Field-constructed Tank Systems, Airport Hydrant Systems, ASTs and SPCC

Overview

- Dealing with unique circumstances – **NOT** your typically corner gas stations with a couple of USTs and nothing else.
- Once the SPCC regulations are applicable then compliance with the SPCC requirements could impact what is done to comply with the UST requirements. Bob May will provide information on the applicability of the SPCC requirements and some insights on things to be aware of.
- Field-constructed tank systems and airport hydrant systems are also unique systems where there is a need to understand if the UST regulations apply and then to understand what is required.

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THE PREMIER PROVIDER OF ENVIRONMENTAL SOLUTIONS

Storage Tank Fusion

USTs in SPCC Plans
ASTs Regulated Like USTs

Robert J May PE
Senior Professional
PADEP Storage Tank Advisory Committee (STAC)
- Public Member
- Committee- Chairperson

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USTs in SPCC Plans

Spill Prevention Countermeasure and Control

- USEPA requirement for total oil storage in containers greater than 55 gallons with an aggregate aboveground oil capacity greater than 1320 US gallons OR an aggregate completely buried (UST) oil capacity of greater than 42,000 gallons
- Spill Prevention Countermeasure and Control (SPCC) plan required.
  - 40 CFR Part 112 – Oil Pollution Prevention
- Many retail motor fuel locations are exempt from SPCC rules
  - Buried storage tanks subject to all the technical requirements 40 CFR Part 280 or Part 281 are exempt.
    - Regulated USTs are those exempted/excluded tanks
    - USTs that are not SPCC exempt (non-residential heating oil) with an oil capacity of greater than 55 US gallons and greater, at facilities where either capacity threshold is exceeded ARE regulated.

Typical UST Location

ASTs at Retail Motor Fuel Locations

ASTs at Retail Motor Fuel Locations (continued)

ASTs at UST Commercial Facilities

ASTs at a Dairy with UST Transport Refueling

SPCC Plan Applicability

- USEPA has a specific definition of oil:
  - "…oil of any kind or in any form…"
  - Petroleum and nonpetroleum oil
  - Synthesized or Synthetic oils
  - Alcohols denatured with oil
  - Biodiesel (B100) and biodiesel blends (Bxx)
  - Containers of oil and water mixtures
  - Includes vegetable oil and animal fats
    - Milk is now specifically excluded (milk has 3% fat)

Not All ASTs Require a SPCC Plan

- ASTs that are exclusively used as “breakout” tanks connected to pipelines regulated by the US Department of Transportation (DOT) under the Pipeline and Hazardous Materials Safety Administration (PHMSA).
- ASTs used exclusively for wastewater treatment
  - Only flow thru portions of the treatment-not all ASTs at the facility

Other Applicability

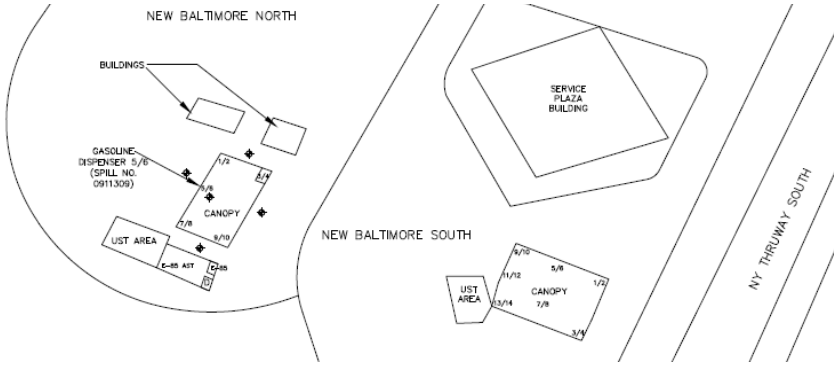
- Home heating oil truck that makes deliveries parking overnight but still storing oil
  - That facility with the parking requires a SPCC plan

Spill Prevention Countermeasure and Control (SPCC) plan

- If total aboveground oil storage capacity is less than or equal to 10,000 US gallons, and has a clean spill history[1], looking back three years, the owner/operator has the option to self-certify.

