SAPP GUIDELINES ON THE MANAGEMENT OF OIL SPILLS (FINAL)

CONFIGURATION MANAGEMENT

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1.0 INTRODUCTION

An oil spill can be defined as an unintentional discharge of any oil in an undesignated area and in uncoordinated manner due to an accident or arising from weather incident or through careless handling.

When an oil spill occurs on land the primary concern of response for planners is; where will the oil go? And at sea concerns would include: what is the slick direction, its speed of movement, weathering and spreading characteristics of the oil under the influence of prevailing currents and weather conditions?

Thus, oil spills can have wide spread impacts and long-term consequences on the environment (e.g. wildlife, fisheries, human neighborhoods and human health, coastal and marine habitats, livelihood, provision of social services as well as on recreational resources of communities.

Oil spills occur despite all measures that responsible companies and agencies put in place to prevent these from happening. These oil spills can happen at any time (day or night), location (land or in water) and regardless of weather conditions.

Oil spills can also vary from region to region and in magnitude, from just a few litres at a gas station for instance to several hundred to millions of litres if the same occurs at huge establishments like a refinery or rail tanker. Due to the un-predictable nature of such an occurrence, preparing a timely and coordinated response to such an emergency creates an enormous challenge where planning and training facilities for such incidents are lacking or inadequate.

2.0 Definitions

Bulk storage container means any container used to store oil. These containers are used for purposes including, but not limited to, the storage of oil prior to use, while being used, or prior to further distribution in operations. Oil-filled electrical, operating, or manufacturing equipment is not a bulk storage container.

Clean-up: The action of remediation, this may include soil excavation, bio-remediation, solvent soil wash, land farming or electrochemical treatment.

Containment: The prevention of the spreading of the oil spill.

Discharge includes, but is not limited to, any spilling, leaking, pumping, pouring, emitting, emptying, or dumping of oil.

Facility means any fixed building, structure, installation, equipment, oil storage, oil gathering, oil processing, oil transfer, oil distribution, and waste treatment, or in which oil is used. The same site and the types of activity at the site.

Fish and wildlife and sensitive environments mean areas that may be identified by their legal designation or by evaluations. These areas may include wetlands, National Parks, critical habitats for endangered or threatened species, wilderness and natural resource areas, marine sanctuaries and estuarine reserves, conservation areas, preserves, wildlife areas, wildlife refuges, wild and scenic rivers, recreational areas, national forests, State lands that are research national areas, heritage program areas, land trust areas, and historical and archaeological sites and parks. These areas may also include unique habitats such as aquaculture sites and agricultural surface water intakes, bird nesting areas, critical biological resource areas, designated migratory routes, and designated seasonal habitats.

Injury means a measurable adverse change, either long- or short-term, in the chemical or physical quality or the viability of a natural resource resulting either directly or indirectly from exposure to a discharge, or exposure to a product of reactions resulting from a discharge.

Oil means oil of any kind or in any form, including, but not limited to: fats, oils, or greases of animal, fish, or marine mammal origin; vegetable oils, including oils from seeds, nuts, fruits, or kernels; and, other oils and greases, including petroleum, fuel oil, sludge, synthetic oils, mineral oils, oil refuse, or oil mixed with wastes other than dredged spoil.

Oil Spill Removal Organization **(OSRO)** means an entity that provides oil spill response resources, and includes any for-profit or not-for-profit contractor, cooperative, or in-house response resources that have been established in a geographic area to provide required response resources.

Petroleum oil means petroleum in any form, including but not limited to crude oil, fuel oil, mineral oil, sludge, oil refuse, and refined products.

Spill: Any amount of oil present out off its "normal" container – where normal refers to a transformer or a drum etc.

Spill Prevention, Control, and Countermeasure Plan; SPCC Plan, or Plan means the document that details the equipment, workforce, procedures, and steps to prevent, control, and provide adequate countermeasures to a discharge.

Storage capacity of a container means the shell capacity of the container.

Abbreviations

PCB: polychlorinated biphenyls
ppm: parts per million

3.0 Possible sources of oil spills in a Power Utility

3.1 Diesel power station leakages

3.2 Power transformer leakages

3.3 Oil storage and pipe work leakages

4.0 General requirements for Spill Prevention, Control, and Countermeasure Plans.

The owner or operator of a facility must prepare a Prevention Plan (PP) in accordance with good engineering practices. The PP must have the full approval of management at a level of authority to commit the necessary resources to fully implement the Plan. The PP should be communicated in writing and/or information sessions.

The following can be used as a guideline to set up your Prevention Plan, which meets the requirements of your company.

