spill, protection, assessment and treatment priorities would be established based on seasonal resources at risk at the time of the incident and by a consultative process, and would refer to, among other sources, the resources of concern identified in SIMA (Spill Impact Mitigation Assessment), the ECCC eeMAP data base, and the Atlantic Region Shoreline Mapping Program (ASMAP) GIS data base that is managed by ECRC.

The SIMA (formerly Net Environmental Benefit Analysis, NEBA) is a structured, scientific and consensus-based tool used by BP to help select the oil spill response option(s) that will yield the greatest benefit with the least net environmental and socio-economic effects. Ideally, the tool is used in the planning phase to pre-identify, or obtain pre-approval of, the best response options for representative planning scenarios. However, during a spill response, BP and government decision-makers will also conduct an expedited or qualitative SIMA to rapidly select the response option(s) with the greatest net environmental benefit given the specific circumstances of the incident.

The ASMAP GIS data base includes information from the National Sensitivity Mapping Program (Percy, 1993) and a “Shoreline Protection” layer (Owens and Dewis, 1995, Owens et al., 1996). In addition to the biological resources layers, the data base includes human resources (land use, aquaculture, water intakes, etc.) and operational considerations, such as access and boat launch locations. The “Shoreline Protection” layer provides potential Protection Objectives, Strategies, Tactics and Operational Considerations on a segment-by-segment basis for the entire region, and is consistent with the Environment and Climate Change Canada (ECCC) “Field Guide to Oil Spill Response on Marine Shorelines”.

1.4 OPERATIONAL CONSTRAINTS

- Development of an SRP involves consideration of a wide range of environmental, stakeholder, operational and regulatory factors, some of which may constrain the shoreline assessment process as well as the protection and treatment strategy and tactical options.

Constraints	
Regulatory/ Stakeholders	• Permits or registration may be needed for site access (e.g. Sable Island). • Regulatory approval may be required for techniques other than manual recovery. • Potential need for Indigenous groups consultations should be investigated for all site access.
Environment	• Consider LiDAR (light detection and ranging) for supporting collection of SCAT data to minimize exposure of field teams in remote locations. • For 24 hour operations, generators and lighting will be required to illuminate activities. • Most locations are remote in terms of access and logistics support would be required for personnel and equipment to remain onsite overnight. • Unique site access challenges: Sable Island and mainland tidal inlets. • Sites may have tidal constraints (tidal water level and currents) • Sites may have environmental and safety constraints (wildlife use, socio-economic activities, etc.) • Extreme/ adverse weather (snow, ice, rain, wind, and storm etc.) may hamper activities.

Constraints	
Equipment	• Availability of properly scaled equipment for mobilisation to remote locations. • Communications equipment suitable for remote locations should be accessible, including potential temporary installation of repeaters and satellite phones.
Personnel	• Shoreline response programs require large numbers of people. These people will need food, welfare services, transportation to and from site, safety provisions, etc. • Command and response activities must be supervised by trained and experienced personnel. • Span of control should not exceed 5-7 people.
Platform	• Limited suppliers of aviation and vessel services to Sable Island. • Appropriate vessel or helicopter transit services for mobilisation and demobilisation of personnel and equipment to remote sites on Sable Island and along the mainland coast. • May require 4x4 transportation for movement of response personnel and equipment.

1.5 REGULATORY REQUIREMENTS

- SRP activities should be coordinated with relevant agencies to confirm that all regulatory requirements are met.

Regulatory Agencies	
Canada Nova Scotia Offshore Petroleum Board (CNSOPB)	The lead agency responsible for pollution response with respect to incidents related to offshore Nova Scotia petroleum exploration or production installations.
Canadian Coast Guard	Has a memorandum of understanding to provide assistance as a resource agency.
Environment and Climate Change Canada (ECCC)	The federal authority for environmental and scientific advice during a marine pollution incident. The National Environmental Emergencies Centre (NEEC) is Environment and Climate Change Canada's focal point for the provision of scientific advice during a polluting incident. ECCC/NEEC normally chairs the Environmental Emergencies Science Table (Science Table), which may provide advice on a wide range of scientific and technical issues, including but not limited to: resource protection and spill clean-up priorities, spill behaviour, environmental/human health impacts of hazardous substances, spill countermeasures and waste disposal. In addition, Science Table Members may, if requested via Incident Command, support a number of important spill response functions, including but not limited to: supplying environmental sensitivity information, monitoring of environmental impacts, providing advice on the coordination of the rescue and rehabilitation of wildlife, spill trajectory and dispersion modelling, compilation of meteorological data and weather forecasts, hazardous materials (HAZMAT) advice, support for **shoreline cleanup assessment technique (SCAT)**, and documenting environmental damage.
Nova Scotia Environment	Responsible for regulating the storage, transportation, treatment and disposal of oily wastes and recovered materials in the event of a marine spill. Also supports the response via the Science Table.
Fisheries & Oceans Canada	As a participant of the Science Table, Fisheries and Oceans provides scientific and technical advice respecting the location of critical fisheries resources and their habitat, the timing and location of fishing activities, oceanographic information, support in spill tracking and trajectory modeling, general advice in support of clean-up operations and strategies, the impact of pollutants on sensitive resources, monitoring the potential impact of response strategies, and priorities for environmental protection related to the fisheries.

1.6 TRANSBOUNDARY ISSUES

- There is a very low possibility of transboundary issues with France (Saint Pierre and Miquelon) and the United States.

There is a very low possibility of transboundary issues. One is for the French islands of Saint Pierre and Miquelon in the summer season, with potential arrival times ranging from 30 to 75 days. In the winter season, the potential is reduced or eliminated by the presence of ice in the Gulf of St. Lawrence.

A similarly low possibility exists for oiling of the US coastline of Maine (from Bar Harbor to the Canadian border at Saint Andrews) during the winter season, with arrival times >75 days. These events are associated with the stranding of weathered tar balls (mostly stain/film thickness (0.1 to 0.001 mm). A few isolated tar ball stranding events may occur in the Cape Cod Bay region near Rhode Island.

1.7 SAFETY ISSUES

- Shoreline Response Program field activities are limited to SCAT teams. The Operations Section has responsibility for implementing and operating shoreline protection and cleanup activities.
- SCAT field teams have a risk profile that is unique and is not covered by the Operations Section safety plan(s). SCAT safety plans should be designed with this in mind.

Shoreline Response Program field activities are limited to SCAT teams. The Operations Section has the responsibility for implementing and operating shoreline protection and cleanup activities. SCAT field teams have a risk profile that is unique and is not covered by the Operations Section safety plan(s). The SCAT teams frequently work independently, often at considerable distance from the main operating area of the response. When designing a Safety Plan for SCAT activities, the following must be considered for proper hazard mitigation to be put in place:

- Communications in remote areas with limited mobile phone coverage and topography that may hinder radios.
- Emergency Response and Evacuation Plan for sudden illness and injury.
- PPE appropriate to the task, including proper hiking footwear for covering long distances in uneven terrain.
- Provision of food and water to sustain full field days.
- Wildlife considerations.
- Appropriate vehicle requirements for access to off-road and remote areas.
- PPE and safety protocol in compliance with Operations requirements when entering active work zones and staging areas.
- PPE and safety protocol unique from Operations requirements when working remote access areas with a hazard profile unlike an active operational work zone.
- Ensure SCAT teams have continuous monitoring and communications from the Command Post. They are often in areas separate from the rest of Operations.

2.0 SRP MANAGEMENT

- The Shoreline Response Program (SRP) is part of the Planning Section (Section 2.1.2 and Figure 1).
  - In a small incident ICS structure and during an initial response, the shoreline response program is part of the Environmental Unit.
  - In an incident with extensive shoreline impact, a Shoreline Response Program Unit may be formed, with a reporting line direct to the Planning Section Chief and continued close cooperation with the Environmental Unit.
- The Environmental Unit Leader (small-scale shoreline impact) or the Shoreline Response Program Unit (SRPU) Leader (large-scale shoreline impact) is responsible for the development of the Shoreline Response Program (SRP) and the SRP Plan which includes:
  - Shoreline Cleanup Assessment Technique (SCAT) Program and the SCAT Tactical Response Plan
  - Shoreline Treatment Recommendations (STRs) and the Shoreline Treatment Tactical Response Plan.
  - Optional: Planning for a Shoreline Protection Plan (SPP) can be moved to the SRP from the Operations Section if appropriate after Initial Phase of the Response. SRP would develop the SPP Tactical Plan.
- The shoreline response program works closely with other functions in the IMT. Good and consistent communication with these counterparts should be established and maintained throughout a response. (Section 2.2)
- SRP manpower resources and staffing needs are listed in Sections 2.3 and 2.4.
- The SRP should be scaled up to the incident potential and scaled down when Command determines resources are no longer required. (Section 2.5).
- Roles and responsibilities for key shoreline response program positions are provided in Section 2.6.
- Known stakeholders with potential direct involvement in the SPP or SRP programs are listed in Section 2.7.

2.1 STRUCTURE

2.1.1 Single Point of Responsibility

BP Canada Energy Group ULC has the concept of a Single Point of Responsibility for the Shoreline Response Program. The Crisis and Continuity/Emergency Response (CCM/ER) Lead for the SBEP is accountable for maintaining the preparedness of the Shoreline Response Program. The Environmental Unit Leader who is activated when an IMT is formed at the initiation of a response is responsible for implementing the Shoreline Response Program, as required.

The Single Point of Responsibility ensures that:

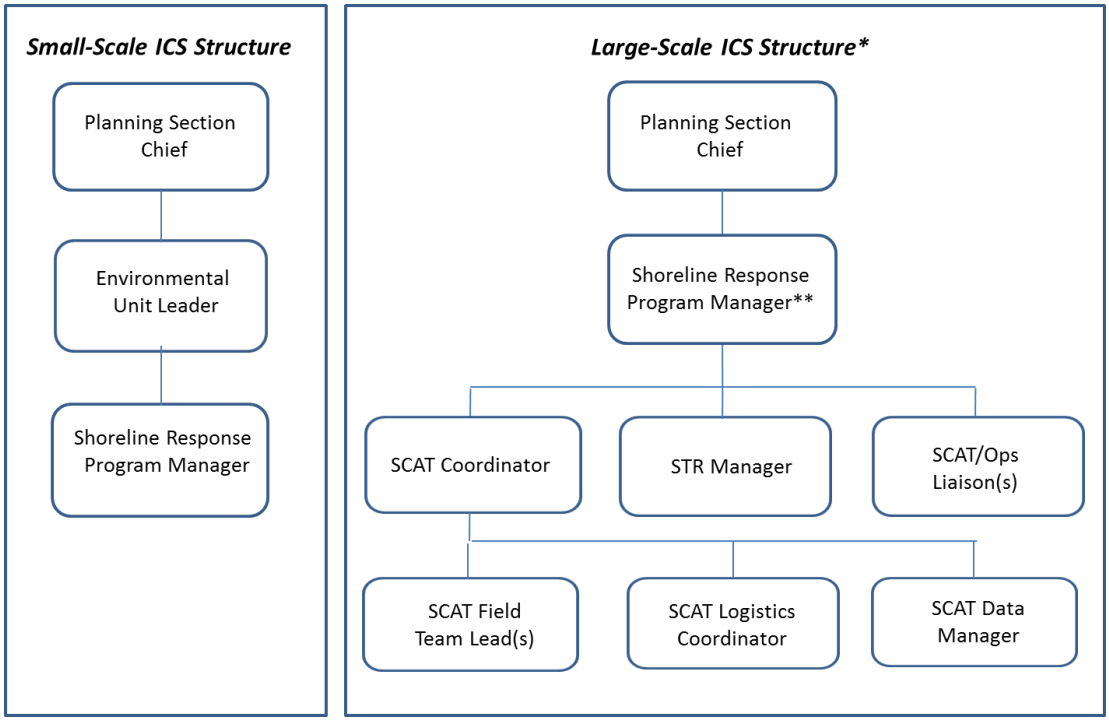
- Plans are reviewed and updated on an annual basis.
- Contractual arrangements and contact information with response organizations are maintained.
- Equipment and infrastructure owned and operated by BP Canada are maintained in a state of readiness.
- Training levels are maintained by staff named to shoreline response positions in the IMT.

2.1.2 Organization of an SRP within the IMT

The shoreline response program is part of the Planning Section in the Incident Management Team (IMT) (Figure 3). In a small-scale ICS structure, the shoreline response program sits within the Environmental Unit. In a large-scale ICS structure, with an expanded shoreline response component, the shoreline response program may form its own standalone Shoreline Response Program Unit (SRPU). The SRPU continues to work closely with the Environmental Unit (EU), whose focus is on providing technical advice and guidance to quickly develop the decisions that define the objectives and priorities of shoreline response. The primary end product is a Shoreline Response Program (SRP) Plan. The SRP Plan is based on Shoreline Treatment Recommendations (STRs) generated by the SCAT teams for shorelines that require treatment actions. The STRs are the work orders that describe to Operations where and how to treat and cleanup shorelines. STRs become work orders for Operations using ICS form 204 only after approval through the ICS Planning Cycle to ensure all stakeholder and regulatory input has been addressed. If the Shoreline Protection Program is also implemented under the SRP, a Shoreline Protection Plan would be included as a deliverable in the SRP Plan.

The number of personnel involved in the program and the number of layers in the vertical structure of the IMT organization are a function of the scale of the response and the necessary span of control. On a small-scale response, several roles may be filled by one person, and the shoreline response program will be under the responsibility of the Environmental Unit Leader. On a large response, span of control is maintained by subdividing management activities vertically by inclusion of “deputy” or other management positions in the chain of command and/or horizontally by subdividing activities by function or by geography. In this case, the SRPU may be formed and optional positions added that may be appropriate for a large-scale response, including an STR Manager and a SCAT-Operations (SCAT-OPS) Liaison Coordinator.

Figure 3 - Integration of the SRP within the IMT structure



* In a response with the potential for a large area of shoreline impact, the SRP may form as a standalone unit (Shoreline Response Program Unit) reporting directly to the Planning Section Chief and working closely with the EU.

** If the Shoreline Protection Program is elevated to Unit level, reporting directly to the Planning Section Chief, the SRP Manager would be called SRP Unit Leader (SRPUL). The SRPUL would maintain a close interface with the EU.

2.1.3 Key features of an SRP

- The shoreline response program, which is part of the Planning Section, focuses on strategic planning that is defined in a Shoreline Response Program (SRP) Plan. This program includes aa Shoreline Cleanup Assessment Technique (SCAT) Tactical Response Plan, a Shoreline Treatment Recommendations (STR) Tactical Response Plan, and a Shoreline Protection Plan (SPP) Tactical Response Plan, if the Shoreline Protection Program is implemented under the SRP after the Initial Phase of the Response. The Environmental Unit Leader, or Shoreline Response Program Unit Leader if a Shoreline Response Program Unit is formed, is responsible for the development of the SRP.
- The shoreline response program works within or closely with the Environmental Unit (EU), whose focus is on providing technical advice and guidance to quickly develop the decisions that define the objectives and priorities of the shoreline programs (Table 1).

- The focus of the EU is on environmental and cultural resource issues and on achieving consensus within the IMT and with stakeholders regarding decisions that define the shoreline response objectives, priorities, constraints and end points.
- The SRP Plan is based on data and information generated by the shoreline response program's SCAT field surveys, which are a necessary and fundamental cornerstone of the shoreline response decision process.
- The SPP Plan is based on aerial oil observations, trajectory modeling and the identification of seasonal resources at risk. The SPP Plan identifies response feasible on-water and on-shore strategies to protect shore-zone resources at risk and the tactics that would be appropriate for a successful protection operation. (Planning for Shoreline Protection initiates in the Operations Section with input and close coordination from the SRP, but it is optional to include in the SRP after the Initial Stage.)
- The SCAT Plan is generated by the shoreline response program and is implemented as the SCAT Program in the SRP Plan. The SCAT program is managed and operated by the shoreline response program.
- The SCAT program creates Shoreline Treatment Recommendations (STRs) for locations that require treatment actions. SRP and SCAT program personnel in the Command Post and in the field work and liaise with Operations to ensure that the Plan and the STRs are understood and appropriately implemented. Shoreline protection and treatment field activities are implemented and managed by the Shoreline Response Group, which reports to the Recovery & Protection Branch of the Operations Section. The SRP Plan incorporates an inspection program that enables closure of treatment operations when pre-agreed end points are achieved.

Table 1 - Environmental Unit and Shoreline Response Program Interface in a Step-wise Sequence of SCAT and STR Activities.

ENVL UNIT (with respect to Shorelines)	Shoreline Response Program Function
STEP E1 Activate EU	**STEP S1** Activate SRP team ("Yes/No" decision by PSC/EUL)
STEP E2 Assess Shoreline Resources at Risk (which includes transport, weathering, etc.)	**STEP S2** Mobilize to appropriate scale Elevate SRP to Unit level under Planning Section ("Yes/No" decision by PSC/EUL)
STEP E3 Develop *REACTIVE PHASE* SCAT activities and priorities recommendations and, once approved by the EUL, provide to the SRP Unit	
	STEP S3 ● Implement *REACTIVE PHASE* SCAT ● Provide reconnaissance data to the EU
STEP E4 ● Process SCAT reconnaissance data ● Develop *REACTIVE PHASE* SRP objectives and priorities recommendations ● Once approved by EUL, provide recommendations to the SRP Unit	

ENVL UNIT (with respect to Shorelines)	Shoreline Response Program Function
STEP E5 • Process SCAT data • Obtain acceptance (TWGs) and approval (Command) of *PLANNED PHASE* SRP treatment objectives, priorities, options , constraints (BMPs) and end points • Once approved by Command, provide to the SRP Unit	**STEP S4** • Implement *INITIAL/REACTIVE PHASE* SRP activities • Prepare SCAT Plan
	STEP S5 • *PLANNED PHASE* SCAT data collection based on approved STEP E5 decisions • Data used by SCAT teams to generate STRs • Ops monitoring, testing, experimentation, etc.
	STEP S6 • Prepare SRP Plan based on STEP E5 decisions and STRs for approval by Command • SRP Plan defines what Ops will do (when and how) during the *DECISION/PLANNING PHASE*
	STEP S7 • SRP Plan Implementation (*OPERATIONS/TREATMENT PHASE*) • OPS Liaison activities in ICP and in the field • Monitoring
	STEP S8 • Inspections and closure (*COMPLETION PHASE*)

2.2 COORDINATION WITH OTHER PARTS OF THE IMT

The SRP works closely with the following functions in the IMT. It is important that the EU or SRPU establish communications with these counterparts at the outset of the response.

IMT Function	Shoreline Response Program Coordination
Shoreline Response Group: Protection - Operations	• Works directly with Operations Shoreline Response Group to evaluate the effectiveness of the protection strategies and tactics and coordinate and appropriate adjustments or changes, if needed.
Shoreline Response Group: Recovery - Operations	• Operations Section uses the STRs to define how they implement their work. Shoreline Response Program must liaise with Operations to ensure the STRs and the SRP are understood and properly implemented. • SCAT Ops Liaisons work with Operations in the field to evaluate the success of the treatment methods and coordinate changes in the treatment recommendations with the shoreline response program function, if needed. • SCAT Teams also often need to coordinate logistics with Operations, particularly when teams are working in active operational Divisions. Clear lines of communication with Division Supervisors are essential for a well-coordinated response.
Air Operations Branch	• SCAT overflights are scheduled and coordinated with the Air Operations Group.

IMT Function	Shoreline Response Program Coordination
- Operations	
Staging Area Manager - Operations	• Ground and on-water support (vessels, vehicles, lunches) is coordinated with staging area logistics.
Safety Officer	• Every response has an incident-specific safety plan. The SCAT safety plan is designed for the unique hazards of SCAT field data collection while also adhering to the overall incident safety protocol. • SCAT survey job hazard analysis does not necessarily identify the same hazards as are associated for Operations. • Shoreline Response Program works closely with the Safety Officer to ensure proper risk minimization and PPE are prescribed in the SCAT Safety Plan, and ensures SCAT teams are aware of the incident reporting and safety policies that are in place for the response.
Logistics	• SCAT Logistics Coordinator works closely with Logistics when ordering equipment, supplies, and support services.
Liaison	• Outreach to land owners/managers and other stakeholders with potential influence or participation in the SRP is aligned with the Liaison Officer and Environmental Unit Leader.
Situation Unit	• SCAT Data Manager compiles and analyzes SCAT survey and inspection data on a daily basis and provides the data output to the Situation Unit for inclusion in displays and ICS-209 (incident status summary). • Situation Unit Leader liaises with the SCAT Coordinator so data and team status is correctly reported out at command and press briefings, in particular with regard to shoreline oiling and segment status.
Command	• The following four management (decision) outputs from Command constitute the core of the SRP program: - STRATEGY: What to do first and then in subsequent operational phases. - TACTICS and CONSTRAINTS: What to do and what not to do. - ENDPOINTS: When to stop work at the completion of each phase. - SIGN OFF: How to monitor the work and how to inspect to ensure that the objectives (end points) have been met. • Command level decision makers require inputs from the SRPUL and EUL to make these strategic planning decisions (Table 1): **1.** Where is the oil and where will is likely go (OIL TRANSPORT)? **2.** What is there oil like and how will it change (WEATHERING)? **3.** What is in the spill path (RESOURCES AT RISK)? **4.** What is operationally feasible (RESPONSE OPTIONS)? **5.** What risks have a time element (RESPONSE PRIORITIES)? **6.** How much and what types of waste will be generated (WASTE MNGT)?

2.3 AVAILABLE MANPOWER/SUPPORT

Appendix 5 of the SBEP OSRP lists the available resources for the Shoreline Response Program.

2.4 STAFFING

The following staff is identified for shoreline response program roles (Table 2). The number of personnel involved in a Shoreline Response Program and the number of layers in the vertical structure of the IMT organization are a function of the scale of the response and the necessary span of control, and may vary as the response proceeds. On a small-scale response, multiple roles may be filled by one person. On a large response, span of control is maintained by filling all positions and/or subdividing management activities vertically by inclusion of a “deputy” or other management positions in the chain of command

and/or horizontally by subdividing activities by function or by geography. Optional positions that may be appropriate for a large-scale response include an STR Manager and a SCAT-OPS Liaison Coordinator.

Table 2 - Shoreline Response Program Staffing Plan

Initial Response and Small-Scale IMT Structure
• Environmental Unit Leader • Environmental Technical Specialists • Historical/Cultural Resources Technical Specialist(s) • Resources-at-Risk Technical Specialist • Shoreline Response Program Manager • SCAT Field Team Leads • SCAT Data Support
Expanded SRP in the IMT Structure
• Shoreline Response Program Manager or Unit Leader • SCAT Coordinator • STR Manager • SCAT Field Team Leads • SCAT Data Manager and Data Support Team • SCAT Logistics/Safety Coordinator • SCAT-OPS Liaison Coordinator

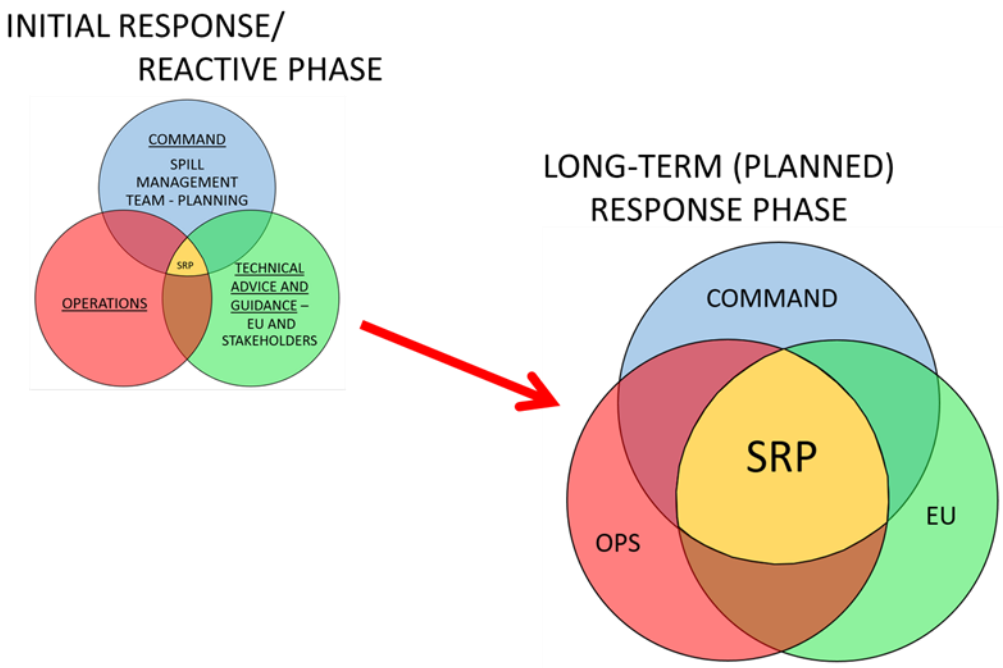
2.5 SCALE UP/DOWN PROCEDURES

The shoreline response program should be scaled up to the incident potential and scaled down when resources are no longer required. This involves notification and activation of sufficient resources to react to the incident potential and to maintain span of control. As more details of the incident become available, resources may be scaled to the actual needs of the response. Typically this results in over-resourcing during the reactive phase of a response, followed by the right-sizing of resources according to the strategies and tactics used in the planned phase of the response.

In most responses with shoreline impact, the SRP continues far longer than the on-water phase of a response. Over time, the needs for resources on-water and in the incident command will scale down as the on-water response demobilizes and long-term planning lengthens the IAP operational period. This shift results in the majority of resources being assigned to shoreline-related activities.

If open-water response has completed, but shoreline protection is still needed in the near-shore area, the planning and development of the Shoreline Protection Plan may be shifted to the SRP, allowing Operations to scale down to shoreline protection and cleanup activities with planning coming from the SRP.

Figure 4 - The Majority of Resources Shifts to SRP Allocation as a Response with Shoreline Impact progresses.



2.6 ROLES AND RESPONSIBILITIES OF KEY SHORELINE RESPONSE PROGRAM TEAM MEMBERS

With an SRP, responsibilities are divided between eight key functions:

- Environmental Unit Leader (EUL)
-
- SRP Manager
- STR Manager
- SCAT-Ops Liaison
- SCAT Coordinator
- SCAT Field Team Lead
- SCAT Logistics Coordinator
- SCAT Data Manager

These functions may all be filled by one person or by multiple people, depending on the size and complexity of the incident.

SCAT Data Manager

- Establishes the protocols for the documentation – processing, representation and archiving of data – to provide consistency and high-quality information
- Responsible for quality control/assurance for the data received from the SCAT field teams, working with them to ensure the data is complete and consistent
- Oversees the production of reports, maps and data summaries, both for the Planning Section/IC and to support field teams (on a small spill, inputs data and produces the reports themselves)
- Responsible for the archiving of all SCAT data and documentation

Environmental Unit Leader (EUL)

- Maintains engagement with Agencies and external stakeholders
- Chairs any committees or Technical Working Groups, such as the Shoreline Treatment Technical Advisory Group (STAG)
- Mobilizes the Shoreline Response Program Manager
- Reviews STRs and ensures appropriate signatures are obtained (for example, by the Historical /Cultural Resources Technical Specialist)

SRP Manager

- Has overall responsibility for the Shoreline Response Program (SRP), creates the SRP Plan and is the single point of contact for Incident Command on all shoreline-related issues
- Ensures accurate information is communicated on all shoreline response issues
- Works with the SCAT Coordinator to set up the SCAT program and with the EUL to help develop the decisions that define the shoreline response
- Has overall responsibility for ensuring shoreline treatments and constraints are implemented by the Operations Section and oversees any field treatment trials or tests
- Provides information to the EUL to support the Planning Section Chief at Planning Meetings and Tactics Meetings

STR Manager

- Generates, reviews and approves Shoreline Treatment Recommendations (STRs)
- Works with the EU's subject matter experts/stakeholders to ensure that their requirements and constraints are incorporated in the recommendations
- Works with the EU to: get reconnaissance information to assess priority areas for initial SCAT surveys, and approval for land access where appropriate; obtain approvals regarding the protection of endangered species and wildlife, or cultural and historical resources

2.7 STAKEHOLDER ENGAGEMENT

Table 3 lists the known stakeholders with potential direct involvement in the SRP program.

Table 3 – Stakeholders with Potential Direct Involvement in the SRP Program.

Organization	Role
Environment and Climate Change Canada (ECCC)	• Federal authority for environmental and scientific advice during a marine pollution incident. • Chair of the Science Table, which may provide advice on a wide range of scientific and technical issues, including but not limited to: resource protection and spill clean-up priorities, spill behaviour, environmental/human health impacts of hazardous substances, spill countermeasures and waste disposal. In addition, Science Table Members may, if requested via Incident Command, support a number of important spill response functions, including but not limited to: supplying environmental sensitivity information, monitoring of environmental impacts, providing advice on the coordination of the rescue and rehabilitation of wildlife, spill trajectory and dispersion modelling, compilation of meteorological data and weather forecasts, hazardous materials (HAZMAT) advice, support for **shoreline cleanup assessment techniques**, and documenting environmental damage.
Fisheries & Oceans Canada	• Provide scientific and technical advice on the location of critical fisheries resources and their habitat, the timing and location of fishing activities, oceanographic information, support in spill tracking and trajectory modeling, general advice in support of clean-up operations and strategies, the impact of pollutants on sensitive resources, monitoring the potential impact of response strategies, and priorities for environmental protection related to the fisheries.
Parks Canada	• Custodians of : - Sable Island National Park Reserve - Kejimkujik National Park Seaside
Indigenous Nations	• Can be requested and activated via the Science Table or directly by IMT through the Liaison function.
Government of Nova Scotia	• Information on parks and protected areas http://novascotia.ca/parksandprotectedareas/plan/interactive-map/ • Environmental Monitoring and Compliance (EMC) Division is responsible for field operations related to environmental protection. Permits and regulatory oversight for work in or around freshwater or wetlands.

3.0 SHORELINE RESPONSE PROGRAM ACTIVITIES

This section:

- points to the location of the Shoreline Tactical Response Plans (Protection, SCAT, Treatment). (Section 3.1),
- describes the role of the shoreline response program in the Planning Cycle. (Section 3.2),
- points to the location of the Shoreline Treatment Options Assessment in the Shoreline Treatment TRP (Section 3.3),
- points to the description of Shoreline Cleanup Phases, End Point Targets and Data Management/GIS in the SCAT TRP. (Sections 3.4 and 3.5),
- describes the four distinct phases of shoreline treatment: Initial/Reactive Phase; Planning/Decision Phase; Operational/Treatment Phase; and Inspection/Completion Phase as they relate to SCAT and the associated shoreline response program activities. (Section 3.6), and
- outlines the need for an initial and progressive demobilization plan. (Section 3.7)

3.1 PLANNED OPERATIONS

3.1.1 Shoreline Protection Tactical Response Plan

The Shoreline Protection Tactical Response Plan (TRP) is in Attachment A of the BP SBEP SRP Manual.

3.1.2 Shoreline Assessment (SCAT) Tactical Response Plan

The Shoreline Assessment (SCAT) Tactical Response Plan (TRP) is in Attachment B of the BP SBEP SRP Manual.

3.1.3 Shoreline Treatment Tactical Response Plan

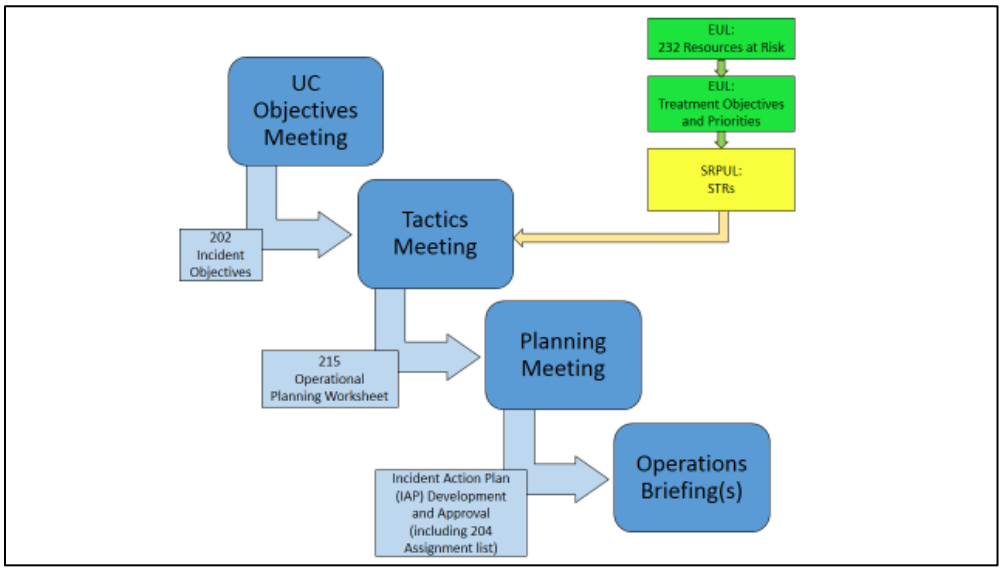
The Shoreline Treatment (Cleanup) Tactical Response Plan (TRP) is in Attachment C of the BP SBEP SRP Manual.

3.2 BRIEFINGS/MEETINGS/REPORTING

The shoreline response program is involved in the IMT planning cycle as part of the Planning Section contribution to the Tactics and Planning Meetings (Figure 5). The STR Manager coordinates with the EU to generate Shoreline Treatment Recommendation (STR) forms which, once approved, are provided to the Tactics Meeting and incorporated into the Planning Meeting and the Incident Action Plan (IAP) through the ICS-204 Work Assignment process.

Shoreline oiling summary data, STR progress and inspection completion data are made generally available to the IMT and outside interests through the Situation Unit and the ICS-209 (Incident Status Summary) form.

Figure 5 - Shoreline Response Program Involvement in the Planning Cycle meetings



3.3 SHORELINE TREATMENT OPTIONS ASSESSMENT

A shoreline response decision tool is provided in the Shoreline Treatment TRP (Attachment C of the BP SBEP SRP Manual).

3.4 SHORELINE CLEANUP PHASES AND END POINT TARGETS

The SCAT TRP in the BP SBEP SRP Manual contains information on cleanup phases and end point targets.

- Treatment Recommendation Process
- Inspection Process
- SCAT Program Phases
- Treatment Endpoints

3.5 DATA MANAGEMENT/GIS

Data management is discussed in the SCAT TRP of the BP SBEP SRP Manual.

3.6 PROGRAM PHASES

Response activities following a spill typically can be divided into the initial REACTIVE PHASE, during which decisions and actions follow pre-planned procedures and priorities or are developed according to the situation at hand, and the PLANNED PHASE, during which the actions follow incident-specific strategies and tactics that are developed on a rolling basis by the incident management team (Table 4). In the Reactive Phase, the SCAT program provides a rapid assessment of the scale and character of the affected area. The Planned Phase involves systematic surveys and establishing priorities, recommending treatment techniques, and setting objectives that determine when operations have been completed.

The information flow that is associated with each of the Reactive and Planned Phases is summarized in Table 4.

Table 4 - SCAT Phases During a Response and the Associated Shoreline Response Program Activities

REACTIVE PHASE	**INITIAL or REACTIVE RESPONSE PHASE**	
	Aerial and/or ground reconnaissance SCAT surveys define the regional scale of the shoreline oiling and define the overall character of the oiling conditions.	This information is provided to the EU to develop initial response recommendations and protection and cleanup priorities.
PLANNED PHASE	**PLANNING or DECISION PHASE**	
	Ground-based SCAT surveys systematically document shoreline character and oiling conditions within segments. The information that is generated is entered into the SCAT database. A key task is to create shoreline segments that are the foundation of the survey database and the decision process.	This data is provided to the EU to recommend to Command treatment objectives, priorities, options constraints and end points. A Shoreline Response Program Plan is created by the SRPUL, describing the objectives and strategies. SCAT Team Leads prepare STRs for each segment to be treated. The STR form is reviewed and approved by Command for inclusion in the Incident Action Plan.
	OPERATIONAL or TREATMENT PHASE	
	Site visits by SCAT to provide operational support to cleanup managers and supervisors. These can include pre-inspection surveys prior to formal post-treatment inspection surveys.	SCAT teams discuss progress and issues associated with the treatment recommendations and end points.
	INSPECTION or COMPLETION PHASE	
	Ground-based SCAT segment surveys document shoreline character and oiling conditions after a weathering period or post-treatment and recommend whether the treatment end points in a segment are achieved.	Once approved by Command, these post-treatment inspections provide closure so that operations teams can redeploy resources from a treated segment. The results of a segment survey are recorded on a Shoreline Inspection Report (SIR) form. Activities may involve Monitoring to observe natural weathering towards end points.

3.7 DEMOBILIZATION PLAN

The first iteration of the demobilization plan is developed during the initial (reactive) response phase to ensure that extra or unnecessary assets (personnel and equipment) mobilized at the outset of the response are not retained if they are not required. This is particularly important for the Shoreline Protection phase as this may be of short duration compared to the SCAT and Shoreline Treatment programs.

The long-range strategies developed in the Shoreline Protection Plan, SCAT Plan and the Shoreline Treatment Recommendations determine which assets are appropriate and necessary as the programs evolve. A long-range demobilization will factor in the differing requirements as these change through time so personnel and equipment can be appropriately adjusted as warranted.

Shoreline treatment typically involves a progressive reduction in effort as segments are treated and end points are achieved.

4.0 SHORELINE RESPONSE PROGRAM SCENARIOS

- Scenarios provide examples of the types of situations that may be expected following an offshore incident in terms of key factors that may apply and appropriate protection and treatment considerations for those situations.
- Summer (Sable Island, Lawrencetown Beach, Kejimkujik National Park Seaside) and winter (Sable Island) example scenarios are provided (Figure 6).
- The likelihood that oil from this project would reach the mainland coasts in winter is very low.

Figure 6 - Scenario locations: Sable Island (green pin), Lawrencetown Beach Provincial Park (red pin), Kejimkujik National Park Seaside (yellow pin).

