

OIL POLLUTION PREVENTION

INTRODUCTION

The United States Environmental Protection Agency's (US EPA) Oil Pollution Prevention regulations (40 CFR 112) are in place to protect navigable waters from oil pollution. The regulations lean heavily on preventing oil spills to navigable waters, but also require that facilities such as Fermilab are prepared to respond to an oil spill or discharge. In compliance with the regulations, Fermilab has a written Spill Prevention, Control and Countermeasures (SPCC) Plan. The SPCC Plan details the regulation's applicability to Fermilab, lists all oil sources subject to the regulation, describes potential spill predictions (direction of flow, rates and controls), describes the site's water drainage scheme, and contains procedures for inspecting, spill response and reporting. This chapter provides a general description of Fermilab's SPCC Plan including the Environmental Emergency Response Action Plan (EERAP).

DEFINITIONS

Bulk Storage Container Bulk storage containers are any containers used to store oil. These containers are used for purposes including, but not limited to: storage of oil prior to use, while being used, or prior to further distribution in commerce. Examples of bulk storage containers used at Fermilab are: 55-gallon drums, totes, or backup generator fuel tanks.

Note: Bulk storage containers must always be stored in secondary containment.

Completely Buried Tank Completely buried tanks are any container completely below grade and covered with earth, sand, gravel, asphalt, or other material. E.g. Fuel service station gasoline and E85 underground tanks.

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

EERAP This plan is included within the monthly assessment procedures of the SPCC Plan. It consists of monthly inspections of oil-filled operational equipment that does not meet the secondary containment/environmental equivalent requirement. The monthly inspections are used to determine if oil-filled operational equipment is leaking, corroding or has any other damage that could cause a leak or spill.

Environmental Equivalent A sufficient area between an oil source (Oil-Filled Operational Equipment) and navigable waters that provides a buffer for an oil spill as determined by a Professional Engineer familiar with 40 CFR Part 112.

Navigable Waters These waters are waters of the United States including territorial waters, interstate waters, interstate lakes, rivers, and streams which are utilized by interstate travelers for recreational or other purposes, and interstate lakes rivers, and streams from which fish or shellfish are taken and sold in interstate commerce. E.g. At Fermilab navigable waters includes Indian Creek, Kress Creek, and Ferry Creek.

Oil 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. Examples of oil used at Fermilab: Diala oil, mineral oil, grease, diesel fuel, motor oil, vegetable oil, etc.

Oil-Filled Operational Equipment (OFOE) Oil-filled operational equipment is any equipment that includes an oil storage container (or multiple containers) in which the oil is present solely to support the function of the apparatus or device. OFOE is not considered a bulk storage container. E.g. Hydraulic systems, lubricating systems (i.e. pumps, compressors), gear boxes, machining coolant systems, heat transfer systems, transformers, circuit breakers, electrical switches, and other equipment containing oil solely to enable the operation of the equipment. Transformers are the most prevalent OFOE at Fermilab.

Permanently Closed A container is permanently closed when: all liquid and sludge has been removed (including connecting lines), and all connecting lines or piping have been disconnected from the container and blanked off, all valves (except ventilation valves) have been closed and locked, and conspicuous signs have been posted on each container stating that it is permanently closed and noting the date of closure.

Reportable Quantity A reportable quantity is the amount of oil spilled that triggers a notification requirement. Oil spilled anywhere on-site in a quantity of 100 gallons or more must be reported to the Department of Energy – Fermi Site Office. Oil spilled into navigable waters or the adjoining shorelines must be reported to the National Response Center and the U.S. EPA if the spill causes a sheen on the water, more than 1,000 gallons were spilled, or it is the second spill of greater than 42 gallons within one year.

Secondary Containment A dike or catchment basin sufficient to contain the capacity of the largest single compartment or container of oil. If outdoors, secondary containment must have sufficient freeboard to contain precipitation (freeboard is 5.5 inches at Fermilab).

