

US EPA ARCHIVE DOCUMENT

Using Load Line Containers to Keep Oil Spills off the Ground

by

Steven L. Shroyer

Vice President, Pollution Control Corp.

The efficient prevention of small oil spills occurring at wells covered by the EPA's Spill Prevention, Control and Countermeasure (SPCC) Plan regulation remains a significant challenge to the nation's oil industry. There are approximately 522,000 onshore wells in the United States that pump crude oil and produced water into tank batteries. Oil production facilities that must follow the SPCC Plan are ones that:

1. Are non-transportation related (all onshore production facilities are).
2. Have an aggregate above ground storage capacity greater than 1,320 gallons.

Tank batteries normally have 3 tanks. One tank in a tank battery on average holds 300 barrels or 12,600 gallons, far exceeding this 1,320 gallon requirement.

3. Due to its location, could reasonably be expected to discharge into or upon navigable waters of the United States or adjoining shorelines. This is determined by the proximity to creeks, rivers, lakes, wetlands, storm drains or certain soil conditions.

Facilities must also submit a plan if they have had a discharge of more than 1,000 gallons or two discharges of more than 42 gallons in a 12 month period.

Federal regulations require an owner or operator of a facility that meets the above criteria to have an SPCC Plan that covers discharge prevention and methods of recovery. Plans

are reviewed and evaluated every five years. This review may require amending the plan to include more effective prevention control technology if the technology is field-proven and will significantly reduce the likelihood of a discharge upon navigable waters. This paper focuses on how the Pollution Control Corp. (PCC®) Load Line Container is one of these field-proven technologies that can protect freshwater from oil spills.

Spills Happen

At a typical production site, one oil well pumps into a tank battery comprised of three tanks for crude oil and one tank for produced salt water. Spills or “discharges” occur:

At the transfer point between the oil tank battery and the truck.

The drainpipe at the base of the tank is commonly referred to as a load line. An oil transport truck will connect its load hose to the load line and pump crude oil or produced salt water from the tank battery into the truck. When the truck is filled, the valves on the load line are closed and the truck’s load hose is disconnected from the load line. At this point residual oil or produced salt water is discharged from both the load hose and the load line pipe. The hose is then capped and dragged back to the truck for transport.

In secondary containment

Federal regulations require facilities to have appropriate secondary containment or diversionary structures or equipment to prevent a discharge. Dikes, berms, or

retaining walls sufficiently impervious to contain oil should be capable of holding the contents of the largest container plus an allowance for precipitation.

However, many load lines extend outside the berm. Research indicates that this is a common practice.

During gear pump truck operation

A gear pump truck uses the gravity from the tank battery to prime the pump to begin to move the oil. Upon completion, when air hits the pump, oil is no longer sucked into the truck. There is normally about an inch of oil in the bottom of the load hose and load line. When disconnected the amount of oil discharged varies from site to site. The distance from the main valve to the end of the load line is the main factor. The amount of oil discharged can range from a cup to one half gallon. Drip pans can overflow with rainwater and can travel to navigable waters. This is especially serious with wells that load multiple times per day.

Drip Pan Solutions Prove Ineffective

Federal regulations require that drip pans be used to contain these discharges. Drip pans are usually a common plastic bucket or half of a 55 gallon steel drum placed under the load line. An estimated twenty to thirty percent of load lines have no drip pans in place. Drip pans have significant limitations:

- In a windy environment, the oil spills onto the ground next to the pan.

- Rainwater can overflow the pan, spilling oil (which floats) on the ground.
- When the pan is full, it contains rainwater, wind blown dirt, and debris that may not be pumped into a truck or disposed of properly.
- Pans are exposed and cattle, birds and wildlife can drink the contents.
- Field mice are frequently found in containers.
- A leak may go undetected as it slowly seeps out into the soil. Steel drums frequently rust and leak. In some areas the salt content in the water can eat through the steel in less than a year. Since water is heavier than oil, corrosion from water starts at the bottom of the drum.
- Plastic pans can be thin and can crack from the ultra violet rays from the sun.

The PCC Load Line Container

PCC developed the Load Line Container to provide an effective and economical solution to load line spills. Today there are more than 70,000 PCC Load Line Containers in use by every major and many independent oil companies. In some areas, the PCC Load Line Containers are used on every new oil well that goes into production.

The PCC Load Line Container screws directly onto the load line. The connection between the truck and the load line is enclosed inside the container.

The PCC Load Line Container has a patented dual purpose sidewinder that is a pipe and valve extending from the side of its collar inside the container, to the bottom of the

container. When the truck is filled, the load line valves are closed and the sidewinder valve is opened. The truck's pump then picks up not only any spilled oil from the bottom of the container, but also air that cleans out the trucks hose. When the load hose is disconnected, there is significantly less discharge. If there is a spill from either the load hose or the load line, it falls into the PCC Load Line Container.

There are two valves at the tank batteries, one at the base of the tank and one at the end of the load line. Many producers use securely fastened bull plugs or caps on the end of the load lines to contain leaking valves. A vandal could unscrew the bull plug (hand tight normally) and open both valves, draining the entire contents of the tank battery. With a locked PCC Load Line Container, the bull plug inside remains in place preventing a spill even if both valves are open. Also in two of our larger containers, the valves are actually locked inside the container.

PCC Load Line Container lids prevent:

- Rainwater from overflowing and spilling oil on the ground.
- Wildlife and cattle from drinking the contents.
- Debris from entering the container
- Vandalism.

PCC Load Line Containers are made from linear low-density polyethylene and contain ultra violet inhibitors to prevent fading and cracking. The polyethylene is 3/8" thick

making them oil field tough and durable. The steel collar and mounting brackets are powder coated to prevent corrosion. The collars and mounting brackets are attached to the container using molded-in inserts and stainless steel nuts and bolts. The hinges are stainless steel nuts and bolts that are rust resistant. PCC Load Line Containers come in safety yellow, black, and Bureau of Land Management approved tan that blends into the surrounding landscape. The current expected life of a PCC Load Line Container is 12 to 15 years. All scrap material and trimmings from manufacturing are collected and recycled.

PCC Load Line Containers are Cost Effective

Research on discharges at load lines is difficult, as only information on spills of more than 42 gallons or spills that reach water are submitted to the EPA. Load line discharges are typically quite small and may range from two to 20 gallons per year, depending on the frequency of loading. Based on data from two companies in different states, the table below illustrates the cost of cleaning a typical load line site with a five foot circle of spilled crude oil.

Item	Cost
1 Supervisor	\$100
2 Laborers	120
1 Truck with tools	120
2 bags of fertilizer	10
2 bags bioremediation	70
Use of roto-tiller	30
Surfactant soap to break up oil	25
Total	\$475

Upon completion both companies surveyed replaced drip pans with PCC Load Line Containers. The oil companies found that for approximately the price of one clean-up, they could purchase and install two PCC Load Line Containers. Installation of a PCC Load Line Container takes between 5 to 15 minutes. Oil companies will also realize additional cost savings over the 12 to 15 year lifespan of the product.

Environmental Impact of the PCC Load Line Container

One gallon of crude oil can contaminate one million gallons of water. The following estimates show the risk associated with the drip pan method of discharge prevention. Determining the number of load lines is difficult, but a conservative estimate puts the number of load lines nationwide at 500,000. Each of these lines discharges an estimated four gallons of oil annually. Switching to the PCC Load Line Container could prevent two million gallons of spilled oil annually.

© 2004 Pollution Control Corp. All rights reserved.