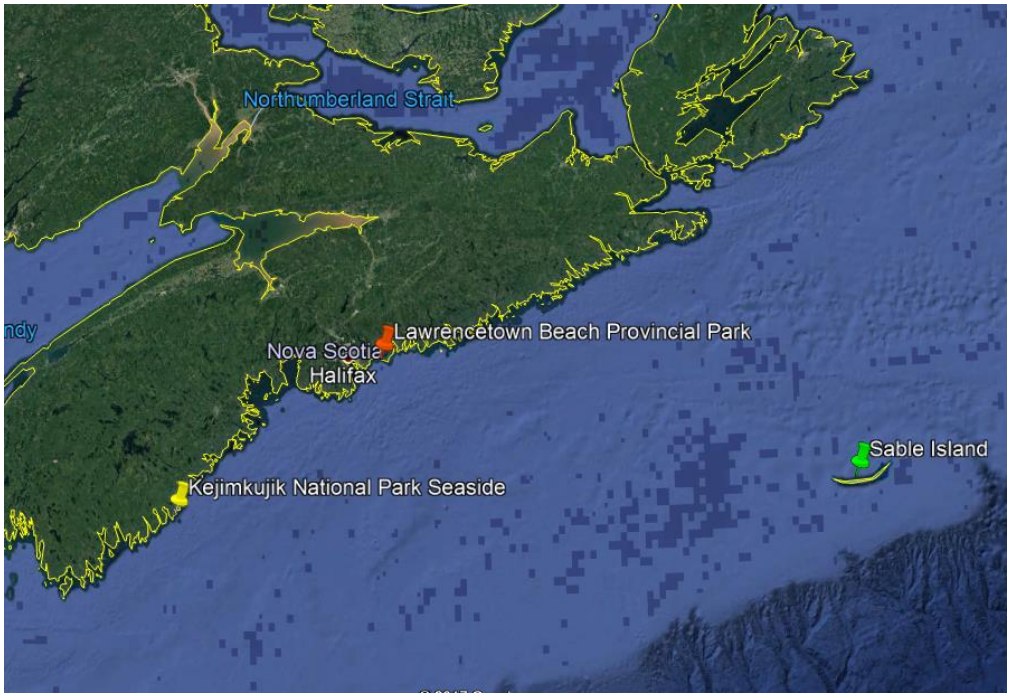
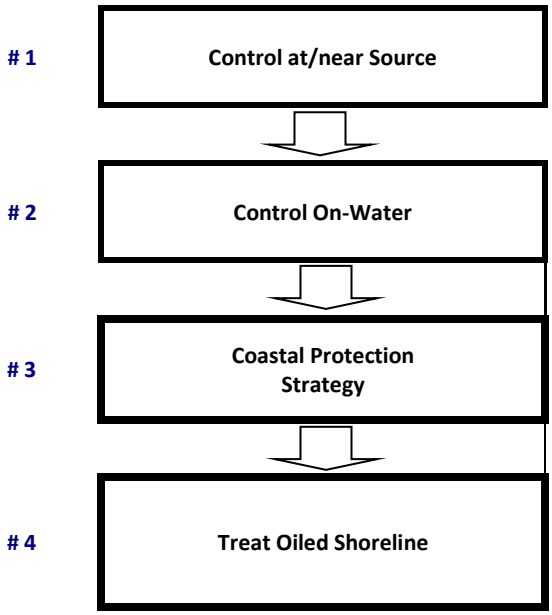


Image sourced from Google Earth, 2017.

Oil spilled on water is transported and spread by winds and surface currents, which are often variable and only occasionally can be predicted accurately. In a typical response operation, where shoreline resources are at risk there are four fall-back stages in a source-to-shoreline sequence (Figure 7), although some elements of the overall strategy may take place at the same time.

Figure 7 - Typical operational response strategies



If control at the source or in open water cannot be achieved due to feasibility, practicality or safety factors, and if the spilled oil poses a threat to the coastal zone, the next line of defence would be near or at the shoreline or at tidal inlets to protect site-specific vulnerable and sensitive shoreline resources or habitats at risk. The objective of a nearshore, on-water protection strategy would be to contain and recover oil, divert oil away from the shore, and/or redirect or deflect oil to strand on a shoreline that has less sensitive resources at risk and where shoreline recovery could be effective.

Shore- or water-based on-water protection typically focuses on booming strategies to redirect, exclude or contain floating oil, while onshore protection can include barriers or redirection (containment) booming tactics (Figure 8).

Figure 8 - Shoreline Protection Strategies and On-Water and Onshore Tactics

Strategies	On-water Tactics: Containment and recovery	On-water Tactics: Redirection away from shore	On-water Tactics: Redirection towards shore	Onshore Tactics: Exclusion boom or barrier	Onshore Tactics: Containment boom shore-seal boom	Onshore Tactics: Containment with berms, sorbents, or sumps	Onshore Tactics: Containment by barriers, contact barrier	Onshore Tactics: Exclusion by booms, barriers, or dams	Onshore Tactics: Channel exclusion by booms, barriers, or dams
Contain/recover oil on water	✓	✓		✓					
Alter direction of oil on water	✓	✓	✓	✓	✓		✓	✓	
Prevent oil movement into channel	✓	✓	✓	✓				✓	
Trap or contain and collect oil at shoreline			✓		✓	✓			
Prevent remobilization of oil						✓			
Prevent overwash into backshore or lagoon		✓			✓	✓		✓	

If all the first series of control or protection strategies are not completely successful, the final step could be the cleanup or treatment of stranded oil (#4 in Figure 6).

The types of shorelines referred to in the SBEP Shoreline Response Program follow the Environment and Climate Change Canada (ECCC) shoreline classification system (Table 5). The ECCC field guide contains tactical decision-making tools for each shoreline type and the preferred tactics for use on Canada's shorelines. The shoreline type is defined as the primary character of the upper intertidal zone where oil is most likely deposited following a coastal spill.

A Field Guide to Oil Spill Response on Marine Shorelines.
Environment and Climate Change Canada.
English: http://publications.gc.ca/pub?id=9.820227&sl=0
French: http://publications.gc.ca/pub?id=9.677556&sl=0

There are four basic groups of cleanup tactics:

- Natural Recovery
- Removal
- In situ
- Chemical/Biological

Natural Recovery	In situ
• Natural recovery	• Mixing – dry • Mixing – wet • Sediment relocation • Flooding • Low-pressure ambient washing • Low-pressure warm/hot washing • High-pressure ambient washing • High-pressure warm/hot washing
Removal	**Chemical/Biological**
• Manual removal • Mechanical removal • Vacuums • Vegetation cutting • Passive sorbents	• Dispersants • Burning • Shoreline cleaners • Bioremediation

The Nova Scotia mainland outer coast shoreline types fall into six groupings for shoreline response considerations (Table 5).

Table 5 - Nova Scotia mainland outer coast shoreline types

Shoreline Category*	Percent of Shoreline (Weymouth to Sydney)*	Kilometers of Shoreline (Weymouth to Sydney)*
Bedrock	13.9	1093.7
Boulder Beach Pebble/Cobble Beach Mixed Sand/Gravel Beach	68	5353.5
Sand Beach	1.4	110.4
Manmade**	2.7	209.2
Salt Marsh	13.7	1077.4
Sand Tidal Flat Mud Tidal Flat	0.4	33.4

* Data sourced from ECRC ESI maps for Nova Scotia

** ECRC ESI database does not distinguish permeable manmade and solid manmade shoreline

The mainland outer coast of Nova Scotia also has a large number (>50) of tidal inlets created by the growth of barrier spits or barrier beaches across shallow bays or estuaries (Figure 8). In addition, there are many narrow tidal channels that connect bays or separate islands from the mainland coast (e.g. Lennox Passage and Isle Madame in Chedabucto Bay).

- Shoreline protection at tidal inlets is intended to prevent oil being transported into backshore wetlands, bays, or lagoons. Inlets are dynamic environments, and successful protection or control strategies require understanding the reversing current patterns and the predictable current velocities and water depths that change continuously throughout the tidal cycle.
- Shoreline protection in tidal channels is intended to minimize the spread of oil into back bay areas or along shore (e.g. a temporary dam was constructed in Lennox Passage during the initial response to the M/T "Arrow" spill to protect many low-energy shorelines between Isle Madam and mainland Cape Breton)

Figure 9 - Examples of tidal inlets (a) near Shelburne; (b) Port Morien

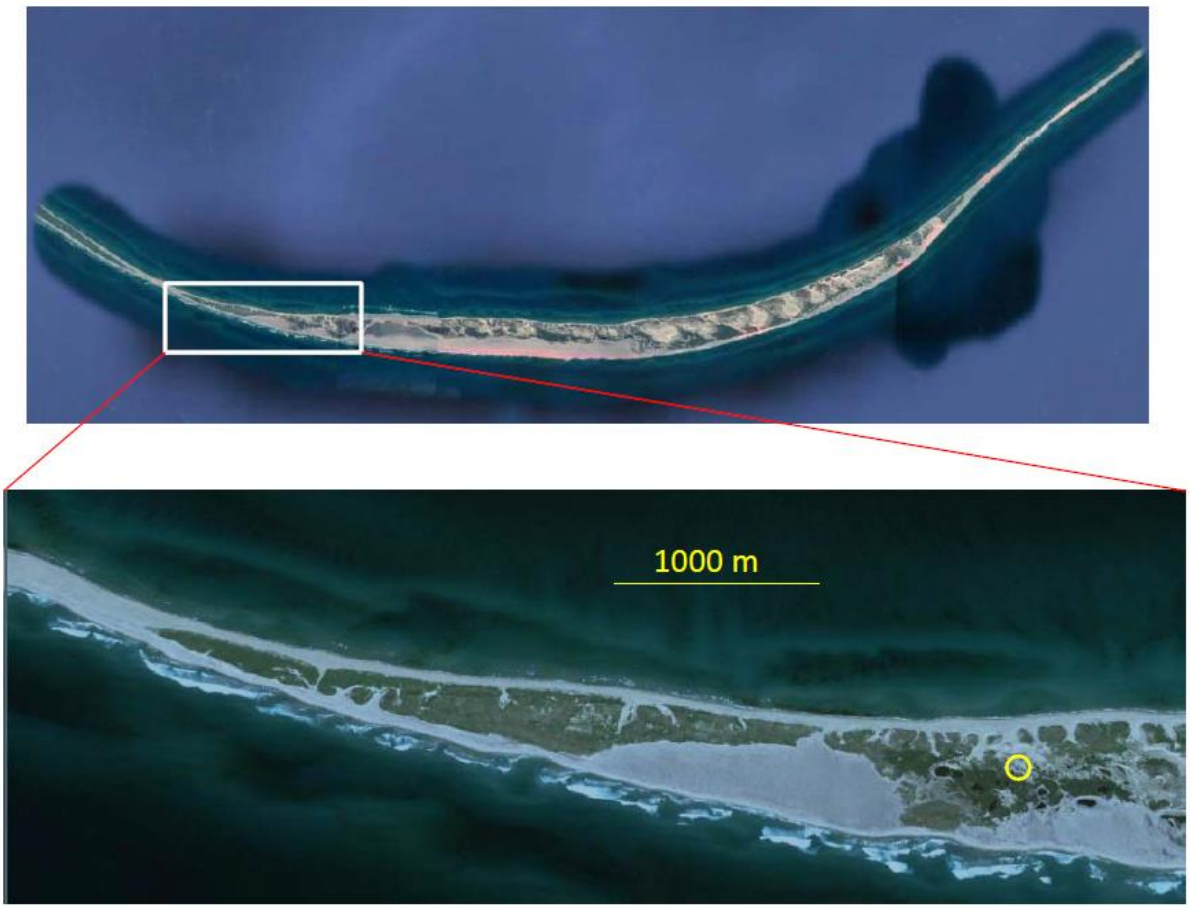
4.1 SHORELINE PROTECTION SCENARIOS

4.1.1 Sable Island – Offshore Summer Scenario

OFFSHORE SUMMER PROTECTION SCENARIO – SABLE ISLAND	
Shoreline Type	Sand
Seasonality	Summer (April – October) Summer winds: predominantly W-SW; average 7.3 ms^{-1} (14 knots) Sea State: median significant wave height 0.8 - 0.9 m • Under most summer conditions, wind and sea state conditions would physically disperse oil slicks approaching Sable Island
Objectives	Prevent or minimize oil reaching the shoreline to protect Resources at Risk, which would include mobile species such as shore birds and marine mammals.
Strategy	The primary protection strategy would be control at or near the source or on-water control.
Techniques	On-water and onshore tactics (Figure 7) Consider construction of a sand barrier across the low washover channel that connects the north and south sides of the island to contain stranded oil (yellow box in lower Figure 9.
Required Resources	Sable Aviation – aviation services Nearshore vessels with boom deployment, containment and recovery systems Landing craft capable of beach landing operations Shore-seal boom systems Small earth-moving equipment for barrier and/or dam construction

OFFSHORE SUMMER PROTECTION SCENARIO – SABLE ISLAND	
	Waste containers for recovered oil-water and oil-sediment materials Fuel delivery and storage service
Limitations	Remote location 300 km (190 mi) southeast of Halifax. Long transit times and potential delays to crew movement, equipment delivery, logistics supply runs, and waste removal. Rough seas and strong currents – high potential for delays and standdown days No services available Heliport and non-maintained sand beach runway access. All vessel based cargo operations at Sable Island are carried out either by beach landing or helicopter sling load, there is no dock.
Resources-at-Risk	Shore birds, marine mammals, Sable Island horses. National Park Reserve, Harbour and Grey Seal breeding ground, Ipswich Sparrow breeding ground, migratory bird stopover.
Approvals/Permits	The island is managed by Parks Canada. Visitors require permits. For general information regarding access to Sable Island refer to the CCG "Visitors Guide to Sable Island" (http://www.ccg-gcc.gc.ca/folios/00018/docs/sable-island-visitors-guide-eng.pdf)
Subject Matter Experts	Aerial observers, wildlife observers, helicopter sling load experts, sea-lift experts

Figure 10 - Scenario Location: Circle Marks the Sable Island Meteorological Station location



4.1.2 Sable Island – Offshore Winter Scenario

OFFSHORE WINTER PROTECTION SCENARIO – SABLE ISLAND

Shoreline Type	Sand
Seasonality	Winter winds: predominantly W-WNW; average 9.9 ms^{-1} (19 knots) Sea State: median significant wave height 1.2 - 1.3 m • Winter wind and sea state conditions would rapidly physically disperse any oil slicks approaching Sable Island
Objectives	Prevent or minimize oil reaching the shoreline to protect Resources at Risk, which would include mobile species such as shore birds and marine mammals.
Strategy	The only feasible protection strategy would involve control at or near the source or on water-control.
Techniques	Nearshore or onshore protection would be constrained by safety considerations and all options would be impractical or ineffective from an operations perspective.
Required Resources	N/A
Limitations	Remote location 300 km (190 mi) southeast of Halifax. Long transit times and potential delays to crew movement, equipment delivery, logistics supply runs, and waste removal. Rough seas and strong currents No services available Heliport and non-maintained sand beach runway access..
Resources-at-Risk	Few Resources at Risk during winter months although the potential would exist for the presence of shore birds and marine mammals. Sable Island horses. National Park Reserve
Approvals/Permits	The island is managed by Parks Canada. Visitors require permits. For general information regarding access to Sable Island refer to the CCG "Visitors Guide to Sable Island" (http://www.ccg-gcc.gc.ca/folios/00018/docs/sable-island-visitors-guide-eng.pdf)
Subject Matter Experts	Aerial observers, wildlife observers

4.1.3 Lawrencetown Beach Provincial Park – Mainland Summer Scenario

MAINLAND SUMMER PROTECTION SCENARIO – LAWRENCETOWN BEACH PROVINCIAL PARK	
Shoreline Type	Sand-cobble beach backed by sand dunes.
Seasonality	Summer (April – October) Summer winds: predominantly W-SW; average 7.3 ms^{-1} (14 knots) Sea State: median significant wave height 0.8 - 0.9 m • Under most summer conditions, and considering the length of time required for oil to each the mainland coast, wind and sea state conditions would physically disperse oil slicks before they would reach the mainland coast
Objectives	Prevent or minimize oil reaching the shoreline to protect Park beach and prevent oil stranding on the coarse sediment (pebble-cobble) beaches at either end of the bay.
Strategy	The primary protection strategy would be control at or near the source or on-water control. Onshore protection could stage in the Provincial Park. Good backshore land access (Highway 207). Small-boat ramp at Cow Bay near Rainbow Haven Provincial Park (approximately 10 km distance).
Techniques	On-water and onshore tactics (Figure 7). Could divert oil with nearshore and shore-seal boom (marked in blue on Figure 10) towards the central sand beach area away from the pebble/cobble sections at the north-eastern (yellow arrow) and south-western (green arrow) ends of the beach to contain oil on the sand beach sections to concentrate the oil and to facilitate oil recovery.
Required Resources	Nearshore vessels with boom deployment, containment and recovery systems Landing craft capable of beach landing operations Shore-seal boom systems Small earth-moving equipment for barrier and/or dam construction Waste containers for recovered oil-water and oil-sediment materials

MAINLAND SUMMER PROTECTION SCENARIO – LAWRENCETOWN BEACH PROVINCIAL PARK	
	Fuel delivery and storage service
Limitations	Plunging breakers ("surf" waves) and rip currents could constrain nearshore on-water protection activities. Access to beach should use existing walkways across the sand dunes to minimize disturbance to dune grasses (Figure 11). May consider creation of temporary access locations for mechanical equipment and plan post-operations restoration.
Resources-at-Risk	High-use recreational sand-cobble beach backed by sand dunes. Provincial Park.
Approvals/Permits	N/A
Subject Matter Experts	Aerial observers, wildlife observers

Figure 11 - Lawrencetown Beach Provincial Park

Figure 12 - Wooden access walkway at Lawrencetown Beach Provincial Park

4.2 SHORELINE TREATMENT SCENARIOS

4.2.1 Sable Island – Summer Scenario (April – October)

SUMMER TREATMENT SCENARIO – SABLE ISLAND	
Shoreline Type	Sand
Seasonality	Summer (April – October)
Objectives	- Accelerate the natural recovery of the oiled shoreline. - Avoid causing more damage to the shore zone than the oil would cause by itself. - Use available resources in a safe, efficient, and effective manner. - Minimize the generation and handling of waste materials.
Strategy	Natural Recovery, In-situ Treatment, and Removal.
Techniques	- Mechanical Removal - Manual Removal - Mixing - dry - Natural Recovery - Sediment Relocation
Required Resources	Sable Aviation – aviation services Landing craft capable of beach landing operations Skid steers Small disc harrow and tractor and/or rototillers. Vessels fitted to carry a minimum of two 40 yard roll-off type dumpsters Manual labour; equipment operators; supervisors; temporary, mobile support services Fuel delivery and storage service
Limitations	Remote location 300 km (190 mi) southeast of Halifax. Long transit times and potential delays to crew movement, equipment delivery, logistics supply runs, and waste removal. Rough seas and strong currents – high potential for delays and standdown days No services available Heliport and non-maintained sand beach runway access. All vessel based cargo operations at Sable Island are carried out either by beach landing or helicopter sling load, there is no dock.

SUMMER TREATMENT SCENARIO – SABLE ISLAND	
Resources-at-Risk	Shore birds, marine mammals, Sable Island horse, protected National Park Reserve, Harbour and Grey Seal breeding ground, Ipswich Sparrow breeding ground, migratory bird stopover
Approvals/Permits	The island is managed by Parks Canada. Visitors require permits.
Subject Matter Experts	SCAT, Wildlife Observers, Helicopter sling load experts, Sea-lift experts

Figure 13 - Scenario location: circle marks the Sable Island Meteorological Station location.

4.3 KEJIMKUJIK NATIONAL PARK SEASIDE - SUMMER SCENARIO (APRIL – OCTOBER)

SUMMER SCENARIO – KEJIMKUJIK NATIONAL PARK SEASIDE	
Shoreline Types	Sand beaches backed by dunes; coarse, mixed-sediment beaches (sand, granule, pebble, cobble) with bedrock outcrops; bedrock
Seasonality	Summer (April – October) Summer is a depositional period for the beach. Calm waves dominate. Sediment accumulates along the shore face when there is little energy to carry the sediment in the backwash. A berm develops and the beach widens.
Objectives	– Treat to agreed endpoints. – Avoid causing more damage to the shore zone than the oil would cause by itself. – Use available resources in a safe, efficient, and effective manner. – Minimize the generation and handling of waste materials.
Strategy	Beaches : In-situ Treatment and Removal Bedrock: Flushing and recovery
Techniques	– Mechanical Removal – Manual Removal – Mixing - dry – Sediment Relocation – Low-pressure washing
Required Resources	- Landing craft capable of beach landing operations - Helicopter service with sling load capability - Skid steers; small disc harrow and tractor and/or rototillers. - Vessels fitted to carry a minimum of two 40 yard roll-off type dumpsters - Manual labour; equipment operators; supervisors; mobile support services - Pumps, containment booms, skimmers - Fuel delivery and storage service
Limitations	- The summer deposition cycle could result in buried oil - Piping Plover nesting season - Remote location with no access roads - Rough seas and strong currents – high potential for delays and “weather” days - No services available
Resources-at-Risk	- National Park protected area - Piping Plover nesting area
Approvals/Permits	Consult with Parks Canada
Subject Matter Experts	SCAT, Wildlife Observers, Helicopter sling load experts, Sea-lift experts

Figure 14 - Kejimkujik Shore Types: Sand Beach and Coarse, Mixed-Sediment Beach with Bedrock Outcrop

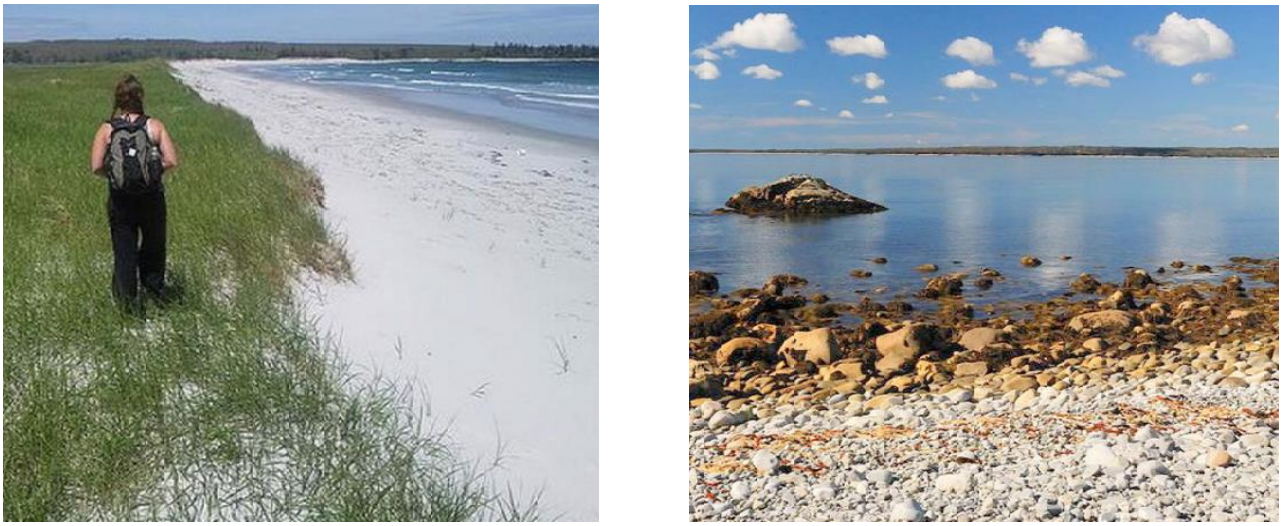
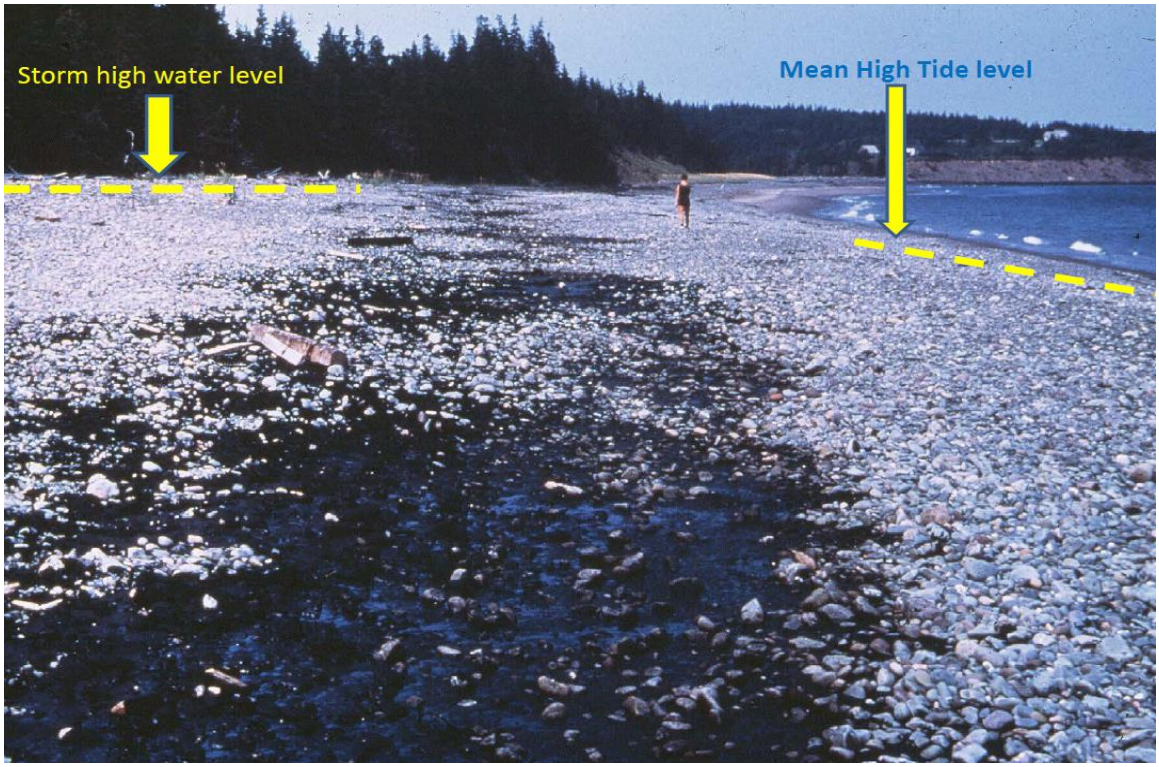


Figure 15 - Oil Stranded Above the Mean High Tide Level by Spring Tides on a Coarse-Sediment Beach Being Buried by Landward Sediment Transport (Chedabucto Bay, NS)



5.0 CHECKLISTS

The SRP Activity Steps and Checklists use position functions according to the large-scale IMT structure with optional Shoreline Response Program Unit. For an IMT structure with the Shoreline Response Program embedded in the Environmental Unit, the SRPU actions are deferred to the Shoreline Response Program Manager with reporting line to the Environmental Unit Leader.

5.1 SUMMARY OF SRP ACTIVITY STEPS

STEP 1 – Initial Response - Activation

If the shoreline is oiled or may potentially become oiled, and the Command determines that there will be a shoreline response, the PSC should activate the SRP (Shoreline Protection and SCAT programs).	If the shoreline is NOT expected to be oiled, the Planning Section Chief should place the SRP and Shoreline Protection (SP) & SCAT program activation on standby.

STEP 2 – Initial Response - Mobilization

Estimate "scale of the problem" and mobilize SRP/SCAT to appropriate level of staffing	Monitor mobilization of the SRP and SCAT program	Engage with PSC, EUL on roles, responsibilities and expectations

STEP 3 – Reactive Phase - SCAT Program

Define SCAT survey strategy and survey phases and priorities *	Provide reconnaissance data to the EU	Establish initial shoreline treatment objectives and initial reactive phase end points *	Define initial shoreline treatment priorities (segments) *

STEP 4 – Reactive Phase - Implementation of SRP activities

Prepare and implement the long-range SCAT Plan	Manage SCAT field activities, safety and support	Monitor SCAT data management and ensure deliverables are distributed

STEP 5 – Planned Phase - SCAT data collection

Manage SCAT field activities, safety and support	Provide field data to the EU	Provide STRs to the EU	Conduct equipment field tests and treatment trials, if required*

STEP 6 – Planned Phase - Preparation of the SRP Plan

Define treatment options by shore type and oiling conditions *	Develop BMPs *	Define SRP objectives, strategy, and treatment end points (by phase and by shore type) *	Define monitoring and inspection process for segment closure *

STEP 7 – Operational/Treatment Phase – Implementation of the SRP Plan

Engage with Operations Section and monitor engagement by SCAT or SCAT/OPS Liaison in the field	Monitor short- and long-range strategies (to closure), and adjust as appropriate *	Provide input to daily or IAP-related activities *

STEP 8 – Inspection/Closure Phase – Completion of the SRP Plan

Engage with Operations Section to arrange for post-treatment inspections	Work with EU to engage stakeholders in the inspection process	Submit signed SIR forms for segments meeting end points *

* *indicates a joint activity with the EU*

5.2 INITIAL RESPONSE CHECKLIST

Activation (Step S1)

- ☐ The **Planning Section Chief** and **EUL** determine whether shoreline impact has occurred, or has the potential to occur, using overflight and trajectory maps.
- ☐ If so, the **Planning Section Chief** activates the Shoreline Response Program. The initial team includes the **SRP Manager** and the **SCAT Coordinator**.
- ☐ If not, the **SRPUL** is placed on Standby.

Mobilization (Step S2)

- ☐ The **EUL** provides overflight and trajectory maps to the **SRPUL.**
- ☐ The **EUL** provides shoreline Resources at Risk to the **SRPUL.**
- ☐ The **SRPUL** uses overflight and trajectory maps to determine the (potential) scale of the incident and therefore the required size of the SRP.
- ☐ Based on input from the EUL and SRP Manager, the Planning Section Chief will determine whether to activate the Large-Scale SRP Organization and whether SRP Manager should elevate to Unit Leader (SRPUL)
- ☐ The **SRPUL** and **SCAT Coordinator** mobilize personnel to the appropriate level of staffing.
- ☐ The **SRPUL** monitors the mobilization of the SRP, ensuring that the staffing remains at a level appropriate to the response.
- ☐ The **SRPUL** establishes communications and engages with the **Planning Section Chief** and **EUL** on roles, responsibilities, expectations and stakeholder engagement.

5.3 REACTIVE PHASE CHECKLIST

Implementation of the SCAT Program (Step S3)

- ☐ Key SRPU and SCAT personnel conduct an aerial orientation of the impacted area or potentially affected area (**SCAT Coordinator, SCAT Logistics Coordinator, SCAT Data Manager, SCAT Field Team(s)** with TL and agency/stakeholder representatives).
- ☐ The **SCAT Data Manager** segments the shoreline, in consultation with the **EUL** and **SCAT Team Leads**, or, if the shoreline is pre-segmented, the **SCAT Data Manager** verifies the segmentation using current survey data.
- ☐ The **SCAT Data Manager** communicates segmentation to the **Operations Section Chief (or delegate)**, **Planning Section Chief (or delegate), EUL** and Logistics Section Chief (or delegate).
- ☐ The **SRPUL** consults with the **SCAT Coordinator and EUL** to define the SCAT survey strategy and survey phases and priorities.

- The **EUL** coordinates with external stakeholders and Agencies, with the option of establishing Technical Working Groups, such as the **Shoreline Treatment Technical Advisory Group (STAG).**

- **The SRPUL** and **EUL** determine the Agency representation required in the SCAT field and support teams, and communicate to SCAT Coordinator.

- The **SCAT Coordinator** and **SCAT Logistics Coordinator** deploy **SCAT Field Teams** to conduct aerial reconnaissance and rapid ground/vessel assessment to gain an overview of the location and character of oiling.

- The **SCAT Data Manager** determines the required scope of, and establishes, the SCAT database.

- **SCAT Field Teams** assess the shoreline for access, logistics and safety on SOS forms.

- The **SCAT Data Manager** enters reconnaissance and SOS data into the SCAT database.

- The **SCAT Coordinator** or **Data Manager** provides initial reconnaissance and rapid assessment data to the **SRPUL**, **EUL**, **Planning Section Chief**, and **Operations Section Chief.**

- The **SCAT Coordinator** provides initial access, logistics and safety assessments (from SOS forms) to the **Operations Section Chief** and **SPRUL**.

- The **SRP Manager** assesses the options for initial treatment, in coordination with the **SCAT Field Teams**, **SCAT Coordinator** and **STAG**, if established.

- The **SRPUL** coordinates with the **EUL** to establish initial shoreside treatment objectives.

- The **SRPUL** coordinates with the **EUL** to establish initial phase treatment endpoints.

- The **SRPUL** coordinates with the **EUL** and the **Operations Section Chief (or delegate)** to recommend initial shoreline treatment priorities.

- The SPRUL seeks **Command** approval of SRP Reactive Phase treatment objectives, priorities, options, constraints and end points.

Implementation of REACTIVE PHASE SRP Activities (Step S4)

- The **SRPUL** coordinates with the **EUL** and **SCAT Coordinator** to use initial (REACTIVE PHASE) SCAT field data and recommendations to determine shoreline survey objectives, strategy and phases.

- The **SRPUL** coordinates with the **EUL** and **SCAT Coordinator** to use initial (REACTIVE PHASE) SCAT field data and recommendations to plan and prioritize SCAT field surveys for the PLANNED PHASE.

- The **SRPUL** coordinates with the **EUL** and **SCAT Coordinator** to develop the initial SCAT Plan.

- The **SCAT Coordinator** and **SCAT Logistics Coordinator** schedule and deploy SCAT field surveys in accordance with the priorities set out in the SCAT Plan.

- The **SCAT Field Teams** conduct shoreline assessment surveys, complete SOS forms, and make recommendations for treatment using the Shoreline Treatment Recommendation (STR) forms based on the Command-approved SRP Reactive Phase treatment objectives, priorities, options, constraints and end points.

- The **SCAT Logistics Coordinator** conducts daily SCAT briefs and debriefs with the **SCAT Field Teams** and support team (**SCAT Coordinator, Data Manager, Agency representatives**).

- The **Data Manager** ensures SCAT field data is uploaded to the database and that QA/QC reviews are performed.

- The **Data Manager** provides SCAT summary data, maps and reports to the **SRPUL**, **EUL**, **Situation Unit Leader**, **Operations Section Chief**, as required.

5.4 PLANNING OR DECISION PHASE CHECKLIST

Concurrent with PLANNED PHASE SCAT data collection and SRP Plan Preparation (Step E5 in the EU and Steps S5 and S6 in the SPRU)

- Planning Section Chief and Operations Section Chief will determine if planning for Shoreline Protection operations will move into SRP as open-water operations scale back. If yes, then SRP will manage Shoreline Protection Plan and will generate STRs for Shoreline Protection Operations.

- The **SRPUL** ensures the **SCAT Data Manager** understands the data and reporting requirements of the SRPU and other key stakeholders, including the **Planning Section Chie**f, **Operations Section Chief** and **Command**.

- The **SRPUL** ensures data and reports reach the appropriate Sections/Units/Branches and personnel, including the **EUL**, **Planning Section Chief**, **Operations Section Chief**, Logistics Section Chief and **Command**.

- The **EUL** uses SCAT data and recommendations to determine how treatment endpoints are selected, ensuring relevant internal and external stakeholders are involved in the decision-making, including the **STAG**, if established.

- The **EUL** uses SCAT data and recommendations to develop proposed objectives, priorities, options, constraints and endpoints to the **Planning Section Chief** for approval, ensuring that all relevant internal and external stakeholders are involved in the decision-making process, including the **STAG**, if established.

- The **EUL** coordinates with the **SRPUL**, **STAG**, **Wildlife Specialist**, and **Historical/Cultural Resources Technical Specialist or Advisor** to develop Best Management Practices (BMPs).

- The **EUL** coordinates with the **SRPUL** and **SCAT Coordinator** to use SCAT data and recommendations to develop procedures for translating field oiling data and recommendations into Shoreline Treatment Recommendations (STRs).

- The **SRPUL** (or **deputy SRPUL**) coordinates with the **Operations Section Chief (or delegate)** to ensure they understand the proposed treatment objectives, priorities, strategies and tactics, and to understand any concerns or issues from Operations with regard to the SRP.

- The **SCAT Coordinator** and **SCAT Logistics Coordinator** schedule and deploy SCAT field surveys in accordance with the priorities set out in the SCAT Plan.

- The **SCAT Data Manager** creates STRs in consultation with the **SCAT Team Leads** and the SCAT database.

- The **SCAT Coordinator** or **Data Manager** provide field data and STRs to the **SRPUL** and **EUL**.
- The **SRPUL** provides STRs to the **EUL** for review and Best Management Practice (BMP) consultation that includes the **Wildlife Technical Specialist** and **Historical/Cultural Resources Technical Specialist or Advisor**.
- The **SRPUL** seeks **Command** approval of STRs via the **Planning Section Chief.**
- The **SRPUL** (or **deputy SRPUL** or **STR Manager**) ensures approved STRs are passed on to the **Operations Section Chief**.
- The **SRPUL** (or **deputy SRPUL** or **STR Manager**) tracks the generation, review and approval of STRs.
- The **SRPUL** (or **deputy SRPUL**) coordinates with the **Operations Section Chief (or delegate)** to ensure they understand the STRs, constraints (BMPs) and the endpoints.
- The **SCAT Coordinator** or **Data Manager** provide SCAT summary data, maps and reports to the **SRPUL**, **EUL**, **Situation Unit Leader**, **Operations Section Chief**, as required.
- The **EUL** assesses shoreline treatment options and tactics by shoreline type and oiling conditions, in coordination with the **SCAT Coordinator**, **SCAT Team Leads** and **STAG**. This may include field trials and equipment demonstrations, which are directed by the **SRPUL** and coordinated with **Shoreline Operations**.
- The **SRPUL** determines the need for, and manages, field treatment trials or demonstrations for specific treatment options.
- The **SRPUL** determines the need for, and manages, operational equipment field tests.
- The **EUL** coordinates with the **SRPUL** and **STAG** to recommend shoreline treatment strategies, priorities, constraints and endpoints, as well as Key Performance Indicators (KPIs).
- The **SRPUL** coordinates with the **EUL** and **SCAT Coordinator** to determine the monitoring, inspection and approval process/procedures for segment completion.
- The **SRPUL** coordinates with the **EUL** and **SCAT Coordinator** to produce the SRP Plan that carries the treatment program through to completion.
- The **SRPUL** seeks **Command** approval of the SRP Plan.

5.5 OPERATIONAL OR TREATMENT PHASE CHECKLIST

SRP Plan Implementation (Step S7)

- The **SRPUL** and **SCAT Coordinator** implement and monitor the operational implementation of the SRP Plan.
- The **EUL** coordinates with the **SCAT Coordinator** to determine the areas to be monitored and prioritizes segments.
- The **SCAT Coordinator** and SCAT **Logistics Coordinator** deploy **SCAT Field Teams** to monitor the recovery of shoreline segments defined by the STRs.

- The **SCAT Coordinator** and SCAT **Logistics Coordinator** deploy **SCAT Field Teams** to monitor treatment operations for effectiveness and compare with endpoints.
- The **Data Manager** and **SRPUL**, **Deputy SRPUL** or **STR Manager** track the progress of treatment operations.
- The **SCAT Field Teams** or **SCAT-Ops Liaison** liaise with **Shoreline Operations** to ensure they understand all elements of the SRP Plans and STRs, and to address any concerns or issues from the Operations teams with regard to shoreline cleanup.
- The **SRPUL** (or **Deputy SRPUL**, or **STR Manager**) tracks the operational status of STRs.
- The **EUL** works with the **SRPUL** and **SCAT Coordinator** to establish a treatment review process, allowing modification of guidelines and STRs as oiling conditions change, or if treatment becomes ineffective (ALARP) or no longer presents a Net Environmental Benefit (NEB).
- The **SRPUL** coordinates with the **EUL** to review and revise (if necessary) treatment strategies and STRs.
- The **SRPUL** communicates the effectiveness, and areas for improvement, of shoreline operations to the **Operations Section Chief**.
- The **SRPUL**, in coordination with the **EUL**, provides input to daily or IAP-related activities (for example, the ICS 204 Assignment Lists).

5.6 INSPECTION OR COMPLETION PHASE CHECKLIST

Inspections and Closure (Step 8)

- The **SCAT Coordinator** and **EUL** evaluate the need for establishing Post Treatment Assessment (PTA) surveys as dress rehearsals for final completion inspections (SIRs) with the appropriate land-owners/managers.
- The **SRPUL** coordinates with the **EUL** and **SCAT Coordinator** to determine the membership of the SIR teams, and which team members have signatory authority, and which can provide comments.
- The **SCAT Coordinator** establishes a system for the **Operations Section Chief** to communicate to the **SRPUL** and **SCAT Coordinator** when treatment has been completed on a given segment.
- Operations provides the **SRPUL** and **SCAT Coordinator** with the segments ready for inspection.
- The **SCAT Coordinator** and **SCAT Logistics Coordinator** deploy **SCAT Field Teams** to conduct Post Treatment Assessments (PTAs) (if required) and SIRs, and make recommendations for No Further Treatment (NFT) as appropriate.
- The **SRPUL** seeks **Command** approval of recommendations for completion via the **Planning Section Chief.**
- The **SRPUL** ensures that SCAT completion data and reports reach the appropriate Sections/Units/Branches and personnel, including the **EUL**, **Planning Section Chief**, **Operations Section Chief**, Logistics Section Chief and **Command**.