Applicable requirements as listed in these guidelines, and you must supplement it with a section cross-referencing the location of requirements as listed in these guidelines and the equivalent requirements in the other prevention plan. If the Plan calls for additional facilities or procedures, methods, or equipment not yet fully operational, you must discuss these items in separate paragraphs, and must explain separately the details of installation and operational start-up. As detailed in this section, you must also:

(1) Include a discussion of your facility's conformance with the requirements listed in this part.

(2) Comply with all applicable requirements listed in this part. The Plan may deviate from these specifications where applicable to a specific facility, if you provide equivalent environmental protection by some other means of spill prevention, control, or countermeasure as stipulated in Specific National Legislation.

(3) Describe in your Plan the physical layout of the facility and include a facility diagram, which must mark the location and contents of each container. The facility diagram must include completely buried tanks. The facility diagram must also include all transfer stations and connecting pipes. You must also address in your Plan:

(i) The type of oil in each container and its storage capacity;

(ii) Discharge prevention measures including procedures for routine handling of products (loading, unloading, and facility transfers, *etc.*);

(iii) Discharge or drainage controls such as secondary containment around containers and other structures, equipment, and procedures for the control of a discharge;

(iv) Countermeasures for discharge discovery, response, and cleanup (both the facility's capability and those that might be required of a contractor);

(v) Methods of disposal of recovered materials in accordance with applicable legal requirements; and

(vi) Contact list and phone numbers for the facility response coordinator, National Response Center, cleanup contractors with whom you have an agreement for response, and all appropriate State, and local agencies who must be contacted in case of a discharge.

(4) The Response Plan must provide information and procedures to enable a person reporting a discharge as to relate information on the exact address or location and phone number of the facility; the date and time of the discharge, the type of material discharged; estimates of the total quantity discharged; estimates of the quantity discharged; the source of the discharge; a description of all affected media; the cause of the discharge; any damages or injuries caused by the discharge; actions being used to stop, remove, and mitigate the effects of the discharge; whether an evacuation may be needed; and, the names of individuals and/or organizations who have also been contacted.

(5) You must organize the Plan such that portions of the Plan describe procedures you will use when a discharge occurs in a way that will make them readily usable in an emergency, and include appropriate supporting material as appendices.

(a) Where experience indicates a reasonable potential for equipment failure (such as loading or unloading equipment, tank overflow, rupture, or leakage, or any other equipment known to be a source of a discharge), include in your Plan a prediction of the direction, rate of flow, and total quantity of oil which could be discharged from the facility as a result of each type of major equipment failure.

(b) Provide appropriate containment and/or diversionary structures or equipment to prevent a discharge. The entire containment system, including walls and floor, must be capable of containing oil and must be constructed so that any discharge from a primary containment system, such as a tank or pipe, will not escape the containment system before cleanup occurs. At a minimum, you must use one of the following prevention systems or its equivalent:

(i) Dikes, beams, or retaining walls sufficiently impervious to contain oil;

(ii) Curbing;

(iii) Culverting, gutters, or other drainage systems;

(iv) Weirs, booms, or other barriers;

(v) Spill diversion ponds;