Spill Prevention, Control and Countermeasures (SPCC) Plan The document that is required by 40 CFR 112.3 that details the equipment, workforce, procedures, and steps to prevent, control and provide adequate countermeasures to a discharge of oil.

Storage Capacity The shell or maximum capacity of any container.

RESPONSIBILITIES

ES&H Director – Ensure the SPCC Plan is implemented, and that the proper resources are provided to prevent, control or respond to an oil discharge. Also, determine when reporting is required in the event of a discharge (to National Response Center, IMEA, US EPA, IEPA, LEPC, FNAL, DOE, etc.)

ES&H Section Environmental Protection Group – Maintain and update oil source inventory and spill history as needed or at least annually. The group is responsible for determining if a modification in the SPCC Plan is a technical change requiring recertification within six months of the modification. It is also responsible for coordinating the five year review of the SPCC Plan and subsequent recertification. The ES&H Section will also provide Oil Handling Training (FN000450) as needed.

Division/Section/Center Head – Assess processes in their areas to ensure complete and comprehensive inventory is maintained of oil subject to the SPCC rule, ensure the necessary employees are trained to handle oil, ensure inspection procedures are completed on a monthly basis by assigning inspection duties to trained oil handlers, ensure prompt clean up and provide the necessary resources in the event of a spill or discharge, employ a remediation contractor if necessary for discharges where their D/S/C is the responsible party (http://www-esh.fnal.gov:8001/RemConMemo/Rem_Con.pdf). In general, the D/S/C Head will ensure compliance with this chapter, and the SPCC Plan.

Whenever a section of buried piping carrying oil is exposed for any reason it will be observed for deterioration. The D/S/C will ensure integrity and leak testing is performed at the time of installation, modification, construction, relocation or replacement of any buried piping that will carry oil.

Will annually perform leak tests to Underground Storage Tanks (e.g. BSS's fuel station) according to 40 CFR 280.

D/S/C Senior Safety Officer (SSO) – Coordinate with EO and ES&H Director in the event of a discharge to navigable waters. Ensure D/S/C employees are familiar with proper spill response through oil handler training.

D/S/C Environmental Officer (EO) – Ensure the requirements of the SPCC Plan are met including filing monthly inspections for a minimum of three years in the Division/Section/Center’s ES&H office, reporting changes in the D/S/C’s oil source inventory to the ES&H Section Environmental Protection Group, and report oil spills that have a potential to threaten surface waters. The EO will also coordinate clean-up efforts in the event of a discharge, and ensure all reporting requirements are fulfilled by communicating with the ES&H Director.

Oil Handler – The oil handler is responsible for completing Oil Handling Training (FN000450) before handling any type of oil that is subject to the SPCC rule. They are also responsible for handling oil in accordance with this chapter and the SPCC Plan which minimally includes providing secondary containment for all bulk storage containers and prompt clean-up and reporting to the EO oil spills that have a potential to threaten surface waters. Oil Handlers may be assigned the responsibility of completing monthly inspections by documenting a visual inspection and submitting the completed documentation to the appropriate D/S/C’s Environmental Officer.

Fermilab Fire Department – Act as first responders once the need for response has been initiated. Stabilize the situation by controlling the release of oil and containing the oil discharge to as small of an area as possible. Initiate mutual aid if necessary, communicate with the ES&H Director as required by the Fermilab Emergency Response Procedure, and coordinate with D/S/C Environmental Officer or alternately the Senior Safety Officer once the discharge has been contained, release the site to the responsible D/S/C to begin clean-up efforts.

All Fermilab Employees, Users, and Subcontractors – Must be generally familiar with standard spill response procedures as outlined in their Local Area Plan or the Fermilab Emergency Response Plan.

PROGRAM DESCRIPTION

To comply with the SPCC Plan, all oil sources with the capacity to hold 55 gallons of oil or more must use secondary containment in order to capture a spill or discharge. The only exception to this rule is for oil-filled operational equipment (OFOE) such as oil-filled transformers. OFOE does not require a monthly inspection and may use an environmental equivalent such as dikes, berms or retention ponds instead of typical secondary containment. For the purposes of the SPCC Plan, all Fermilab ponds, with the exception of the Main Injector ponds, can be considered retention ponds. Therefore, nearly all OFOE complies with the SPCC rule.