- The **SRPUL (or Deputy)** ensures that, when further treatment is required, the **Operations Section Chief** understands why and what needs to be done.

- The **SCAT Team Leads** or **SCAT-Ops Liaison** ensures that, when further treatment is required, **Shoreline Operations** understand why and what needs to be done.

- The **SRPUL** and **SCAT Coordinator** ensure SRP and SCAT personnel are demobilised as the appropriate level of effort is reduced during the response.

- The **Operations Section Chief** ensures Operations personnel are demobilised as the requirements for shoreline operations reduce.

Security Classification: BP Public	**BP Canada Energy Group ULC**	

Scotian Basin Exploration Project

Oil Spill Response Plan

Annex E

Waste Management Tactical Response Plan

B02	Issued for Use	Mike Condon	Allen Pere	April 9, 2018
B01	Issued Final	Mike Condon	Allen Pere	February 5, 2018
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Acronyms/Abbreviations

Abbreviation	Definition
BMP	Best Management Practice
BPD	Barrels Per Day
CCG	Canadian Coast Guard
CEDRE	Centre of Documentation, Research and Experimentation on Accidental Water Pollution
CEPA	Canadian Environment Protection Act
CWS	Canadian Wildlife Service
ECCC	Environment and Climate Change Canada
CNLOPB	Canada-Newfoundland Offshore Petroleum Board
CNSOPB	Canada- Nova Scotia Offshore Petroleum Board
DFO	Department of Fisheries and Oceans
EIHWHRMR	Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations
FPSO	Floating, Production Storage and Offloading
GIS	Geographic Information System
HDPE	High-Density Polyethylene
IBC	Intermediate Bulk Containers
ICP	Incident Command Post
ICS	Incident Command System
IMO	International Maritime Organisation
IPIECA	International Petroleum Industry Environmental Conservation Association
IMHWR	Interprovincial Movement of Hazardous Waste Regulations
ISO	International Organisation of Standardisation
MARPOL	International Convention for the Prevention of Pollution from Ships
NEB	National Energy Board (Canada)
MBCA	Migratory Birds Convention Act
MODU	Mobile Offshore Drilling Unit
MSDS	Material Safety Data Sheet

Abbreviation	Definition
nm	Nautical miles
NEEP	National Environmental Emergency Plan
NEEC	National Environmental Emergencies Centre
NSEA	Nova Scotia Environment Act
OECD	Organization for Economic Co-operation and Development
OIM	Offshore Installation Manager
OMS	Operating Management System
OSCAR	Oil Spill Contingency and Response
OSRP	Oil Spill Response Plan
OSWMP	Oil Spill Waste Management Plan
PPE	Personal Protective Equipment
PSV	Platform Supply Vessel
SAM	Staging Area Manager
SCAT	Shoreline Clean-up Assessment Techniques
LTTD	Low Temperature Thermal Desorption
TPH	Total Petroleum Hydrocarbon
TSB	Transportation Safety Board (Canada)
WM	Waste Management Coordination Contractor (Generic)
WMDD	Waste Management, Disposal and Deposit
WWTP	Waste Water Treatment Plant
WTN	Waste Transfer Note

Foreword

This Oil Spill Waste Management Plan (OSWMP) constitutes part of the overall BP Canada Energy Group ULC (BP) Oil Spill Response Plan (OSRP). It provides a framework for contingency planning and response preparation for waste management activities associated with the clean-up operations for a potential oil spill resulting from exploratory drilling within the Scotian Basin Region. It is to be used as the basis for the development of incident-specific waste management plans and procedures, as required.

Purpose

This OSWMP provides a reference for the management of wastes generated from an oil spill response resulting from the Scotian Basin Exploration Drilling Project only.

Scope

This OSWMP applies to all BP owned and managed facilities in the BP Scotian Basin Region. This includes sites and locations, inclusive of drilling, logistics, operations, maintenance, construction, decommissioning and abandonment both onshore and offshore. All BP Waste Management Team members, should read, and comply with this OSWMP.

The management of wastes from trans-boundary response operations or shoreline clean-up operations along international coastlines is not considered in this OSWMP. This OSWMP does not include detailed information on shoreline remediation techniques, or the design of decontamination stations.

This OSWMP should be used in conjunction with the following project management documents:

- GDP 4.6-0002 Crisis and Continuity Management – Oil Spill Preparedness & Response
- BP Scotian Basin Oil Spill Response Plan (CN001-HS-PLN-600-00003)
- Scotian Basin Exploration Waste Management Plan
- Subscriber agreement with ECRC for Tier 2 oil spill response
- Mutual Aid agreements as identified in the OSRP

BP Waste Management Response Action Plan Overview

ASSESS AND QUANTIFY	
• Review modelling outputs Including waste quantities • Assess waste locations • Assess waste treatment facilities	Review trajectory modelling and identify preliminary response strategies
	Identify primary locations where waste generation is expected, including shoreline impact areas
	Characterize likely waste streams for each primary location
	Estimate waste quantities and rates of generation.
	Define basis of change of strategies as a result of size of incident
	Identify approved waste treatment facilities in region and determine their available capacity
MOBILIZE RESOURCES	
• Internal resources • External resources	Ensure availability of waste specialists, select and engage support consultants and equipment. Engage with authorities (Science Table, CCG, ECCC, NSE)
DEVELOP STRATEGY	
• Is intermediate storage required? • Determine management Strategy • Establish contractual arrangements • Establish field bases, if required • Finalize incident specific plan	Select preferred options for each waste stream based on primary waste locations, select alternatives if capacity exceeded.
	Review management arrangements and assess need to set up field operations bases
	Determine contractual arrangements strategy and implement
	Consider options and conditions and define management strategy for each waste stream
ONGOING OPERATIONS	
• Manage day-to-day operations • Ensure compliance • Support service providers • Monitor and review strategy • Communicate response efforts	Review relevant regulatory requirements and ensure compliance
	Manage operations as defined in contractual arrangements
	Continually liaise with support and service providers
	Ensue continuous review of progress and strategy
	Ensure all parties are continually updated on progress

Phase details, references and additional considerations are presented in Attachment G.

1.0 INTRODUCTION

This Oil Spill Waste Management Plan (OSWMP) has been prepared as part of the Oil Spill Response Plan (OSRP) to meet the requirements of the Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) pursuant to the Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act.

This OSWMP framework documents the strategic plan for the management of wastes generated in the event of an oil spill from BP's exploratory drilling operations in the Scotian Basin region. It is to be used as the basis for the development of incident-specific waste management plans and procedures.

To maximize effectiveness, it is critical that waste management is incorporated as part of the overall response strategy to all spill incident, and that waste management arrangements are in place from the beginning of the response operations. This is essential to enable a successful and rapid response, to avoid secondary contamination and to limit long-term liabilities at the impacted areas.

Although a range of different waste types can be generated, this document establishes common operational procedures for accumulating and storing wastes, the transfer of different waste types, and the approved treatment/processing or disposal whether offshore or onshore. During an actual response, further detailed operational procedures will be developed and be scaled to reflect the actual incident and location of released oil, and the anticipated level of oiling at specific coastal locations.

1.1 PROJECT OVERVIEW

BP Canada Energy Group ULC (BP Canada Energy Group ULC and/or any of its affiliates are hereafter generally referred to as "BP") will be conducting an exploration drilling program on Exploration Licences (ELs) 2431, 2432, 2433, and 2434 known as the Scotian Basin Exploration Project. Approval for the Project was issued by the CNSOPB in 2014.

BP will drill up to seven exploration wells in phases over the term of the licences (from 2018 to 2022). A Mobile Offshore Drilling Unit (MODU) will be contracted to drill wells within the ELs. Logistics support will be provided through a fleet of platform supply vessels (PSVs) and helicopters. A supply base located in Halifax Harbour will be used to store materials and equipment. It is expected that drilling activity for the first well in the program will commence in 2018. It is anticipated that exploration drilling will be carried out in multiple phases so that initial well results can be analyzed to inform the strategy for subsequent wells.

The Project will operate under an Incident Management Plan (IMP) which will include a number of specific contingency plans for responding to specific emergency events, including a potential oil spill. The IMP and supporting specific contingency plans, such as the Oil Spill Response Plan will be submitted to the CNSOPB prior to the start of any drilling activity.

As a Tactical Response Plan (TRP), this OSWMP provides the framework for contingency planning and response preparation for waste management aspects associated with the clean-up operations resulting from an oil spill within the Scotian Basin region, in support of the OSRP.

1.2 OBJECTIVES OF THE OIL SPILL WASTE MANAGEMENT PLAN

The objectives of the OSWMP are to:

- Identify all potential sources and understand the character of all wastes associated with oil spill response activities within the Scotian Basin Region;
- Align the OSWMP with Canadian and Nova Scotian regulatory requirements and BP Group Practices;
- Provide a framework for incident-specific spill plans to manage waste, as far as practicable, under the waste management hierarchy and treat waste close to its source of generation;
- Identify potential waste management facilities, including third-party facilities, that are approved to receive wastes; and
- Assign responsibilities and define the required resources for implementing the OSWMP, and describe the verification and monitoring measures that are required.

This OSWMP should be reviewed periodically and updated as required to reflect the most current information on the following:

- Potential locations and materials associated with discharge/release event scenarios;
- Companies and facility options for managing, treatment, and disposal of solid and liquid wastes; and
- Regulatory framework and the BP Oil Spill Preparedness and Response Group Practice.

1.3 DOCUMENT STRUCTURE

This OSWMP provides:

- Details of how the waste team is integrated into the Incident Command structure;
- Information on the types of wastes anticipated from different response activities and the tools used to predict quantities of wastes;
- BP's approach to waste management during incident response in the Scotian Basin Region;
- Waste handling, segregation, and classification details; and
- Waste treatment and disposal options and details, offshore and onshore including 3rd party facilities.

1.4 SUPPORTING DOCUMENTATION AND PROCEDURES

To implement an effective response, the following documents tools and resources should be consulted alongside this OSWMP:

- Records and modelling estimates of the release/spill as updated frequently during the response;
- Estimated quantities of wastes generated, including those generated by the Oil Spill Waste Assessment Tool;
- Designated Geographic Information Systems to identify potentially impacted shoreline areas (including potential WM locations, control points, access and logistics infrastructure, tactics sheets, response location details, photos, etc.);
- Shoreline Clean-up Assessment Technique (SCAT) Team procedures and methodology;

- Incident Command procurement procedures and guidelines for materials, personnel, facilities, and service providers.

1.5 REGULATORY FRAMEWORK FOR OIL SPILL WASTE MANAGEMENT

This OSWMP is intended to ensure that BP is compliant with local legislation and regulations and conforms to BP Practices.

1.5.1 Regulatory Overview

The CNSOPB is the Lead agency responsible for the regulation of offshore petroleum exploration and development activities including the response any major incident which may result from BPs offshore exploration drilling program. The CNSOPB maintains a Memorandum of Understanding (MOU) with the Canadian Coast Guard (CCG) to support monitoring activities in the event of a spill from offshore exploration and drilling operations.

The Canadian Coast Guard is the lead agency for marine spills from ships. When a marine incident occurs, CCG will use their expertise to ensure an appropriate response to the incident is being carried out. CCG may respond in support of the CNSOPB and will monitor the polluter's response (in the role of Federal Monitoring Officer) and provide advice and guidance as required.

Environment and Climate Change Canada (ECCC) is the federal authority responsible for providing environmental advice when a marine spill occurs. ECCC also coordinates the provision of consolidated, comprehensive, scientific information and advice in the event of an environmental emergency to the lead government agency and the Responsible Party/On-Scene Commander through the “Science Table”.

Nova Scotia Environment (NSE) as the Provincial regulator responsible for waste disposal, will generally be engaged through both the Science Table and directly to facilitate information and support on how recovered oil and other wastes will be segregated, classified, stored and shipped for treatment and/or disposal.

1.5.2 Federal Agencies – Roles and Responsibilities

The CNSOPB maintains an Emergency Preparedness and Response Plan and Incident Reporting Guidelines to help staff during environmental emergencies. They also maintain Memoranda of Understanding with the National Energy Board (NEB), Canada – Newfoundland Offshore Petroleum Board (CNLOPB), Transportation safety Board (TSB), Environment and Climate Change Canada (ECCC), Canadian Coast Guard (CCG) and the Department of Fisheries and Oceans (DFO) for support during environmental incidents within their jurisdiction.

CNSOPB’s Offshore Waste Treatment Guidelines (OWTG), outline the recommended practices for the management of waste materials by operators of petroleum drilling and production operations in Canada's offshore areas.

The “Environmental Emergencies Science Table” (Science Table) is chaired by ECCC and brings together relevant experts in the field of environmental resource protection in the event of an emergency

response. It is a group of specialists that provides consolidated scientific and technical advice on environmental concerns, priorities, and strategies, thus enabling and optimizing the environmental response. The members of this Science Table can represent response agencies, all levels of government, Aboriginal representatives, local communities, industries, environmental non-government organizations, and academic institutions.

During the response to an environmental emergency requiring multi-agency cooperation, the Science Table can be convened by the National Environmental Emergencies Centre (NEEC) to provide advice to the "Lead Agency" and "Responsible Party".

The Science Table will develop a consensus on protection and clean-up priorities, bring the right expertise, adapt the scale of response to an environmental emergency, and provide a forum for rapidly moving information to minimize damage to human life or health, or the environment, while maximizing the use of limited response resources. These discussions can occur onsite, or by telephone or by videoconference.

The Science Table is flexible and designed to work within any emergency structure (e.g., Incident Command System or Unified Command Structure).

1.5.3 Provincial Agencies – Roles and Responsibilities

Nova Scotia Environment (NSE) is the Provincial regulator with responsibilities related to waste storage, treatment and disposal. Under the NSE-Emergency Response Plan, NSE will be directly involved with disposal issues related to marine environmental emergencies and oil spills, including providing information on approved commercial treatment facilities and approved solid waste disposal facilities.

Currently, the types of waste and recovered materials typically generated from a marine oil spill are not specifically defined under provincial legislation. Legislation regarding residential and industrial waste management is well established under the Nova Scotia Environment Act (NSEA) and Regulations. Much of this legislation can be applied to the various classes of oil spill waste, recovered materials and residues. Proper waste management procedures can also be derived from existing provincial regulations, policies, guidelines and standards in place which can guide effective oily waste and recovered materials management.

Resources such as soil treatment facilities, energy recovery incineration, water treatment facilities, used oil treatment facilities, etc. are available within the province. Each facility receives case by-case approval to accept, store, handle, and treat different classes of waste and/or recovered materials.

These waste management facilities are expected to be engaged in the event of a major oil spill that requires land-based management of large volumes of oil and/or oily waste. It is important to note that each facility is different and has different conditions of Approval to operate its waste management systems. These conditions will include limits on types and volumes of wastes that are accepted; operational description and treatment endpoints; geographical location and surrounding environments; and their decommissioning and site restoration plans. Provincial regulators will often specify testing

requirements that assure facilities receive certain analytical data from waste generators to ensure appropriate classification and management.

Specific Canadian legislation related to waste management from a marine oil spill is summarized in Table 1.

Table 1 - Applicable Regulations and Guidelines for Waste Management

Reference	Source
Federal Statutes and Regulations	
Canadian Environmental Assessment Act, 2012	Offshore exploration drilling is a designated activity under the Canadian Environmental Assessment Act. http://laws-lois.justice.gc.ca/PDF/C-15.21.pdf
Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act.	This Act establishes the CNSOPB. The Board ensures that petroleum activities are conducted in a manner in which environmental hazards are properly identified, and the associated risks are assessed and then mitigated and managed. http://laws-lois.justice.gc.ca/PDF/C-7.8.pdf
Canada Shipping Act, 2001	Requires both Ships and Oil handling facilities to have oil pollution plans, and arrangements with a response organization. Plans must be implemented in the event of an oil spill including the implementation of Waste Management Plans. Gives Minister (through a Federal Monitoring Officer (FMO) the power to take measures deemed necessary to repair remedy, minimize or prevent pollution damage from ships. http://laws-lois.justice.gc.ca/PDF/C-10.15.pdf
CNSOPB Offshore Waste Treatment Guidelines (OWTG)	The Offshore Waste Treatment Guidelines (OWTG), outline recommended practices for the management of waste materials by operators of petroleum drilling and production operations in Canada's offshore areas. http://www.cnsopb.ns.ca/pdfs/owtg_redraft.pdf . Note: These guidelines apply to normal operating conditions and do not address waste management aspects related to oil spill response.
Canadian Environmental Protection Act (1999)	Various regulations under this act may apply during oil spill incidents, such as: • Disposal at Sea Regulations (Allowable concentration for discharge) • Export and Import of Hazardous Waste and Hazardous Recyclable Materials Regulations • Interprovincial Movement of Hazardous Waste Regulations (Both regulations provide requirements for documentation and classification of waste or recovered materials for the purposes of transporting across international and provincial boundaries, respectively. http://laws-lois.justice.gc.ca/PDF/C-15.31.pdf

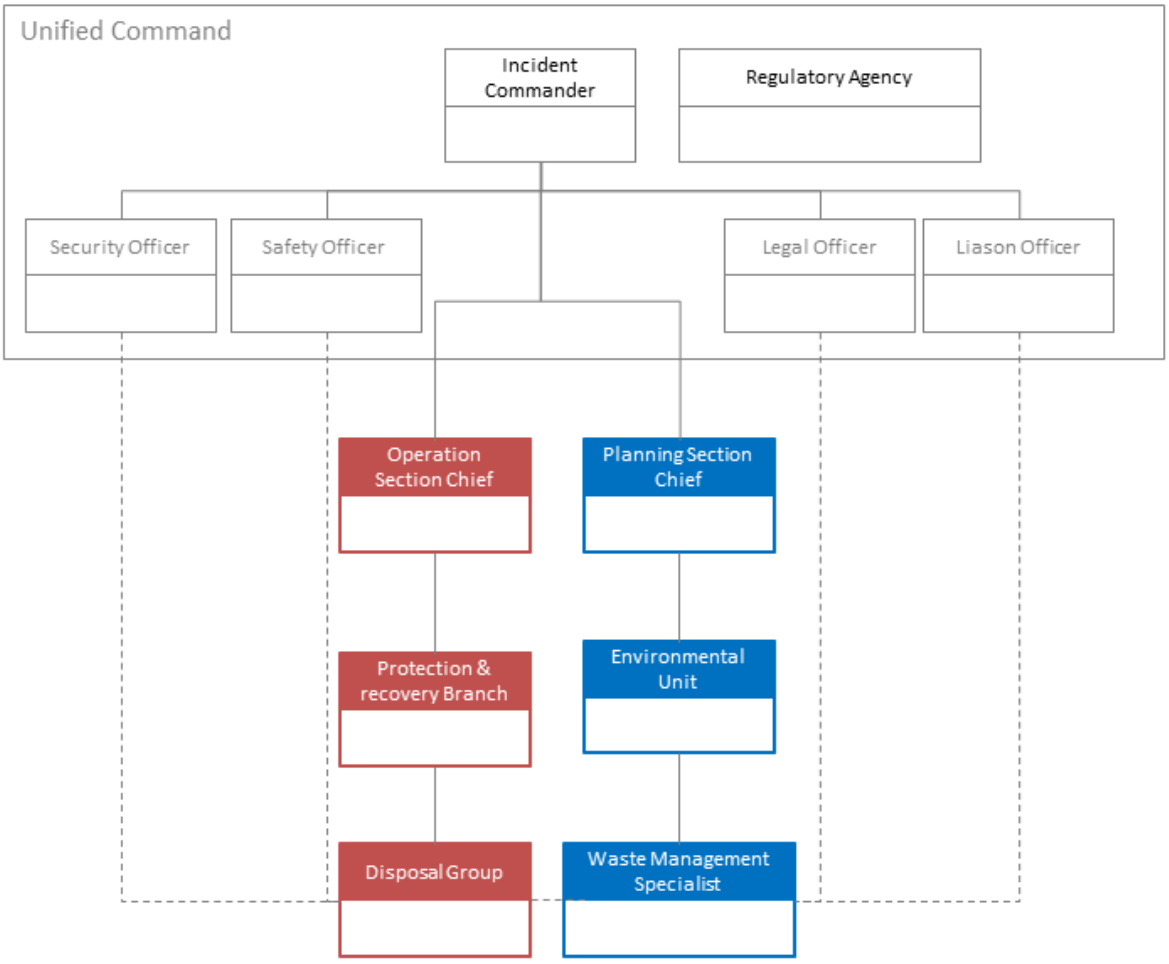
Reference	Source
Transportation of Dangerous Goods Act	Provides a framework for classification of Dangerous Goods, contingency plans, shipping papers and restrictions. http://laws-lois.justice.gc.ca/PDF/T-19.01.pdf
Transportation of Dangerous Goods Regulations	Provides details of a classification system for dangerous goods for the purposes of transportation. (In Nova Scotia these classification categories are linked to provincial statutes). https://www.tc.gc.ca/eng/tdg/clear-tofc-211.htm
Export and Import of Hazardous Waste and Hazardous Recyclable Materials Regulations	Provides the classification of waste or recovered materials for the purposes of Transporting across International boundaries. http://laws-lois.justice.gc.ca/PDF/SOR-2005-149.pdf
Interprovincial Movement of Hazardous Waste Regulations	Provides the requirements for documentation and classification of waste or recovered materials for the purposes of Transporting across provincial boundaries. http://laws-lois.justice.gc.ca/PDF/SOR-2002-301.pdf
Fisheries Act (Enforced jointly by DFO and ECCC)	Defines fish habitat as spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly to carry out their life processes Prohibits harmful alteration, disruption or destruction of fish habitat Prohibits the deposit of a deleterious substance in waters frequented by fish. Makes reporting of spills of deleterious substances mandatory. http://laws-lois.justice.gc.ca/PDF/F-14.pdf
Provincial Statutes and Regulations	
Nova Scotia Environment Act	Enabling legislation for various waste management regulations including: • Activity Designation Regulations • Dangerous Goods Management Regulations • Used Oil Regulations • Solid Waste Management Regulations http://nslegislature.ca/legc/statutes/environment.pdf
Activity Designation Regulations	Establishes the activities that require an operating Approval under the NSEA including • a facility for the handling of soils containing a chemical or petroleum product which is located in a place other than where the soil originated or became contaminated; • a facility for the disposal of oily debris resulting from releases of a petroleum product; https://novascotia.ca/just/regulations/regs/envactiv.htm

Reference	Source
Dangerous Goods Management Regulations	Provides definitions for dangerous goods and waste dangerous goods, storage and handling requirements for designated dangerous goods and waste dangerous Goods. https://www.novascotia.ca/just/regulations/regs/envdgm.htm
Solid Waste-Resource Management Regulations	Establishes requirements and restrictions for municipal solid waste disposal facilities. https://www.novascotia.ca/just/regulations/regs/envsolid.htm
Petroleum Management Regulations	Establishes standards for petroleum tank storage systems. https://novascotia.ca/just/regulations/regs/envpetma.htm
Used Oil Regulations	Established requirements for used oil collectors, analytical testing requirements, and restrictions on the use and transfer of used oil. https://www.novascotia.ca/just/regulations/regs/envusedoil.htm
Environmental Assessment Regulations	Identifies requirements for waste management facilities which are listed in the Regulations including: A facility for treating, processing or disposing of contaminated materials that is located at a site other than where the contaminated materials originated. https://novascotia.ca/just/regulations/regs/envassmt.htm

2.0 INCIDENT COMMAND - ROLES AND RESPONSIBILITIES

BP's waste management activities will be delivered by the Incident Command Team as set out in the OSRP. The resourcing of the waste management team will be determined by the known and anticipated extent of the release.

Figure 1 - Incident Command Structure for Waste Management



2.1 DISPOSAL GROUP SUPERVISOR

The Disposal Group Supervisor, under the Protection and Recovery Branch, coordinates activities associated with collecting, characterizing, transferring, storing, transporting, and disposing of waste materials both on water and onshore. Coordination with regulatory agencies (i.e., Science Table and NSE) through the Waste Management Specialist in the Environmental Unit and Liaison Officer may be necessary to ensure compliance with applicable regulations regarding the handling and transport of various classes of waste.

2.2 WASTE MANAGEMENT SPECIALIST

The Waste Management Specialist(s) provides technical expertise and support to the Disposal Group through the Waste Management Plan which details the procedures for the characterization, handling, storage, transportation, recycling, and disposal of waste generated during response activities. The Waste Management Specialist also assesses long-term risk, coordinates with regulatory agencies,

manages approvals/permits, directs waste characterization. Coordination with regulatory agencies through the Disposal Group Supervisor and the Liaison Officer is expected to ensure compliance with local waste handling and disposal/discharge regulations.

All waste tracking reports generated by the Disposal Group will be documented on the Incident Status Form for Waste Tracking (ICS 209 Form), Attachment C.

2.3 REGULATORS

In the four Atlantic Provinces, provincial environmental protection legislation authorizes respective 'Departments of Environment' to regulate the management of oily wastes and recovered materials. This will generally include regulation of the transportation, storage, treatment, and disposal.

(http://www.novascotia.ca/nse/contaminatedsites/marine.oily.waste.management.asp)

BP will coordinate and cooperate with NSE and other provincial and municipal agencies and apprise them of waste management and disposal activities performed and anticipated needs as the OSWMP is implemented. When the OSWMP is amended to include updated information, potentially including additional management activities, waste staging locations or disposal and recycling facilities, the applicable regulatory contacts will be informed of changes and provided a copy of the revised OSWMP. Communication with regulators on oil spill waste management is through the Liaison Officer or Incident Command as presented in Figure 1.

3.0 WASTE CATEGORIES AND QUANTITY ESTIMATES

3.1 OIL SPILL WASTE CATEGORIES

The typical waste types expected to be generated from any major offshore oil spill have been identified based on industry experience from previous international oil spill incidents. The significant factors that influence the types and quantities of waste generated include the type of oil spilled, environmental conditions, the affected shoreline type, and the recovery and clean-up techniques employed. The waste management team will liaise with the Shoreline Clean-up Assessment Technique (SCAT) Team to ensure that the recovery methodology and preparatory works are designed and undertaken to minimize the generation of oiled waste where practicable. The primary types of high volume wastes that are likely to arise from a large spill incident are presented in Table 2.

Table 2 - Typical Waste Categories and Sources

Response front	Waste Source	Recovered oil/emulsions	Oily water		Oiled Booms and sorbents	Oily minerals (beach material)	Oiled response solids	Tar balls	Medical waste	Oiled wildlife (dead)	Beach litter and seaweed	General domestic waste	Empty drums/containers	Black and grey water	Recyclables/reusable
Offshore (>50 Km Offshore)	Dispersant Application												✓		
	Surface Skimmers	✓	✓		✓		✓								
	In-situ Burning				✓		✓								
Nearshore (6 - 16 Km)	Surface Skimmer	✓	✓		✓		✓								
Shoreline Response (<6 Km Offshore)	Shoreline Skimming	✓	✓		✓		✓								
	Equipment Decontamination Station		✓		✓		✓								
Onshore Response	Shoreline Clean-up	✓	✓		✓	✓	✓	✓		✓	✓	✓			✓
	Personnel Decontamination Stations		✓		✓		✓					✓			
	Equipment, Vehicle and Boom Decontamination Station		✓		✓		✓								
	Wildlife Treatment Centres		✓				✓		✓	✓		✓		✓	✓
Onshore Support Facilities	Incident Command Post											✓		✓	✓
	Remote Worker Camps											✓		✓	✓

3.2 OIL SPILL WASTE ASSESSMENT TOOL (OSWAT)

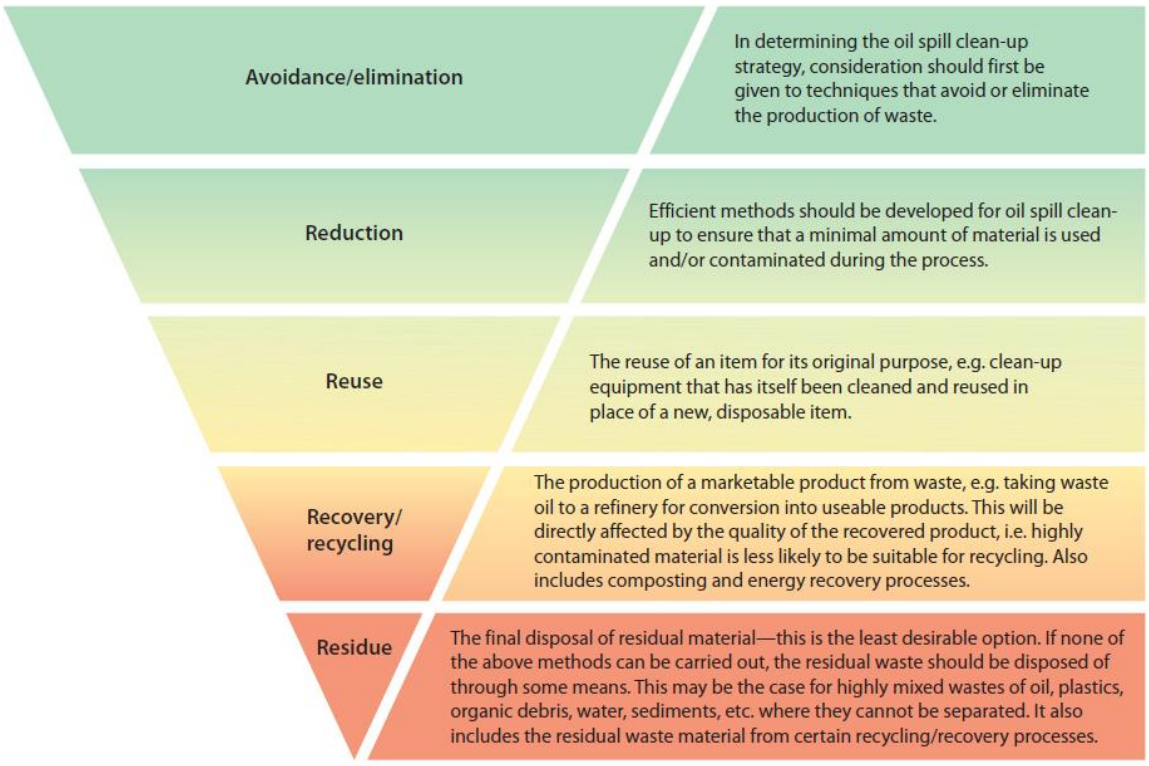
Throughout a response the Environmental Unit will produce waste volume estimations including regular updates. The volume and location of waste will be assessed using oil spill modelling, shoreline oiling estimations, the Environmental Sensitivity Index (ESI) on the Geographic Information System (GIS), and the shoreline response technique proposed. The BP Oil Spill Waste Assessment Tool (OSWAT) is available online or desktop. During initial stages of the response the OSWAT should be updated by the Waste Management Team as new modelling and release parameters are available. The response and management methods for wastes generated should be updated accordingly based on this information.

4.0 WASTE MANAGEMENT APPROACH

4.1 WASTE MANAGEMENT GENERAL PRINCIPLES

IPIECA 2014, presents the concept of the oil spill waste hierarchy which uses the principles of waste reduction, reuse and recycling to minimize the amount of waste produced, thus reducing environmental and economic costs and ensuring that legal requirements are met. The figure below presents the structure for the waste management strategy considered in this plan.

Figure 2 - Oil Spill Waste Management Hierarchy



Source: IPIECA 2014

4.2 WASTE HIERARCHY FOR OIL SPILLS

The waste hierarchy is a widely-endorsed order of preference for managing wastes. These general waste management options, in order of desirability from an environmental and economic perspective, are as follows:

Elimination -Apply strategies and implement techniques to avoid the production of waste

Reduction - Segregation of wastes at source to minimize the quantities generated and reduce the cross-contamination of oiled materials requiring management.

Reuse - Reuse of materials where possible by cleaning, repairing and refurbishing whole items or spare parts to allow direct reuse in a process or other practical applications.

Recovery - Recover as much as possible from wastes, such as the recovery of energy from spilled oils.

Recycle – Isolate material streams by segregating where practicable (such as metal cans and plastic bottles) to allow them to be converted into a new substance or product thereby reducing the quantity of wastes requiring disposal.

Treatment - Chemical, biological and thermal treatment of wastes to reduce hazards and long-term impacts on the environment.

Refuse/Disposal - Disposition of material in accordance with applicable environmental laws and guidelines.

The response effort, including waste management and planning teams should use the waste hierarchy to the extent practicable. During planning, specific focus should be given to the minimization of wastes generated by the response activities.

Initially, the primary focus of the response effort will be to collect, contain and remove the released product and contaminated materials as quickly as possible. As a result, volumes and logistics may not allow for all potential management options (e.g., reuse/recycling) to be fully implemented. Certain materials collected and/or generated from the clean-up may have recovery (e.g., energy recovery) or recycling value. Recovery, reuse or recycling of contaminated and non-contaminated materials will be evaluated and implemented where applicable and practical. As time progresses and as spill clean-up activities proceed, a better understanding of the waste being generated is attained, and reuse and recycling of the waste will become more feasible. It is a priority of the IC team to implement recycling and reuse for the generated wastes.

4.3 HEALTH AND SAFETY

Health and safety protocols will be administered by each of the entities working under this plan's Corporate Health and Safety Programs, and project-specific Health and Safety Plans. The health and safety program for project field work to support response activities will be detailed in a specific Health and Safety Plan. Health and safety plans for specific waste staging areas and de-contamination sites will be prepared by IC resources and available at each location.

4.4 WASTE CLASSIFICATION AND SAMPLING

Waste Classification is undertaken to determine waste physical and chemical properties, hazards, and to inform management methods and treatment/disposal options. Before any of these wastes are recycled, treated or disposed of, there may be a requirement to further classify the wastes, based on sampling or generator knowledge. These tests are typically required by the recycling treatment or disposal facilities,

to ensure that the materials meet the facility specific waste profiles. In Nova Scotia, classification and acceptance requirements for various waste streams are established for each facility under the conditions for an Industrial Approval. Activities which require an Approval are listed in the Activity Designation Regulations.

Under the Nova Scotia Dangerous Goods Management Regulations, the definitions of Dangerous Goods and Waste Dangerous Goods are linked to the classification systems established in the Federal Transportation of Dangerous Goods Regulations (TDGR). These regulations also designate certain materials as dangerous goods including petroleum products with a flashpoint greater than 61°C that are liquid in ambient conditions or during handling. These regulations also establish prohibitions for diluting wastes, and minimum standards for storage, labelling, contingency planning, inventory control and disposal.

The Transportation of Dangerous Goods Act (TDGA) administered by Transport Canada, applies to substances that fall under the definition of 'dangerous goods' in the TDGR. In general, oily waste is not expected to be classified as either dangerous goods or waste dangerous goods (as defined by the Nova Scotia Regulations), but may fall under the following TDGR Hazard classes (generally defined as follows):

- Class 3: Flammable and combustible liquids (flashpoint < 60° C)
- Class 4.1: Flammable solids (Readily combustible under normal conditions of transport)
- Class 6.1 Toxic substances (substances that are liable to cause death or serious injury or to harm human health if swallowed or inhaled or if they come into contact with human skin), and
- Class 9: Miscellaneous products

In 2002, the lnterprovincial Movement of Hazardous Waste Regulations were issued under Section 191 of the CEPA. This regulation established requirements for waste manifests for all shipments of hazardous waste between Canadian provinces. The goal of the Interprovincial Transport Regulations is “to ensure that the Canadian manifest tracking and hazards classification conditions for waste, formerly set out in the Transportation of Dangerous Goods Regulations, are maintained for the interprovincial movements of hazardous wastes." lnterprovincial transportation of waste dangerous goods destined for disposal must comply with the requirements of these regulations and the hazard classifications under the TDGR. Tracking of waste shipments within Nova Scotia are subject to Approval requirements for the facility or contractor. Several examples of shipping papers are provided in Attachment E.

In 2005, many of the TDGR classifications for Class 9 (Miscellaneous Dangerous Goods) which were previously used to classify waste (based on leachate extraction concentrations (formerly Appendix 4) and environmentally hazardous substances (formerly Appendix 5), were transferred to the Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations (EIHWHRMR).

Based on changes to these Federal statutes, specific classification of oil spill waste under TDGR is expected to be limited to the possible transport of Class 3 Flammable liquids.

In the case of debris and waste from a marine oil spill, consideration of the waste classifications, testing requirements, and acceptance limits established through the individual operating Approvals for each facility should be the primary concern to ensure compliance. While these existing Approvals provide for

the handling of oil spill waste, direct discussions with individual contractors and operators in advance of a spill are recommended.

4.5 WASTE SEGREGATION AND STORAGE

For the purposes of this OSWMP, waste streams should be segregated into four basic types: solids, liquids, biological wastes and special wastes as recommended by the Atlantic Canada Marine Oily Waste Working Group (AOWWG, 2011) . The solid and liquid categories can be further divided into those which are oiled and those which are not oiled, as described in Table 3. Before any of these segregated wastes are recycled, treated or disposed of, there may be a requirement to further classify the wastes, based on sampling or generator knowledge to confirm acceptance at treatment/disposal facilities.

Table 3 - Oil Spill Waste Segregation Categories

Waste Category	Segregated Waste Stream
Oiled Solids/Semi-Solids	Oil contaminated material that may include debris, soil and sand collected from the shoreline
	Oil contaminated containment boom (where oil has been removed to greatest extent possible)
	Oil contaminated sorbent booms (where recoverable oil has been drained/removed to greatest extent possible)
	Oil contaminated rags, gloves, disposable personnel protective equipment (PPE)
	Oil contaminated sorbents (pads, pom-poms, etc.)
	Weathered oils (Tar Balls/Patties, asphalts, etc.)
	Recovered Sludges/solids from oil/water recovery vessels or tank bottoms
	Oiled Vegetation including driftwood
Non-Oiled Solids	Pre-impact debris removal such as trash or driftwood from beaches
	Non-contaminated material generated by responders such as packaging material, damaged equipment or tools, disposable PPE, etc.
	Compostable Wastes (food waste, box board, etc.)
	Recyclables such as plastic bottles, aluminum cans, scrap metal, glass, cardboard, cleaned non-adsorbent boom, etc.
Oily Liquids	Recovered Oil (skimmed or recovered from boom)
	Emulsions
	Decontamination rinse water not contaminated with solvents or degreasers
	Oil/Water Mixtures from decanting operations or Oil Water separator effluent with oil concentrations > 15 ppm (AOWWG, 2011)
Non-Oily Liquids	Oil/Water Mixtures from decanting operations or Oil Water separator effluent with oil concentrations < 15 ppm (AOWWG, 2011)
	Greywater/Sewage
Biological Wastes	Wildlife carcasses recovered during response activities and generated from operations at wildlife rehabilitation centres (Note: carcasses of birds that fall under the MBCA must be handled by a CWS certified person)
	Medical waste associated with wildlife rehabilitation centres
	First Aid station wastes (e.g., bandages)
Special Wastes	Decon rinse water contaminated with solvents, degreasers, etc.