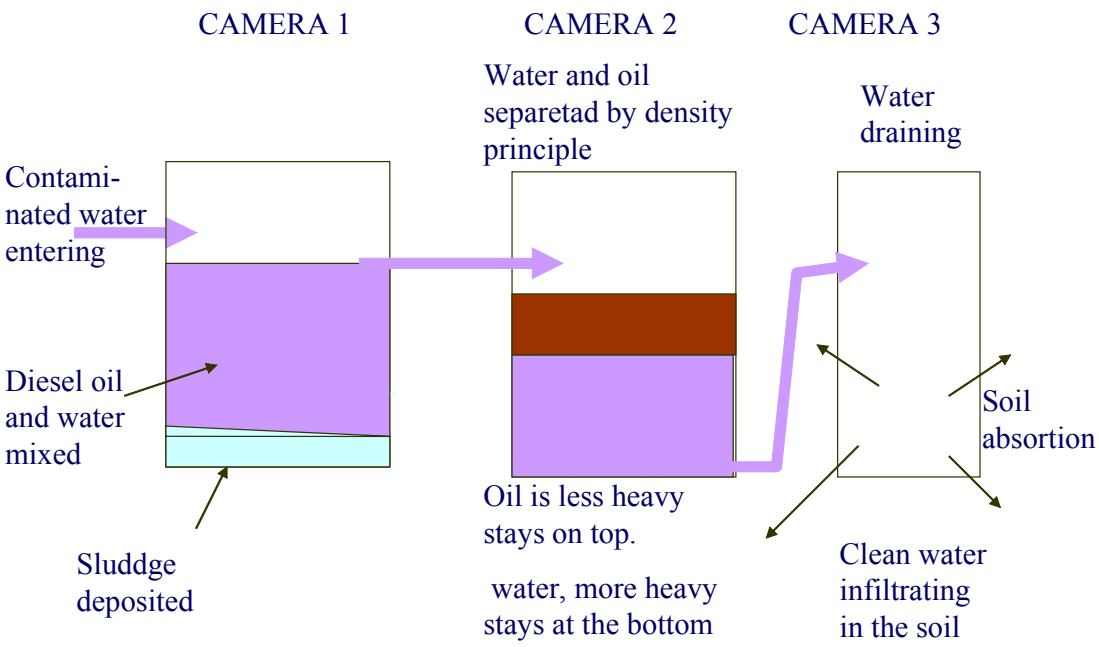
(vi) Retention ponds; or

(vii) Sorbent materials.

(viii) Drip pans; or

(ix) Sumps and collection systems.

(x) Water-oil separation tanks



(c) *Inspections, tests, and records.* Conduct inspections and tests required by this part in accordance with written procedures that you or the certifying engineer develop for the facility. You must keep these written procedures and a record of the inspections and tests, signed by the appropriate supervisor or inspector. Records of inspections and tests kept under usual and customary business practices will suffice for purposes of this paragraph.

(d) *Personnel, training, and discharge prevention procedures.*

(1) At a minimum, train your oil-handling personnel in the operation and maintenance of equipment to prevent discharges; discharge procedure protocols; applicable pollution control laws, rules, and regulations; general facility operations; and, the contents of the facility SPCC Plan.

(2) Designate a person at each applicable facility who is accountable for discharge prevention and who reports to facility management.

(3) Schedule and conduct discharge prevention briefings for your oil-handling personnel at least once a year to assure adequate understanding of the SPCC Plan for that facility. Such briefings must highlight and describe known discharges or failures, malfunctioning components, and any recently developed precautionary measures.

(e) *Security*

Fully fence each facility handling, processing, or storing oil, and lock and/or guard entrance gates when the facility is unattended.

5.0 Spill Prevention, Control, and Countermeasure Plan requirements.

The owner or operator of a facility must:

(a) Meet the general requirements for the Plan

Meet the general requirement for the plan listed under section 4 and the specific discharge prevention and containment procedures listed in this section.

(b) *Facility drainage.*

(1) Restrain drainage from diked storage areas by valves to prevent a discharge into the drainage system or facility effluent treatment system, except where facility systems are designed to control such discharge. You may empty diked areas by pumps or ejectors; however, you must manually activate these pumps

or ejectors and must inspect the condition of the accumulation before starting, to ensure no oil will be discharged.

(2) Use valves of manual, open-and-closed design, for the drainage of diked areas. You may not use flapper-type drain valves to drain diked areas. If your facility drainage drains directly into a watercourse and not into an on-site wastewater treatment plant, you must inspect and may drain uncontaminated retained storm water, as provided in paragraphs 1 and 2 of this section.

(3) Design facility drainage systems from undiked areas with a potential for a discharge (such as where piping is located outside containment walls or where tank truck discharges may occur outside the loading area) to flow into ponds, lagoons, or catchment basins designed to retain oil or return it to the facility. You must not locate catchment basins in areas subject to periodic flooding.

(4) If facility drainage is not engineered as in paragraph 1 of this section, equip the final discharge of all ditches inside the facility with a diversion system that would, in the event of an uncontrolled discharge, retain oil in the facility.

(5) Where drainage waters are treated in more than one treatment unit and such treatment is continuous, and pump transfer is needed, provide two "lift" pumps and permanently install at least one of the pumps. Whatever techniques you use, you must engineer facility drainage systems to prevent a discharge as described in 4 in case there is an equipment failure or human error at the facility.

(c) ***Bulk storage containers.***

(1) Do not use a container for the storage of oil unless its material and construction are compatible with the material stored and conditions of storage such as pressure and temperature.

(2) Construct all bulk storage container installations so that you provide a secondary means of containment for the entire capacity of the largest single container and sufficient freeboard to contain precipitation. You must ensure that diked areas are sufficiently impervious to contain discharged oil. Dikes, containment curbs, and pits are commonly employed for this purpose. You may also use an alternative system consisting of a drainage trench enclosure that must be arranged so that any discharge will terminate and be safely confined in a facility catchment basin or holding pond.

(3) Do not allow drainage of uncontaminated rainwater from the diked area into a storm drain or discharge of an effluent into an open watercourse, lake, or pond, bypassing the facility treatment system unless you:

(i) Normally keep the bypass valve sealed/ closed.