The Giese Road transformer and the transformers that are located around the Main Injector, Anti-Proton Source and MiniBooNE do not meet the regulation's secondary containment or environmental equivalent requirements. Thus to keep these sources in compliance, the SPCC Plan addresses this shortcoming.

The SPCC Plan requires monthly inspections of the OFOE at the above mentioned locations. Indian Creek is the vulnerable water that runs near the transformers of Main Injector, Anti-Proton Source, MiniBooNE and Giese Road. The procedure is meant to protect Indian Creek from a discharge from these transformers.

IMPLEMENTATION OF THE SPCC PLAN

Since the main focus of the SPCC Plan is prevention, inspection procedures are in place in order to quickly identify bulk storage containers or OFOE that may be leaking, or showing signs of structural instability. Table 1.0 shows the general actions to be taken for each facility component.

Table 1.0

Facility Component	Action	Frequency/Circumstances
Bulk storage container	Observe outside of container for signs of deterioration and discharges.	Following a regular schedule (monthly) and whenever material repairs are made.
Container supports and foundation	Observe container's supports and foundations.	Following a regular schedule (monthly) and whenever material repairs are made.
Liquid level sensing devices (overfill)	Test for proper operation on oil-filled equipment.	Prior to filling or adding oil
Diked area	Observe for signs of deterioration, discharges, or accumulation of oil inside diked areas.	Monthly
	Observe for presence of oil.	Prior to draining
NPDES Outfall Structures	Visually inspect for signs of deterioration and ability to slow and/or stop flow as needed for clean-up activities	Monthly

Facility Component	Action	Frequency/Circumstances
Buried storage tank	Leak test.	Annually
Buried piping	Observe for deterioration.	Whenever a section of buried line is exposed for any reason.
	Integrity and leak testing.	At the time of installation, modification, construction, relocation, or replacement.

Monthly Bulk Storage Inspections

On a monthly basis, bulk storage containers must be visually assessed to determine if they are leaking or if they corroding or have other damage that may cause a leak. See Appendix A contains the detailed bulk storage inspection procedures.

Items to look for while inspecting the bulk storage containers include:

- Drip marks
- Discoloration
- Puddles containing spilled or leaked material
- Corrosion
- Cracks
- Localized dead vegetation on the ground near the container

The foundation that the bulk storage container is sitting on should also be inspected for:

- Signs of strain or settling
- Cracks or corrosion
- Discoloration
- Puddles containing spilled or leaked material

Note: As stated earlier, bulk storage containers must be kept in secondary containment. Monthly inspections should ensure the adherence of this important rule.

Monthly Oil-Filled Operational Equipment Inspections

The only OFOE that must be inspected at Fermilab are those sources that do not meet the secondary containment or environmental equivalent requirements. In order to ensure that these sources do not discharge oil into navigable waters, or to ensure that a discharge is detected as early as possible, a monthly inspection must be completed.

The OFOE listed in Table 2.0 must be inspected monthly according to the procedure in Appendix A.