Waste Category	Segregated Waste Stream
	Waste Flammable liquids
	Contaminated Ballast water containing invasive species
	Oily contaminated soils that meet the definition of a TDG flammable solid
	Other TDG classified wastes
	Empty hazardous waste containers with residues (< 10%)
	Wasted dispersants
	Analytical-sampling wastes (water, oil, reagents, containers) generated both-on-site and at off site laboratories
	Spent Rechargeable Batteries

For many waste categories, it will not be necessary to do any sampling as the management and disposal will not be dependent on the exact chemical composition of the material. Frequently, the reason for sampling and analysing waste is to determine if a potential treatment (or disposal) option is suitable for the particular waste and to monitor the success of the treatment process. For example, pre and post treatment hydrocarbon chemistry for soil being treated in a thermal desorption unit.

For very heterogeneous wastes, such as mixed contaminated combustible wastes that may be treated by incineration, there will be no need for sampling or analysis provided that the wastes have been properly segregated at the source.

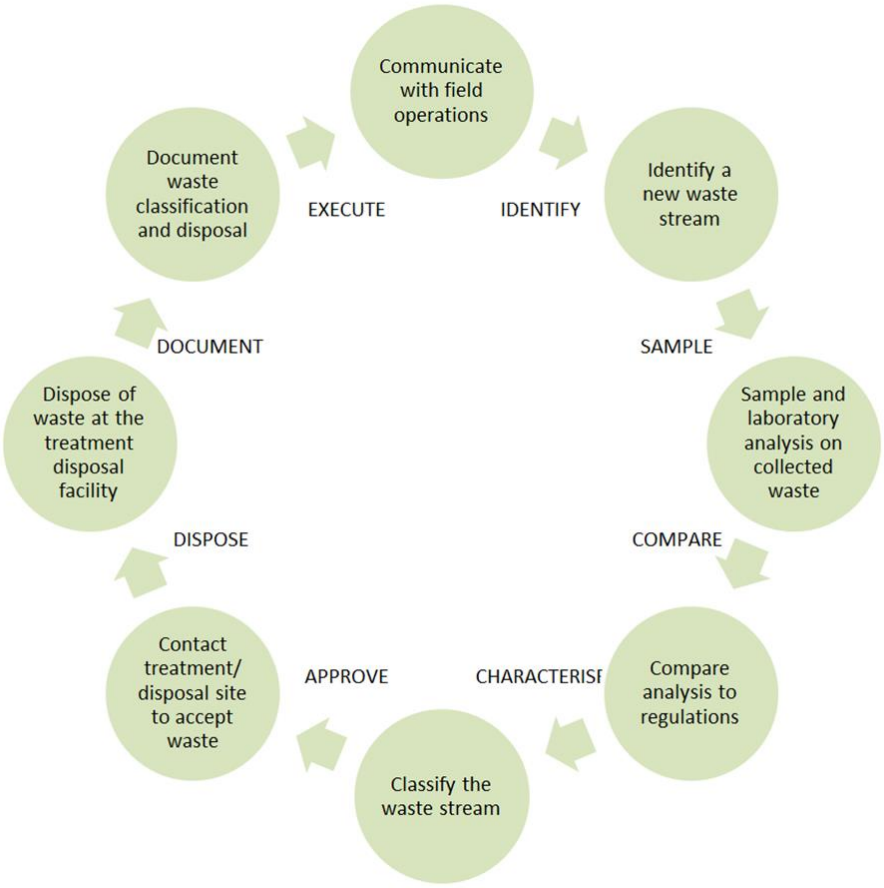
More homogeneous types of waste, such as oily water and contaminated sediment, need to be sampled and analysed to determine their oil content (and possibly other parameters) before and after treatment. This is required to confirm a treatment is suitable, to verify the suitability for discharge of treated effluent, to identify when a treatment process has been effective, and to inform the requirement of treatment system maintenance/upgrades.

Analytical testing requirements will generally be established in the facility Approval. Analytical testing will be used to determine waste characteristics and classifications required by receiving facilities to verify that the material meets facility-specific acceptance criteria, and potentially to complete facility-specific waste compliance reports, if required.

General sampling and analysis will also provide additional information to response workers and the public regarding the chemical and physical properties of materials that are generated and managed during the response. Temporary handling facilities may also want to consider the potential to limit future liability through appropriate baseline testing. Prior to performing analytical testing on wastes it is recommended that consultation with intended waste recycling, treatment or disposal facilities and provincial officials be undertaken to ensure that the appropriate test methods are used. A generic waste classification and segregation framework is provided in the (Draft) Atlantic Canada Guidance for Management Oily Wastes and Recovered Materials Following Marine Oil Spills.

IMO Guidelines for Sampling and Identification of Oil Spills – Section VI, Manual on Oil Pollution also provides the following guidance for confirmation of waste categories where analytical testing may be required (IMO, 2012).

Figure 3 - IMO Waste Sampling and Classification Framework



The Waste Team will provide directions to segregate each waste stream based on the material classification or analytical testing. One of the objectives of waste segregation is to prevent non-oily wastes becoming contaminated by oily wastes; where contamination does occur, the mixed waste must be treated as contaminated by oil. Wastes streams must also be segregated because more stringent storage and handling requirements will likely apply for special wastes.

4.6 WASTE CONTAINMENT AND LABELLING REQUIREMENTS

A range of different container types will be required, as detailed in Table 4. The IMT Logistics Section is responsible for procuring suitable waste containers by hire agreement or purchase. The majority of the containers are expected to be reused during the response operations and decontaminated as required.

4.6.1 Containment of Wastes

Recovered materials must be stored in suitable containers and/or vessels to allow for secure transportation and transfer for ongoing management. This may occur at locations both offshore and onshore. The following storage equipment may be required as part of the spill response operations.

Offshore: *Crude oil tankers; barges or equivalent vessels; Vessel tanks on deck or within the actual vessels; Skips/boxes; 'Big bags' (also known as 'bulk bags' or 'tote bags') for solids*

Shoreline/Onshore: *Fast tanks/collapsible containers (range of sizes); Pillow tanks (for liquids), Metal or plastic drums; Tanks/Intermediate Bulk Containers (IBCs); Skips, Bins; Plastic bags/sacks; Waste storage cells/pits*

Further information on the types of storage equipment and segregation is provided in Section 5, Section 6, and Table 4. If there is any doubt as to whether a particular waste is contaminated (for example seaweed or beach litter), the waste should be regarded as being contaminated and segregated as oily waste, pending appropriate classification.

Table 4 - Waste Segregation Requirements and Container Types

Activity/source	Waste stream	Waste staging area		Waste storage site	
		Segregation requirements	Example container types	Segregation requirements	Example container types
Beach cleaning	Beach litter (Un-oiled)	Segregate recyclables where possible	Sacks/bags or bins	Bulk with general non-oiled waste	Skips or large bulk containers (20 or 40ft)
Shoreline booms and skimming	Used booms	Segregate as hazardous waste – avoid contaminating other materials	Skips or large containers at port facilities	As per collected at port	As collected at port and stored on impervious ground
	Oily material	Segregate combustible and non-combustibles	Sacks/bags, bins/drums or skips	Bulk segregated combustible and non-combustible wastes in designated handling area	Skips or containers
	Oil and water	All recovered fluids to be stored separately until sampled	Pillow tanks or tanks	Transfer to bulk storage	Tanks
Intermediate waste storage sites	Construction waste	N/A	N/A	Bulk with general non-oiled waste	Skips
	Oily water	N/A	N/A	IBCs or tanks	Bulk in tanks
	Oiled materials	N/A	N/A	Bulk segregated combustible and non-combustible wastes in designated oiled waste area	Skips or containers
Equip, vehicle and boom decon station	Oily water	Keep oil contaminated water separate and store in oily waste zone	Tanks or IBCs	Bulk with similar liquids	IBCs or dedicated tanks
Shoreline response Team(s)	Oiled materials	Segregate combustibles and non-combustibles	Drums or skips	Bulk segregated combustible and non-combustible wastes	Skips or large bulk containers (20 or 40ft) in oiled waste area
Shoreline response Operations	Oiled sediments	Minimise recovery of oil-contaminated materials only	Drums or skips. May be loaded directly onto trucks	Bulk with similar types	Skip or storage cell
	Oiled beach debris	Segregate combustibles and non-combustibles (where possible)	Drums or skips	Bulk similar types in oiled waste area and store separately in oiled waste zone	Bulk in skips or large containers (20/40ft) in oiled waste area
	Tar balls	Keep segregated where possible – do not mix with sediment	Drums or skips	Bulk together	Skips
Wildlife treatment centres	Oily water	Keep oil-contaminated water separate	Tanks or IBCs	Transfer to bulk storage	Tanks

Activity/source	Waste stream	Waste staging area		Waste storage site	
		Segregation requirements	Example container types	Segregation requirements	Example container types
Wildlife treatment centres	Medical waste	Following medic's instructions, keep all medical waste separate	Sharps or medical waste containers in clinics	Keep separate	As packaged – do not attempt to bulk with other wastes
	Oiled wildlife	Double bag	Bin or drum	Keep separate and transfer as a priority load	Bagged in covered skips
	Oiled materials	Segregate combustibles and non-combustibles	Sacks/bags, bins/drums or skips	Bulk segregated combustible and non-combustible wastes	Bulk in skips
Activity/source	**Waste stream**	**Waste staging area**	**Waste storage site**		
		Segregation requirements	**Example container types**	**Segregation requirements**	**Example container types**
Incident Command Posts (ICP)	General domestic waste	Segregate recyclables where possible	Dedicated bins	N/A	As supplied at offices
Remote worker camps	General domestic waste	Segregate recyclables where possible	Dedicated bins	Store recyclables together. Bulk residue with other combustible non-oiled waste	Dedicated bins and labelled skips
	Sewage sludge (dry)	Keep separate	Skip	Keep separate, bulk if multiple sources	Skip
	Various hazardous wastes	Segregate and store according to different types generated	Drums and bins	Bulk compatible wastes together and store in dry area	Drums/bins and skips

4.6.2 Labelling and Manifesting of Recyclables and Wastes

All waste containers must be labelled at the initial point of containment. Bags, drums and other containers used for oil spill response operations will need to be provided with appropriate labels by the waste team so that these can be fixed to the container at the time the waste is contained.

The Dangerous Goods Management Regulations establishes requirements for appropriate labelling as follows:

> *"Dangerous goods or waste dangerous goods or the containers in which these goods are stored shall be legibly and indelibly labelled*
> *(a) in accordance with the Transportation of Dangerous Goods Regulations (Canada);*
> *(b) in accordance with the Workplace Hazardous Materials Information System (WHMIS) Regulations;*
> *(c) in accordance with policies, standards and guidelines established or adopted by the Minister; or*
> *(d) if clauses (a), (b) or (c) do not apply, in accordance with standards established or adopted by industry."*

The contents of any waste container will be known or, where sampling results are pending, the material will be treated as special waste and labelled accordingly until results inform management decisions.

As a minimum, each container labels will include:

- The type of waste contained;
- Date of containerising or packing;
- Information about potential hazards, including any applicable hazard/warning signs or labels.
- The Waste Team or designate will ensure that all loads of waste dispatched from each staging area, interim or long-term areas are checked to ensure that they are properly secured and labelled. Waste materials must only be transferred to facilities that have been pre-audited and approved by BP.

Irrespective of whether a facility is approved as described above, waste will only be allowed to leave a site in a contractor owned and licensed vehicle.

4.7 WASTE TRANSFER NOTES

All transfers of waste from a staging area or storage site must be documented using the Waste Transfer Note (WTN) or approved equivalent (i.e., contractors shipping document). Detailed implementation guidance for waste tracking is provided in Attachment A, C, D, & E.

4.8 ASSESSMENT OF WASTE MANAGEMENT OPTIONS

An assessment of the potential management options for each specific waste type has been conducted as part of this OSWMP as outlined in Figure 4 and Table 5. These options will be further assessed in incident-specific plans. The assessment was conducted in accordance with the waste management hierarchy, and oil and gas industry guidance. The following waste management options were considered:

- Reuse and recycling: resale as crude oil for processing/blending, road construction material (asphalt), material recycling (plastics, metal, glass, paper and cardboard)
- Biological treatment: industrial composting; land-farming
- Chemical treatment: neutralization; stabilisation/solidification; wastewater treatment plant
- Thermal treatment: Energy recovery at cement works; thermal desorption
- Disposal: Municipal Solid Waste landfill; Industrial landfill

Additional options may be considered where practical and where facilities exist. Each specific waste stream should be considered based on the anticipated volume, industry capacity and cost/liability. A simplified guide to the preferred management route is detailed below. A number of options may be considered for each waste type, with different risks and liabilities associated with each.

Figure 4 - Management Options for Various Waste Classes

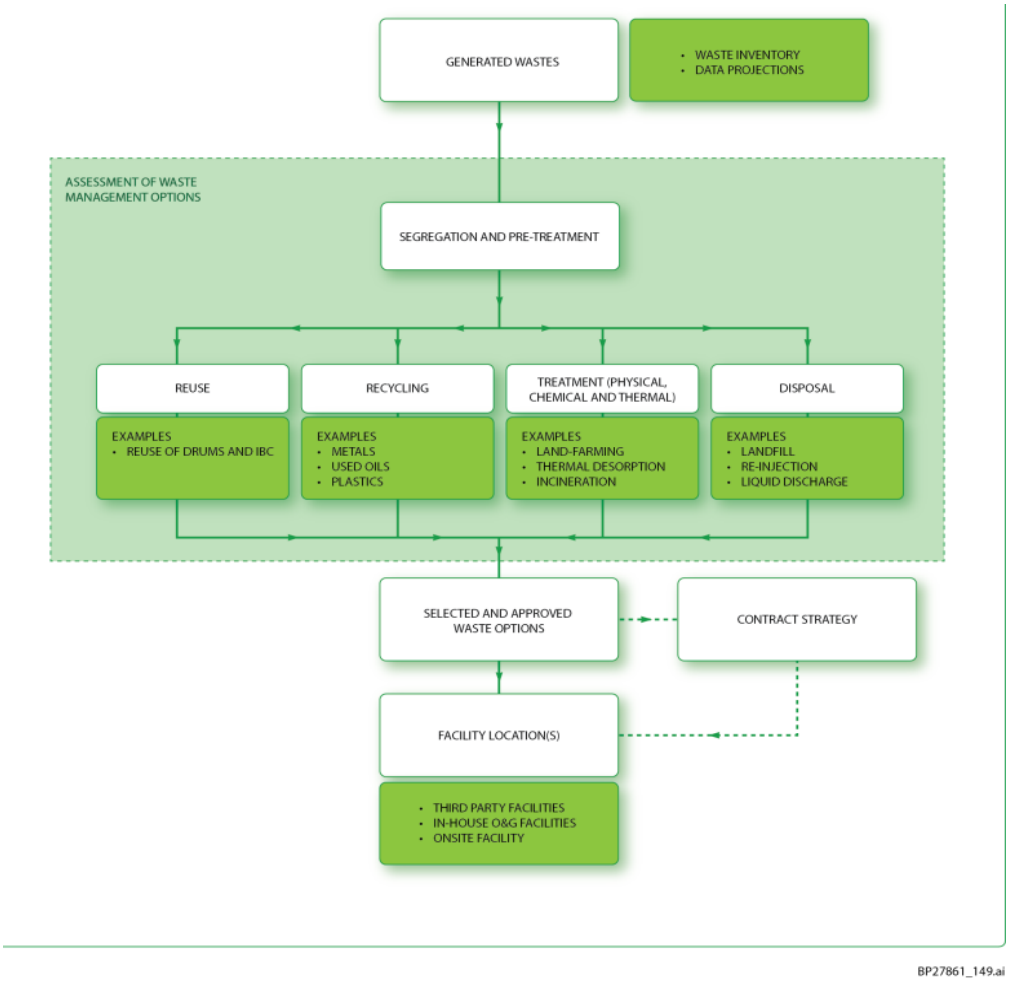


Table 5 - Oil Spill Waste Categories with Storage, Handling and Disposal Options

Waste Type	Source	Containment	Initial Storage	Transportation	Final Disposition
Recovered oil (Offshore)	Offshore Skimming operations	Barges, floating bladders	Barges, floating bladders	Barge	Sold as crude or Feedstock for fuel blending
Recovered oil (Onshore)	Near shore/ onshore vacuum/ skimming operations	Barges, floating bladders, vacuum trucks, portable tanks	Barges, floating bladders, vacuum trucks, portable tanks	Tanker, barge, vacuum truck	Sold as crude or Feedstock for fuel blending
Recovered oil (non-commercial)	Offshore/onshore skimming operations	Barges, floating bladders, vacuum trucks, portable tanks	Barges, floating bladders, vacuum trucks, portable tanks	Tanker, barge, vacuum truck	Oil - water Treatment facility
Skimmed/Decanted Water	Offshore/onshore skimming operations	Tanks, Vacuum trucks	Tanks, Vacuum trucks	n/a	Decant and dispose in accordance with regulatory requirements
Decontamination Water	Rinsate from personnel or equipment	Open 55 gallon drums fitted with bung-sealing, portable tanks	Portable tanks, tanker trucks, vacuum trucks	Tanker, barge, vacuum truck	Used oil collector/ contractor, portable treatment facility
Oily solid wastes					
Tar Balls/ Oiled aggregate	Shoreline recovery operations	Plastic bags (Double lined), roll off boxes, Dumpsters	Lined Pad	Lined dump truck/ Garbage truck	Beneficial re-use asphalt plants, cement kilns, etc. Incinerator
Contaminated Soil	Oiled shoreline	Stockpile on and cover with oil resistant sheeting, Tarps, roll-off boxes	Temporary Storage (Lined Pad or Pit)	Lined dump truck/	Soil treatment facility (Bioremediation, thermal desorption, solidification/ stabilization
Oiled Organic Debris	Oiled shoreline and beach materials	Plastic bags (double bagged), roll-off boxes, Dumpsters	Temporary Storage (Lined Pad or Pit)	Lined dump truck/ Garbage truck	Solid waste or industrial landfill / Incinerator
Misc. oiled debris and equipment	Oiled shoreline, beach and marine equipment/materials	55 gallon drums/ roll off boxes/ dumpsters	Temporary Storage Lined Pad or Pit	Lined dump truck/ Garbage truck	Solid waste or industrial landfill / Incinerator
Contaminated Sorbent Material, booms and PPE	Clean-up equipment which cannot be reused	Plastic bags taped closed stored in roll off boxes/ 55 gallon drums/ dumpsters	Lined Pad	Lined Truck/ Garbage truck	Solid waste or industrial landfill / Incinerator

Waste Type	Source	Containment	Initial Storage	Transportation	Final Disposition
Non-Oily Wastes					
Non-oiled solids	Solid waste from cleanup activities	Marked or colour coded plastic bags	-	Garbage Truck	Solid Waste or industrial Landfill
Sewage/Sanitary Waste	Cleanup operations	Portable toilets/septic system/holding tanks	-	Vacuum/ Sewage Truck	Sewage/ wastewater treatment facility
Animal Carcasses	Oiled shoreline	Small -Clear plastic bags (double bagged) Large – Dumpsters	Temporary Storage Site (Enclosed, lockable area)	Truck meeting regulatory requirements for biomedical waste	Veterinary Incinerator
Biomedical Waste	Wildlife Restoration Facilities	Marked plastic/metal containers or plastic bags resistant to puncture	Temporary Storage Site (Enclosed, lockable area)	Truck meeting regulatory requirements for biomedical waste	Provincial biomedical waste treatment facilities.
Recyclable Materials	Cardboard, Plastic bags, and packaging, plastic bottles, aluminum cans, scrap metal, glass	Plastic Bags, Plastic garbage cans, Recycle containers Dumpsters	Plastic Bags, Plastic garbage cans, Recycle containers Dumpsters	Garbage trucks Recycling trucks	RRFB Recycling facilities

Contact details for existing approved Contractors and service companies are in Attachment B. Details will be updated periodically to add new service providers and confirm contact details are up-to-date.

4.8.1 Evaluation Process and Audit

As part of contingency planning/preparedness or during any response to a release scenario, all facilities receiving wastes from the clean-up operations will be audited by BP or CONSULTANT before transfer of wastes occurs.

All environmental audits of third-party facilities and service providers will be conducted using the BP Duty of Care procedure, or approved equivalent.

4.8.2 Temporary Storage Facilities

A staged approach for management of waste is expected, and activities can be separated into two main phases. Phase one addresses temporary storage and transportation activities occurring immediately after the spill, while the second phase addresses recycling, treatment and disposal activities potentially occurring long after the initial response.

Phase one will take place concurrently with the response operations, and could last for days to months depending on the scale of incident. This phase typically includes activities such as:

- The siting, development and operation of primary storage facilities (near shore), in the immediate vicinity of the spill site or equipment staging areas. The operation of these sites is typically linked to the duration of the site clean-up activities in the geographic area they serve;
- The siting, development and operation of intermediate storage facilities that serve as collection points for segregated materials from several primary storage sites;
- The siting, development and operation of longer term storage area(s) that would act as storage buffers between the rate of collection vs the rate of recycling, treatment and/or disposal. The timeframe for the development of these sites could be in the order of weeks to months but operationally, these sites could last from months to years depending on treatment and disposal capacities in the region; and
- Transportation between storage sites and recovered materials/waste management facilities.
- Phase two activities will typically include:
- Developing and commencing applicable waste treatment processes for the various stored waste streams;
- Identifying and implementing recycling strategies for certain recovered wastes or recyclable materials (re-processing, energy recovery, etc);
- Disposal of treated waste residues; and
- Restoration and decommissioning of all waste handling sites used during response activities.

All longer-term storage facilities utilized for oily waste and recovered materials management will require Approval by NSE.

4.8.3 Dedicated Facility Development

During a large spill, the amount of material collected could potentially exceed the current capacity of existing storage, recycling, treatment and/or disposal sites in the region. If very large quantities of wastes are expected and a long-term storage site is required, the option of developing a dedicated waste processing and remediation facility will be considered.

BP would need to work closely with provincial regulators to agree on the scope of such a facility and the processing capability would be designed depending on the nature and quantity of materials to be managed. Standards for landfill siting and operations are provided in the Guidelines for Industrial landfills (NSE 1991).

At the end of the response, this facility could be commercialised, contributing to the capacity of waste management facilities in the region (depending on the location and availability of potential commercial markets). All final disposal facilities will require Approval by NSE.

5.0 OFFSHORE OPERATIONAL WASTE MANAGEMENT PLAN

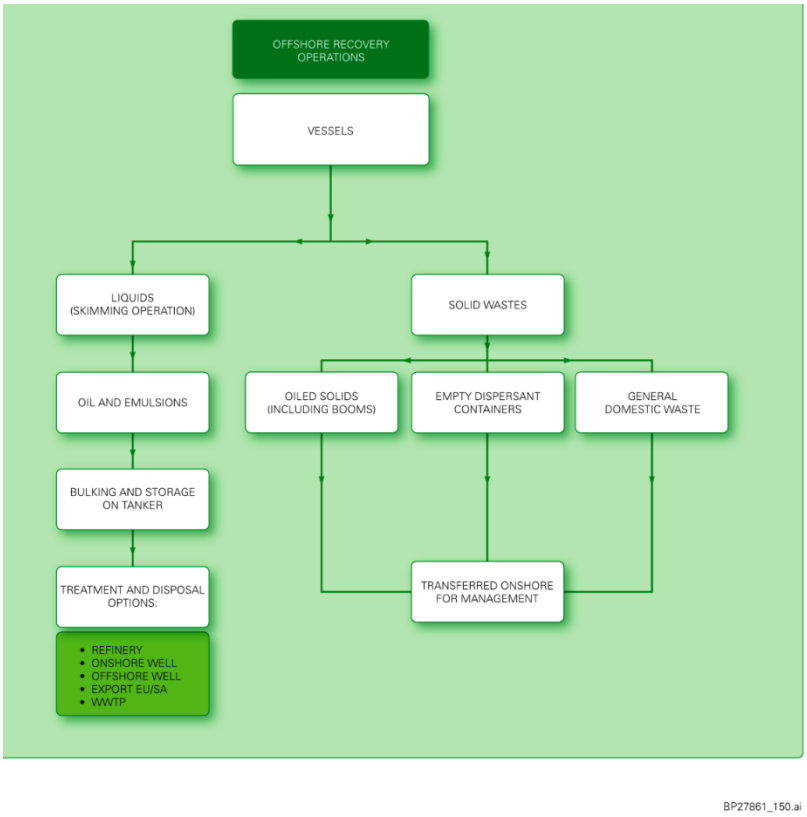
5.1 OFFSHORE WASTE MANAGEMENT OPERATIONS

This section provides the general details of BP's offshore waste management operations in the unlikely event of an oil spill resulting from drilling operations within the Scotian Basin Region.

The offshore response operations can generate a range of liquid and solid wastes from the various tactical response operations, including dispersant application, enhanced recovery of oil from skimming, and in-situ burning. Modelling of the potential wastes generated will be undertaken with the Oil Spill Waste Assessment Tool (OSWAT), and should be revisited on a regular basis during response operations as new information about the spill response becomes available.

The most significant quantity of waste is expected to be the oil and emulsions recovered from skimming operations. In addition, oiled solids, empty dispersant drums and general domestic waste can also be expected to be produced in smaller quantities, as shown in Figure 5.

Figure 5 - Management Options for Offshore Wastes



5.2 WASTE MINIMIZATION

One of the main objectives of any oil spill response operation is to minimize the amount of oil that reaches the shoreline. In turn, this minimizes the amount of waste that will be generated for disposal. In practice, this means using:

- Skimmers to capture as much oil as possible before it reaches the shore. This increases the amount of waste that is generated offshore, but much of the oil collected can likely be recycled.
- Dispersants, where approved by the regulatory authorities, to break the oil down into fine droplets that then disperse into the water column where they are biodegraded by microorganisms.
- Nearshore booming to protect sensitive coastal habitats and zones from oiling.
- Specific details as to how these operations will be undertaken are described in the specific tactical response plans associated with the OSRP.

5.3 WASTE SEGREGATION, CONTAINMENT AND HANDLING

5.3.1 Solid Wastes

Any vessels involved in responding to the oil spill must manage their routine general domestic wastes and wastewater in accordance with existing CNSOPB Offshore Waste Treatment Guidelines (CNSOPB 2010).

Each vessel will have its own waste handling plan detailing procedures and locations for management and handling of various waste materials. The interface between the vessel plan and the incident-specific OSWMP will be defined in the incident specific plan.

5.3.2 Recovered Oil

Recovered oil is expected to be a mixture of crude oil, seawater and emulsion in variable proportions, but it is likely that the majority of the liquid would be seawater. A range of oil/ emulsion/seawater ratios in the recovered fluids should be expected. The closer to the point of release, the fresher the oil and therefore the higher the oil proportion.

5.3.3 Initial Storage of Collected Liquids

To maximize the efficiency of the enhanced recovery systems, efforts must be made to minimize the time it takes for each vessel to offload a full tank of recovered liquids so it can return to skimming efforts as soon as possible. Therefore, it may be necessary to have barges (or equivalent vessels) in the field escorting each enhanced recovery system. Recovered liquids will be pumped from the skimmer vessels into the barges for temporary storage and subsequent transport, as required.

If the spill is sufficiently large, a crude oil tanker of sufficient capacity can also be obtained from the spot market for this purpose. The capacity and availability of an oil tanker would need to be considered early, as the time required to contract the vessel and be ready to receive recovered oil could range up to 21 days, but within 7 days is considered most likely. A sufficient number of barges will be required until the tanker arrives; otherwise the efficiency of the skimmer operations will be compromised.

The collected fluids are likely to have a high biological content that, when they degrade anaerobically, can produce Hydrogen Sulphide, which can be a hazard to human health and vessel/equipment damage. This is especially when the degradation rates are increased by the thermal heating effect of fluids sitting in tanks exposed to radiation from the sun. It may be necessary to consider the venting of H2S if the gas generation cannot be effectively controlled by the use of biocide.

5.4 WASTE COLLECTION AND TRANSFER

5.4.1 Solid Waste

All solid wastes will be returned to designated port facilities and held in a waste staging area, although large quantities of solid waste from the offshore response efforts are not expected.

5.4.2 Oil-Water Processing on the Tankers/Barges

Once laden, the Tanker/barge would sit stationary offshore, acting as a gravity separator. A settlement time of at least 3 days would generally be required for decanting. Separation can be aided by heating the oil with on-board equipment to reduce the viscosity. Following settlement, the on-board Bilge Water Cleaning System can be used to separate oil from water and discharge into impacted waters in accordance with Canadian regulatory requirements. If Approval is granted, there may be an opportunity to further the offshore processing capacity by retrofitting the tanker/barge to incorporate a hydrocyclone skid for further oil-in-water separation and water discharge.

5.4.3 Other Processing Offshore

Tanks on the MODU and/or PSVs may be possible to use as temporary storage prior to the arrival of a suitable tanker or barge; however, this capacity is expected to be limited.

5.5 RECYCLING, TREATMENT AND DISPOSAL

5.5.1 Treatment of Recovered Oil and Emulsions in Nova Scotia

There are a number of contractors who are approved to accept oily waste for treatment /recycling and or disposal. Handling of these products is expected to be completed by "Approved" Used Oil Collectors and other oily waste contractors who have the vehicles, staff and facilities for management of these recovered materials. While recovered oil does not meet the prescribed definition of used oil, the nature of the materials and associated treatment processes are appropriate and consistent with existing facilities and Approvals. Details should be confirmed in advance with NSE and the disposal contractor.

It is recognised that the volumes anticipated to be generated by a large scenario may overwhelm the throughput capacity of those facilities at their current capabilities, requiring interim and longer-term storage. Short term interim storage of liquids at designated facilities should be expected.

International facilities may also be available to process and recycle recovered oil; however, such transfers must be in accordance with the Canadian Export and Import of Hazardous Waste and Hazardous Recyclable Materials Regulations. Assessment of these options is beyond the scope of this document.

5.5.2 Processing Onshore

If the option to process recovered oil at local oil processing facilities cannot be arranged, oily liquids could be held in the Tanker or other acceptable land based storage facility indefinitely until one of the following options is arranged in conjunction with local regulatory authorities and contractors:

- Development of offshore well owned by BP or one of its partners for injection of liquid waste;
- Construction and commissioning of an onshore disposal well;
- Construction and commissioning of an onshore oily wastewater treatment plant.

6.0 ONSHORE OPERATIONAL WASTE MANAGEMENT PLAN

6.1 ONSHORE WASTE MANAGEMENT OPERATIONS

This section provides the general details of BP's proposed land based waste management operations in the unlikely event of an oil spill resulting from drilling operations within the Scotian Basin Region.

During an actual event, detailed procedures will be developed for actual impacted areas, once Shoreline response operations are identified on a segment-by-segment basis. Modelling of the potential wastes generated will be undertaken with the OSWAT, and will be updated regularly during response operations as new information about the response activities becomes available.

Waste recovered during shoreline response operations will need secure storage pending transport to intermediate storage sites and/or approved treatment and disposal facilities. Specific procedures for management of specific waste streams (such as Tar balls as detailed in Attachment F) may also be developed, depending on the nature and quantities of the wastes generated.

In a worst-case release scenario, a network of intermediate waste storage sites is expected to be established at locations as close to impacted shorelines as possible. Intermediate storage locations are currently proposed to be located on or near existing or former municipal waste handling facilities (pending the acceptance of mutually agreeable lease arrangements with the municipalities or other property owners, and the regulatory authorities). Specific permitting requirements and monitoring plans will be established for each location and approved by NSE. A list of potential interim storage/handling areas is provided in Attachment B.

6.2 WASTE MINIMIZATION

6.2.1 Pre-emptive Beach Cleaning

The quantity of waste generated on affected beaches can be effectively reduced by removing vegetation and other debris from the shoreline before the oil reaches the shore. Natural materials (e.g. seaweed) can remain on the shoreline above the high-tide mark in remote areas. Collecting beach litter ensures that this natural material can be managed with fewer environmental concerns, and will reduce the volume of oil-contaminated waste for treatment /disposal.

Priority areas for pre-emptive beach cleaning should be identified at the start of any response. They should be informed by arrival time modelling, and offshore intelligence on oil movements from offshore vessels and spotter planes.

6.2.2 Coordination with Shoreline Clean-up Teams

The volume of waste that would need to be managed would be substantially greater than the volume of the actual oil stranded. The volume of waste can be minimised via careful collection of oil-contaminated

sediments, including sand and stones, to minimise the entrainment of excessive amounts of uncontaminated material.

Measures must also be taken to minimize the amount of special waste that needs to be managed. Careful segregation of oily wastes from domestic and non-oily wastes limit cross contamination and allows optimum reclamation and disposal of each waste stream.

Containers containing oily waste must be stored on impervious ground or in lined areas to prevent contamination of the underlying soil.

6.3 SHORELINE WASTE COLLECTION AND STORAGE LOCATIONS

An oil spill which impacts the coastline may require a network of intermediate and long-term waste storage locations to support the management of all associated wastes. This network comprises the following discrete operational sites:

- Waste staging areas – primary shoreline accumulation location
- Intermediate waste storage sites – centralized accumulation site enabling segregation and bulking of similar wastes prior to transportation (waste stored for days to weeks)
- Long-term waste storage sites – engineered sites designed to contain wastes for many months or years where alternative offsite management options are not available

For waste staging areas and intermediate waste storage sites, site-specific locations will be identified as per the BP Oil Spill Contingency Plan.

6.4 SITING, DESIGN AND OPERATIONAL CONSIDERATIONS FOR WASTE STORAGE SITES

Considerations for the siting, design and operation of primary, intermediate and longer-term storage sites are provided in the Draft Atlantic Marine Oil Spill Waste Management Guide (EC 2011). Note that all staging areas will require appropriate containment measures to reduce the potential for secondary contamination. These will be determined on a site specific basis depending on the types of wastes proposed to be stored.

6.4.1 Primary Waste Staging Areas

Primary waste staging areas should be located, sized, and set-up to serve as a waste and equipment staging area as part of each local shoreline response. Waste and equipment staging is important to allow the uninterrupted movement of collected wastes to treatment, long-term storage, or disposal.

Small craft harbour locations will be identified where access is available to receive waste and impacted equipment in need of cleaning and decontamination. The locations will be selected primarily for ease of access to impacted areas; however, once approved they will require significant site preparation works to minimize secondary contamination. A generic lease agreement has been developed for the use of such sites. The lease arrangements to allow access and use of these sites should be confirmed by the waste

management team as soon as possible. The waste team is also expected to conduct a tactical review to assess the works which will be required at these sites to accommodate a waste staging area.

These locations are also expected to be able to deploy response equipment and supplies for use in the field. Collected wastes should be stored temporarily at the sites and transferred to the nearest intermediate waste storage sites for bulking before transfer to either a long-term storage site, or directly to waste treatment/disposal facilities.

6.4.2 Intermediate Waste Storage Sites

Intermediate waste storage sites should be located at appropriate strategic locations close to primary storage sites. Existing or former municipal waste handling facilities (transfer station and former waste disposal sites) have been identified where access is available to receive waste for intermediate storage. As with primary waste staging areas these sites will lease agreements to access and will require review and assessment prior to design of storage facilities.

These sites are expected to allow bulking of wastes from a number of waste staging areas. Each waste type will be segregated and bulked together for onward transport in suitable containers. All wastes must be labelled and documented in line with the requirements in this plan. Required permitting and Approvals for these facilities from the local and provincial authorities and liaison with stakeholders will be managed centrally by the IMT.

Where possible, wastes should not be stored for longer than a few days at the intermediate sites. Waste materials should be manifested and transferred to BP approved waste management facilities for processing. Where limited processing capacity exists, or end points cannot be identified, wastes should be routed to the nearest long-term waste storage site.

Proposed locations for the network of intermediate waste storage sites are provided in Attachment B, and are to be consulted in the event of an oil spill. Depending on the availability of waste management options in specific regions, wastes may be routed directly to long-term waste storage sites.

6.4.3 Long-term Waste Storage Sites

Where regional capacity close to the source of waste generation is limited or no approved facilities are identified, wastes will be transferred to long-term waste storage sites, to be constructed by BP to provide time for alternative options to be assessed. The number of sites will depend on the location of oiled coastline, the specific tactical plan for Shoreline response along the coastal segments and the sites which have been pre-identified. Long term waste storage sites will require significant up-front design works and approvals to be carried out between the oil spill waste management team, the IC, Liaison Officer, and local regulators.

Where generated wastes cannot be transferred directly to third-party facilities for treatment or disposal due to limited capacity or transport constraints, they will be stored in purpose built facilities on selected sites, specifically designed to protect surface and groundwater resources.

Waste will be stored according to a compatibility matrix and risk assessment findings. Plans for intermediate storage sites will be agreed with regulatory authorities as part of the operational response and subsequent Restoration and Monitoring Program. Where onsite treatment occurs, attention should be made to the fate of all residues. Residues may need further transport to suitable disposal sites to ensure all long-term liabilities are adequately managed.

6.5 RECYCLING, TREATMENT AND DISPOSAL

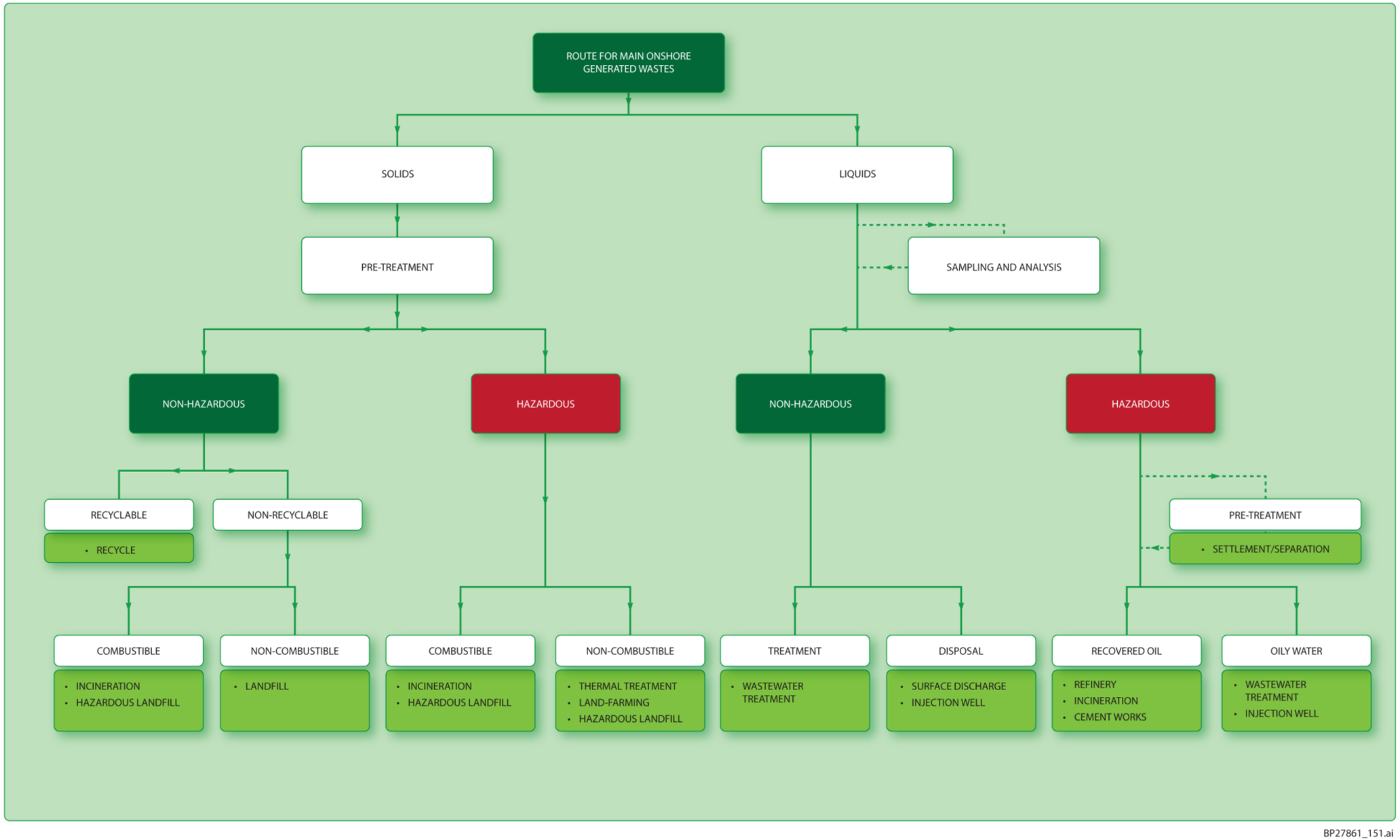
6.5.1 Treatment of Oiled and Non-Oiled Wastes in Nova Scotia

There are a number of contractors who are approved to accept oily and non-oily waste for treatment /recycling and or disposal. Handling of these products is expected to be completed by "Approved" waste contractors who have the vehicles, staff and facilities for management of these recovered materials. Details related to Approval restrictions and requirements should be confirmed in advance with NSE and the disposal contractor. Figure 6 shows management options for onshore waste.