[1] no reportable oil discharges greater than 1,000 gallons or two reportable oil discharges greater than 42 gallons in a rolling 12-month period

- No self-certification in Missouri, only a Professional Engineer (PE) can certify any SPCC plan
- For most facilities with an aggregate oil storage greater than 10,000 gallons, Professional Engineer (PE) must certify plan
- Location of USTs must be on the SPCC figure of oil storage



Oil Storage and Use

- SPCC plans include all types of oil containers (storage tanks and drums). A Storage tank is referenced as a bulk container
- Oil filled equipment (while not bulk storage, does count to overall facility threshold)
  - Oil filled equipment (electrical transformers)
  - Oil filled operational equipment (equipment gear boxes)
  - Oil filled manufacturing equipment (heat exchanger)
- Bulk storage
  - Oil (motor fuels) tank on Generators (Gensets)
  - Tanks, drums IBCs, certain refuelers

Spill Prevention Control and Countermeasure (SPCC) Plan Updates

- All SPCC plans now require the ASTs to have integrity inspections and testing interval schedule
- Large Aboveground Storage Tanks (ASTs)
  - Field erected –typically API 650 Standard (atmospheric pressure)
    - Industry standard API 653 Inspections and certified inspectors
- Manufacturer (shop) built ASTs
  - Steel Tank Institute (STI)
    - STI SP001 Inspection standard
      - Table 5.5 Table of Inspection Schedules

AST Types

Manufactured type AST

STI SPFA

STANDARD FOR THE INSPECTION
OF ABOVEGROUND STORAGE TANKS

SP001

JANUARY 2018
6TH EDITION

API 650 type field constructed AST

Tank Inspection, Repair, Alteration, and Reconstruction

API STANDARD 653
FIFTH EDITION, NOVEMBER 2014

AST Piping Inspection
API Standard 570
Fourth Edition February 2016

STI SP001

STI Reproduction Permission

TABLE 5.5 TABLE OF INSPECTION SCHEDULES

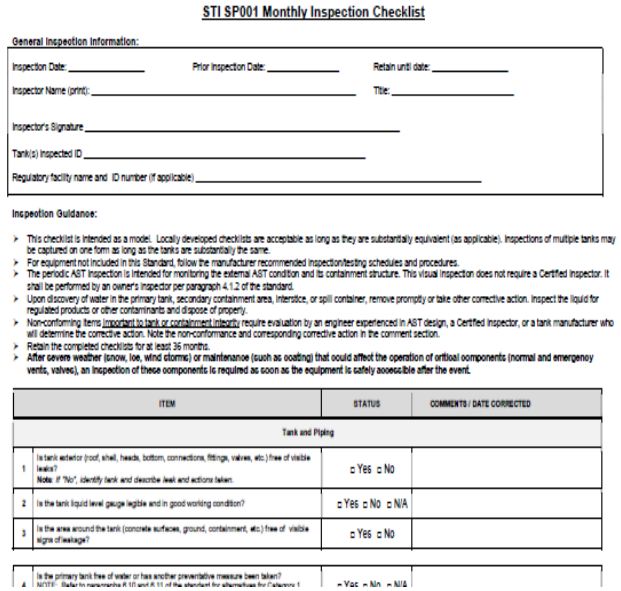
AST Type and Capacity in U.S. gallons (liters)		Category 1	Category 2	Category 3
Shop-Fabricated ASTs	0 – 1100 (0-4164 liters)	P	P	P, E&L(10)
	1101 - 5,000 (4168-18,927 liters)	P	P, E&L(10)	[P, E&L(5), I(10)] or [P, L(2), E(5)]
	5,001 - 30,000 (18,931-113,562 liters)	P, E(20)	[P, E(10), I(20)] or [P, E(5), L(10)]	[P, E&L(5), I(10)] or [P, L(1), E(5)]
	30,001 - 75,000 (113,566-283,906 liters)	P, E(20)	P, E&L(5), I(15)	P, E&L(5), I(10)
Portable Containers		P	P	P**

