

Directive 055

Storage Requirements for the Upstream Petroleum Industry

July 2011

Disclaimer

The following information is provided for guidance and summary purposes only and is not an exhaustive description of ERCB requirements relating to a given topic or subject area.

Operators and licensees must at all times comply with and should consult all applicable ERCB requirements before undertaking any activity.



Section 2:

The storage requirements in *Directive 055* apply to upstream petroleum facilities, well sites, & pipelines licensed or approved by the ERCB, including

- well sites, gas batteries (single and multiwell), oil/bitumen batteries (single and multiwell), oil/bitumen satellites, custom treating plants, compressor stations, straddle plants, gas processing/fractionating facilities, pump stations, tank farms/oil loading and unloading terminals, and oilfield waste management facilities.

Note that *Directive 055* does not apply to the storage of fuels or the underground cavern storage of natural gas.



Section 2:

Applicable Material Types:

Any material that could adversely affect the environment and is produced, generated, or used on upstream petroleum sites under the jurisdiction of the ERCB must be stored in accordance with Directive 055 including, but not limited to

- produced water,
- crude oil,
- emulsions,
- condensates (C5+, nonpressurized storage),
- chemicals,
- solvents,
- produced sand,
- lubricants other than for motor vehicle use,
- oilfield wastes,
- oily waste, and
- bitumen.



Section 2:

Alternative Storage Systems:

Directive 055 is intended to permit alternative storage systems if it can be shown that the system can meet the objectives & intent of the Directive.

–Applications submitted pursuant to Directive 056 for a new energy development or a modification to an existing development that incorporate an alternative storage system must be filed nonroutine.

–If the alternative storage system is not part of a modification to an energy development that requires the license/approval to be amended, submit an application for approval to Directive_055-storageapps@ercb.ca.

In both situations, the application must contain storage design details and sufficient information to substantiate that an equivalent level of environmental protection and safety will be achieved by the proposed storage system.



Section 3.4.1:

Permanent Storage Devices Not Requiring Secondary Containment:

- Aboveground or underground tanks used to store water meeting surface water discharge criteria.
- Storage devices used to infrequently store fluids for very short durations, provided they are emptied immediately after used and are regularly inspected to verify integrity.
 - Examples:
 - pop tanks and other emergency containment tanks
 - wash water collection systems from floor drains



Section 3.4.1:

Wash Water Collection Systems:

- Secondary containment and leak detection is not required if the collection system is used to contain only wash water (water and dirt).
 - Provided that it is emptied and inspected regularly.



Section 3.5:

Temporary Storage:

Refers to the storage of materials produced, generated, or used in specific operations of the upstream petroleum industry and should typically not exceed three months.

Specific operations include:

- plant turnarounds,
- construction operations,
- containment and cleanup of a spill,
- emergency conditions, and
- well drilling, completions, testing, and servicing operations (e.g., portable test tanks).

Tanks used to store fluids in these operations do not require an impervious liner. They do require diking unless the operation qualifies for it to be optional.



Section 3.5:

Temporary Storage Continued:

Diking is optional if:

- the site is **manned** for the duration that fluids are **being produced** to tank,
- the tank is fitted with a **high-level shutdown** device,
- the fluids are **not being produced** to the tank but are simply being stored, or
- storing **sludges or solids** in steel-fabricated solids storage bin.



Section 3.5:

Temporary Storage Continued:

If there is no dike around tank for well drilling, completions, testing, or servicing operations, licensee must empty or remove tank from site within 72 hours of completing operation.

Must use reasonable judgment to ensure sensitive areas are protected.

Should not consider the option to not dike a tank when close to a body of water.

Even in temporary storage situations, contaminated materials or materials possessing the potential to leach must not be stored directly on the ground.



Section 3.8

Identification of Storage Facilities:

- All stand-alone storage facilities shall have signs, as per section 6.020 and Schedule 12 of the *Oil and Gas Conservation Regulations*, at the entrance to the facility.
- Within a storage facility and at storage areas that form part of an operating upstream petroleum site, signs should indicate the materials that are stored, warnings, and any general housekeeping practices that should be followed in the storage area (e.g., segregation).



Section 5.1

Single-Walled Aboveground Tanks < 5 m³:

- 5 m³ per site can be stored without secondary containment
- must be visually inspected monthly to verify integrity
- spill control devices at fluid transfer points
- externally coated or made from corrosion-resistant material
- leak detection & secondary containment should be considered if release presents a risk to water body or groundwater

Small tanks exceeding the total combined volume of 5 m³ per site require secondary containment.



Section 5.3:

Single-Walled Aboveground Tanks $\geq 5 \text{ m}^3$:

- dike and liner required for facilities constructed after January 1, 1996
- dike capacity: 110% of the tank or 100% of the largest tank plus 10% of whichever is greater, the capacity of the largest tank or the aggregate capacity of the other tanks within the diked area.
- spill control devices at fluid transfer points
- cathodic protection in corrosive environments
- tanks installed before January 1, 1996, do not require a liner but must be integrity-tested every 5 years



Section 5.3:

Single-Walled Aboveground Tanks $\geq 5 \text{ m}^3$:

“Measures must be incorporated to prevent the overfilling of tanks”

Examples:

- automatic sensing devices for interconnection with shutoff equipment at the supply point
- automatic overflow shutoff devices (float valve or mechanical type)
- vent restriction devices
- overflow alarm devices (audible or visual type)
- inventory control



Section 5.3.3:

Double-Walled Aboveground Tanks $\geq 5 \text{ m}^3$:

- Requires the primary tank to be separated from the secondary containment system so as to provide continuous interstitial space below and around the primary tank.
- The words “continuous interstitial space below and around the primary tank” were intended to prevent intrusions (such as manways and piping) through the tank walls below the liquid level within the primary tank.