It is recognised that the volumes anticipated to be generated by a large scenario may overwhelm the throughput capacity of those facilities at their current capabilities, requiring interim and longer-term storage. Short term interim storage of liquids at designated facilities should be expected.

International facilities may also be available to process and recycle recovered oil, however such transfers must be in accordance with the Canadian Export and Import of Hazardous Waste and Hazardous Recyclable Materials Regulations. Assessment of these options is beyond the scope of this document.

Figure 6 - Management Options for Onshore Wastes



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7.0 WASTE TRACKING AND DATA MANAGEMENT

7.1 DATA MANAGEMENT AND REPORTING

7.1.1 Data Generation and Tracking

The primary process for tracking the quantities and fate of the different types generated during an oil spill response will be the Waste Transfer Note (WTN) or equivalent contractor approved tracking system.

The Environmental Unit will collate the data from all the WTNs. They will analyse and summarise this information to determine the quantities of individual types of waste that are: Generated from different parts of the oil spill response (offshore, onshore/different geographical locations); Transferred from staging areas to intermediate and long-term storage areas; Recycled; Treated; Incinerated; Landfilled. Details will include the locations where these activities occur.

The Environmental Unit will dedicate suitable resources by setting up a team to manage the WTNs, including filing systems, to enable daily/weekly data to be provided where necessary. The above information should be collated on a monthly basis at a minimum, and reports prepared for internal and external use as required.

7.1.2 Document Control and Retention

Original copies of WTNs must be kept by the person originating the transfer. Completed WTNs will be collected by the Environmental Unit.

The Environmental Unit will be responsible for collating and checking WTNs and will also retain copies of WTNs in the longer term (for at least 5 years). The Unit will compile waste data during the response for submission to regulatory authorities and other bodies as required. Further details on the management of waste transport and tracking administration are contained in the regional Waste Management Plan, and Appendices A, C, D, and E.

7.2 COMPLIANCE ASSESSMENT AND REVIEW

The Environmental Unit must agree on procedures with regulatory agencies via the liaison, submit data on wastes arising and treatment/disposal, as required, should have regular contact with regulatory agencies to ensure compliance with all legal requirements relating to the management of wastes generated by the oil spill clean-up operations. Periodic audits of waste management procedures should be done by the Environmental Unit at all locations where waste is handled (storage areas, treatment facilities and disposal sites) to ensure compliance with the requirements of this waste management plan and any legal requirements.

8.0 WASTE TREATMENT AND DISPOSAL FACILITIES

Attachment B provides a list of the currently approved oily waste treatment /disposal contractors and facilities in Nova Scotia. This list confirms the general availability of local specific treatment and disposal options.

As needed other authorized and permitted facilities may be added to this list. Each facility will be reviewed by BP to ensure that they have the appropriate permits to receive the recovered waste for reuse/recycling or disposal. Any new waste management alternative technologies will also follow this auditing process. The IMT should be notified when any new alternative technologies or disposal/ recycle/reuse sites are identified for use.

9.0 REFERENCES

ACOWWG, 2011 – "Draft" Atlantic Region Marine Oil Spill Recovered Materals Waste Management Guide

IPIECA-IOGP (2014) –Oil Spill Waste Minimization and Management (Good management Guidelines for incident management and emergency response personnel)

CEDRE (2004) – Oil Spill Waste Management, Operational Guide

BP America Inc (2012) – Waste Management Handbook, Guidance for Pre-Planning, Preparedness and response to Emergency Response Events

IMP 2012 - International Maritime Organisation (IMO) Guidelines for Sampling and Identification of Oil Spills – Manual on Oil Pollution

CNSOPB 2010 - Offshore Waste Treatment Guidelines (OWTG) http://www.cnsopb.ns.ca/pdfs/owtg_redraft.pdf

TDGA Transportation of Dangerous Goods Act http://laws-lois.justice.gc.ca/PDF/T-19.01.pdf

TDGR Transportation of Dangerous Goods Regulations https://www.tc.gc.ca/eng/tdg/clear-tofc-211.htm

Export and Import of Hazardous Waste and Hazardous Recyclable Materials Regulations http://laws-lois.justice.gc.ca/PDF/SOR-2005-149.pdf

FA Fisheries Act http://laws-lois.justice.gc.ca/PDF/F-14.pdf

GNS 2017a Government of Nova Scotia, Nova Scotia Environment Act, Accessed May 2017 http://nslegislature.ca/legc/statutes/environment.pdf

GNS 2017b Government of Nova Scotia, Dangerous Goods Management Regulations, Accessed May 2017 https://www.novascotia.ca/just/Aregulations/regs/envdgm.htm

GNS 2017c Government of Nova Scotia, Solid Waste-Resource Management Regulations, Accessed May 2017 https://www.novascotia.ca/just/regulations/regs/envsolid.htm

GNS 2017d Government of Nova Scotia, Used Oil Regulations, Accessed May 2017 https://www.novascotia.ca/just/regulations/regs/envusedoil.htm

NSE 1997 Nova Scotia Environment, Municipal Solid Waste Landfill Guidelines. Accessed May 2017http://www.novascotia.ca/nse/dept/docs.policy/Guidelines-Municipal.Solid.Waste.Landfill.pdf

NSE 1991 Nova Scotia Environment, Guidelines for Industrial Landfills (Updated May 2005) Accessed May 2017 https://novascotia.ca/nse/dept/docs.policy/Guidelines-Industrial.Landfill.pdf

ATTACHMENT A

Best Management Practices – Waste Management of Solids

Best Management Practices (BMP) and guidelines for the staging and routing sites that will ensure proper handling and disposal of solid waste include:

1) Preparation of bins: Labelling, Containment, Inspection and Maintenance

a. Each oily waste container:

i. Will be identified with a clearly visible, unique numeric or alpha-numeric code.
ii. Will be lined prior to placing any contaminated material into it, to aid in the prevention of secondary releases.

b. At each staging and routing site:

i. All open top containers will have plastic liners; containers should also be covered to prevent water accumulation during heavy rain events.
ii. During transportation, all loaded containers will be tarped utilizing the truck's mechanical tarping system, roll tarp or box cover.
iii. Containers will be routinely inspected at the staging areas to ensure proper containment of waste.
iv. Any damaged containers and/or liners will be identified and removed from service for required repair prior to returning to service.

c. In the event leakage does occur, the following will take place:

i. Source of leak will be determined and corrected.
ii. Utilize standard spill clean-up materials and equipment (shovel and adsorbents).
iii. Any remaining impacted soil will be excavated, containerized and removed for treatment and/or disposal.

d. Contaminated containers e.g., oil residue on the outside of the container, will be manually cleaned with sorbents, or will be transferred to an approved area for decontamination.

2) Tracking of Waste Shipments (Manifesting/documentation: from clean-up area to staging & routing to disposal site)

The following provides generic procedures for documentation and tracking/manifesting for all solid waste shipments:

a. WM Rep receives call from the field and "starts" a new log entry on "Full Container Log" in the WM SharePoint server (or equivalent).

b. WM Rep asks caller for information, and logs the following for each new order:

i. Date and time of request
ii. Last name of WM Rep taking order

iii. Company name of requester
iv. Name and BP badge number (if applicable) of personnel requesting service
v. Phone number of requester
vi. Collection Area (efforts will be made to use geographic coordinates when possible)
vii. Applicable Staging Area (Destination)
viii. Container ID number
ix. Confirm 3rd party or WM-owned container
x. If 3rd party container, company name and address of where box needs to be returned
xi. Service requested – either pick up full only and do not replace with an empty (i.e. "DNR" pulldown), or swap (i.e., "Swap" pulldown)
xii. Description of the waste material

NOTE: The description of the waste is required to determine the type of equipment for the job. A data management system will be used to track waste characterization documentation, profiles, and shipping papers. Waste that is collected at each waste staging area is tracked daily by the waste staging area location, and the information is used to update the forms on a daily basis. Recyclables are also tracked and documented on a routine basis.

c. Once ALL of these REQUIRED fields are populated, the WM Rep will select "OK" in Share Point (or equivalent), and a "Shipment ID number" will be assigned.

d. WM - Command Centre Rep will provide the caller with that Shipment ID number (sequence of order) for future reference.

e. Based on information above, WM populates the following four fields:

i. Waste Management Method
ii. Disposal Facility
iii. Whether Disposal Facility is WM or 3rd Party owned/operated
iv. Profile number

f. Staging Area Manager (SAM) / Staging Area Administrator (SAA) reviews WM SharePoint data records for any new orders.

g. SAM locates the "Shipment ID Number" on the Full Container Log, and selects a driver to perform service.

h. SAA populates the record as follows:

i. Company name of assigned shuttle carrier for Service Requested
ii. Date/time shuttle left Staging Area for Service Requested
iii. SAM/SAA prints full container log entry as haul ticket

Note: Shuttle truck goes to beach/location to drop off empty container (if a swap) and/or pick up full container (making sure to verify the container number before picking it up). If full box cannot be located, driver will refer to the Routing Slip for the requester's name and phone number to obtain further directions. The driver will inspect the area for any external contamination prior to removing the container. If any contamination is noted the driver will notify the WM command centre to report the occurrence. WM will initiate a response as appropriate, and also complete required notifications to regulatory agencies.

i. When the driver arrives with a full container at the Staging Area:

   i. SAA locates the container number on Shipment Log, and pulls up associated Shipment Record.

   ii. SAA enters the date/time that the full container arrived at the Staging Area in Shipment (full container) Log

j. If the Log shows that this is a 3rd party container:

   i. SAM must verify that contents of the bin matches the logged "waste description".

   ii. SAM contacts WM Rep (WM – BP Command Centre) to obtain approval to move the 3rd party-owned container (Note, these 3rd party containers will be moved by same WM driver, after being dumped, to the 3rd-party laydown yard address that BP Command Centre populated on log).

   iii. WM service representative will email BP Environmental Waste Rep at the BP command centre for approval and report back to SAM when approval has been received to move the container.

   iv. Once BP Command Centre calls back to say BP has approved pickup, SAA pulls down "yes" in "Was movement of 3rd Party Container approved by BP" field.

   v. SAM obtains a driver to pull full container to disposal facility.

   vi. SAA selects a new pre-printed manifest and enters the following (or makes certain that all of the following information is already contained on it):

   - Shipment ID number
   - Staging Area and Beach/Location Information
   - Management Method
   - Profile number
   - Disposal Facility
   - Unique Manifest number (should be pre-printed)
   - Size of Container (either in m^3, or by weight)
   - Container ID number
   - Generator signature block (BP or CONSULTANT [environmental consultant authorized to sign manifest on behalf of BP] representative, located at each staging area, will sign)
   - Carrier company name
   - Driver name
   - Truck Identifier (Truck Number)
   - Whether it is a 3^{rd} party-owned container.
   - Address of where to return 3^{rd} party (empty) container (after dumping)
   - Time of departure to disposal facility

   vii. SAM/SAA gives driver the completed manifest; driver signs and dates it (as "transporter").

   viii. SAM/SAA prints full container log entry as haul ticket

   ix. BP or CONSULTANT representative will sign manifest at the staging area and hand back to driver.

x. SAA keeps blue (signed by CONSULTANT and Driver) copy. This copy will be mailed to National Accounts Sales and Services (NASS) Program Manager for BP).

xi. BP or CONSULTANT retains gold copy of the manifest for recordkeeping.

xii. Driver departs for disposal facility with load and completed/signed manifest.

xiii. SAA completes the Shipment Line item in data record for this container with the following information (found on their copy of manifest):

- SAM's last name
- Manifest number
- Size of container (CY)
- Carrier company name
- Driver's last name
- Truck Identifier (Truck number)
- Date/Time truck left to deliver waste to disposal facility
- Load was rejected at Landfill and Returned to Staging Area – pull-down "No"

Note: If load is subsequently rejected at landfill and returns to Staging Area for any reason (e.g. incorrect Profile, arrived after operating hours, or does not meet acceptance criteria), SAA will change "No" dropdown to "Yes" dropdown for data field "Load was rejected at Landfill and Returned to Staging Area", and an explanation inserted into "Comments" field (last field in the Record). Then, for these loads:

1. If load will still be going to landfill (e.g., next day when gate opens again), SAA will modify information populated in item ix. for that same Shipment ID when load departs for landfill again.
2. If re-routing to alternate disposal facility is necessary, SAA will enter "NA" in all of the subsequent fields up to the "Order Closed" field, and pull down "yes". At that point, SAM notifies Command Centre to begin new order in "Full Container Log".

i. WM submits the "Daily Shipment Log" electronically to CONSULTANT, CONSULTANT submits to BP on a daily basis.

ii. The Situation Unit completes waste tracking forms from the data presented by CONSULTANT.

3) <u>Disposal Site Steps:</u>

a. Driver arrives with load.

b. Destruction/Disposal Facility Receiver signs and dates shipping papers (as "facility").

c. Load is weighed and info loaded into a Waste Inventory Tracker (for WM facilities).

d. Destruction/Disposal Facility will generate copy of weight ticket and signed shipping papers (and any other paperwork which denotes any additional services required, such as solidification, etc.) and forwards to WM Command Centre.

e. All shipping papers and other documentation will be sent to BP electronically and/or mailed to the address identified on the manifest.

4) <u>Site storage restrictions: no storage at staging/routing sites or clean-up sites</u>

a. No containers loaded with oily debris will be stored at any location other than the BP-approved WM staging site.

b. Containers loaded with oily debris will not be stored at any BP-approved WM staging site longer than 72 hours for any loads having an approved and signed profile on file.

c. Each operational BP-approved WM staging site will have 24-hour manned security.

ATTACHMENT B

Waste Treatment and Handling Areas

Proposed Waste Staging Areas

TO BE SOURCED FROM SCOTIAN BASIN ONEMAP GIS

Managed Staging Areas

Location Name	Address
Refer to small craft harbours within the impacted area.	TBD

Waste Storage Areas

Location Name	Address
Refer to small craft harbours within the impacted area.	TBD

Decontamination Station Areas

Location Name	Address
TBD	TBD
*Others TBD as needed	

Maps are maintained (Incident Deployment and staging) for the BP Incident Command. Additional staging areas will be added to these maps for communication and approval by the Incident Joint IC as required.

Strategic staging areas have been identified to support the clean-up operations. The areas are divided by function of the site which includes equipment staging sites, waste staging areas and decontamination stations. Additional staging areas may need to be added for future capacity, as necessary.

Additional staging areas (and recycling/disposal sites) will be added as amendments to the approved OSWMP based on changing conditions of the emergency response. To the extent practicable, waste staging areas will be located in existing waste management facilities. Additional waste staging areas in non-business locations and de-contamination stations may be discussed with regulators and local government agencies for review and concurrence. Provincial Agency Contacts are summarized in Table 6.

BP will comply with all Approvals that are required to site and operate temporary staging areas to support the response operations. These are expected to be operated under lease agreements and located on or near small craft harbours used for equipment deployment, or existing municipal solid waste transfer or disposal facilities.

Consideration for siting of other temporary handling facilities will include various location criteria such as presence of wetlands, floodplains, proximity to archaeological and historic sites and resources, consideration of local demographics, known threatened and endangered species habitat, logistics to and from the site and availability of the property under consideration.

Each staging area will be equipped with an adequate supply of appropriate containers to support anticipated clean-up activities. Facility specific “Spill Control and Countermeasures Plans” will be developed for any sites in accordance with lease and /or regulatory requirements. All WM staging areas also have site-specific spill response and notification plans onsite for use by site personnel.

When the waste staging area is no longer required to support operations, or at the end of lease agreement, each staging area will be decommissioned by removing all temporary facilities and equipment, evaluating surface soils for any evidence of contamination that resulted from staging activities (followed by remediating impacted soils, if needed), returning the land to original grade as necessary and stabilizing or re-vegetating areas as required by the lease agreement.

Table 6 - Provincial Agency Contacts

Jurisdiction	Agency	Contact	Position	Email	Phone
Nova Scotia	Nova Scotia Environment, Head Office	Matthew Brufatto	Planning & Development Officer	Matthew.Brufatto@novascotia.ca	902-424-2578
Newfoundland and Labrador	Service NL	Robert Locke	Manager of Operations and Environmental Protection	rlocke@gov.nl.ca	709-729-2008
New Brunswick	Department of Environment and Local Government	Mike Correy	Emergency Management Specialist	mike.correy@gnb.ca	506-453-8371
Prince Edward Island	PEI Department of Environment, Labour and Justice	Debbie Johnston	Emergency Response Coordinator	dajohnston@gov.pe.ca	902-368-5059

Table 7 provides a listing of locations and contact information for approved oily waste treatment /disposal facilities in Nova Scotia:

Table 7 – Approved Oily Waste Treatment/Disposal Facilities in Nova Scotia

Facility	Location	Contact	Type of Waste Accepted (Solid, Liquid, Soil)	Treatment Technology	Specialized Equipment	Storage Capacity	Processing Capacity	Restrictions	Acceptance of Oil Spill Waste					
									Oiled PPE	Recovered Oil	Oiled Vegetation	Oiled Sorbent Materials	Oiled Beach Materials	Animal Carcasses
Nova Scotia - Waste Treatment Facilities and Services														
Envirosoil	Rocky Lake Quarry, Bedford	Jerry Scott (902) 835-3381	Contaminated Soil, Drilling waste sludges	Low Temperature Thermal Desorption	Scales, Earth Moving equipment, Containment pond for	100,000 tonnes, Liquid Drilling waste sludge	50,000 tonnes/year	CCME Industrial Criteria Levels. Metals for soils	No	Sludges	Yes	No	Yes	No
Clean Earth Technologies	Halifax Aerotech Park	Colin Morrel 902-835-9095 902 209-3476 after hours	Soil Hydrocarbons metals and PAH, TDG Class 9 Hazardous Wastes Leachate Toxic	Volume reduction and Soil Washing, Third party (Stabilization), Horizon (thermal Desorption and secure	Patented mobile technology for soil treatment, Water treatment for both organics and inorganics in wastewater	30,000 tonnes storage; Tankage for 100,000 gallons	80 tonnes - 250/ hour for soil, between 75 gal.min 150gal.min, 1000 gal/min	Cannot take materials classified as Hazardous Waste	Yes	No	Yes	Yes	Yes	No
Clean Harbours Canada Inc.	Debert, Nova Scotia	P.O. Box 188 Debert, NS B0M 1G0 Ph: 902-662-3336/ Fax: 902-662-2211 winters.scott@cleanharbors.com	Hazardous Waste Transfer Facility,Used Oil	Hazardous Waste Transfer Facility	Drums handling access to a complete range of external waste handling and disposal options	1000 Barrels/4 32,000 litre tanks	Transfer Station Only no processing	None	Yes	Yes	Yes	Yes	Yes	No
Envirosystems Inc.	Dartmouth, Saint John, NB	Sid Hales 902-494-5890 902-494-5806 (direct)	Industrial waste water, Used Oil	Solid: Incinerator, Landfill Liquid: Re-refinery	400,000 litres bulk storage	Solid: 10-20 tonne/week Liquid: 100,000L/day	2,000 tonnes/day in summer (do not process in winter)	PCBs	Yes	Yes	Yes	Yes	Yes	No
Envirosystems Inc.	Halifax , Saint John	Jeff Fraser Operations Manager 494-5892	Waste Collection	Temporary Storage Only	4 Master Vacs Wet/Dry Units, 4 vacuum Trucks, 2 Vacuum tankers Mobile Wash Units , Additional Units can be mobilized from NB as required.	None	None	Explosives	Yes	Yes	Yes	Yes	Yes	Possible
Envirosystems Inc.	Debert Colchester County and Moncton, NB	Cliff Travers or Darren Black (1 800-565-4383)	Waste Oil and Industrial Waste Water, Hazardous waste Transfer Station (Moncton	Oil Reprocessing and water treatment	Bulk Oil Collection, 5 tractors, 9 bulk tankers, 2 liquid pumper trucks, 2 straight trucks for solid waste, On site Lab and Technician	18,000,000 Litres waste water storage capacity, 200,000 gallons waste oil storage	12,000,000 litres processing capacity	NSEL Approval, Used Oil Collector	Yes	Yes	Yes	Yes	Yes	No
Envirosystems Incorporated Atlantic Industrial Cleaners, AIC Sullivans)	Dartmouth, Sydney	Tim Sullivan (VP Nova Scotia - 1-902-564-46752	Industrial waste water and used oil	Solid: Thermal desorption, Landfill Liquid: Re-refinery	Cape Breton - 3 Vacuum trucks, Support Vehicles, Water treatment ECRC Contractor Dartmouth 12 Vacuum Trucks, Liquid Storage	100,0000 liter's Dartmouth 800,000 litres	Equipment for 60 gallons /minute. Not currently under approval but can be activated pending authorization from NSEL No water treatment facilities in	Explosives and PCBs	Yes	Yes	Yes	Yes	Yes	Yes
Terrapure// Newalta	Antigonish, Bedford, Sussex	1-902-835-8078 1-506-432-9500	Solid, Industrial Liquid , Used Oil Soil	NS Operations are for Collection and temporary storage only, Reprocessing for Fuel oil	1 Vacuum Trucks, oil Tanker, 3 straight trucks, Additional equipment can be mobilized, pumps etc	100,000 litres	Solids: 500 tonne/week	Explosives , Medical waste	Yes	Yes	Yes	Yes	Yes	No
Atlantic Soils and Associated	New Glasgow	Ashley Cameron / Shane Cameron 902-396-4110	Contaminated Soil	Bio-remediation	Earth Moving Equipment	2,000 tonne/day	Liquids: 100,000L/day	Free product, PCBs	No	No	Yes	No	Yes	No

Facility	Location	Contact	Type of Waste Accepted (Solid, Liquid, Soil)	Treatment Technology	Specialized Equipment	Storage Capacity	Processing Capacity	Restrictions	Acceptance of Oil Spill Waste					
									Oiled PPE	Recovered Oil	Oiled Vegetation	Oiled Sorbent Materials	Oiled Beach Materials	Animal Carcasses
Environmental Soil Services	Pictou	902-752-5932	Contaminated Soil	Bio Remediation	Earth Moving Equipment			Liquid Wastes	No	No	Yes	No	Yes	No
Conrads - SRT Soil Remediation Technologies	Halifax / Waverley	Brent Conrad P.O. Box 2129 150 Cono Dr. Dartmouth, NS B2W 3Y2 Ph: 902-435-7645 Fax: 902-462-8324 brentc@conrads.ns.ca	Contaminated Soil	Bioremediation	Scales , Mechanical Screens and Shredder, Earth Moving Equipment, Air blowers and Vacuum Fans	100,000 tonnes soil storage capacity, plus secure storage for other solid waste pending Offsite disposal	Screen 1000 tonnes day, 20-30,000 tonnes /year of Contaminated Soil	Explosives, PCB, Medical waste etc., NSEL Approval Restrictions	No	No	Yes	No	Yes	No
Nova Scotia - Used Oil Collectors														
Central Region														
Envirosystems Inc.	Dartmouth, Saint John, NB	902-494-5890	Industrial waste water, Used Oil	Solid: Incinerator, Landfill Liquid: Re-refinery	400,000 litres bulk storage	Solid: 10-20 tonne/week Liquid: 100,000L/day	2,000 tonnes/day in summer (do not process in winter)	PCBs	Yes	Yes	Yes	Yes	Yes	No
Envirosystems Inc.	Dartmouth, Sydney	1-902-564-46752	Industrial waste water and used oil	Solid: Thermal desorption, Landfill Liquid: Re-refinery	Cape Breton - 3 Vacuum trucks, Support Vehicles, Water treatment ECRC Contractor Dartmouth 12 Vacuum Trucks, Liquid Storage	100,0000 litres Dartmouth 800,000 litres	Equipment for 60 gallons /minute. Not currently under approval but can be activated pending authorization from NSEL No water treatment facilities in Dartmouth	Explosives and PCBs	Yes	Yes	Yes	Yes	Yes	Yes
Newalta Former Eastern Environmental Services	Bedford, Sussex	Chuck Stager 902-835-8078 Dave Rautio 1-506-432-9500	Solid, Industrial Liquid , Used Oil Soil	NS Operations are for Collection and temporary storage only, Reprocessing for Fuel oil	1 Vacuum Trucks, oil Tanker, 3 straight trucks, Additional equipment can be mobilized, pumps etc	100,000 litres	Solids: 500 tonne/week	Explosives , Medical waste	Yes	Yes	Yes	Yes	Yes	No
Northern Region														
Clean Harbours Canada Inc.	Debert, Nova Scotia	P.O. Box 188 Debert, NS B0M 1G0 Ph: 902-662-3336/ Fax: 902-662-2211	Hazardous Waste Transfer Facility, Used Oil	Hazardous Waste Transfer Facility	Drums handling access to a complete range of external waste handling and disposal options	1000 Barrels/4 32,000 litre tanks	Transfer Station Only no processing	None	Yes	Yes	Yes	Yes	Yes	No
Envirosystems Inc.	Debert Colchester County and Moncton, NB	1-800-565-4383	Waste Oil and Industrial Waste Water, Hazardous waste Transfer Station (Moncton	Oil Reprocessing and water treatment	Bulk Oil Collection, 5 tractors, 9 bulk tankers, 2 liquid pumper trucks, 2 straight trucks for solid waste, On site Lab and Technician	18,000,000 Litres waste water storage capacity, 200,000 gallons waste oil storage	12,000,000 litres processing capacity	NSEL Approval, Used Oil Collector	Yes	Yes	Yes	Yes	Yes	No
LaFarge Canada	Brookfield	Chris Richards	Used Oil	Cement Kiln (Energy Recovery)		3 - 110,000 litre above ground tanks		Solids (Except Roofing Shingles)	No	Yes	No	No	No	No
Eastern Region														
Envirosystems Incorporated	Sydney	1-902-564-46752	Industrial waste water and used oil	Solid: Thermal desorption, Landfill Liquid: Re-refinery	Cape Breton - 3 Vacuum trucks, Support Vehicles, Water treatment ECRC Contractor Dartmouth 12 Vacuum Trucks, Liquid Storage	100,0000 litres Dartmouth 800,000 litres	Equipment for 60 gallons /minute. Not currently under approval but can be activated pending authorization from NSEL No water treatment facilities in Dartmouth	Explosives and PCBs	Yes	Yes	Yes	Yes	Yes	Yes

Table 8 provides a listing of locations and contact information for approved municipal solid waste disposal sites in Nova Scotia:

Table 8 – Approved Municipal Solid Waste Disposal Sites in Nova Scotia

Disposal Site	Contact
Antigonish / Guysborough / Pictou	
Guysborough County Landfill Site PO Box 79 Guysborough, NS B0H 1N0	Phone: 232-2316
Cumberland / Colchester / East Hants	
Colchester Balefill Facility PO Box 697 Truro, NSB2N 5E7	Phone: 897-3160
Cumberland Central Landfill PO Box 549, Amherst, NSB4H 4A1	Phone: 667-5141 Fax:667-5873
Halifax Regional Municipality	
Otter Lake Waste Processing and Disposal Facility Exit 3, Hwy 103, 600 Otter Lake Drive	HRM Phone: 311
Valley	
Eastern Management Centre 100 Donald Hiltz Connector Rd., Kentville	Phone: (902) 679-1325 Toll free: 1-877-927-8300
Western Management Centre 343 Elliot Rd. at Exit 19 off 101 North of Lawrencetown	
South Shore	
West Hants Landfill 1569 Walton Woods Rd., Scotch Village NS B0N 2G0	Phone:757-2308 Fax: 798-8553
Kaizer Meadow Landfill PO Box 369, Chester B0J 1J0	Phone: 275-2330 Fax: 275-4771
Queens Municipal Landfill PO Box 1264 Liverpool, NS B0T 1K0	Phone: 354-3455 Fax: 354-7473

Table 9 provides a listing of locations and contact information for approved municipal solid waste transfer stations in Nova Scotia:

Table 9 – Approved Municipal Solid Waste Transfer Sites in Nova Scotia

Facility Name	Address	Phone (902)	Fax (902)
Cape Breton			
CBRM Transfer Station	575 Grand Lake Rd, Sydney, CBRM	563-5590	563-5598
Kenloch Transfer Station	P.O. Box 179, Port Hood, Inverness County	787-3502	787-3110
Victoria County Solid Waste	440 Old Margaree Rd, Baddeck, Victoria County	295-2026	295-1780
Antigonish/Guysborough/Pictou			
Beech Hill Municipal Solid Waste Transfer Station	1358 Beech Hill Rd, Antigonish County	863-4744	863 -5751
Guysborough County Recycling Transfer Station	151 Waste Management Rd , Route 16, Guysborough County	232-2316	232-2422
St. Mary's Transfer Facility	P.O. Box 296, Sherbrooke, Guysborough County	522-2659	522-2309
Pictou County Transfer Station	220 Mount William Rd, Mount William, Pictou County	396-5062	396-4782
Cumberland/Colchester/East Hants			
Advocate	4472 Highway 209, Advocate Harbour, Cumberland County	667-5141	
Oxford (for town residents only)	6279 Highway 321, Roslin, Cumberland County		
Pugwash	1031 Irishtown Rd, Pugwash, Cumberland County	667-5141	
River Hebert	142 Dump Rd, River Herbert, Cumberland County	667-5141	
Halifax Regional Municipality			
HRM Middle Musquodoboit Transfer Station	249 Sibley Rd, Middle Musquodoboit, HRM	311	490-6690
HRM Sheet Harbour Transfer Station	21611 Hwy#7, Sheet Harbour, HRM	311	490-6690

Facility Name	Address	Phone (902)	Fax (902)
Valley			
Eastern Management Centre Transfer Station	100 Donald Hiltz Connector Rd, Kentville, Kings County	1-877-927-8300	679-1327
Western Management Centre Transfer Station	343 Elliot Rd, Lawrencetown, Annapolis County	1-877-927-8300	679-1327
South Shore			
Lunenburg Regional Waste Transfer Station	908 Mullock Rd, Whynot Settlement, Lunenburg County	543-2991	543-7960
Queens Organic Transfer Station	P.O. Box 1264, Liverpool, Queens County	354-3455	354-7473
Valley/Digby			
Yarmouth County Solid Waste Park	1932 Hardscratch Rd, Yarmouth, Yarmouth County	742-5852	742-5220
Regional Material Recovery Facility	4571 Highway 3, West Green Harbour, Shelburne County	656-3273	
Clare Transfer Station	P.O. Box 458, Little Brook, Digby County	645-2993	769-3773

Source : http://novascotia.ca/nse/waste/facilities.asp

Table 10 provides a listing of locations and contact information for approved recycling sites in Nova Scotia:

Table 10 – Approved Recycling Facilities in Nova Scotia

Region and Facility Name	Address	Phone (902)
Cape Breton		
Baddeck Enviro Depot and Municipal Recycling Facility	440 Margaree Rd., Baddeck, Victoria County	295-2026
Green Island Recycling Ltd.	345 Gulf Crescent Dr., Sydport Ind. Park, Sydney	564-8104
Inverness Material Recycling Facility	23 Beach Rd., Inverness, Inverness County	787-3503
Cumberland/Colchester/East Hants		
Cumberland Central Recycling Facility	2052 Little Forks Rd, Cumberland County	667-5141
Municipality of the County of Colchester	Exit 18, Highway 104, 185 Mingo Rd., Kemptown	897-0450
Halifax Regional Municipality		
Miller Waste Systems, operators of the Halifax Regional MRF	20 Horseshoe Lake Dr., Halifax, Halifax County	490-6640
South Shore		
Queens Solid Waste Facility	3750 Highway Number 8, 10 Mile Lake, Queens County	350-1084
Yarmouth / Digby		
Scotia Recycling Ltd.	273 Forest St. Yarmouth	742-5654

Source : http://novascotia.ca/nse/waste/facilities.asp

Table 11 provides a listing of locations and contact information for approved composting sites in Nova Scotia:

Table 11 – Approved Commercial Composting Facilities in Nova Scotia

Facility / Location	Type of Operation	Serving	Phone (902)
Cape Breton			
Baddeck Composting Facility, Baddeck, Victoria County	Food and yard waste	IC&I	295-2026
West Arichat Composting Facility West Arichat, Richmond County	Food and yard waste	IC&I	226-2396
CBRM Composting Facility, Sydney, CBRM	Food and yard waste	IC&I, Residential	563-5593
Inverness Composting Facility, Kenloch, Inverness County	Food and yard waste, fish waste	IC&I	787-3503
Antigonish / Guysborough / Pictou			
Guysborough Composting Facility Guysborough County	Enclosed IC&I, food and yard waste	IC&I	232-2316
Atlantic Country Compost (TE Boyle Farm & Forestry Limited) * Tracadie,Antigonish County	Fish processing waste, food and farm waste, wood chips composting	IC&I	232-3317 or 863-7845
The Pictou County Solid Waste Management Composting Facility, Mount William, Pictou County	In-vessel food and yard waste, wood	IC&I, Residential	396-1495
Cumberland / Colchester / East Hants			
Colchester Balefill / Composting Facility Kemptown, Colchester County	In-vessel food and yard waste, paper products	IC&I, Residential	895-0450
Fundy Compost Incorporated * Brookfield, Colchester County	Sawdust, food and yard waste, fish meal, biosolids, source separated organics	IC&I (sludge) Residential (East Hants)	673-3020
Cumberland Central Composting Facility Little Forks, Cumberland County	Enclosed food and yard waste, paper products	IC&I, Residential	667-5141

Facility / Location	Type of Operation	Serving	Phone (902)
Halifax Regional Municipality			
Miller Waste Systems * Burnside Industrial Park, HRM, Halifax County	In-vessel food and yard waste, grease trap sludge, wood chips, sawdust and bark, paper products	IC&I, Residential	468-3161
New Era Farms * Ragged Lake Industrial Park, HRM, Halifax County	In-vessel food and yard waste, paper products	IC&I, Residential	876-5185
Valley			
Northridge Farms * Demsey Corners, Kings County	In vessel food and yard waste	IC&I	847-3691
South Shore			
Lunenburg Regional Recycling and Composting Facility, Whynott Settlement, Lunenburg County	In-vessel food and yard waste, paper products, municipal sewage sludge, sawdust, bark, wood chips, fish processing waste	IC&I, Residential	543-2991
Louisiana Pacific Resources Group Technology (formerly ABT Canada Ltd.) *East River, Chester	Wood waste processing	IC&I (waste from own operations)	275-2936
Yarmouth / Digby			
Town of Yarmouth Compost Facility South Ohio, Yarmouth County	In-vessel food and yard waste, paper products	IC&I, Residential	742-5220
Spectacle Lake Concrete & Excavating Ltd. Campsite Environmental Inc. Compost Facility* Church Point, Digby County	Mink carcasses (mix with sawdust)	IC&I	769-2777
Legend			
*	privately-owned facility		
**	accepts leaf and yard waste only		
IC&I	refers to the industrial, commercial and institutional sector		
Residential	refers to household green carts		

Source : http://novascotia.ca/nse/waste/facilities.asp

Table 12 below is a listing of locations and contact information for approved Special Waste handling sites in Nova Scotia:

Table 12 – Approved Special Waste Handling Facilities in Nova Scotia

Facility Name	Address	Phone	Fax
Cape Breton			
CBRM Household Special Waste Depot	345 Gulf Crescent Dr. Edwardsville, CBRM	902-564-8104	902-564-8085
Antigonish / Guysborough / Pictou			
Guysborough County HHW Facility	151 Waste Management Rd, Route 16, Guysborough County	902-232-2316	902-232-2422
Pictou HHW Facility	220 Mount William Rd, Mount William, Pictou County	902-396-5062	902-396-4782
Cumberland / Colchester / East Hants			
Colchester HHW Facility	185 Mingo Rd, Kemptown, Colchester County	902-897-0450	902-897-0882
East Hants HHW Facility	1306 Georgefield Rd, Georgefield	902-261-2178	902-261-2179
Halifax Regional Municipality			
HRM HHW Facility	20 Horseshoe Lake Dr, Halifax, HRM	311	902-490-6690
Valley			
Eastern Management Centre HHW Facility	100 Donald Hiltz Connector Rd, Kentville, Kings County	1-877-927-8300	902-679-1327
Western Management Centre HHW Facility	343 Elliot Rd, Lawrencetown, Annapolis County	1-877-927-8300	902-679-1327
South Shore			
Kaizer Meadow HHW Facility	450 Kaizer Meadow Rd, Municipality of Chester	902-275-2330	902-275-4771
Lunenburg Regional HHW Facility	908 Mullock Rd, Whynot Settlement, Lunenburg County	902-543-2991	902-543-7960
Cogmagun Road HHW Facility	1569 Cogmagun Rd, Cogmagun, Hants County	902-757-2308	902-757-0292
Queens Solid Waste Facility	3750 Highway #8 10 Mile Lake, Queens County	902-350-1084	

Facility Name	Address	Phone	Fax
JSB HHW Facility	243 Sandy Point Rd, Shelburne, Shelburne County	902-875-5336	902-875-1278
Barrington HHW - Municipality of Barrington	1138 Clements Pond (Off HWY #103	902-635-0181	
Yarmouth / Digby			
Clare HHW Depot	919 Bonnie Road	902-837-8369	
Digby HHW Depot	245 Upper Cross Road	902-245-2657	
Yarmouth County HHW Depot	1932 Hardscratch Road	902-742-5852	