Table 2.0

Fig. ID*	Location/FAMIS ID	Chemical / Container Type	D/S/C Owner
009	AP 30/Y-AP30	Transformer Oil / 323-gal Transformer Reservoir	FESS
010	AP 50/Y-AP50-1	Transformer Oil / 748-gal Transformer Reservoir	FESS
010	AP 50/Y-AP50-2	Transformer Oil / 748-gal Transformer Reservoir	FESS
010	AP 50/Y-AP50	Transformer Oil / 670-gal Transformer Reservoir	FESS
011	Giese Road Transformer/Y-GR2	Transformer Oil / 1545-gal Transformer Reservoir	FESS
060	MI-30/TRPHP-MI30-1	Transformer Oil / 316-gal Transformer Reservoir	FESS
060	MI-30	Transformer Oil / 1184-gal Transformer Reservoir	AD
060	MI-30	Transformer Oil / 1184-gal Transformer Reservoir	AD
060	MI-30	Transformer Oil / 1865-gal Transformer Reservoir	AD
060	MI-30	Transformer Oil / 1184-gal Transformer Reservoir	AD
060	MI-30	Transformer Oil / 1184-gal Transformer Reservoir	AD
061	MI-31/TR-MI31A	Transformer Oil / 316-gal Transformer Reservoir	FESS
062	MI-40	Transformer Oil / 1184-gal Transformer Reservoir	AD
062	MI-40	Transformer Oil / 1184-gal Transformer Reservoir	AD
062	MI-40	Transformer Oil / 1184-gal Transformer Reservoir	AD
062	MI-40	Transformer Oil / 1184-gal Transformer Reservoir	AD
062	MI-40/TRPHP-MI40-1	Transformer Oil / 316-gal Transformer Reservoir	FESS
062	MI-40/TRPHP-MI40-2	Transformer Oil / 620-gal Transformer Reservoir	FESS
063	MI-50	Transformer Oil / 1184-gal Transformer Reservoir	AD

063	MI-50	Transformer Oil / 1184-gal Transformer Reservoir	AD
063	MI-50	Transformer Oil / 2046-gal Transformer Reservoir	AD
063	MI-50	Transformer Oil / 1184-gal Transformer Reservoir	AD
063	MI-50	Transformer Oil / 1184-gal Transformer Reservoir	AD
063	MI-50/TRPHP-MI50-1	Transformer Oil / 316-gal Transformer Reservoir	AD
071	MiniBooNE/TR-MBDA	Transformer Oil / 237-gal Transformer Reservoir	PPD
071	MiniBooNE/TR-MBDB	Transformer Oil / 237-gal Transformer Reservoir	PPD

*The Figure ID refers to the identifying number associated with an oil source in the Oil Source Inventory (see the SPCC Plan).

APPENDIX A

MONTHLY ASSESSMENT PROCEDURE

Bulk Storage Containers (Tanks) and Select Oil-filled Operational Equipment (OFOE)

The tanks and OFOE subject to Fermilab's EERAP (listed in Table 2.0) should be visually assessed to determine if they are leaking and if they have corrosion or other damage that may cause a leak. Items to look for while observing the tank or OFOE include:

- drip marks,
- discoloration,
- puddles containing spilled or leaked material,
- corrosion,
- cracks,
- localized dead vegetation on the ground in the area.

Additionally, the foundation should be observed for signs of strain or settling, cracks or corrosion, discoloration, and puddles containing spilled or leaked material. Tanks with level gauges should be hand gauged or opened and visually assessed to determine if the level gauges are accurate. Level gauges on electrical OFOE should be evaluated when equipment is shutdown for routine maintenance. The level alarm floats should be tripped to determine that they are functioning properly. For additional information on the assessment of the tank condition, review the "Condition of Steel Tanks, OFOE, and Pipes" information provided in the following pages.

The tank water content should be tested. If the tank has an automatic water level detection system, check the system for water content. Otherwise, use a compatible water detecting paste and a dip stick to test and gauge the water level. If water is detected, drain or pump out the water if able to do so. Otherwise, apply an appropriate microbicide to the tank contents.

Leaks

Leaks include, but are not limited to, leaks from fittings, valves, pipe connections, flanges, seams, welds and gaskets. The OFOE or tanks, pipes and valves, as well as the area underneath the OFOE or tanks, pipes and valves should be observed for signs of leaks whenever possible. Oil leaks should be cleaned up and the source of the leak identified and corrected if possible during the assessment. If the leak cannot be repaired at the time of the assessment, it should be

reported to the maintenance supervisor so that appropriate action can be taken (e.g., through a work order).

For fill areas (i.e., areas where the visible oil could have come from a drip or spill during loading or unloading), the oil should be cleaned up and the area observed at a later date to determine if the visible oil was from a leak, a drip or spill during loading or unloading.