Section 5.3.3:

Double-Walled Aboveground Tanks $\geq 5 \text{ m}^3$:

- equipped with a method of overfill protection or an automatic shutoff mechanism to prevent overflow of primary tank
- spill control devices at fluid/delivery connection
- system to monitor interstitial space on a monthly frequency
- be protected against damage from vehicular traffic
- be equipped with a valve as close as practical to the tank to prevent draining should a piping break/leak occur



Section 6

Underground Storage Tanks (UST):

- Tanks installed after January 1, 2002, must be double-walled and require monthly monitoring for leak detection.
- Newly Installed UST's and associated piping must be tested for integrity as a complete system prior to placing in service.
- Steel tanks must have cathodic protection and external coating.
- Spill control devices at hose connections and fluid transfer points.
- Single-walled tanks installed prior to January 1, 2002, must be integrity-tested every 3 years.



Section 7

Containers:

Portable devices with an internal volume less than 1 m³:

- total combined volume of containers on site without secondary containment cannot exceed 1 m³
- container and stored material must be compatible
- impervious dike, curb and/or collection tray capacity must be 100% of the largest container or 10% of the aggregate volume, whichever is greater
- monthly visual inspection



Section 8:

Lined Earthen Excavations:

- Construction
 - Primary containment device. Concrete is too porous & susceptible to cracking but is acceptable as a working surface.
 - Impervious liner system for secondary containment.
 - Leak detection system between the secondary and primary containment devices.
 - If fugitive odours or access by wildlife are concerns, these storage systems should be fitted with mitigative measures.



Section 8

Lined Earthen Excavations:

- **Secondary Containment and Leak Detection**
 - Leak detection must be monitored monthly.
 - Fluids must be field tested for pH, chlorides, hydrocarbon odour, and visible oil sheen and results must be recorded.
 - Laboratory testing for the following is required annually:
 - pH,
 - electrical conductivity,
 - major ions (e.g. Ca, Mg, Na, K, NO₃, Cl⁻, PO₄), and
 - oil and grease
- ERCCB must be notified if any of the monitoring results indicate a concern.



Section 9

Bulk Pads:

- Used for the storage of solid materials.
- Must incorporate:
 - Compacted clay or synthetic liner, concrete or asphalt base pad with a slope directed to a catchment device to allow for the collection of precipitation and any generated leachate.
 - Continuous curb with a minimum height of 15 cm on at least three sides of the bulk pad.



Section 9

Bulk Pads:

- Where stored materials may generate a leachate:
 - Concrete or asphalt may be used as a working surface but are not considered adequate as primary containment.
 - A compacted clay or synthetic liner is required under the working surface.
 - A leachate collection system above the primary containment device and a leak detection system under the primary containment device is required.



Section 11

Discharge of Collected Surface Waters:

Collected waters must be tested and must meet the following criteria prior to being released in a controlled fashion to adjacent lands:

- chloride content 500 mg/L maximum
- pH 6.0 to 9.0
- no visible hydrocarbon sheen
- no other chemical contamination
- landowner or occupant consent
- water not allowed to flow directly into any watercourse
- each release recorded, including prerelease test data and estimated volume of water released

NOTE: Report 2009-A, Section 17, provides notice that criteria will be changing



Section 12

Withdrawal of Storage Tanks from Service:

Not Exceeding 180 Days

- Isolate tank, empty tank or measure & record the fluid level in tank & repeat procedure monthly, maintain cathodic corrosion protection system (if applicable) and maintain monthly leak detection monitoring.

Exceeding 180 Days

- Remove all liquids and vapours from tank and piping, isolate tank & clearly mark as empty, maintain cathodic corrosion protection system (if applicable) & verify integrity of tank prior to reactivation (if been out of service for > 1 year) and then appropriately re-label the tank.



Section 12

Permanent Withdrawal from Service:

- All fluids and sludges removed and be purged of all combustible vapours.
- Expected that aboveground tanks be removed from active part of site.
- Preferred that underground tanks be removed from active part of site.
 - If compromises operations, tank must be isolated and removed when site is decommissioned.
- Upon removal of a tank, the soil surrounding the tank must be assessed and appropriately decontaminated.
- Excavated contaminated soils must be managed in accordance with *Directive 058*. Also refer to *Informational Letter IL 98-2* for further information regarding contamination management.



Section 13.1

Compacted Clay Liners:

- Clayey soil must be put down in lifts and compacted to achieve a hydraulic conductivity of
 - 1×10^{-6} cm/s or less determined in situ
 - 1×10^{-7} cm/s or less determined in a laboratory from a representative disturbed sample
- The specifications of the clayey material used for the liner and the details of liner construction (quality assurance/quality control data) must be documented and made available upon request.



***Report 2009-A: Updates to Storage
Requirements for the Upstream Petroleum
Industry (July 2009)***

**Document to communicate updates and clarification
to *Directive 055* requirements.**

Posted on the ERCB website at www.ercb.ca.



**If you have questions/comments, please
contact your local ERCB field centre or email
the ERCB industry education coordinator
industry.education@ercb.ca**