Source : http://novascotia.ca/nse/waste/facilities.asp

Table 13 - Approved Animal Crematoriums in Nova Scotia

Approval Holder Name	Site Name	Street Address	County	Community	Expiry Date	Approval Number
Halifax Veterinary Management Co. Ltd	223 Robinson Road, RR1	223 Robinson Road	Hants	Mill Village	22-Jun-2026	2006-051498-R01
M.E.C. Pet Services Inc.	M.E.C. Pet Services Inc.	10062 Highway 215	Hants	South Maitland	12-May-2018	2008-061917-T01
Margaret Deveau	Animal Crematorium - East Kemptville	205 Gray Road	Yarmouth	East Kemptville	25-Mar-2019	2009-065971
Metro Pet Crematory Inc	Metro Pet Crem-Lot 4 - 3395 Sackville Dr	3395 Sackville Drive	Halifax	Upper Sackville	09-Feb-2020	2010-070758-A01
Parker Pet Crematorium Limited	Parker pet Crematorium Limited	609 Grand Lake Road	Cape Breton	Grand Lake Road	02-Jun-2024	2013-085439
Peaceful Acres Pet Cemetery Limited	Peaceful Acres Pet Cemetery Limited	250 Collier Road	Hants	Ardoise	31-Jan-2019	2009-065871-T01
Precious Pet Cemetary		369 Pomquet River Road	Antigonish	St. Andrews	28-Feb-2022	2012-080543
South Shore Pet Crematorium & Disposal	South Shore Pet Crematorium & Disposal	2717 Barss Corner Road	Lunenburg	Maplewood	24-Jun-2022	2010-072640

Table 14 - Trucking Association of Nova Scotian (TANS), County Dispatchers

County / Area	Position	Name	Address	Home / Work	Mobile	Fax	Email
ANTIGONISH 1	President	[redacted]	191 South Side Harbour Rd. Antigonish, NS B2G 2L4	[redacted]	[redacted]		trucker.069@hotmail.com
	First Vice President		160 College Rd. Antigonish NS B2G 1Y2				ronnie@archibaldcontracting.com
	Second Vice President		4214 Hwy. 316 St. Andrew's, NS B0H 1X0				jdavery39@hotmail.ca
	Third Viooce President		PO Box 1642 Antigonish, NS B2G 2L8				mjcameron03@gmail.com
	Fourth Vice-President		4667 Highway 316, Lower South River, Antigonish NS B2G 2L4			902-863-4321	k.mccarron@bellaliant.net
	Secretary / Treasurer		21 Celtic Dr. PO Box 3 St. Andrews, NS B0H 1X0			902-867-1779	ron_chisholm@ns.sympatico.ca
	TANS Area 1 Director		P.O Box 1392 Antigonish, NS B2G 2L7			902-870-0403	brophytrucking@easltink.ca
	Dispatcher	[redacted]	P.O Box 1392 Antigonish, NS B2G 2L8	[redacted]	[redacted]	902-863-6485	antigonishdispatcher@gmail.com
CAPE BRETON 1	President		1671 Kings Road, Sydney NS B1S 1E0			902-562-0085	craigmacdonald68@gmail.com
	Vice President		2745 Kings Rd. Sydney Forks, NS B1L 1A2				
	Vice President		P.O. Box 453, 16 Union St. North Sydney, NS B2A 3M5			902-794-8892	aprilmacdonald15@gmail.com
	Vice President		P.O. Box 651, 2245 Kings Rd. Sydney, NS B1P 6H7				george567@ns.sympatico.ca
	Secretary / Treasurer		1120 Birch Grove Rd. Birch Grove, NS B1B 1J7			902-737-1440	johnl1970mac@hotmail.com

County / Area	Position	Name	Address	Home / Work	Mobile	Fax	Email
	Vice President	[redacted]	1625 Coxheath Rd. Blacketts Lake, NS B1L 1A7	[redacted]	[redacted]		N/A
	Dispatcher		118 Tompkinsville Rd. Reserve Mines, NS B1E 1K7			902-849-0423	d_g_hooper@hotmail.co
GUYSBOROUGH 1	President		2147 Tompkinsville Rd. Guysborough, NS B0H 1N0			902-533-2170	tyson.byard@gmail.com
	First Vice President		5992 Route #16 Peas Brook, NS B0H 1N0			902-358-2119	bayview.excavators.ltd@hotmail.com
	Second Vice President		3474 South River Lake Rd. Erinville, NS B0H 1N0			902-533-3856	N/A
	Third Vice President		27 Warf Rd. New Harbour, NS B0H 1T0				N/A
	Dispatcher		6886 South River Lake Rd. Roachvale, NS B0S 1N0			902-533-2170	tinajordan2009@outlook.com
INVERNESS 1	President		2852 Hwy 105 Kingsville, NS B0E 3L0				invernesscountytruckers@hotmail.com
	Vice-President		RR #1, 3839 Hwy. 19 Judique NS B01 1P0				scottvac@gmail.com
	Secretary/Treasurer		317 Hwy. 19 Newtown NS B9A 1J3				terrymacisaac@hotmail.com
	Dispatcher		2852 Hwy 105 Kingsville, NS B0E 3L0				invernesscountytruckers@hotmail.com
RICHMOND 1	President	[redacted]	P.O. Box 34 West Archicat NS B0E 3J0	[redacted]		902-594-2065	p.covin@hotmail.com
	First Vice-President		RR #1 St. Peter's, NS B0E 3B0				kellystrucking@ns.aliantzinc.ca
	Second Vice-President		66 Eastside Road Grand River, NS B0E 1M0				macleodexcavating@gmail.com
	Secretary / Treasurer; Dispatcher		PO Box 51 St. Peter's, NS B0E 3B0			902-535-2647	rcta@ns.sympatico.ca

County / Area	Position	Name	Address	Home / Work	Mobile	Fax	Email
VICTORIA 1	President	[redacted]	69 McCharles Cross, PO Box 662 Baddeck, NS B0E 1B0	[redacted]	[redacted]	902-295-2316	jonathan.maclean@outlook.com
	TANS Area 1 Director Vice-President VCTA		17 Loch Bhreagh Drive Boularderie East, NS B1X 1J7			902-674-2023	loch.bhreagh@hotmail.com
	TANS Area 1 Director **TANS Chair**		RR#1, 8 Peter MacLean Road Ottawa Brook, NS B0E 1T0			902-622-1389	kilkare@gmail.com
	Dispatcher		PO Box 291, Baddeck, NS B0E 1B0			902-295-1287	calvinrita@ns.sympatico.ca
COLCHESTER 2	President		408 Marney Rd. Brookfield, NS B0N 1C0			902-897-2583	tim.priest@ns.sympatico.ca
	Vice President		85 Brookside Branch Rd. Brookside, NS B6L 2A7				westernstar2010@hotmail.com
	Dispatcher		Maple St. Hilden, NS				mmhamilton49@outlook.com
CUMBERLAND 2	President		RR #1, 1821 Beckwith Rd. Oxford, NS B0M 1P0			902-447-2057	vaughnsmith2008@gmail.com
	First Vice-President		RR #4, 514 Ripley Loop Rd. Amherst, NS B4H 3Y2			902-667-0202	baxter.trucking@xplornet.ca
	TANS Area 2 Director Second Vice- President CCTA		13 Tupper Blvd. Amherst, NS B4H 4J4			902-667-0302	bdowetruck@gmail.com
	Third Vice-President		P.O. Box 289, 692 Sunset Ave. Oxford, NS B0M 1P0			902-552-2085	carlabenjamin@eastlink.ca
	Secretary		3304 Highway 302 Maccan, NS B0L 1B0			902-545-2129	philgilbert@eastlink.ca
	Dispatcher		PO Box 296, Oxford, NS B0M 1P0			902-230-2058	rubyanderic@eastlink.ca
WEST HANTS 2	President		5348 Highway #1 St. Croix, NS B0N 2E0			902-798-2224	wayne.d.davis1953@gmail.com
	First Vice-President Treasurer / Secretary		350 Greenhill Rd., Box 1, Site 8 Mount Uniacke, NS B0N 1Z0			902-757-2551	pat.brimicombe@eastink.ca
	Second Vice-President		90 Cochran Lane, RR #1 Walton, NS B0N 2R0				maurie.fern@ns.sympatico.ca
	Third Vice-President	[redacted]	6249 Hwy #1, RR #1 Ellershouse Hants County, NS B0N 1L0	[redacted]	[redacted]		N/A

County / Area	Position	Name	Address	Home / Work	Mobile	Fax	Email
	Dispatcher	[redacted]	5322 Hwy #1 Box 44 Newport Station Hants County NS B0N 2B0	[redacted]			dispatchwh@gmail.com
PICTOU 2	**Artea 2 Director** President PCTA		19 G&B Williams Loop Barney's River, NS B0K 1A0			902-924-2712	bryan@williamsheavyhauling.com
	Vice-President		RR # 1, 88 Landfill Rd. Mt. William, Merigomish, NS B0K 1G0			902-396-1810	shanecameron@ns.aliantzinc.ca
	Secretary/ Treasurer		108 Ambercrombie loop, RR#3 New Glasgow, NS B2H 5C6			902-485-3406	maanderson@eastlink.ca
	Director		6216 Trafalgar Rd. RR # 1 Stellarton, NS B0K 1S0			902-752-7328	abel@ns.sympatico.ca
	Dispatcher		PO Box 117 Thoburn, NS B0K 1W0			902-922-2035	simonfraser1941@gmail.com
EAST HANTS 2	President		176 Highway 236 Scotch Village, NS B0N 2G0			902-632-2953	fred.bond@eastlink.ca
	Vice President		1422 Hwy 214 Ninemile River NS B25 2R3			902-883-7035	laurathompson1981@gmail.com
	Secretary		Box 3 Comp 15 Upper Rawdon, NS B0N 2N0				julie.frail@hotmail.com
	Dispatcher		1285 Hwy. 2 Lantz, NS B2S 1Z2				nancy.logan019@gmail.com
HALIFAX 2	President		7485 Hwy. 207 west Chezzetcook, NS B0J 1N0			902-281-2335	leadingedge1@live.ca
	Vice-President HCTA / Dispatcher		PO Box 160 Sheet Harbour, NS B0J 3B0			902-885-2390	easternshorehaulage@outlook.com
	Second Vice-President		745 Sackville Drive Sackville NS B4C 2T2			902-864-0505	horace@live.ca
	Secretary		202 Lake Major Rd. Dartmouth, NS B2Z 1B3			902-434-8004	bldunphy@eastlink.ca

County / Area	Position	Name	Address	Home / Work	Mobile	Fax	Email
	Dispatcher - Chezzetcock-Musquodobit	[redacted]	4486 #7 Highway Porter's Lake, NS B3E 1M2	[redacted]	[redacted]	902-827-5350	gramps@eastlink.ca
	Dispatcher - Burnside		237 Lake Major Rd. Box 2970 Dartmouth East, NS B2Z 1B3			902-435-4187	rosedunphy1@gmail.com
	Dispatcher - Beechville Bedford/Sackville		745 Sackville Drive Sackville NS B4C 2T2				horace@live.ca
	TANS Area 2 Director		15079 Hwy. 224 Cook's Brook, NS B0N 2H0			902-758-1049	wee_delivery@hotmail.com
ANNAPOLIS 3	President / Secretary Treasurer		5215 West Paradise, Bridgetown, NS B0S 1C0				welegge@hotmail.com
	Vice President	[redacted]	1861 Middle Road, RR #3 Middleton, NS B0S 1P0	[redacted]	[redacted]		stefaniemburns@hotmail.com
	Dispatcher		PO Box 532, Bridgetown, NS B0S 1C0				acta.jwood@outlook.com
CLARE 3	President, Secretary/Treasurer		334 Eustache Comeau Rd., RR#1 Saulnierville, NS B0W 2Z0			902-769-5027	louco_contracting@hotmail.com
	Vice President		397 Thimot Rd. Saulnierville, NS B0W 2Z0			902-769-3428	bglombard@ns.sympatico.ca
	Dispatcher		2-514 Water St. Yarmouth, NS B5A 1L8			902-881-0101	dashelley1010@gmail.com
DIGBY 3	President		72 Moore Lane Deep Brook, NS B0S 1J0			902-638-8513	allenmoore@ns.aliantzinc.ca
	Secretary/ Treasurer		9446 Highway #8 Lequille, NS B0S 1A0			902-532-7740	donnie@brown-bros.ca
	Dispatcher		72 Moore Lane Deep Brook, NS B0S 1J0			902-638-8513	allenmoore@ns.aliantzinc.ca

County / Area	Position	Name	Address	Home / Work	Mobile	Fax	Email
KINGS 3	**TANS Area 3 Director Treasurer/Secretary** President KCTA	[redacted]	350 White Rock Rd. Canaan, NS B4N 4K1	[redacted]	[redacted]	902-678-2251	weirsontrucking@gmail.com
	First Vice-President		350 87 West Brooklyn Mt. Road, Wolfville, NS B0P 1P0				morsemachining@ns.aliantzinc.ca
	Second Vice-President Secretary/Treasurer		1114 Alders Rd. Kentville, NS B4N 4K1			902-678-5845	n_ametalworksltd@xcountry.tv
	Third Vice-President		82 English Mountain Road, Kentville, NS B4N 4K1				threnaburghardt@hotmail.com
	Fourth Vice-President		274 Harrington Road, Coldbrook, NS B4R 1C1				marklyn@ns.aliantzinc.ca
	Dispatcher		350 White Rock Rd. Kentville, NS B4N 4K1			902-678-2251	kingscountytruckersassociation@g mail.com
LUNENBURG 3	**TANS Area 3 Director** / President LCTA		99 Carver Rd. Baker Settlement, NS B4V 7J3			902-685-2778	wrbolivar@eastlink.ca
	Vice-President		700 Upper Branch Rd. Wileville, NS B4V 5M7			902-543-4089	stanconrad@hotmail.com
	Secretary / Treasurer;		Site 7, Box 8, RR #2 Chester, NS B0J 1J0			902-273-2351	alloutdoors@eastlink.ca
	Dispatcher County Co-Ordinator		743 Chester Grant Rd., RR #3 Chester Basin, NS B0J 1K0			902-275-5495	bradyhennigar@hotmail.com
QUEENS / SHELBURNE 3	President		60 Danesville Loop Danesville, NS B4V 8P4			902-677-2272	donaldwhynot@eastlink.ca

County / Area	Position	Name	Address	Home / Work	Mobile	Fax	Email
	First Vice-President	[redacted]	RR #2, 575 Northfield Rd.aledonia NS B02 1B0	[redacted]		902-682-2724	shawnrawding@hotmail.com
	Second Vice-President		108 King Street Shelburne, NS B0T 1W0			902-875-1654	info@harlowconstruction.ca
	TANS Area 3 Director **TANS Vice Chair** Secretary / Treasurer QCTA		42 Devon Shire Rd. Caledonia, NS B0T 1B0			902-682-3422	gerryvandyk@eastlink.ca
	Dispatcher						dispatch.qsta@gmail.com
YARMOUTH 3	President		325 Hwy. 1, Dayton Yarmouth, NS B5A 5A1			902-749-0238	prime.trans@ns.sympatico.ca
	Vice-President		2713 Highway 1 Port Maitland NS B5A 5A8			902-649-2324	rosevalley@ns.aliantzinc.ca
	Vice-President		58 Main Shore Rd. Yarmouth, NS B5A 4K2			902-749-4868	administration@rdharris.com
	Dispatcher		2-514 Water St. Yarmouth, NS B5A 1L8			902-881-0101	dashelley1010@gmail.com

ATTACHMENT C

Incident Status Form for Waste Tracking (ICS 209 Form)

ICS 209 - Incident Status Summary (Oil Spill)

Incident:	Prepared By: at
Period:	Version Name:

Spill Status (Estimated, BBLs)

Source Status:
- ○ Secured
- ○ Unsecured

Remaining potential:

Rate of spillage:

	Last 24 Hours	Total

Mass Balance/Oil Budget

Total spilled product accounted for:

Waste Management (Estimated, BBLs)

Type	Recovered	Stored	Disposed of
Oil			
Oily Liquid			
Liquid			
Oily Solid			
Solid			

Shoreline Impacts

Degree of Oiling	Miles Affected	Miles Cleaned	Miles Remaining to be Cleaned
Light			
Medium			
Heavy			
Total			

Wildlife Impacts

Type	Captured	Cleaned	Released	DOA	Died in Facility
Bird					
Mammal					
Reptile					
Fish					
Other					
Total					

Safety Status

Type	Last 24 Hours	Total
Responder Injury		
Public Injury		
Other		

Equipment Resources

Type	Ordered	Available /Staged	Assigned	Out-Of-Service

Personnel Resources

Organization	People in the Field	People in Cmd. Post	Total People On Scene
Federal			
State			
RP			

Total Personnel Resources:

Comments

ICS 209 - Incident Status Summary (Oil Spill)			© 1997-2010 dbSoft, Inc.

ATTACHMENT D

Solid Waste Transportation Plan

This Waste Transportation Plan has been prepared to provide guidance for the transportation of various waste streams that may be generated in the unlikely event of an oil spill during BP exploration activities in the Scotian Basin.

1. INTRODUCTION

As part of the response to an Incident, oil spill clean-up activities will generate various waste steams which must be transported for reuse, recycling, treatment and /or disposal. All transportation and disposal activities will be performed in accordance with all applicable laws, regulations, standards and guidelines as detailed in the OSWMP.

2. WASTE STAGING ACTIVITIES

Strategic staging areas will be identified to support the clean-up operations associated with a specific incident. These areas are divided by function of the site which includes equipment staging sites and decontamination stations. A third classification of staging site are beach locations but are not listed since those locations will be determined as needed. BP may add additional staging areas, as needed, in coordination with the applicable municipal and provincial agencies.

3. TRUCK LOADING OPERATIONS

Trucks will be loaded in a designated portion of each staging area as directed by the Staging Area Manager (SAM). Prior to loading of solids, the driver will perform a circle check of the equipment to assure that no contamination is on the outside of the container and appropriate tarps are available if required. In most instances, solid wastes will be transported in roll-off type containers. Drivers should be aware of the potential for free liquids to be released, and appropriate actions should be taken to prevent further releases, and ensure compliance with receiving facility Approval.

4. WASTE PROFILE

All waste that has been generated from activities related to the incident operations will require proper classification and profiling into approved facilities prior to shipment to avoid delay during offloading. Profiles will be completed based on generator knowledge of the waste and/or Material Safety Data Sheet (MSDS), analytical data, or other documentation. The WM contractor will work to secure waste material profiles that are generic in nature so that logistical operations will not be impeded. Trucks should not be dispatched unless approved profiles are in place for the proposed treatment /disposal facility.

5. SHIPMENT DOCUMENTATION

Proper shipping document will be provided to the hauler, which will be used to document and accompany each truck shipment. At a minimum, the shipping document will include the following information:

- Name and Address of Waste Generation staging area
- Name and Address of Waste Transporter
- Name and Address of Disposal Facility
- Description of the Waste
- Quantity of Waste Shipped (may be estimated in weight or volume at generation site; however, verified quantity at receiving facility is expected in weight)

A copy of the shipping document for each truckload will be retained on-site at the staging area until the Incident response is complete, or the staging area is decommissioned and cleaned, whichever occurs first. All records will be returned to BP at the conclusion of the project, or at BP's request. If any waste is suspected to be dangerous goods, special waste, or hazardous waste, sampling for waste characterization and proper waste classification and management will be completed.

6. REQUIREMENTS OF TRANSPORTERS

The WM contractor will provide company drivers or hire qualified transporters to haul the waste materials to the appropriate staging area or treatment/disposal facility. The selected transporters will be fully licensed and insured as needed, to haul the waste material. Contact details for the Trucking Association of Nova Scotian (TANS), County Dispatchers are shown in Table 14.

7. TRAFFIC CONTROL PROCEDURES

Solids for disposal will be transported in covered roll-off bins or appropriate end dump trailers to the designated treatment/disposal facility. As much as possible, trucks will be staged on-site to avoid impacts on the local roads. The WM contractor will work to adhere to local conditions and restrictions as required by local bylaws. While at staging areas, vehicles will be required to maintain slow speeds (i.e., less than five miles per hour) for safety purposes, and for dust control.

8. TRANSPORTATION ROUTES

Transportation of waste materials will be on arterial roads which are approved for truck traffic, to minimize any potential impact on the local community. The WM contractor will work with local officials to identify the routes which vehicles will take to minimize impact to local communities and activities. Drop-off/Pick-up locations for waste collection containers are planned for road-accessible locations. Major transportation routes in Nova Scotia are provided in Figure 7.

9. OFF-SITE LAND DISPOSAL FACILITIES

Based the anticipated waste disposal needs, predetermined waste profiles have been established for approved facilities that are expected to receive waste. Final determination of the selected disposal facility will be based on waste type (solids or liquids), BP-approval status and availability for processing

or disposal. Attachment B lists approved treatment/disposal facilities and will be updated as required, and as directed by BP.

Only approved waste management and disposal, re-processing or recycling facilities (with the exception of recycle facilities for common items such as plastic water bottle, aluminium cans, glass, cardboard, etc.) that are listed in Attachment B will be used. Special arrangements and the required approvals will be obtained for county or municipal disposal facilities (as identified by local officials) prior to use, as required.

10. RECORDKEEPING

CONSULTANT will be responsible for maintaining documentation for materials that are received and removed at staging areas and de-contamination stations, including “clean de-con” certifications for decontaminated materials, equipment and vehicles/vessels. CONSULTANT also maintains an electronic database of waste manifests and waste tracking information.

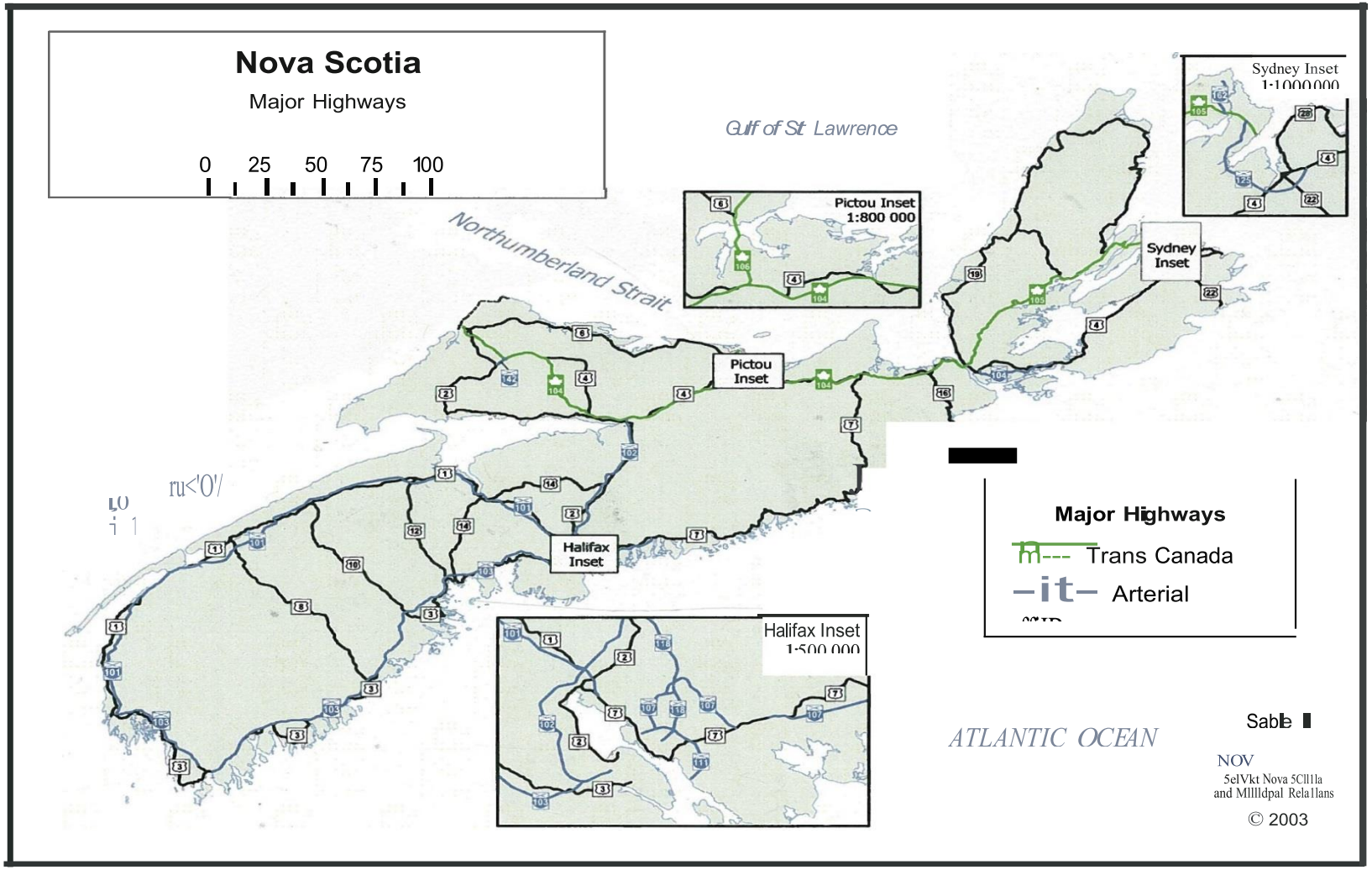
11. HEALTH AND SAFETY

Drivers and support personnel will adhere to the site-specific Health and Safety Plan (HASP) that has been prepared for staging areas, collection points or disposal facilities. All personnel working at these sites will be required to be familiar with the HASP.

12. CONTINGENCY PLAN

Each waste hauler is required to have a contingency plan prepared for emergency situations (vehicle breakdown, accident, waste spill, waste leak, fire, explosion, etc.) during transportation of waste material from the Site or designated staging areas to the designated disposal facility. Once the waste hauler is selected, a copy of its contingency plan will be kept on file by the WM contractor or approved designee. Each driver will be provided with an emergency response phone number.

Figure 7 - Major Transportation Routes in Nova Scotia

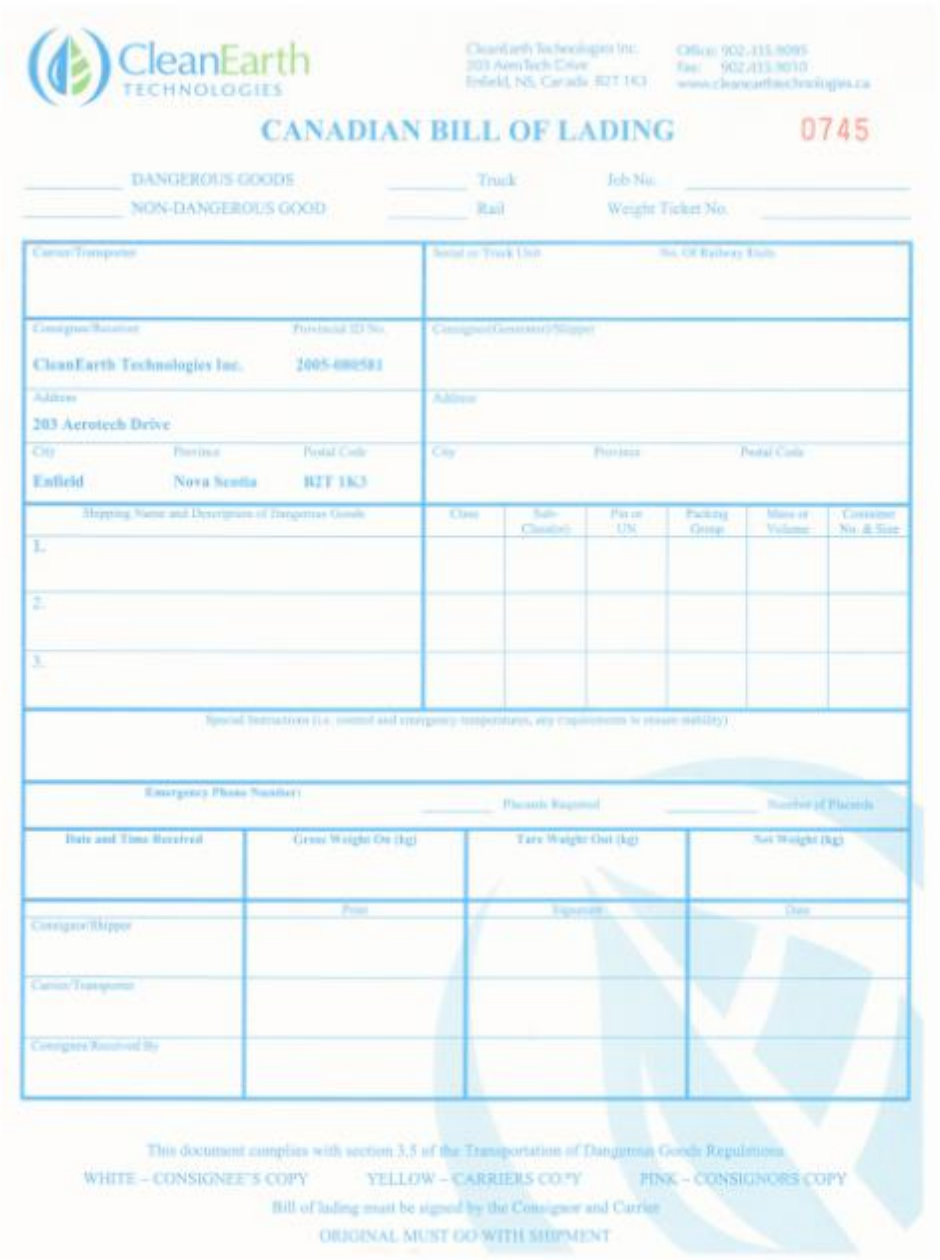


ATTACHMENT E

Example Waste Manifest / Transfer Note

All waste and recyclable materials generated from a spill will be shipped using appropriate shipping papers. The following provides examples of contractor manifests used in Nova Scotia.

Figure 8 - Clean Earth Technologies, Canadian Bill of Lading



CleanEarth TECHNOLOGIES

CleanEarth Technologies Inc.
203 AeroTech Drive
Enfield, NS, Canada B2T 1K3
Office: 902.433.8085
Fax: 902.433.9010
www.cleanearthtechnologies.ca

CANADIAN BILL OF LADING 0745

_____ DANGEROUS GOODS _____ Truck Job No. _____
_____ NON-DANGEROUS GOOD _____ Rail Weight Ticket No. _____

Carrier/Transporter			Serial or Truck Unit		No. Of Railway Units
Consignee/Receiver CleanEarth Technologies Inc.		Provincial ID No. 2005-080581	Consignor/Generator/Shipper		
Address 203 Aerotech Drive			Address		
City Enfield	Province Nova Scotia	Postal Code B2T 1K3	City	Province	Postal Code

Shipping Name and Description of Dangerous Goods	Class	Sub-Class(es)	PIN or UN	Packing Group	Mass or Volume	Container No. & Size
1.						
2.						
3.						

Special Instructions (i.e. control and emergency temperatures, any requirements to ensure stability)

Emergency Phone Number(s) _____ Placards Required _____ Number of Placards

Date and Time Received	Gross Weight On (kg)	Tare Weight Out (kg)	Net Weight (kg)

	Print	Signature	Date
Consignor/Shipper			
Carrier/Transporter			
Consignee/Received By			

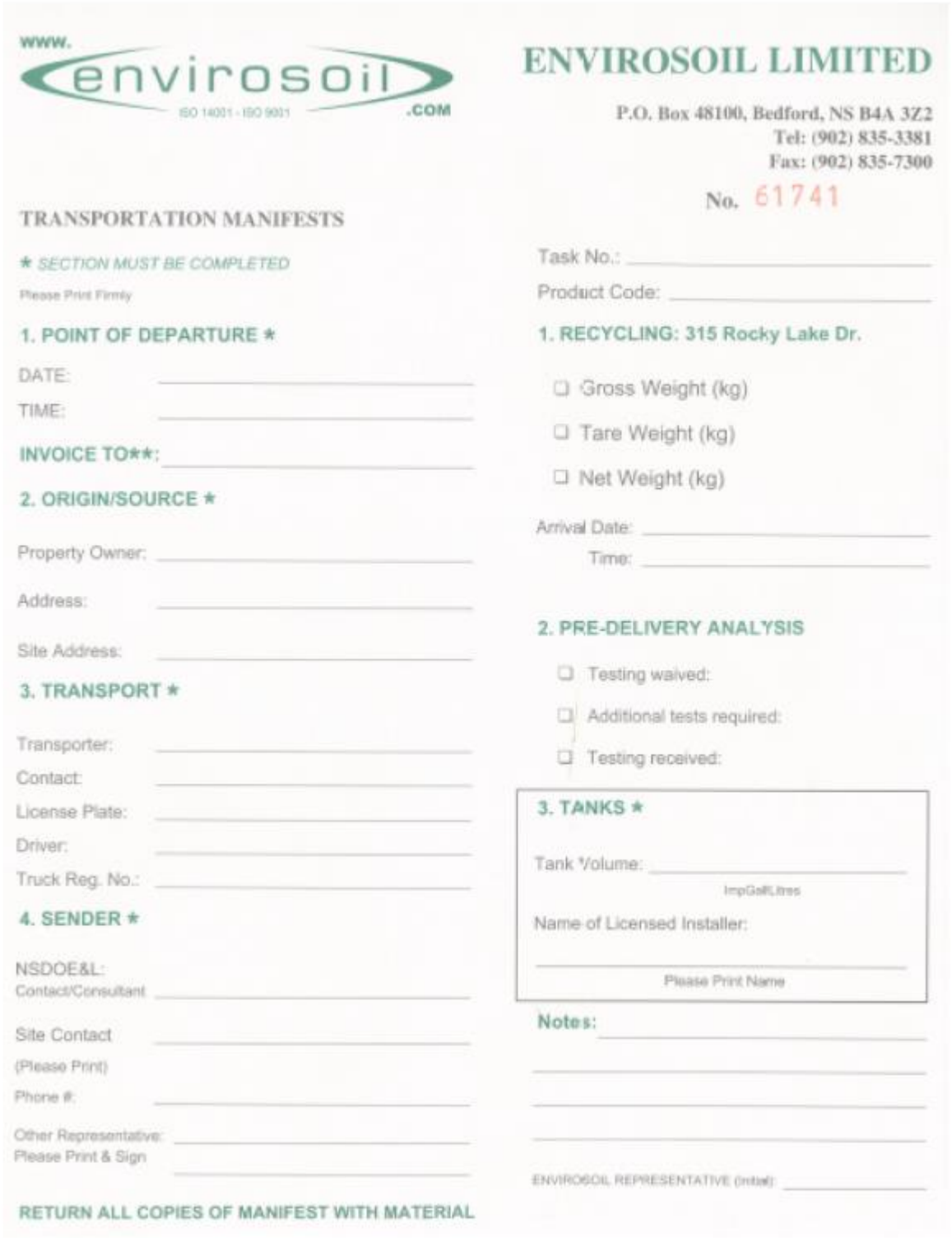
This document complies with section 3.5 of the Transportation of Dangerous Goods Regulations

WHITE – CONSIGNEE'S COPY YELLOW – CARRIERS COPY PINK – CONSIGNORS COPY

Bill of lading must be signed by the Consignor and Carrier

ORIGINAL MUST GO WITH SHIPMENT

Figure 9 - Envirosoil Limited, Transportation Manifest



www.envirosoil.com
ISO 14001 - ISO 9001

ENVIROSOIL LIMITED

P.O. Box 48100, Bedford, NS B4A 3Z2
Tel: (902) 835-3381
Fax: (902) 835-7300

No. 61741

TRANSPORTATION MANIFESTS

★ SECTION MUST BE COMPLETED

Please Print Firmly

1. POINT OF DEPARTURE ★

DATE:

TIME:

INVOICE TO★★:

2. ORIGIN/SOURCE ★

Property Owner:

Address:

Site Address:

3. TRANSPORT ★

Transporter:

Contact:

License Plate:

Driver:

Truck Reg. No.:

4. SENDER ★

NSDOE&L:
Contact/Consultant

Site Contact

(Please Print)

Phone #:

Other Representative:
Please Print & Sign

RETURN ALL COPIES OF MANIFEST WITH MATERIAL

Task No.:

Product Code:

1. RECYCLING: 315 Rocky Lake Dr.

- ❑ Gross Weight (kg)
- ❑ Tare Weight (kg)
- ❑ Net Weight (kg)

Arrival Date:

Time:

2. PRE-DELIVERY ANALYSIS

- ❑ Testing waived:
- ❑ Additional tests required:
- ❑ Testing received:

3. TANKS ★

Tank Volume:

Imp Gal/Litres

Name of Licensed Installer:

Please Print Name

Notes:

ENVIROSOIL REPRESENTATIVE (Initial)

Figure 10 - Soil Remediation Technologies, Transportation Manifest

SRT

Tel: (902) 435-SOIL (7645) Fax: (902) 462-0318
Site: 150 Cosso Drive (In Conrad's Quarry)
Mail: P.O. Box 2129, Dartmouth, NS B2W 3Y2
Emergency Pager # (902) 458-5468

SOIL REMEDIATION TECHNOLOGIES

NOTIFY SITE PERSONNEL BEFORE SENDING MATERIALS

TRANSPORTATION MANIFEST
(Soils Containing Light Hydrocarbons)

A-DEPARTURE POINT
DATE:
TIME:

INVOICE TO:

1. ORIGIN / SOURCE (must fill out)
Site Owner:
Address:
Site Address:
Soil Location:

2. COLLECTED SOIL
❑ M³ ❑ tonne
Physical Condition:
❑ Dry ❑ Moist ❑ Wet
Type of Soil:
❑ Gravelly ❑ Sandy ❑ Clay
Contaminant:
❑ Gasoline ❑ Heating Oil ❑ Diesel
❑ Other (specify):

3. TRANSPORTATION (must fill out)
Transporter:
License Plate:
Registration No.:
Driver:

4. SENDER
Site Contact:
Phone#:
Consultant:
Signature:

OWNER REPRESENTATIVE:

STORAGE AREA
Pile ID #:
Test Sample #:
SRT REPRESENTATIVE:

2. AUTHORIZED BY:
DOE Contact:
or
Consultant
Responsible:
Signature:
Delivery Authorized By:

3. DELIVERY INSPECTION

	Acceptable	Unacceptable
Quantity	❑	❑
Physical Condition	❑	❑
Transporter	❑	❑
License Plate	❑	❑
Driver	❑	❑

Comments:

4. PRE-DELIVERY ANALYSIS
Test Results ref. (attach):
Additional Tests required:

A DIVISION OF CONRAD BROTHERS LTD.

White: SRT copy Yellow: File copy Pink: Trucker copy Goldenrod: Customer copy

ATTACHMENT F

Tar Ball Management, Sampling and Disposal Procedures

Introduction

This Tar Ball Management Plan documents the standard procedures that BP and its contractors will use to manage the sampling and disposal of weathered oil tar ball or oiled beach materials (henceforth called tar balls).

Tar balls are typically highly weathered oil that has disintegrated into small lumps. They may be the first visual indication of oil reaching a shoreline from an offshore release. Tar balls come in many forms, shapes and textures and are found in a variety of colours. For purposes of this plan, the term "tar ball" is applicable to non-liquid weathered oil that is manually collected during shoreline clean-up activities.

The data collected from the analysis of the tar ball material will be used to verify that this material is acceptable for recycling or other non-disposal management options, such as supplemental use for energy recovery or roadbed material, or for disposal in local approved disposal facilities (landfills).

Objectives

The goals of this procedure are as follows:

- to minimize the amount of sand picked up with the tar balls. Field crews must now use screening techniques to minimize the amount of sand collected when the tar balls are collected.
- To minimize the use of plastic bags. Tar balls in plastic bags are a hindrance to removing tar balls later for reuse, recycling or biological remediation.

Procedure

Prior to collecting tar balls (or other response-generated oily organic beach material), BP representatives will contact the WM contractor to request delivery of a lined and roll-top covered container. The WM contractor will deliver and position the container at a road-accessible nearby location and record the container delivery and location as a BP staging area for tracking purposes. Several BP staging areas are pre-established; additional locations will be established as needed.