All corrective actions must be noted on the inspection form.

Condition of Steel Tanks, OFOE, and Pipes

Shell Distortions

Shell distortion includes dents, bumps or bulges that may have occurred from impact, over-pressurization or over-filling. Distortion (e.g., dents and bulges) in the shell of a tank or OFOE that are visible to the naked eye should be noted. Figure 1 depicts a dent and a bulge.

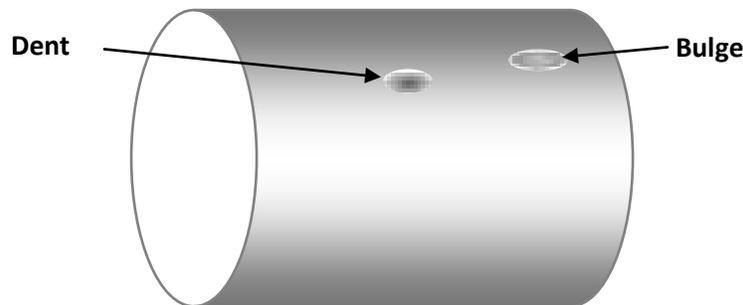


Figure 1 – Example of Dents and Bulges

Shell distortions that have already been identified and evaluated do not need to be identified unless the distortion increases in size or depth.

Corrosion

Corrosion, usually present as rust, is a result of oxidation or chemical reaction with the tank, OFOE, or pipe wall. To assist Fermilab personnel in quantifying the corrosion, the following guidelines are provided. These guidelines may not represent the most conservative interpretations of corrosion. Fermilab personnel should also use their judgment regarding the risk of tank failure due to corrosion.

Three categories of corrosion should be classified in the assessments:

- Surface rust,
- Pitting, and
- Stress corrosion.

To provide a consistent approach for the assessments, interpretations are provided for the three categories of corrosion. Even though these interpretations were developed for consistency, they should not limit personnel from using more conservative interpretations of the type of corrosion that might be observed.

Surface Rust

As depicted in Figure 2, surface rust is characterized by a rust-colored patch with a relatively even surface (i.e., no deep or severe pits or crevices).



Figure 2 – Example of Surface Rust

If surface rust is visible through paint or has displaced paint and is larger than the flat side of a dime, as depicted in Figure 3, the surface rust should be identified on the assessment form.

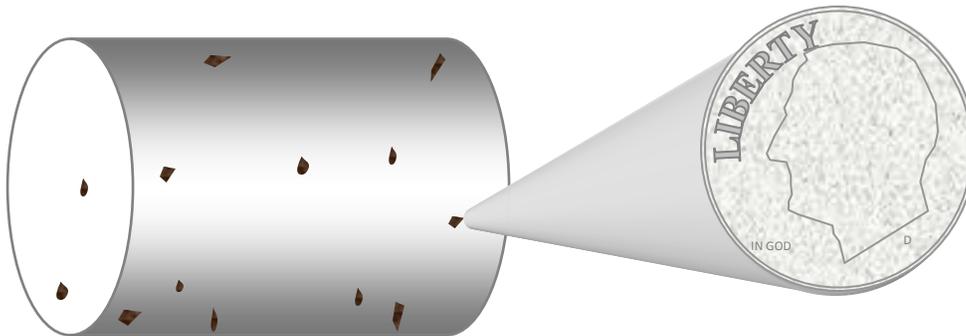


Figure 3 – Visual Depiction of the Dime Comparison for Surface Rust

Pitting

Pitting is localized corrosion that results in pits or crevices in the steel. Rust that results in pitting deeper than the thickness of a dime, as depicted in Figure 4, should be identified on the assessment form.



Figure 4 – Visual Depiction of the Dime Comparison for Pitting

Stress Corrosion

Stress corrosion is a combination of mechanical stress and corrosive conditions. Stress corrosion normally results in localized cracks with rust.