(ii) Inspect the retained rainwater to ensure that its presence will not cause a discharge as described in paragraph (b) 1.

(iii) Open the bypass valve and reseal it following drainage under responsible supervision; and

(iv) Keep adequate records of such events, for example, any records required under permits issued in accordance with of this chapter.

(4) Do not use partially buried or bunkered metallic tanks for the storage of oil, unless you protect the buried section of the tank from corrosion. You must protect partially buried and bunkered tanks from corrosion by coatings or cathodic protection compatible with local soil conditions.

(5) Test each aboveground container for integrity on a regular schedule, and whenever you make material repairs. The frequency of and type of testing must take into account container size and design (such as floating roof, skid-mounted, elevated, or partially buried). You must combine visual inspection with another testing technique such as hydrostatic testing, radiographic testing, ultrasonic testing, acoustic emissions testing, or another system of non-destructive shell testing. You must keep comparison records and you must also inspect the container's supports and foundations. In addition, you must frequently inspect the outside of the container for signs of deterioration, discharges, or accumulation of oil inside diked areas. Records of inspections and tests kept under usual and customary business practices will suffice for purposes of this paragraph.

(6) Control leakage through defective internal heating coils by monitoring the steam return and exhaust lines for contamination from internal heating coils that discharge into an open watercourse, or pass the steam return or exhaust lines through a settling tank, skimmer, or other separation or retention system.

(7) Engineer or update each container installation in accordance with good engineering practice to avoid discharges. You must provide at least one of the following devices:

(i) High liquid level alarms with an audible or visual signal at a constantly attended operation or surveillance station. In smaller facilities an audible air vent may suffice.

(ii) High liquid level pump cutoff devices set to stop flow at a predetermined container content level.

(iii) Direct audible or code signal communication between the container gauger and the pumping station.

(iv) A fast response system for determining the liquid level of each bulk storage container such as digital computers, telepulse, or direct vision gauges. If you use this alternative, a person must be present to monitor gauges and the overall filling of bulk storage containers.

(v) You must regularly test liquid level sensing devices to ensure proper operation.

(8) Observe effluent treatment facilities frequently enough to detect possible system upsets that could cause a discharge.

(9) Promptly correct visible discharges which result in a loss of oil from the container, including but not limited to seams, gaskets, piping, pumps, valves, rivets, and bolts. You must promptly remove any accumulations of oil in diked areas.

(10) Position or locate mobile or portable oil storage containers to prevent a discharge. You must furnish a secondary means of containment, such as a dike or catchment basin, sufficient to contain the capacity of the largest single compartment or container with sufficient freeboard to contain precipitation.

7.0 RESPONSE TO AN OIL SPILL

7.1 Preparation

Cardinal steps that must be followed before any team can respond to an oil spill. Following questions can be asked.

- When did the oil spill occur?
- Where did the oil spill occur?: country side, in town, near a river, on a high way etc
- What type of habitat or community live around the oil spill area?
- What type of vessel was involved in the spill?
- What type of oil or fluid spilt?
- What was the weather condition at the time of spill?
- In what terrain - flat, hilly, near a drainage channel?

Assessment of the oil spill will need considerable judgement to perform. Evaluating the cause, extent and ultimate corrective action can be done using the table given below (Table 1). The assessment shall include the following factors:

a) identifying the source of the spill;

b) the age of the spill;

c) life-threatening conditions;

d) weather conditions;

e) properties affected (utilities, neighbours, public roads);

f) traffic implications;

g) threat to any water bodies;

h) PCB presence;

j) soil types; and

k) public relations threat.

The above guiding questions would help the planning authority to deploy an effective oil spill response personnel and equipment to protect environmentally sensitive areas and in clean-up planning. It is vital that oil spill response team or organization have access to good information, equipment and well organized decision support systems before hand. An emergency response with vital background information is important in that: *'Poor information makes bad decisions and good information makes better decisions."*

There are other decision support systems that could be put in place such as computer based models to predict the direction of flow of the oil spill and a geographical information system. From an oil spill response perspective, the primary area of interest could be the protection of sensitive environments and subsequently for rescue purposes. Hence such decision tools should provide the basis for taking any such action immediately an oil spill is reported.

7.2 The Emergency Response Team

Equipped with the above information any emergency response agency or centre can now proceed to put up an emergency response team that should comprise the following:

7.2.1 Spill Manager (Scene Manager)

The Spill Manager is the official responsible for monitoring or managing responses to oil spills. Once notified of an oil spill, the Spill Manager also will conduct an immediate assessment to evaluate several factors, including the size and nature of the spill, the type of oil spilled, its potential hazards, and the resources needed to contain and clean it up. The Spill Manager also will monitor any existing response efforts to determine whether additional technical support is necessary.