- Tar balls will be stored in containers with a removable, reusable plastic liner or clear plastic bags (approximately 4 mil or stronger), or other suitable containers which can be obtained from BP staging locations. Any liners may be reused during the day, if not excessively oiled, and then segregated for proper disposal apart from the tar balls.
- Each container or plastic bag may be filled to approximately 10kg.

Note: Filled containers or bags should not contain free liquids. If liquids are observed, sorbent material should be added to adsorb liquids, or liquids should be decanted off and contained for liquids management.

- The tar balls will be delivered in containers or bags to the BP Staging Area.

- The tar balls will be accepted by a BP representative, logged in and placed in a WM container.
- Once the container is full, the BP representative will contact the WM Contractor to arrange for pick-up of the container and completed log sheet.

The WM contractor will pick up and transport the container to a WM Waste Staging Area and arrange for treatment/disposal of the material. Transportation, management and disposal of response-generated oily waste material are discussed in Attachment D.

Local Maintenance Crews

Maintenance crews who routinely clean the beaches should avoid combining free or sticky tar balls with other wastes collected on the beaches. Maintenance crews who have accumulated tar balls may contact the Environmental/Community contact, who will contact WM and arrange for proper transport and recycling/disposal of the material.

Security Precautions at Waste Storage Areas

Tar balls collected by BP or its contractors will be stored at a BP or WM managed staging area prior to final disposal. WM has been contracted by BP to manage, transport and dispose of waste materials generated by the Incident clean-up activities. Each staging area has a full time Staging Manager and is secured by various combinations of fencing, lights, and local security services.

Tar Ball Waste Characterization Sampling at Waste Storage (Staging) Area

The WM contractor will notify BP and CONSULTANT which provides BP-contracted sampling personnel, when the first load of tar balls/beached oil is collected at each established WM waste staging area. The objective is to collect and analyse a representative sample of tar balls that initially accumulate at each staging for characterization sampling. CONSULTANT will collect a representative sample of the material and submit for laboratory analysis for the parameters listed in Table 15, at a minimum, in order to verify that the material meets facility acceptance criteria at the pre-designated disposal facilities:

- Toxicity Characteristic Leaching Procedure (TCLP) volatiles (VOCs) for benzene
- TCLP metals
- Other as required by the facility Approval

WM will hold the material on-site pending the results of laboratory analyses. Laboratory analyses will be requested on quick turnaround basis for each initial sampling at the WM staging areas. CONSULTANT will forward analytical results to BP waste management specialists for review. BP will contact WM to confirm disposal requirements and provide analytical reports to support applicable waste profiles. The Incident Waste Management Plan, will provide additional detail regarding WM waste transporting, onsite management and disposal options.

Following the initial sampling for each of the WM landfill waste profiles, periodic random sampling (approximately once a month) of tar balls/beached oil that is collected during shoreline clean-up and destined for a WM landfill for disposal will be completed to provide verification for waste profiles.

Table 15 - Analytical Sampling and Testing Requirements

Analysis and Method	Recommended Container	Preservative	Holding Time
TCLP VOCs (benzene) SW 846 8260D (solids)	8 oz. wide mouth jar	Cool to ≤4ºC in field	TCLP extract: within 14 days, analyse within 28 days
TCLP Metals SW846 6000 series 7471 Mercury (solid)	Liquid: 1000 mL plastic Solid: 8 oz.-wide mouth jar	Cool to ≤4ºC	Extract within 180 days except mercury (28 days) Prep and analysis of TCLP extract within 180 days except mercury (28 days)

ATTACHMENT G

Table 16 - Action Item Phases for Waste Management Team during Oil Spill Response Activities.

Sector	1	2	3	4	5	Potential Barriers / Considerations
Team Resources	● Contact lead Waste Management contractor and consultant If available/used. ● Review modelling data and utilize Predictive waste generated tool to estimate response locations and resources required.	● Determine physical resources (containers, transportation etc.) ● Create staffing plan - ID rotational requirements and number of staff	● Develop specific roles and tasks in waste management team ● Agree on format for submittal of daily reports and communication outlining tasks/activities for Waste Team	● Assemble additional waste team members - long term staffing ● Work with finance and contract managers to resolve invoicing procedures for contractors and service providers	● Create a plan for the establishment of a field compliance program. ● Initiate staff rotational changes as necessary.	● Availability of expertise. ● Prioritisation of shared resources. ● Waste specialist and environmental consultant availability in country and access to country may be limited. ● Limited availability of site level waste management operations personnel.
Staging / Waste Collection Locations	● Prepare authorization for staff required to sign waste manifests ● Confirm likely locations on GIS and tactics plans.	● Facilitate Communications between operations and waste Management team on setting up waste collection staging areas ● Refine Wastes collection location details following review of modelling outputs	● Communicate with operations to understand their activities and potential permitting and planning requirements. ● Refine Wastes collection location details following review of modelling outputs.	● Refine Wastes collection location details following review of modelling outputs	● Work with IC on waste management public educations	● Permitting requirements and clearance to use land for staging. ● Staging area ground preparation, access and security. ● Capacity at existing waste storage locations. ● Protection of soil and groundwater. Drainage requirements.
Operations Support / Waste Management Plan	● Set up waste management documentation common access point ● Obtain IC requisition forms for resource requests and Determine spending level authorities ● Develop incident specific Waste Management Plan details.	● Decide on an operations model for waste management ● Coordinate with source control branch to manage source wastes with the same waste management process ●Obtain MSDS for source materials and chemicals /compounds used	● Engage operations to communicate Waste Management Plan Procedures	● Coordinate waste management programs to assess consistency between each incident commands (e.g. additional sectors, staging areas, etc.) if applicable.		● Compliant logistics and transport of waste, ● Availability of containers. ● Availability of suitable specialist personnel or access of personnel.
Agency and Regulator Interactions	● Confirm Applicable Waste Regulations via liaison officer	● Determine permitting and other requirements for wastes collected. communicate the waste management plan to relevant agencies	● Review and update the waste management plan per relevant comments from authorities.		● Evaluate waste data for increasing / decreasing trends for each waste type and disposal facility to evaluate bottlenecks and efficiencies.	● Availability for correspondence through liaison manager. ● Difficulties acquiring dispensations from existing requirements. ● Response time.
Approved Disposal or Recycling Sites	● Review approved waste disposal sites for suitability for use	● Review list of approved waste disposal facilities with operations team for gaps in the facility type and geographic location	● Initiate capacity balancing discussions with currently approved facilities for daily waste type and volume acceptance ● Check feasibility of incident specific facilities if required.		● Undertake site checks on facilities.	● Requirement to set up contractual arrangements. ● Liability generation. ● Inadequate work practices at poorly developed facilities. ● Capacity availability (including decanted contaminated water treatment/discharge)
Waste Data Tracking	● Determine and document tracking of wastes requirements. ● Determine Waste Volume estimates Identify Data Management Reporting Process	● Update tracking infrastructure requirements based on reviews of modelling outputs.	● Coordinate collection of verified and validated staging area waste data for posting on IC forms daily	● Undertake checks on tracking data and reporting.		● Electronic communications infrastructure ● Requirements for data reporting to authorities.
Alternative Options and Recycling Facilities	● If quantities of skimmed oil are likely to be sufficient: investigate locations that can take skimmed oil of good quality for reclamation as a product	● Check capacity and capability of materials recycling facilities against anticipated recyclable materials and quantities.	● Assign development of a recycling plan for recyclables generated by IC(s) to consultant/contractor (depending on scale of operation) Evaluate Potential for dedicated facilities	● If feasible - Implement recycling plan using approved recycling facilities. ● Liaison with operations and logistics for assistance as needed.		● Capacity, Buffer storage, Requirement and capability for cleaning recyclable materials. ● Alternative treatment options permitting, public perception, and timescales.
Waste Characterisation / Sampling	● Ensure that the sampling plan includes waste characterisation sampling requirements and frequency	● Direct field personnel to begin sampling waste streams. ● Interface with sampling / Monitoring Plan Staff regarding identified waste streams proper sampling and characterisation	● Continuous review of waste sampling and characterisation to ensure treatment and disposal are appropriate and compliant.			● Laboratory availability, capability, expertise and contractual agreements. ● Waste acceptance criteria definition.

Security Classification: BP Public	**BP Canada Energy Group ULC**	

Scotian Basin Exploration Project

Oil Spill Response Plan

Annex F -

Monitoring & Sampling Framework

B02	Issued for Use	Mike Condon	Allen Pere	April 9, 2018
B01	Issued Final	Mike Condon	Allen Pere	February 5, 2018
A01	Issued for Review	Mike Condon	Allen Pere	November 1, 2017
Rev	Revision Description	Content owner	Approver/Issuing Authority	Issue Date

Unique Identifier:	CN001-HS-PLN-600-00003	Rev B02

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1.0 INTRODUCTION

The goal of Monitoring & Sampling (M&S) activities is to deliver consistent, accurate, timely, and defensible information that enables effective decision-making within the Incident Command System and potentially serve to inform a wider set of stakeholders. Generally, M&S activities are related to the measurement of environmental (physical, chemical, biological) parameters in specific areas of the response zone(s). Documenting the character, location, and/or behaviour of natural or introduced elements in the environment provides important information to support safety, resourcing, response techniques, and communications.

BP's approach provides a clear framework to accommodate a range of response scenarios and the associated M&S activities. As incidents evolve, the M&S may necessarily shift. Early phase needs are addressed by employing a First Strike Monitoring Plan. In a specific response scenario this framework is used to guide the overall M&S approach and aims to:

- Describe the rationale for specific M&S activities;
- Identify individual M&S plans;
- Provide linkages between M&S activities and ICS teams;
- Set expectations about the intended use and audience for M&S outputs; and
- Provide the First Strike Monitoring Plan (FSMP) for the drilling location.

2.0 GUIDING PRINCIPLES

A range of M&S activities are likely to be planned or underway at any one time during an active response, so trying to develop a single M&S Plan that captures all of the necessary details can be very time-consuming and even stymie early operational decision-making. Therefore, establishing a set of guiding principles provides the response team with a framework to approach/plan any specific monitoring or sampling activity while maintaining cohesion across the spectrum of M&S activities and the teams responsible for delivering them.

M&S plans and activities should:

- Directly **support response decision-making** priorities;
- Be **adaptive** enough to accommodate changes in the response objectives or conditions;
- Include **clear thresholds that are actionabl**e, including **activation/termination criteria;**
- Adopt a **phased approach** when practical to help support decision points;
- **Integrate existing data/knowledge** to enhance efficiency and accuracy of decisions;
- Use relevant and effective **Data, Sample, and Information Management protocols;**
- **Deliver informational products** easily communicated to other relevant response teams;
- Be **periodically assessed** for value, relevance, and effectiveness; and
- Be executed by **personnel with relevant subject matter expertise.**

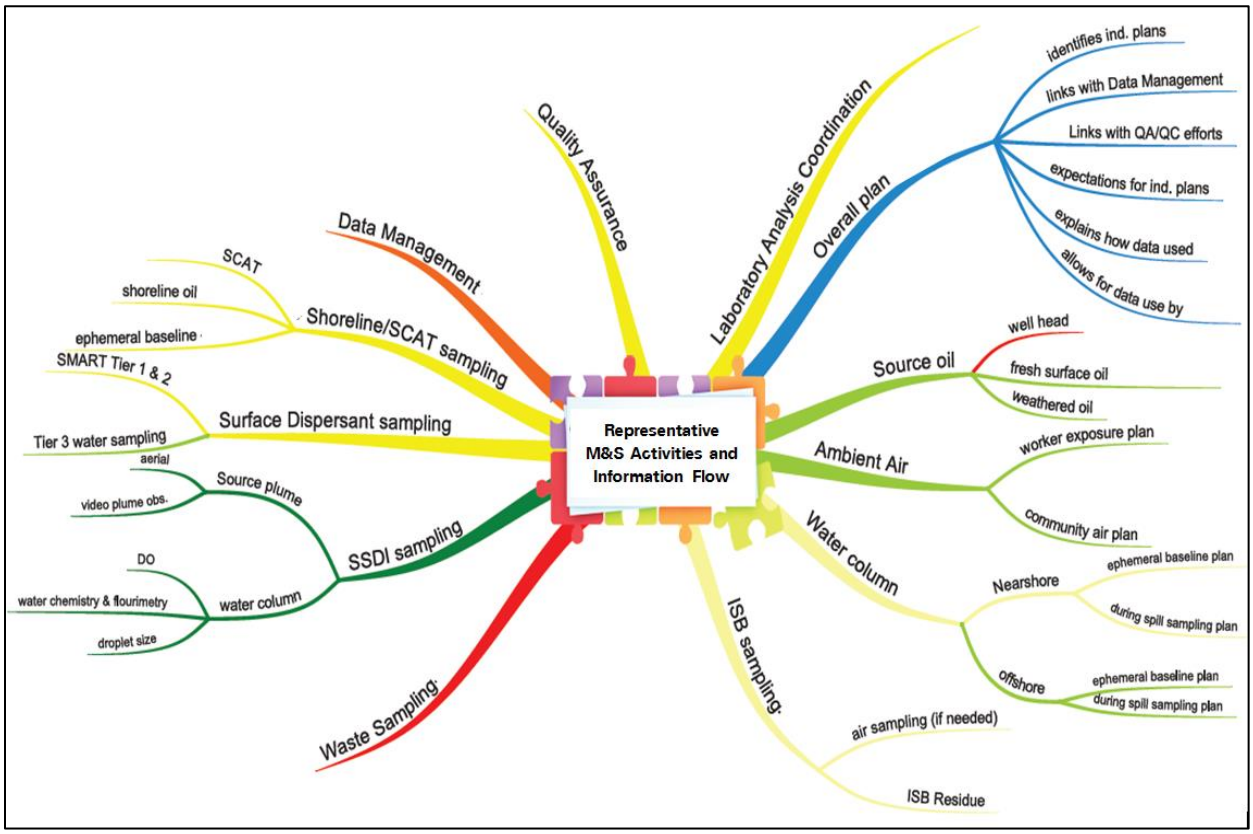
It is instructive to distinguish between Monitoring and Sampling:

Monitoring: Actively tracking, measuring, or assessing some aspect of the response to help inform response decision-making (e.g., monitoring dispersant efficacy to determine application rate).

Sampling: Systematic gathering of in situ samples yielding instantaneous (e.g., temperature) or delayed (e.g., chemical analysis) results to provide objective data for use in decision-making or communications.

As depicted in **Figure 1,** there are a wide range of M&S needs (e.g., from air quality monitoring to ISB sampling) and activities (e.g., from SMART monitoring to detailed chemical analysis) and each closely aligned with data management, modelling, and communications. BP uses an overarching M&S plan in order to provide clarity and consistency of approach that is critical for effectively managing the diverse, specific plans that might emerge in a given scenario

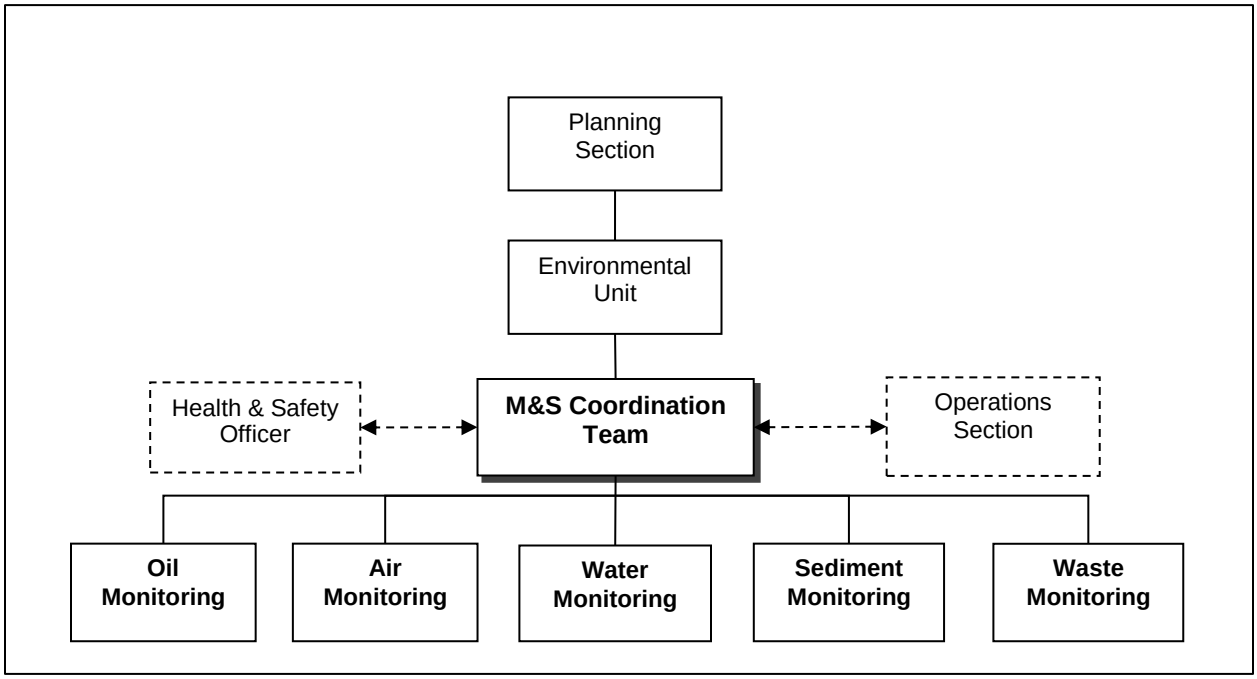
Figure 1 - Representative "network" of M&S activities illustrating the potential complexity.



3.0 STRUCTURE OF THE MONITORING & SAMPLING COORDINATION TEAM

Generally, M&S activities are related to the measurement of environmental (physical, chemical, biological) parameters and coordinated within the Environmental Unit (see **Figure 2**), with an important responsibility to engage and inform a wider set of experts and stakeholders within the IC (i.e., Situation Unit, Operations, Communications, Command, Health & Safety, and Modelling Teams). The M&S Team should embed liaisons with these other teams for large/prolonged responses (or at minimum appoint a member of the M&S Team to serve this liaison role, to keep other teams informed/engaged).

Figure 2 - ICS organizational placement of M&S Coordination Team with key partners



4.0 MAINTAINING THE RELEVANCE OF MONITORING & SAMPLING ACTIVITIES

Before any M&S plans are approved or initiated, BP will use a functional requirement process to ensure that targeted resources are applied to activities that can provide consistent, valuable, and timely information to the Incident Command staff. This process will result in a clear and agreed set of achievable activities that are aligned to specific decision points and response priorities (see examples in **Table 1**). It is important to note that in many cases both monitoring and sampling activities will be used simultaneously. For example, the water column might be monitored for presence/absence of a

constituent and sampled to provide more detailed evidence about the exact composition or condition (e.g., degree of weathering) of that constituent.

Table 1 - Example matrix of M&S plans, representative activities, and linkage to decision-making.

Representative Plan Type	Example Activity	Relevance to Decision-making
In Situ Burn (ISB) Monitoring	Burn residue composition	Helps inform potential impacts
Air Quality Monitoring	Concentration of VOCs	Informs safety decisions
Subsea Dispersant Monitoring	Dispersant efficacy	Informs dispersant application rate
Surface Dispersant Monitoring	Degree of weathering	Informs optimal spray zones
Waste Sampling	Water column samples	Enhances trajectory modelling
Seafood Sampling	Testing of fish tissue	Informs public health decisions
Shoreline/SCAT Sampling	Pre-impact documentation	Provides detail on degree of impact

BP response personnel assigned to the M&S Coordination Team work very closely with counterparts in the Operations Section, Health & Safety, and Situation Unit teams. BP understands the importance of bringing experts from relevant Agencies into the M&S team to strengthen and, where necessary, agree the plans. The relationship with Operations is especially critical as the approval of many operational plans is dependent on some M&S. For example, aerial dispersant application may require pre-spray monitoring for marine mammals/ birds and post-spray SMART monitoring for efficacy while maintaining alignment with standardized M&S procedures. Similarly, the M&S team works closely with the Situation Unit as the Common Operating Picture is a primary aggregation point and communication tool for M&S data. The partnership with the Health & Safety team is equally important to ensure that adequate PPE and precautions are in place for M&S field teams.

5.0 DEVELOPING ADAPTIVE MONITORING & SAMPLING DESIGNS

It is important for M&S activity plans to be adaptive and for the coordination team to actively manage the core deliverables from these activities to ensure relevance to the overall response objectives (which may change over time). Beyond a change in the response objectives, the conditions in the response zone may also change, dictating an evolution of the M&S activities. For example, monitoring activities that might originally have been conducted from a vessel might be replaced or augmented with the use of autonomous systems (e.g., drones, autonomous underwater vehicles (AUVs)) to extend or sustain monitoring in the far-field, under dangerous conditions

One practical example of this approach is in situations where establishing both fixed and adaptive sampling locations are necessary. The former provide the ability to track change over time and the latter provide the M&S team with sufficient flexibility to maintain accurate maps of oil movements in dynamic environments (e.g., open ocean). In the event of a subsea blow-out, fixed (i.e., revisited) M&S locations might be established in the near-field while adaptive M&S locations might be located farther afield to focus limited resources within a larger area.

While M&S plans may require adaptation, BP remains committed to using safe and scientifically defensible techniques in conducting the actual sampling, monitoring, or associated analyses. For example, while some adaptive sampling locations might change over time the number of samples will remain at a level that enables statistical rigor. Similarly, while the frequency of sampling may change the standard procedures for acquiring samples will remain consistent (unless a change is agreed by the responsible ICS leader).

6.0 SETTING ACTIONABLE THRESHOLDS

BP designs M&S plans and activities with actionable thresholds aligned with the response scenario and objectives. Essentially, this means that if a particular measurement passes a pre-determined threshold that an action is triggered. Actions can range from the termination of a monitoring activity to the initiation of a sampling program, or even the suspension of other operational activities (e.g., if a human health exposure limit is breached). These thresholds help support a compliant response and effective decision-making by promote strong alignment within the IC, removing ambiguity, and providing objective documentation.

Examples of actionable thresholds may include those set by regulation or for operational safety, such as

- Human health and exposure limits;
- Environmental toxicology limits (e.g., dissolved oxygen <2ppm); and
- Response-specific decision points (e.g., elapsed time).

A key aspect of this framework principle is the establishment of initiation/termination criteria for M&S activities. Drawing from pre-developed OSR plans there should be clear points of initiation for specific M&S activities (e.g., pre-impact SCAT surveys). Similarly, over time specific elements of an M&S plan will no longer be necessary to inform the response decision-making, and there should be clearly agreed thresholds for ending those activities in an orderly manner.

Table 2 - Example of M&S activities and actionable thresholds

Example M&S Activity	Example Threshold	Example Action
Air Monitoring	Lower Explosive Limit (LEL)	Triggers Evacuation of Personnel
Surface Dispersant Monitoring	No visible oil on ocean surface	Terminate the M&S Activity
Waste Stream Sampling	Waste composition is regulated	Initiate the M&S Activity
Shoreline/SCAT Sampling	Models indicate shoreline impacts	Initiate the M&S Activity
SSDI Monitoring	Well control operations completed	Terminate the M&S Activity

7.0 UTILIZING A PHASED APPROACH

BP uses a phased approach when designing and executing M&S activities, allowing the response team to assess, test, and refine specific procedures while maintaining flexibility and resource allocation efficiency. A phased approach also allows initial environmental, waste, and health assessments to commence before a full complement of personnel and equipment is in place, and time to reconcile any disparate viewpoints on longer-term M&S priorities.

In some instances (e.g., application of dispersants, where time is of the essence to minimize impacts), the M&S Team can develop both Phase 1 and Phase 2 plans with a specific threshold (e.g., prolonged spill event; positive demonstration of efficacy) embedded in Phase 1 that would trigger Phase 2. Typically, Phase 1 M&S plans are limited in scale, area, and duration where demonstrating the readiness to execute, effectiveness and value are paramount before moving to Phase 2 (or beyond) with sustained M&S activities aimed at informing response decisions.

In the case of In Situ Burning (ISB) or Sub-Sea Dispersant Injection (SSDI) there are specific reasons for using a phased approach. Both have inherent Health & Safety factors that need to be considered (e.g., use of surface vessels), both activities will need to be coordinated through SIMOPS, and in the case of ISB there will likely be a smoke plume that may interfere with other activities depending on atmospheric conditions. BP is a leader in understanding SSDI, both in terms of application operations and monitoring protocols. This means BP has developed industry-level SSDI monitoring practices and led to the development of a dedicated SSDI monitoring kit designed for ocean environments. BP has the ability to transport and deploy this kit anywhere in the world to support capping and containment activities.

8.0 INTEGRATING EXISTING AND NEW DATA

BP personnel work with closely other response professionals, relevant agency representatives and regional stakeholders (e.g., academia) to integrate existing survey data, samples, local knowledge, and modelling results with information collected during the response. This combination of information streams quickly enhances the state of knowledge about the response area and serves as an excellent opportunity to bring the optimal combination of voices and expertise into the planning and assessment of monitoring and sampling. Critically, the integration of existing data helps to calibrate important modelling activities and can expedite operational decision-making that relates to other aspects of the response such as Spill Impact Mitigation Analysis (SIMA). In ideal situations, the majority of the existing and new M&S information can be embedded within the Common Operating Picture (COP) for rapid analysis and display during key decisions.

9.0 MANAGING MONITORING & SAMPLING DATA, SAMPLES, & INFORMATION

BP understands the importance of effectively managing the M&S data, samples, and information. This starts with the use of standard operating procedures during actual data/sample acquisition, continues with verifiable tracking (e.g., chain of custody documentation), and culminates in effective integration and storage of these information assets (e.g., within a GIS database). From previous experience BP has developed a series of OSR-related Knowledge Management Documents (KMDs) that provide quick access to important lessons learned – including for sample and data management.

The primary data and information practices are encompassed in the response-specific Quality Assurance Project Plan (QAPP). BP is capable of deploying dedicated data and sample management specialists to consult with the wider set of M&S team members (and others within the response) to ensure clear understanding of the QAPP requirements and provide overall assurance of data management activities.

10.0 COMMUNICATING MONITORING & SAMPLING RESULTS

Fundamentally, BP designs all M&S activities to help inform the wider set of response decisions, objectives, and communications. The results from M&S activities are typically easily displayed in map or graph format and therefore are easily integrated into the BP's Common Operating Picture (COP) – the primary communication and awareness tool used within the ICS. Importantly, BP has developed specific COP modules for Operations and the Environmental Unit – providing a tailored visualization context for M&S results. For example, the to-date measurements of air quality parameters relative to actionable thresholds can be rapidly displayed, discussed and used to help make decisions about the safe deployment of response personnel or necessary evacuations.

BP has also developed the concept of an Operational Science Advisory Team (OSAT) Develop to expedite analysis and communication of M&S results. This multi-disciplinary team is critical in supporting the information flow within the IC and linkages to the Situation Unit, Liaison Officers, and JIC personnel. As shown in **Table 3**, BP outlines specific "informational products" that have a clear Objective, Description, Frequency/Iteration, Audience, and Key Consultations defined within the summarized M&S Activity Cycle.

Table 3 - Example Activity Cycle, including target audience, for M&S "Information Products"

Key Informational Products	Iteration	Target Audience
Dispersant/ISB Monitoring Report	Daily	PSC, OSC, IC, Source Control, Situation Unit
Mission Guidance	Daily	Monitoring Vessel/AOV Teams
Monitoring and Sampling Map	Daily	IC, FOSC, PSC, OSC, Situation Unit
Efficacy and Threshold Report	Daily	EUL, PSC, OSC, IC, Source Control, Situation Unit
Sample Status & Tracking Report	TBD	Data Management Unit, EUL
PIO Talking Points Memo	TBD	EUL, PSC, PIO, FOSC
Consultations Summary	TBD	EUL, PSC, OSC, IC

11.0 ASSESSING MONITORING & SAMPLING ACTIVITIES

Over time, the changing nature of many spill response activities demands an adaptive approach (see above). In turn, this requires a periodic assessment of each M&S activity to, at minimum, determine if:

- The agreed M&S protocols are being followed correctly;
- There are additional personnel, equipment, or data management needs;
- The M&S "informational products" are being effectively communicated;
- The design of the specific M&S plan/program is still fit-for-purpose; and
- The M&S activity outputs are being utilized for maximum benefit in response decision-making.

During a large-scale or prolong-duration response (especially those requiring personal rotations) focus can potentially drift from the original mission (or, conversely, stay focused on the original objective when a change is indicated). BP will assign a specific M&S Team member with the responsibility to coordinate the periodic assessment of M&S plans and activities.

12.0 COMPETENCY OF PERSONNEL

It is imperative that competent personnel be deployed to plan, oversee, and execute M&S activities which can be physically taxing and require discipline specialization to ensure accuracy and consistency. Considering the degree and importance of communication required personnel rotations need to include a specific element focused on sustaining these linkages that are critical to information flow. Above all the M&S Coordination Team personnel must have the ability to integrate an operational perspective into the plans. Finally, in certain circumstances even expert personnel may require some degree of incident-specific training to ensure that agreed protocols are being followed and that the M&S objectives are clearly understood for the given response scenario.

13.0 OTHER CONSIDERATIONS

A. Aligned Activities

There are several other response activity sets that are closely aligned with M&S activities, including:

a. Data and information management protocols;
b. Quality Assurance and Quality Control (QA/QC) procedures;
c. Spill trajectory and/or air dispersion modelling;
d. Health & Safety Plans;
e. Resources at Risk (RaR); and
f. Spill Impact Mitigation Assessment (SIMA).

These related activities need to be closely considered and integrated during the M&S planning and execution phases. In particular, there are important lines of communication between the responsible personnel that need to be established early and maintained throughout the response.

B. Complications to Anticipate

There are a variety of circumstances to be aware of when developing, executing, and communicating M&S plans and results. Some examples of these potential complications include:

a. Cycle of delayed analytical sample results misaligned with decision-making timeline;
b. Different start/stop times for M&S activities can disrupt the daily duty cycle / mission plans;
c. Loss of distinction between the data and resulting information used for decisions; and
d. Information flow disruptions due to an overly high volume of M&S data.

While responders can anticipate some of these complications, many are best mitigated through establishing and maintaining strong communication linkages between the relevant IC teams, setting clear expectations about need for and timing of M&S deliverables, and setting clear accountabilities.

14.0 FIRST STRIKE MONITORING PLAN: BP SCOTIAN BASIN

The BP Scotian Basin First Strike Monitoring Plan (FSMP) is intended to guide the rapid establishment of the Monitoring & Sampling (M&S) teams and drive initial, practical monitoring activities that can serve as the basis for subsequent monitoring activities. The FSMP serves as a “quick-reference” guide for first responders in the Environmental Unit, and the focus is squarely on the initial operational response phase of the incident (although the results may help inform post-response phases). Specific FSMP activities are requisite when the described initiation point (see Table 1) is reached but are also designed to be adapted as the scenario evolves. The FSMP is not intended to be the full or final monitoring plan. In executing the FSMP the M&S teams will also establish important lines of communication with

relevant experts and stakeholders, and establish the foundation for critical supporting functions such as data management and sample chain of custody protocols.

Principal Objectives of the Scotian Basin FSMP:

- Serve as the initial organizing focus for the M&S Coordination Team within the response;
- Protect the health and safety of responders and others in the response zone;
- Document pre-impact baseline conditions for source oil, dispersants, air quality and water quality*;
- Initiate compilation of existing data and agree actionable thresholds for the operational response;
- Establish important fixed monitoring locations to be revisited (for trend analysis);
- Monitor the basis for and efficacy of initial dispersant applications and/ISB;
- Establish initial presence/absence, character, and behaviour of fresh oil on/below the surface;
- Help inform subsequent operational response decisions as the incident evolves;
- Validate and refine existing and future modelling outputs to inform response decision-making; and
- Establish important foundations for mapping, documenting, and managing M&S data/information.

**Any pre-impact surveys for shorelines will be determined by the dedicated SCAT team. Monitoring of waste streams and sea-bed sediment conditions will be assessed and integrated (as necessary) as the incident evolves.*

Initial Steps for Activating the Scotian Basin FSMP:

- Designate the Monitoring & Sampling (M&S) Coordination Team leader
- Activate "call-out" for key personnel to staff the M&S Coordination Team
- Activate "call-out" for key personnel to staff the in-field, operational monitoring task forces
- Activate "call-out" for SSDI Monitoring Kit, supplies, and analytical laboratories to support monitoring
- Determine if weather/spill conditions require use of drones, AUVs, ocean gliders in place of vessels
- Meet and establish lines of communication with the Operations, Situation, Health & Safety, and Command teams;
- Meet with relevant experts from BP, regulatory authorities, and key contractors to align with SIMA; and
- Meet with modelling team(s) to understand their needs and establish mutual exchange of data*.

**"Mutual exchange" includes modelling teams receiving in situ data to validate/refine models and the M&S coordination team receiving updated model outputs to help drive mission guidance.*

General Description of Scotian Basin FSMP Activities:

The specific objectives of the FSMP are dependent on acquisition of relevant, timely, and accurate science-based data – most importantly the presence/absence and condition/character of oil and the efficacy of dispersants and/or ISB. The FSMP is aimed at collecting initial samples and establishing the foundation for operational monitoring and then will be accomplished by designating fixed monitoring locations and adaptive zones including the near-field source zone and the pathways to "The Gully" and Sable Island. Subsequent monitoring zones may be established to determine the "edges" of any subsea dispersed oil plume and document the areas where dispersed oil is not being detected (i.e., negative returns). The M&S Coordination Team will also help determine if the spill scenario and conditions

require the use of autonomous (unmanned) monitoring platforms (e.g., marine autonomous vehicles; aerial drones). Activating the FSMP will "trigger" some very specific actions (see Table 1) and in the process establish some important functional elements (e.g., data management protocols) for a broader set of M&S activities.

Table 4 - Summary of Scotian Basin FSMP Activities

FSMP Activity and Purpose	Action(s)	Initiation Point
Capture unmitigated source oil sample for analysis of total petroleum hydrocarbons (TPH), weathering potential, dispersability.	EU requests Ops to secure 15 1-liter samples of at-source oil using a source control remotely operated underwater vehicle (ROV) and at surface location nearest source.	Immediately upon availability of the ROV and sampling bottles and **before** subsea dispersant application begins (i.e., unmitigated oil).
Capture baseline air quality samples in source control zone and from vessels farther afield to assess exposure threats to worker safety.	EU works with Health & Safety team experts to document air quality thresholds and to provide Ops with SUMMA® canisters (air sampling devices) to collect baseline samples.	Immediately upon availability of the ROV and sampling bottles and before **AND** after dispersant application begins.
Capture baseline water quality in the source control zone and within priority monitoring zones.	Capture of water samples (via Niskin bottles) at fixed depths and surface in designated locations.	Immediately upon availability of the sampling vessel/equipment and before **AND** after dispersant application.
Secure a pure dispersant sample for reference tests and analysis.	EU requests Ops to secure 5 1-liter samples from each unique source of dispersant being used.	Before dispersant stockpiles are exhausted and ideally before use.
Document initial presence/absence, character, and behaviour of fresh and dispersed oil on/below the surface.	EU directs sampling teams to collect water samples and take in situ measurements to document dissolved oxygen, presence of oil, droplet size distribution, and trends.	Following capture of unmitigated source samples and integration of first modelling results into the mission guidance.
Validate and refine existing and future modelling outputs to inform decision-making and track oil.	EU works with modelling team(s) to integrate data into models and use models to inform mission guidance.	Immediately upon availability of initial models and initial monitoring data and continuing throughout response.
Monitor dispersant delivery rates, timing, and method to optimize SSDI efficacy and limit volume.	EU requests Ops to document dispersant delivery details (timing, rate, total volume, method, product).	Monitoring capability in-place **prior** to any/all SSDI applications.
Designate fixed/adaptive monitoring zones to accommodate SIMA outcomes and priority resources.	Ensure that source control zone, and pathways to The Gully, and Sable Island are recognized as priorities.	Prior to any incident – included in approved OSRP.
Conduct initial **surface** dispersant efficacy assessment to inform response tactics.	Ops uses SMART protocols for visual monitoring. Physical samples captured pre/post application for lab-based analysis of weathering.	Monitoring capability in-place prior to dispersant application and remains in place for subsequent deployment.
Conduct initial **subsea** dispersant efficacy assessment to inform response tactics.	EU requests Ops gain access at source control location for deployment of video, LISST, fluorometer, and Niskin bottles.	Monitoring capability in-place prior to dispersant application and remains in place during subsequent SSDI.
Conduct initial **in situ burn** (ISB) efficacy assessment to inform response tactics.	Ops to determine burnability of source oil and safely monitor active burns for total volume.	Prior to any incident - ISB monitoring protocols integrated in OSRP.

FSMP Activity and Purpose	Action(s)	Initiation Point
Optimize the allocation of limited monitoring resources.	Initiate compilation of relevant, existing baseline environmental data.	After initial source samples and efficacy testing is conducted.
Protect the quality and integrity of the resultant monitoring data.	Establish protocols for mapping, documenting, and managing M&S data/information.	Prior to any incident – included in approved OSRP.

Reporting Scotian Basin FSMP Results:

Reporting of FSMP results is time-critical and will follow a clearly agreed set of formats and delivery timescales to maximize protection of responders and resources at risk in the Scotian Basin. All FSMP data collected in the Scotian Basin will be maintained with industry standard metadata, chain-of-custody protocols, and will be accessible within the Incident Command (IC) via the Situation Unit's Common Operating Picture (COP). Specific briefings to the CNSOPB and other authorities (e.g., ECCC-ESTS; Port of Halifax) will be coordinated through the Incident Command Staff.

The initial FSMP activities will focus on several priority monitoring zones (see Figure 1) with the potential to maintain focus in those areas and/or shift the prioritization of monitoring assets based on the evolution of the incident. The focus of the adaptive monitoring in the "source control zone" will be on the volatility, condition, and movement of oil and the efficacy of dispersants on fresh oil. The focus of the monitoring in the "pathway zone" (between the source and "The Gully" and Sable Island) will be presence/absence and movement of any surface-expressed or sub-surface dispersed oil and, if found, a more detailed assessment of the condition of that oil (i.e., can it be further mitigated). The main focus for the fixed monitoring stations (to be re-occupied on a periodic basis) is to establish presence/absence of oil, assess weathering of any detected oil, and provide oceanographic data to the modelling team(s) to help refine their outputs.