Visible rusty cracks in the steel (i.e., not just cracks in the paint) may indicate stress corrosion cracking. If cracks are longer than the diameter of a dime or wider than the thickness of a dime, as depicted in Figure 5, they should be noted on the assessment form.

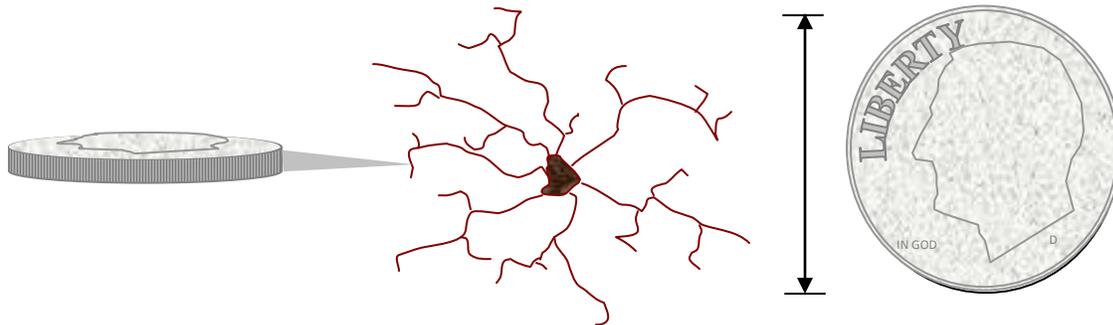


Figure 5 – Visual Depiction Stress Corrosion

Containment Area

Traditional Secondary Containment Areas

Secondary containment areas should be visually assessed for signs of oil that might indicate a leak, and cracks or holes in the containment structure. Items to observe for include:

- the level of precipitation and available capacity,
- the operational status and condition of drainage valves,
- the permeability of the secondary containment system and the presence of cracks,
- the status of pipes, inlets and drainage beneath tanks,
- discoloration,
- stressed vegetation,
- spilled or leaked material,
- corrosion, and
- the presence of debris or other items in the secondary containment area.

The drains should be closed or in place unless precipitation is being drained at the time of the inspection.

Double-Walled Tanks

The interstitial space in a double-walled tank should be checked for signs of leaks. If an interstitial space monitor is present, observe the monitor for signs of leaks. If an interstitial vent or opening is present on top of the double-walled tank, observe the inside of the interstitial space for signs of oil using an intrinsically-safe light. If neither an interstitial space monitor or interstitial vent are present, use the interstitial space drain line to check for signs of leaks: place a bucket under the interstitial space drain line then slowly and carefully open the interstitial space drain line using non-sparking tools (i.e., brass). If liquid is observed, close the interstitial space drain line and get assistance and additional equipment to drain the interstitial space (e.g., spill control equipment, a container capable of holding the leak liquid)

EERAP Transformers

In accordance with the EERAP in Appendix I transformers without adequate secondary containment and/or diversionary structures must be inspected on a monthly basis. A list of these transformers is maintained in the EERAP. An inspector will visually assess these transformers

for signs of leakage, in-place external drain plugs, and the condition of transformer's concrete pad and any diversionary structures at the location.

Tank Truck Loading & Unloading

Areas where tank trucks load and unload should be visually observed for signs of leaks. If the loading or unloading areas have containment systems, they should be surveyed to determine that they are in adequate condition. Warning signs, where applicable, should be legible.

Security

Lights around oil use, transfer and storage should be adequate for detecting spills and as a preventative measure against vandalism. Security fences should be adequate for preventing unauthorized entry and entrance gates should be closed and locked or guarded when the facility is unattended.

The assessment form (i.e., "tank condition ok" and "pipe condition ok") includes visual observations of the exterior surfaces of oil related tanks, pipes and equipment. The purpose of the visual observation is to identify leaks; shell distortions; and corrosion.

Personnel conducting monthly assessments are not required to be experts on maintenance, corrosion, steel integrity or metal fatigue. The purpose of the assessment is to identify potential problems before they result in a release or spill. The visual observations should not require tools or equipment unless insulation needs to be removed to access the tank shell or a flashlight is required to observe unlit areas.