In general, the Spill Manager has the following key responsibilities during and after a response to a hazardous substance release or an oil spill: (1) assessment; (2) monitoring; (3) response assistance; and (4) evaluation.

7.2.2 Evaluation

Evaluating response actions provides information that is useful for designing or improving spill response plans.

Model oil spill assessment table (Table 1)

Using your judgement and the facts available, allocate the relevant points (1, 3 or 5) to each of the following and add them together. The cumulative score will dictate the appropriate corrective action.

Oil spill assessment table

Condition	1	2	5
Source of the spill	Weep	Drip/Leak	Explosion/Incident
Age of spill	Historic	Happened recently - spill still moist	Happened within last 24 h
Threat to any waterbody	No threat	Threat with rain	Access to waterway
Containment	Leak is minor – can be controlled, contained and plugged with oil spill kit	Leak is moderate – cannot be successfully managed with spill kit.	Leak is serious, containment is impossible
Life threatening Conditions	Not at all	Moderate (Environmental or health risk only)	Serious (Explosion, fire, health and major environmental)
Weather conditions	Good weather and will last until spill is cleared	Moderate, but may change suddenly to weather conditions which will hamper containment	Raining
Properties affected	None	On-site (Only Utility's property is affected)	Off-site (Utility's neighbouring properties and public roads) ≥25 points
Public relations threat	Small	Medium	Large
Soil types	Clay or compacted ground	Loose or loam soil	Sandy soil and Gravel
Traffic implications	Not on any road	Public road	Road closed

PCB presence*	None	Less than 50 ppm in the oil	Over 50 ppm in the oil will automatically get ≥25 points
Total score ☐	Sub total	Sub total	Sub total

Minor spill **≤ 12 points**	**Moderate spill** **13 – 24 points**	**Major spill** **≥ 25 points**
Clean-up must be performed and a report issued to the relevant Spill Manager	Contain and call in the assistance of the Spill Manager	Contain, call on Spill Manager who will assess the situation and if needed call upon an emergency response team

*If the PCB levels of the oil are not known through prior testing, the spill shall be treated as a PCB spill, until such time that analysis proves otherwise.

7.3 Response Techniques

Various mechanisms are available for controlling oil spills and minimizing their impacts on human health and the environment. The key to effectively combating spills is careful selection and proper use of the equipment and materials best suited to the type of oil and the conditions at the spill site.

The need for immediate corrective action to limit the spillage cannot be overemphasised as this will minimize the environmental damage and reduce remediation costs. This can involve actions such as:

a) closing a valve;

b) repairing the leak with rags, plugs or other appropriate material;

c) repositioning the container so that the leaking area is at the highest level or lifting a fallen drum/container;

d) placing a leaking container or equipment into a collecting tray or bund area; and

e) collecting the spilt oil in a container located underneath the leak or channelling the leak into a container

7.3.1 Mechanical containment or recovery

This is the primary line of defense against oil spills. Containment and recovery equipment includes a variety of booms, barriers, and skimmers, as well as natural and synthetic sorbet materials. Mechanical containment is used to capture and store the spilled oil until it can be disposed of properly.

The containment of a spillage will involve an action that will either prevent or stop a spill from spreading. It is vital to prevent any oil spill from entering waterbodies such as drains, stormwater systems, dams or rivers. Containment of the oil near the source will minimize pollution and will enable easy clean-up and/or remediation. This shall be done using one or more of the following:

a) soil barriers;

b) sand bags;

c) bund walls; and

d) absorbent materials.

7.3.2 Chemical and biological methods

These can be used in conjunction with mechanical means for containing and cleaning up oil spills. Dispersants and gelling agents are most useful in helping to keep oil from reaching other sensitive habitats. Biological agents have the potential to assist recovery in sensitive areas such as marshes, and wetlands.

7.3.3 Physical methods

These are used to clean up. Natural processes such as evaporation, oxidation, and biodegradation can start the cleanup process, but are generally too slow to provide adequate environmental recovery. Physical methods, such as wiping with sorbent materials, pressure washing, and raking and bulldozing can be used to assist these natural processes.

7.3.4 Training

The manager responsible for the site shall ensure that appropriate training is given in the use of the spill equipment, reporting and emergency response procedures.

7.3.5 Preventive measures

Prevention remains better than cure and for this reason each spill shall be evaluated and analysed and appropriate preventive measures adopted.