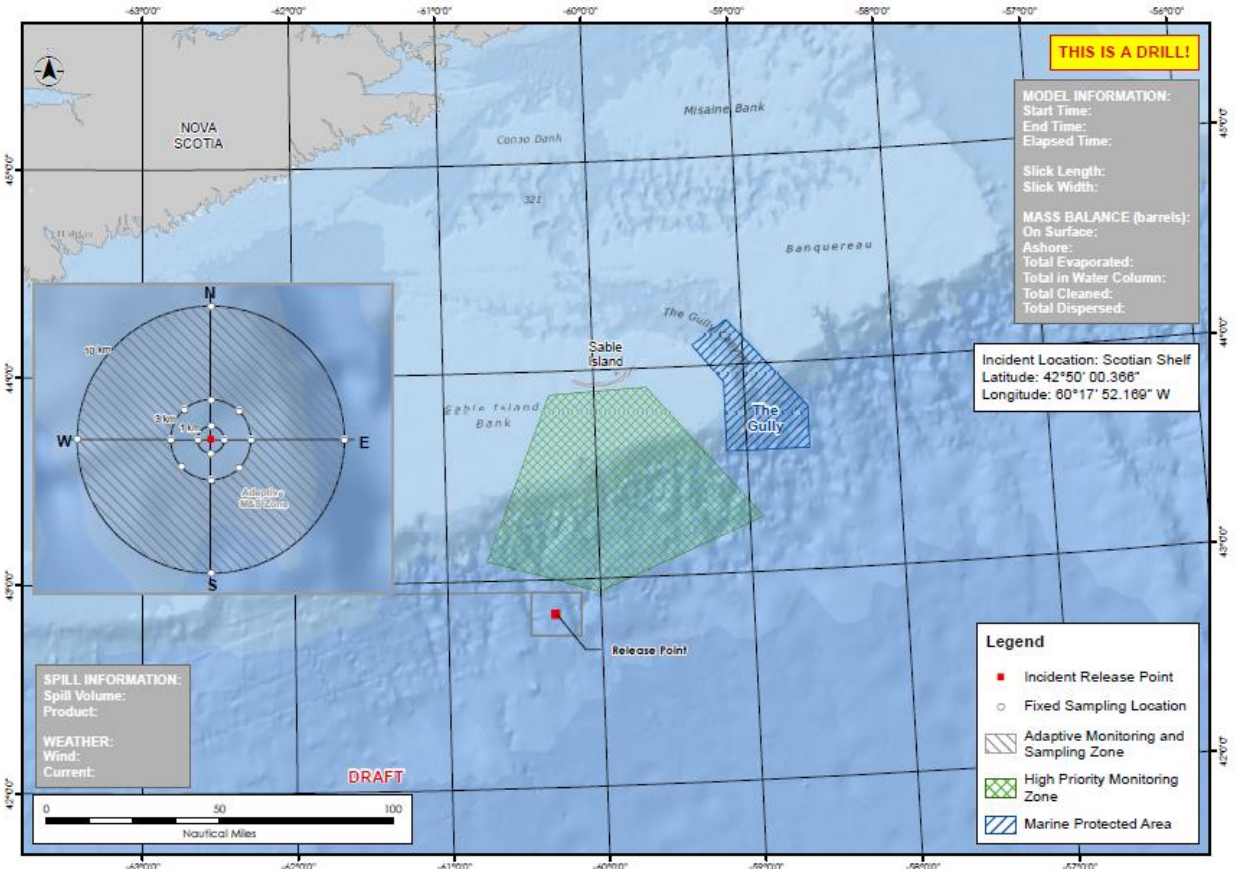
All sampling locations (including time/depth) will be recorded with coincident measurements and compiled in GIS format for rapid analysis and display. A basic mapping symbology will be used for FSMP data so that any measurements above or below an actionable threshold can be easily queried and displayed. Measurements that exceed an actionable threshold (e.g., dissolved oxygen <2ppm) will be represented by red triangles with black outline. Measurements that are below a threshold will be represented by a green circle with a black outline. Measurements that are outstanding (e.g., awaiting delayed analytical results) will be represented by an open (unfilled) circle with a yellow outline.

The BP-led M&S Coordination Team, located within the IC, will be responsible for all the following aspects of the Scotian Basin FSMP data/information flow:

- establishing and ensuring effective data management protocols;
- delivering mission guidance for the in-situ monitoring team(s);
- tracking the status of latent analytical results;
- transferring M&S data locations/outcomes to the Situation Unit for storage/display;
- preparing and delivering daily or weekly summary reports (including map summaries) to IC;
- alerting the IC if/when/to what extent any actionable thresholds are exceeded;
- staying engaged in any ongoing SIMA-based decision-making;

- revisiting monitoring locations and criteria based on changes in the scenario;
- liaising with the Operations, Health & Safety, Situation, and Communications teams and other key stakeholders;
- providing mutual support to the modelling team(s);
- tracking the location of monitoring vessels or unmanned host platforms (e.g., AUVs); and
- informing SIMOPS of any proposed changes in the monitoring fleet or locations in the near field.

Figure 3 - Scotian Basin FSMP – Priority Monitoring Zones and Sampling Locations



RESOURCES

BP has developed a number of practical "work tools" to help guide the design and implementation of M&S plans and activities. These templates are complemented by industry and government best practice guidelines.

- Organization and responsibilities of the M&S Coordination Team
- Example Overall Monitoring Group Plan
- M&S Daily Activity Cycle
- Phased SSDI Monitoring Plans
- In Situ Burn (ISB) Monitoring Plan [NOTE: Produced for Scotian Basin during Dec2017 Exercise]
- Waste Sampling Plan
- Seabed Monitoring Plan
- Daily M&S Communications Briefing
- Sample Management Plan
- Analytical Request Form
- Chain of Custody Template for Physical Samples
- Call-out protocol, shipment manifest, and maintenance records for BP SSDI Monitoring Kit
- BP Manifest of Verified Response Contractors (including M&S professionals)
- Additional Resources:
  - BP OSR Knowledge Management Documents (KMDs)
  - API SSDI Monitoring Guidelines
  - IOGP-IPIECA OSPR Good Practice Guide Series
  - US EPA Sampling and Analysis Plan (SAP) Checklist
  - US EPA Standard Operating Procedures (SOPs)
  - US EPA Quality Assurance Project Plan (QAPP)
  - USCG SMART Monitoring Protocol

Security Classification: BP Public	**BP Canada Energy Group ULC**	

Scotian Basin Exploration Project

Oil Spill Response Plan

Annex G -

Decontamination and Demobilization Plans

B02	Issued for Use	Mike Condon	Allen Pere	April 9, 2018
B01	Issued Final	Mike Condon	Allen Pere	February 5, 2018
A01	Issued for Review	Mike Condon	Allen Pere	November 1, 2017
Rev	Revision Description	Content owner	Approver/Issuing Authority	Issue Date

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1.0 DECONTAMINATION PLAN

The following outlines a template for a Decontamination Plan and is intended for the BP Canada Incident Management Team (IMT) in case of an incident. It provides detailed information to support the IMT with the implementation of decontamination activities including personnel, equipment and vessels.

1.1 DECONTAMINATION PLAN

1.1.1 Plan Objectives

This Decontamination Plan has been prepared to identify general decontamination procedures associated with product release cleanup operations. The focus of this plan is to provide decontamination procedures for the safe handling and removal of product-saturated material from spill boom returned from deployment, as well as from other product-affected equipment.

Waste material generated at the decontamination stations will be either treated by the water treatment system at the decontamination stations or transported to wastewater treatment, recycling, or disposal facilities. In either case, waste is managed in accordance with regulatory guidelines. Close coordination with the Environment Unit (ENV) and Disposal Group (DISPG) is necessary to ensure proper waste handling procedures are followed.

1.1.2 Health and Safety Program

Personnel working at decontamination sites (including the on-site supervisor[s]) may be exposed to noxious substances, health hazards, or safety hazards during decontamination activities and therefore will not be permitted to participate in, or supervise, field decontamination activities until they have been medically qualified and trained to a level required for these activities and responsibility. Before mobilization, site workers are required to have the following medical surveillance and training:

- Medical clearance for wearing a respirator
- Completion of a respirator fit test appropriate for wearing an air purifying respirator
- Have passed a drug and alcohol test
- Complete appropriate training to perform hazardous waste work
- Successful completion of PPE and decontamination training

The site supervisor will verify that site personnel have met the above requirements before arrival on-site. Copies of the written training documentation will be retained in the incident response file. Contractor personnel should not be allowed to work at the site unless such training documentation is available.

Based on the potential exposure to product during the decontamination process, workers conducting activities inside of the staging, boom decontamination, and truck decontamination areas should wear Level C PPE at the beginning of the effort. After industrial hygiene monitoring to determine levels of

oil-mist (or other product) exposure, PPE levels may be downgraded. Level of PPE protection selected for the site and work areas include those listed on **Table 1**:

Table 1 - PPE Levels C and D

PPE Level	Ensemble Components	Tasks Requiring Use
Level D Should be worn only as a work uniform and not in any area with respiratory hazards. It provides minimal protection against chemical hazards.	• Long pants and shirt with sleeves • Steel-toed footwear • Safety spectacles with side shields • Hardhat • High visibility traffic vest	Walking on site
Enhanced Level D	• All level D PPE • Chemical resistant work gloves • Hearing protection • Full face shield • Poly coated Tyvek	Oil decontamination work areas (after oil mist exposure levels are determined to be at an acceptable level)
Level C Should be worn when the criteria for using air-purifying respirators are met, and a lesser level of skin protection is needed.	• All Modified Level C PPE • Air purifying respirator with combination organic vapor/high efficiency particular air (P100) cartridges	Oil decontamination work areas (prior to oil mist exposure levels are determined to be at an acceptable level)

1.1.3 Boom Handling and Decontamination

As product-saturated boom is retrieved from offshore, it will be collected and transported to the nearest decontamination station. Product-saturated boom can be received via water or road access. Once at the dock, the product-saturated boom will be off-loaded from the water transport vessel and placed into containers that are equipped with a liner to reduce the potential for product leakage. Filled containers may be transported to the decontamination stations by truck and then placed on the staging pad, immediately adjacent to the decontamination pad.

Before departure to the decontamination site, the container will be covered to reduce the potential for rainwater to enter the container and reduce air emissions. The container cover will remain in place until decontamination site workers are prepared to begin decontamination of product-saturated boom contained in the container. A description of the work process is as follows:

1. The decontamination team, as necessary, will roll the cover of the container back to obtain access to the oily boom. Oily boom handling should be performed mechanically as much as possible to reduce the potential for personnel exposure to contaminants. A crane or a long stick track hoe should be used to remove one section of oily boom (up to 100 linear feet/meters) at a time from the container.

2. The oily boom will be placed in a staging area where workers can untangle the boom and detach mooring lines and anchors before decontamination.

3. The untangled boom will be visually identified for “light decontamination” or “heavy decontamination” based on the amount of oil/product on the boom. Lightly affected boom will be decontaminated using hot water pressure wash (3,000-psi maximum). Heavily affected boom will be decontaminated by spraying it with a citrus-based cleaner before using a hot-water pressure-washer to remove visual contamination from the boom. The cleaner must be approved by regulatory agencies as a miscellaneous oil spill control agent and a copy of the SDS must be included in the documented approval.

4. Before removing decontaminated boom from the decontamination pad, liquid accumulation from the decontamination pad sump should be removed using the sump pump to reduce the potential for re-contaminating the boom.

5. This process will be repeated until all product-saturated booms are removed from the container. At the end of the day, or during a rain event, the header for the container will be repositioned to prevent accumulation of rain water inside of the container.

6. The staging and decontamination pads will be constructed with 2-ft high HDPE or compacted-clay-lined earthen berms around the perimeter to serve as secondary containment and a 3-ft deep sump to collect fluids that will then be pumped through a treatment system.

As each length of boom is decontaminated, the boom will be visually inspected to determine whether it should be repaired, redeployed, or returned to its owner. Boom designated for repair or redeployment will be bundled appropriately and staged for pickup. Boom designated for return to owners will be moved to a clean area of the site and allowed to dry before bundling and staging for pickup. Before moving the cleaned boom to the drying or staging areas, the cleaned boom will be visually inspected and certified as clean.

1.1.4 Vehicle and Equipment Decontamination

This vehicle/equipment plan was developed to show work process for completing vehicle/equipment decontamination.

- A special decontamination pad has been designed specifically for addressing contaminated vehicles and vehicles transporting equipment that may require decontamination. Vehicles designed for this facility must follow the facility traffic routing plan to gain access to the decontamination pad. The pad is sufficiently long to accommodate at least two vehicles and trailers at a time for decontamination.

- The vehicle or equipment requiring decontamination will be visually inspected to determine whether the application of a citrus-based cleaner is needed for decontamination. This vehicle/equipment will then be decontaminated using a hot-water pressure-wash until visual decontamination has been removed. Liquids in the decontamination pad sump will be removed before vehicles exit the decontamination pad.

- After vehicle or equipment is decontaminated, it will be visually inspected for complete decontamination. The inspection will be conducted by a decontamination site representative and the vehicle/equipment owner/operator. Once it is agreed that the decontamination is complete, the vehicle/equipment owner/operator will sign off on a Certificate of Decontamination before the vehicle/ equipment leaves the site. The original of the Certificate of Decontamination will be kept by the Documentation Unit, and a copy will be provided to the vehicle/equipment owner/operator.

1.1.5 Personnel Decontamination

During oil response operations, if personnel or equipment becomes contaminated by oil, the following decontamination process should be followed:

- Decontaminate any contaminated equipment prior to taking off any protective clothing.
  - Place equipment in an appropriate location for decontamination.
  - Wash equipment with mild detergent and water.
  - Rinse with water and air dry.
- Remove any contaminated PPE and place in appropriate container.
  - Wash any oil contaminated area of the body with water and a mild detergent.
  - Rinse area with water.
- Contaminated water generated during personnel decontamination at the decontamination stations may be treated on-site by the water treatment system or transported offsite to a water treatment plant. Materials (e.g., solid waste) collected during personnel decontamination will be disposed of in accordance with the Waste Management Plan.

Decontamination of personnel working within the decontamination pad area(s) will use large designated low-sided containers, or cleaning pools for cleaning equipment and for personnel decontamination. The cleaning pool will be set up within secondary containment to capture potentially spilled material. Decontamination areas will include several cleaning pools for individuals to wash in while they are still wearing PPE, as well as the appropriate number of drums for disposal of spill debris. The final step in personnel decontamination requires a facility for personnel to shower after removing PPE.

Each personnel decontamination area should maintain a supply of the following equipment:

*The following are examples. Actual supplies and quantities are to be determined by the Decontamination Group Supervisor.

- Four 2- or 3-gallon pressure sprayers
- 4 rolls of caution tape
- 20 free-standing guide posts
- Eight 55-gallon drums, open with lid

- Two 55-gallon drums, open top with bung opening lid
- 20 packs of sorbent wipers (minimum 50 pads each)
- Four plastic buckets and four scrub brushes
- Four child wading pools
- Labels for drummed waste
- Four 50-ft garden hoses with variable spray nozzles
- Four 20-gallon plastic trash cans
- Plastic sheeting
- Duct tape
- 20 boxes of disposable Nitrile gloves (each day)
- 200 disposable poly Tyvek (per day)

The drums will be labeled as follows:

- Oily PPE
- Other oily debris (i.e., sorbent pads, boom, etc.)
- Non-oily debris

Each personnel decontamination area will be surrounded with containment material or be placed in a containment area. Upon leaving the staging, boom decontamination, and vehicle decontamination areas, each individual must go through the designated decontamination stations.

Decontamination procedures will generally include the following:

- Clean the PPE in a series of decontamination pools.
- Remove and dispose of PPE in appropriate drums for disposal or cleaning and reuse.
- Personnel leaving the decontamination area will perform final cleaning of PPE.

Personnel decontamination procedures, specifically, will include the following steps:

- Station # 1—Exit the work area after removing gross contamination and leaving it in contaminated area for later disposal. Enter the decontamination area by stepping on absorbent roll.
- Station #2—Step into washtubs and remove all visible contamination from clothing and boots via wash brush. Absorbent pads and water sprayers or garden hoses should be available at this station to assist in the cleaning.
- Station #3—Step from washtub and walk on absorbent roll. Remove outer gloves and place in waste can.
- Station #4—Continue on absorbent roll and step into next washtub. Remove protective clothing down to the boots and step out of and away from boots and clothing.
- Station #5—Throw disposable clothing in waste bin and place boots in personnel bags for reuse.
- Station #6—Remove and dispose of inner gloves and exit decontamination line into sheltered area.

All liquids generated during personnel decontamination operations will be transferred to the decontamination pad sump and pumped through the treatment system or transported for final disposal.

1.1.6 Decontamination Water Treatment System

Under normal conditions, without rainfall, decontamination water will be treated and recycled at the decontamination area or transported for final disposal. The treatment system will consist of a frac tank constructed with an underflow weir to remove both floating material and settling solids. Pretreated water will be stored in a second frac tank. Water from the second frac tank will be treated batch-wise through a system consisting of a bag filter and two stages of organo-clay filtration. The bag filters and organo-clay will be changed as necessary and the used filters and clay will be disposed of as solid waste according to the Waste Management Plan. This treatment will remove residual fine solids and residual oil. Treated water will pass into a clean water frac tank, which will feed the decontamination pressure washer systems.

The water usage for cleaning is estimated to be 200 gallons per hour or 2,400 gallons per day for a 12 hour work day. The water treatment system will likely operate once per week to keep the clean water frac-tank supplied.

If the decontamination area is not covered, it may accumulate rainwater. Storage capacity should be provided to temporarily store this rainwater. Accumulated rainwater will need to be treated/disposed of according to the Waste Management Plan.

Rainwater will be treated through the initial frac tank for removal of floating or settling material prior to storage. Sufficient rainwater storage/treatment capacity will be provided to hold the maximum potential rainwater/day volumes. In the event the volume of collected rainwater exceeds the capacity of the above listed facilities, the appropriate regulatory agencies will be notified.

Any free oil, tar material, and oily debris that accumulate in the oil/water separator will be vacuumed from the top of the separator. The vacuumed material will be transported by vacuum truck for treatment, recycling, or disposal to an approved facility.

1.1.7 Waste Disposition

During the decontamination process, the following waste streams may be generated:

- Free oil
- Oily solid waste
- Oily debris
- Oily liquid
- Oily PPE
- General household refuse
- Inert construction waste

Oil-contaminated water generated at the decontamination stations may be treated or transported according to the Waste Management Plan. Free oil will be removed by vacuum truck from the frac tank with the underflow weir when a measurable quantity has accumulated. Storm water collected on the staging pad and decontamination pads will be pumped into frac tanks and then removed by vacuum truck as necessary. Free oil and storm water removed by vacuum trucks will be treated, recycled, or disposed.

Solid waste generated at the decontamination stations will be disposed of according to the Waste Management Plan. Finally, at the completion of decontamination activities, the remaining fluids will be treated, recycled, or disposed.

1.2 DECONTAMINATION PLAN FOR VESSELS

1.2.1 Plan Objectives

Vessel decontamination includes on water and onshore decontamination processes. The activities in this section refer to commercial vessels, deployed resources, and private vessels. Gross decontamination of vessels is generally conducted at offshore decontamination stations. Secondary decontamination of vessels is generally conducted at inshore decontamination stations (both fixed and mobile decontamination stations), as well as onshore decontamination stations. Proper waste handling procedures should be coordinated through the Environment Unit (ENV) and Disposal Group (DISPG). Signoff or approval may be required from the Canadian Coast Guard) CCG after vessel decontamination.

1.2.2 Operator Responsibility

It should be noted that vessel decontamination and spill response operations do not absolve vessel operators of their responsibilities under regulatory guidelines to prevent discharges of product from their vessels.

1.2.3 Onshore Vessel Decontamination

Onshore vessel decontamination guidance is provided below for small and large vessels. Vessels arriving from offshore and near shore activities should be inspected to ensure that vessels are not actively sheening prior to entering onshore decontamination stations.

Vessel decontamination should not be conducted in the vicinity of water intakes, environmentally sensitive areas, or in areas where the public could be affected. Decontaminated vessels must remain at the decontamination station until regulatory agency personnel or the designated official has inspected and released the vessel for transit.

1.2.3.1 Small Vessel Decontamination

- As small vessels enter an onshore decontamination station, they will be registered by personnel before decontamination begins.

- Small vessels should be surrounded with boom to provide primary containment for free oil or sheens that may enter the water, unless the small vessel will be immediately removed from the water and placed on a decontamination or storage pad designed to contain all fluids.
- If the vessel contains oily boom, equipment, and/or vehicles, these should be off-loaded and decontaminated separately.
- Any free oil and/or sheen that may enter the water during the boom and equipment removal process will should collected using sorbent materials. The used sorbents will be collected, bagged, and handled as described in the Waste Management Plan.
- After oily boom and equipment are removed, the small vessel should be lifted by crane or equivalent equipment and placed on a decontamination pad designed to contain all liquids generated during the decontamination process. The liquids will be recovered, treated and recycled, or disposed of as appropriate through the water treatment system or transported for final disposal per the Waste Management Plan. If the small vessel is decontaminated without removing it from the water, the decontamination procedures outlined below for large vessels will be employed.
- Once removed from the water and placed on a decontamination pad, the small vessel's hull and deck will be decontaminated with a hot pressure washer. If it is determined that more aggressive decontamination measures are required, then an approved cleaning solution will be used. Cleaning solutions used onshore must be compatible with the station's wastewater treatment equipment and process, as well as with the approved liquid disposal facilities. The use of approved cleaning solutions does not require additional approval prior to use. Storage and handling of approved cleaning solutions and other chemicals will be managed in accordance with manufacturers' specifications.
- For small vessels removed from the water that require bilge decontamination, the bilge plug should be removed and the bilge area should be pressure-washed on the decontamination pad.

  Important: The bilge plug needs to be replaced before the vessel is placed back into the water. If the bilge plug cannot be removed, wastewater should be removed manually or by pumping.
- Prior to being released and placed back into the water, the small vessel will receive a post-cleaning inspection conducted by the regulatory agency and/or a designated official.

1.2.3.2 Large Vessel Decontamination

Important: Prior to beginning any large vessel decontamination, the water body at the decontamination station should be pre-boomed to provide containment for free oil and/or sheen that may enter the water during the decontamination process.

- As large vessels enter the dock at the onshore decontamination station, they should be registered by personnel prior to decontamination.

- As the large vessel is moored to the decontamination station dock, the pre-placed boom will be set in place by small boat(s) around the large vessel, thereby providing containment for free oil and/or sheens that may enter the water.
- If the vessel contains product-saturated boom, oily boom, equipment, and/or vehicles, these will be off-loaded and decontaminated separately.
- Once oily boom and equipment are removed, the large vessel will be decontaminated using a hot-water pressure-washer. If the deck and hull of the vessel are to be decontaminated, deck plugs, scuppers, ocean valves, and any other overboard valve should be secured and/or closed before decontamination begins. An inspection of the bilge area may be conducted to determine if the bilge area has been impacted by oil from the spill, and if so, the bilge should be pressure-washed.
- If water-based pressure-washing is not effective and it is determined that more aggressive decontamination measures are required, then an approved cleaning solution should be used. Cleaning solutions will be sprayed onto sorbent pads or a rag and manually applied to the vessel surface. Once the cleaning solution is applied, additional water will not be used to wash the area until the solution has been wiped off with sorbent pad or rag. Cleaning solution application and use will be conducted in general conformance with the procedures in this plan and the Waste Management Plan.
- All liquids that accumulate on the vessel deck or in the vessel bilge during the decontamination procedure will be removed by vacuum truck.
- Any free oil and/or sheens that enter the water during the decontamination process will be collected using sweep or sorbents. The used sweep or sorbents will be collected, bagged, and handled according to the Waste Management Plan.
- Vessels with raw water suction cooling systems must purge the system during gross decontaminated at one of the offshore decontamination sites.
- Prior to being released and placed back into the water, the large vessel must receive a post-cleaning inspection conducted by regulatory agency or designated official.

1.2.3.3 Commercial Fishing Vessel Decontamination

Fishing vessels should be decontaminated following the procedures for small and large vessels, as described above. In addition, all commercial fishing vessels should comply with regulatory-specific health department requirements before returning to commercial fishing. For example, the decks and onboard fish-holding surfaces should be washed using cleaning solutions and power-spraying equipment as follows:

- Wash all contact and non-contact surfaces with an approved cleaning solution (as described above), and rinse with clean water.
- Repeat until all signs of oil and cleaning solutions are no longer visible.
- Allow to air dry.

- All contact surfaces of the vessel, equipment, and utensils (defined as those surfaces that will be in contact with commercial fish products during catching, landing, storage, delivery, and/or offloading steps of the operations) should be free of cleaning solutions, chemicals, detergents, and any contaminants.
- All non-contact surfaces and equipment that are capable of cross-contaminating the fish should be free of cleaning solutions, chemicals, detergents, and any contaminants.

1.2.3.4 3rd-Party Vessel Decontamination

Areas contaminated with oil should be avoided by third-party vessels. Owners of third-party vessels should not perform their own decontamination. Decontamination should only be conducted by personnel trained in the proper handling or disposal of the oiled material.

If a third-party vessel travels offshore or nearshore and becomes contaminated, the owner/captain should take the vessel to the nearest offshore or nearshore decontamination station for gross decontamination before returning to port. Should a vessel become contaminated in nearshore waters or need secondary cleaning, the vessel should be taken to one of the decontamination sites as directed.

1.2.4 Offshore Vessel Decontamination

This section addresses the decontamination of vessels offshore, or the gross decontamination of source vessel hulls that have been soiled by oil released from the wellhead. The purpose is to ensure that once gross decontamination has been completed, a vessel can relocate and be demobilized or continue operations without causing further pollution. Secondary or final decontamination may be required.

Gross decontamination is defined as the removal of weathered oil that is clinging or attached to the hull of the vessel. Since the light ends of oil evaporate, the asphaltene characteristics of the weathered oil coupled with the cold weather conditions in the Atlantic region may cause the weathered oil to stick or cling to the hull. Gross decontamination may not remove the stains on the hull since the oil may have impregnated the surface and may require fine cleaning at the next scheduled dry-dock or secondary decontamination. This will be agreed between BP and the Vessel Owners Representative during the final vessel inspection carried out following secondary/final decontamination.

Vessels requiring cleaning should contact the designated offshore decontamination station setup by the decontamination unit to make individual arrangements for each vessel.

Each vessel will slow down to minimum safe steerage while decontamination teams, comprised of two vessels, perform either a water wash or water and surface washing agent wash. Containment boom should be deployed, and skimmers will be notified if skimmable oil is observed.

Note: Vessels will not be permitted to depart field unless agreement has been given and signatures have been obtained on form ICS-221 from the appropriate parties. Additionally, there may be a requirement for sign off on vessel gross decontamination assessments (where required).

1.2.4.1 Scope

Gross decontamination activities are intended to clean the vessel hulls to a level of cleanliness adequate to allow the vessel to move offsite.

This plan does not address more specific and detailed decontamination that might be required for oiled equipment such as ROVs, moon pools, drill equipment, chemical injection systems (i.e. coiled tubing), lifting equipment, tethers and/or ballast tanks. If failure to perform decontamination on such items could result in further pollution when the vessel moves to its next port of call or location, specific plans shall be developed with the CCG, vessel owner and BP to address the need to decontaminate these items before moving offsite. These items will however be addressed as part of the secondary/final decontamination carried out following arrival at a secondary/final decontamination site.

The site safety plan for fire-fighting vessel operations procedures addresses the safety requirements for personnel engaged in the cleaning process as well as the requirements for the vessels and equipment needed to perform the work.

1.2.4.2 Accountabilities

Accountabilities with respect to decontamination of vessels responding to the Scotian Basin Worst Case Incident Exercise 2017 will be determined and agreed upon prior to conducting vessel decontamination activities.

1.2.4.3 Safety

The Site Safety Plan should address safe work practices, air monitoring and the proper personnel protection equipment (PPE) for personnel performing gross decontamination operations. As a minimum, crew members engaged in the decontamination process should wear steel toe shoes, eye protection, protective gloves and a life jacket.

1.2.4.4 Communications

The Simultaneous Operations Group (SIMOPS) will provide notification for a vessel to proceed to gross decontamination. Upon completion of decontamination SIMOPS should be contacted for further instructions before the vessel returns to operations or departs for a new location, as appropriate.

1.2.4.5 Decontamination Logistics

A full decontamination assessment will be undertaken prior to, and after gross decontamination by a BP Marine Inspector. Ballast tanks should be visually inspected as part of this assessment if it is suspected they may be contaminated. A Marine Chemist should be in attendance where tank entry is required to confirm this. If ballast tanks are contaminated, this issue should be identified in the secondary decontamination assessment form and will be addressed during secondary or final decontamination.

Decontamination Area

The vessel should coordinate with the Offshore Decontamination Task Force to agree on a time slot for gross decontamination. Once the vessel to be decontaminated has arrived at this location, handling will pass to the Captain of the vessel(s) conducting the decontamination on an agreed upon VHF channel.

Initial Inspection

The fire-fighting vessel will conduct an initial inspection of the hull to determine what areas need gross decontamination. A written report with photos will be provided to the Offshore Decontamination Task Force and the DECON Supervisor. If there is no contamination to the hull a plan should be agreed upon with respect to the decontamination process and the future movements of the vessel which will be coordinated through field SIMOPs.

Method for decontamination

Fire-fighting vessels will provide gross decontamination services. The gross decontamination vessels will use fire-fighting monitors and nozzles as defined in Fire Fighting Vessels Operation Procedures to wash down the source vessel hull. Depending upon the size of the vessel to be decontaminated and the amount of oil on the vessel, two vessels may be required to perform the task in parallel.

Vessels will use two primary methods for cleaning the hull;

i) spray continuously on one post until the oil is removed; or;

ii) spray back and forth in a “sweeping” motion until the oil is removed.

The flow rate will vary depending on how far away the contaminated vessels are from the fire-fighting vessels but will normally range between 1500–2000gpm. Flow rates will not normally exceed 3000 gpm. No dispersant or other chemical cleaning agents shall be used as a part of this wash down **at any time**. Use of any chemicals or cleaning agents is strictly prohibited for the purposes of gross decontamination. The vessel hull design and the amount of oil on the vessel will directly affect the duration for cleaning each vessel.

Upon completion

Once the vessel has completed gross decontamination, the source vessels hull should be examined the vessels Master and BP Marine Inspector and/or the CCG for acceptance and sign off that the hull is sufficiently cleaned to relocate the vessel from its location. Assessment forms in should be used to provide documentary evidence that the inspection was completed satisfactorily and that all parties are in agreement. If secondary or final decontamination is needed it will be conducted under the direction of the IC/UC Decontamination Plan.

Assessment Forms

The assessment forms should be utilized for gross decontamination acceptance and sign off.

Return to Operations

If required following gross decontamination operations the vessel may return to service until advised of further instructions. SIMOPS should be contacted to determine instructions following completion of gross decontamination.

Demobilization

Where approval has been given to release a vessel from field, SIMOPS will instruct the vessel accordingly to proceed either to secondary decontamination or the procedure to be followed should the vessel be demobilized and permanently released from operations subject to the appropriate forms being completed and signatures being obtained.

2.0 DEMOBILIZATION PLAN

The following outlines a template for a Demobilization Plan and is intended for the BP Canada Incident Management Team (IMT) in case of an incident. It provides detailed information to support the IMT with the implementation of demobilization activities including personnel, equipment and vessels.

2.1 PURPOSE OF PLAN

The Demobilization Unit (DMOB) ensures that response equipment and personnel are released and returned to their home destinations through an orderly and cost-effective process. Demobilization from an incident response is a team effort involving all personnel working on the incident. The Planning Section Chief (PSC) and DMOB Leader ensure that a systematic plan will be implemented upon approval of the Incident Command (IC).

2.2 OBJECTIVE

Demobilization of personnel is important to future planning for the response organization structure. Demobilization will be conducted in an orderly fashion for the efficient release and safe return of all response personnel to their respective home destinations. The following categories are prioritized to ensure the response organization remains intact and that incident objectives are achieved:

- Ensure the health, safety, and security of response personnel.
- Maintain accountability of personnel and equipment.
- Manage demobilization of response resources.

Resources, including personnel, no longer required for the response during each phase of the incident will be demobilized as rapidly as possible. Resources should be identified on a daily basis and the Incident Demobilization Plan (IDP) updated to reflect organizational changes.

2.3 DEMOBILIZATION GUIDELINES

Demobilization involves the following resources:

- Personnel no longer required for the incident response.
- Equipment no longer required for the incident response.
- Vessels no longer required for the incident response.

This IDP will be implemented by the DMOB and coordinated with Command and General Staff upon approval of the IC/Planning Section Chief. Resources will be released in the following general priority:

- Resources required to be returned to emergency services.
- Resources needed for government services.
- Resources mobilized from off-site or non-local resources.
- Local resources—personnel, equipment, and facilities.

2.4 GENERAL INFORMATION

2.4.1 Air Travel

Released personnel requiring air transportation will be required to make all flight arrangements to meet their own needs.

2.4.2 Safe Driving Guidelines

The following general guidelines should be followed when long travel times are involved:

It is BP policy that drivers are appropriately rested and alert while operating a motor vehicle; therefore, it is strongly recommended that all persons during demobilization follow the safe driving practices guidelines, shown below, or make alternative transportation arrangements.

- No driver shall drive more than 10 hours in any consecutive 24-hour period.
- Additionally, during the same 24-hour period, the driver shall have a minimum of 8 consecutive hours rest break.
- Drivers should take at least a 10-minute out-of-the-car break every 2 hours.
- Work/Drive time combination should be limited to no more than 16 hours during any one 24-hour period:
  - The safety of all personnel is paramount and requires a team effort during demobilization.
  - Demobilized personnel are appropriately rested and alert prior to operating a motor vehicle.

2.5 RESPONSIBILITIES

2.5.1 Command

- Approve overall IDP.
- Approve daily list of releasable resources.

- Ensure that personnel receive their orientation packets with the Demobilization Procedure Notice on arrival.

2.5.2 Planning Section Chief (PSC)

- Ensure that the demobilization process and expectations receive wide distribution and that there is an orderly, timely, and efficient release of resources.
- Ensure demobilization information is disseminated in advance to ensure the orderly downsizing of incident resources. The primary means of identifying operational resources for demobilization should be accomplished through the completion of the Operation Planning Worksheet (ICS 215) Demobilization of personnel and resources is accomplished through the Demobilization Form (ICS 221). Guidance documents should be utilized for vessels, equipment, and personnel to ensure that requirements are met upon resource demobilization.
- Ensure that agency/industry-specific requirements regarding demobilization of the agency's/industry's resources are followed. Any deviations must have the approval of the agency/ industry or the Incident Commander (IC).
- Review the IDP prepared by the DMOB Leader.
- Review Command and General Staff comments and make changes as appropriate prior to presenting the plan for approval.
- Ensure the Planning Section has the appropriate level of personnel and resources present to support ongoing operations.
- Identify adequate section personnel and resources required to implement the IDP.
- Notify the DMOB Leader in advance of anticipated demobilization of surplus resources.
- Ensure that personnel receive their orientation packets with the Demobilization Procedure Notice on arrival.
- Advise personnel to leave appropriate time for the demobilization process.

2.5.3 DMOB Leader

- Participate in planning and tactical meetings.
- Prepare and submit the IDP based on input from all sections. Prepare and submit updates if required due to changes in the on-the-ground situation.
- Ensure that all sections know and understand their responsibilities within the IDP and procedure.
- Engage the Safety Officer (SOFR) to ensure safety is maintained as a priority in all planning and execution of the demobilization activities.

- Evaluate logistics and transportation capabilities required to support demobilization.
- Oversee and monitor the demobilization process in accordance with the IDP and implement changes where needed.
- Track and brief the PSC on the demobilization progress.
- Ensure that all section/unit records and paper documents are provided to the Documentation Unit (DOC).
- Ensure that all electronic documents, files, e-mails, and other electronic data are collected by IT Unit as specified in the applicable procedures.
- Make available the Demobilization Form (ICS 221) forms to personnel prior to departure.
- Review, approve, and maintain completed Demobilization Form (ICS 221) forms submitted by demobilizing personnel.

2.5.4 Operations Section Chief (OSC)

- Ensure that the Operations Sections (OPS) has the appropriate level of resources present to support ongoing operations.
- Identify adequate section personnel and resources required to implement the IDP and execute field activities related to demobilization.
- Notify the PSC/DMOB Leader in advance of anticipated demobilization of surplus resources.
- Identify tactical resources that require decontamination. Coordinate decontamination effort with the Decontamination Unit (DECON) and DMOB.
- Advise personnel to leave appropriate time for the demobilization process.
- Ensure that all personnel receive their orientation packets with the Demobilization Procedure Notice on arrival.

2.5.5 Logistics Section Chief (LSC)

- Ensure the Logistics Section (LOG) has the appropriate level of personnel and resources present to support ongoing operations.
- Identify adequate section resources required to implement the IDP.
- Notify the DMOB Leader in advance of anticipated demobilization of surplus resources ready for demobilization.
- Coordinate personnel and equipment transportation needs.

- Ensure that the Supply and Communication Units are prepared to accept and document the return of equipment that was checked out through them.
- Advise personnel to leave appropriate time for the demobilization process.
- Ensure that all personnel receive their orientation packets with the Demobilization Procedure Notice on arrival.

2.5.6 Site IT Lead

- Ensure that the IT Unit has the appropriate level of resources present to support demobilization process.
- Identify adequate section personnel and resources required to implement the IDP.
- Ensure that loaned equipment is collected from personnel prior to demobilization.
- Ensure that access to computing resources is deactivated.
- Ensure that electronic data, including electronic documents, files, e-mail, and other electronically stored information is collected from personnel prior to demobilization, as specified in the Documentation Plan.
- Monitor and oversee the maintenance of electronic data collection from personnel.

2.5.7 Finance Section Chief (FSC)

- Ensure that the Finance Section (FS) has the appropriate level of personnel and resources present to support ongoing operations.
- Identify adequate section resources required to implement the IDP.
- Notify the DMOB Leader in advance of anticipated demobilization of surplus resources.
- Ensure that personnel and equipment time reports are complete and accurate. Adjust Equipment and Time Recorder’s schedule to meet demobilization needs.
- Ensure that any injury and/or equipment claims are documented and complete.
- Advise personnel to leave appropriate time for the demobilization process.
- Ensure that all personnel receive their orientation packets with the Demobilization Procedure Notice on arrival.

2.5.8 Personnel Release Procedures

All personnel departing from any area of responsibility are required to go through the demobilization process, as described below.

- Demobilization Form (ICS 221) must be completed before demobilization.
- The demobilized individual is required to check in with the DMOB upon safe arrival home.
- Responders are required to return any security badges issued upon completing demobilization activities and exiting facility or work area.

2.5.9 Equipment Release

Equipment release will be initiated by the Operations Section (OPS) after being approved by IC. All equipment will be released through the use of an ICS 221 form, which also aids the process to ensure equipment is properly decontaminated and certified prior to release to the owner. The staging areas will be used to consolidate and inventory materials when necessary. BP-owned materials requiring transportation from the recovery area to other locations will be coordinated through LOG. Waste removal operations will be scheduled to be complete prior to full demobilization of operational resources.

2.6 RELEASE PROCESS

The ICS 221 will be used to facilitate the process and ensure resource accountability. Section Chiefs will provide their lists of surplus personnel to the DMOB Leader in advance of anticipated release. The DMOB will combine lists from the Section Chiefs daily and compile a “Tentative Release” list to be submitted to the Deputy Incident Commander for review and approval.

When a final approval for release is obtained from the IC, the DMOB will:

- Notify Section Chiefs of those personnel and equipment to be released by verbal notification.
- Section Chiefs or Field Supervisors will then verify that all staff members have received the demobilization information and requirements for completion.

2.7 OTHER CONSIDERATIONS

- Ensure that current safety practice continues to be followed and encouraged during demobilization. Additional demobilization safety practices may be developed as the need is identified.
- Ensure that demobilized personnel are appropriately rested and alert prior to operating a motor vehicle as part of demobilization.
- Reduce the impact on local neighborhood and communities during demobilization efforts (traffic volume, etc.).
- Identify and mitigate the risk associated with the recovery, decontamination, storage, and disposal of deployed boom.
- Coordinate with DECON to ensure proper decontamination of oiled boom and other materials before they are demobilized.

- Maintain the right skill sets and certifications for response and support personnel required for the demobilization effort.
- Ensure that the demobilization activities do not create additional environmental hazards and liabilities.
- Maintain security until demobilization is complete.
- Maintain secure storage and demobilization areas to reduce material loss.
- Identify and procure final storage areas for retained equipment and materials.