The following sections provide additional information on what to observe and note during the assessment.

MONTHLY ASSESSMENT FORM

Area:		Date:	
Inspector Name:		Signature:	
BULK STORAGE CONTAINERS/Oil-Filled Operating Equipment			
	Yes/No/NA	Comment	
Signs of leakage			
Tank condition okay			
Foundation condition okay			
Drain valves locked			
Water in tank			
Gauges/alarms working properly			

CONTAINMENT AREA		
Signs of oil in containment area		
Containment condition okay		
Drainage valves/openings closed		
TRANSFER OPERATIONS		
Signs of leakage from pipes, valves, flanges		
Pipeline condition okay		
Out-of-service pipes capped		
TRUCK LOADING AND UNLOADING AREAS		
Signs of leaks or spills		
Warning signs posted or wheel chocks used		
SECURITY		
Lighting functioning properly		
Fences and gates intact		
Gates locked or guarded when facility is unattended		

Diked Area Drainage Form Instructions

Precipitation, including rain, snow, sleet and ice, should be removed from containment areas after the precipitation event.

Rainwater

Prior to draining rainwater, the entire containment area should be observed for signs of spills or leaks.

If signs of spills or leaks are observed, they should be removed and the source identified and corrected prior to opening the drain.

- Sheens on the surface of the water can be removed with absorbent pads or pigs.*
- Sludges or large leaks may require a pump or special handling. The D/S/C Environmental Officer should be contacted prior to attempting removal.
- The tank and transfer lines should be observed for sources of the leak. If a leak is identified, it should be corrected before draining.
- If no leak is identified, the source may have been from a spill or drip during transfer operations.

After the containment area is observed for spills or leaks, the drain may be opened and the rainwater allowed to drain.

- The draining of rainwater should be observed until the containment area is free of standing water.
- If signs of spills or leaks are observed during draining, the drain valve or plug should be closed and the spilled material cleaned up before draining is continued.
- After the rainwater has drained out of the containment area, close the drain valve or install the plug.
- The Diked Area Drainage Report Form should be completed, signed, given to the appropriate supervisor for their signature, and filed in the supervisor's office.

Snow and Ice

Snow and ice should be removed from containment areas where possible. Shovels and picks should be used to accomplish this task, except near the drain valve or plug. Since snow and ice can cover spills and leaks, care must be taken not to remove contaminated snow and ice.

* If the containment area has other hazardous materials besides oils and fuels, consult a manager to determine if the materials used for collecting or cleaning the containment area are considered hazardous waste.

DIKED AREA DRAINAGE FORM

Containment Area:	
Appearance of water at time of draining:	

If oil or sheen is present, what was done to clean it up:			
Was the source of oil or sheen identified, and if so, what was done to correct problem:			
Date Drainage Started:		Time Drainage Started:	
Date Drainage Stopped (Containment Resealed):		Time Drainage Stopped (Containment Resealed):	
Operator Name:			
Operator Signature:			
Supervisor Name:			
Supervisor Signature:			

DIKED AREA DRAINAGE FORM

Containment Area:	<i>Used Oil Tank</i>
Appearance of water at time of draining: <i>Generally clear, but with a slight sheen.</i>	

<p>If oil or sheen is present, what was done to clean it up: <i>Placed sorbent pad on top of water, which soaked up the sheen.</i></p>			
<p>Was the source of oil or sheen identified, and if so, what was done to correct problem: <i>Source of oil was probably from drips or spills during filling operation. No leaks were observed.</i></p>			
Date Drainage Started:	8/17/02	Time Drainage Started:	9:00 AM
Date Drainage Stopped (Containment Resealed):	8/17/02	Time Drainage Stopped (Containment Resealed):	9:25 AM
Operator Name:	John Smith		
Operator Signature:			
Supervisor Name:	John Hancock		
Supervisor Signature:			