** Owner shall either discontinue use of portable container for storage or have the portable container DOT (Department of Transportation) tested and recertified per the following schedule (refer to Section 9.0):
Plastic portable container - every 7 years
Steel portable container - every 12 years
Stainless Steel portable container - every 17 years

Category 1 -ASTs with spill control and CRDM
Category 2 -ASTS with spill control and without CRDM
Category 3 -ASTS without spill control
CRDM -Continuous release detection method
P -Periodic inspection by owner
E -Formal External Inspection by Certified Inspector
I -Formal Internal Inspection by Certified Inspector
L -Leak test by owner
Numbers in parentheses is maximum inspection interval in years

Monthly AST Inspections

- Monthly AST inspections are required under several regulations
  - National Fire Protection Code (NFPA) 30 Flammable and Combustible Liquid Code
    - Industry Standards referenced API 653 and STI SP001- routine visual inspection
  - SPCC self certified plans (Industry Standards)
  - SPCC plans certified by a PE (Industry Standards and good engineering practices)
  - Person doing the inspection must be trained in storage tank features
    - UST locations could use the Class C operator
    - Primary observations for leak detection and safety devices (vents) to determine if operable
  - Some states regulate ASTs, and those regulations reference a monthly inspection.
  - Pennsylvania requires a 72 hours visual inspection for leaks and water in the containment area.



STI SP001 Monthly Inspection Checklist

General Inspection Information:

Inspection Date: _____ Prior Inspection Date: _____ Retain until date: _____

Inspector Name (print): _____ Title: _____

Inspector's Signature _____

Tank(s) Inspected ID _____

Regulatory facility name and ID number (if applicable) _____

Inspection Guidance:

- This checklist is intended as a model. Locally developed checklists are acceptable as long as they are substantially equivalent (as applicable). Inspections of multiple tanks may be captured on one form as long as the tanks are substantially the same.
- For equipment not included in this Standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a Certified Inspector. It shall be performed by an owner's inspector per paragraph 4.1.2 of the standard.
- Upon discovery of water in the primary tank, secondary containment area, interstice, or spill container, remove promptly or take other corrective action. Inspect the liquid for regulated products or other contaminants and dispose of properly.
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a Certified Inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for at least 36 months.
- After severe weather (snow, ice, wind storms) or maintenance (such as coating) that could affect the operation of critical components (normal and emergency vents, valves), an inspection of these components is required as soon as the equipment is safely accessible after the event.

	ITEM	STATUS	COMMENTS / DATE CORRECTED
	Tank and Piping		
1	Is tank exterior (roof, shell, heads, bottom, connections, fittings, valves, etc.) free of visible leaks? Note: If "No", identify tank and describe leak and actions taken.	☐ Yes ☐ No	
2	Is the tank liquid level gauge legible and in good working condition?	☐ Yes ☐ No ☐ N/A	
3	Is the area around the tank (concrete surfaces, ground, containment, etc.) free of visible signs of leakage?	☐ Yes ☐ No	
4	Is the primary tank free of water or has another preventative measure been taken?	☐ Yes ☐ No ☐ N/A	

SPCC Guidance

https://www.epa.gov/oil-spills-prevention-and-preparedness-regulations/spcc-guidance-regional-inspectors

911 pages

Transfer Areas and General Containment

Chapter 4 Secondary Containment and Impracticability

4.1 Introduction

The purpose of the SPCC rule is to prevent discharges of oil into navigable waters of the United States and adjoining shorelines. One of the primary ways the rule sets out to accomplish this goal is by requiring secondary containment. A secondary containment system provides an essential line of defense in the event of a failure of the primary containment, such as a bulk storage container, a mobile or portable container, piping, or oil-filled equipment. The system provides temporary containment of discharged oil until the appropriate actions are taken to abate the source of the discharge and remove oil from areas where it has accumulated to prevent it from reaching navigable waters or adjoining shorelines. The rule includes two categories of secondary containment requirements:

- A general provision addresses the potential for oil discharges from all regulated parts of a facility. The containment method, design, and capacity are determined by good engineering practice to contain the most likely discharge of oil until cleanup occurs.
- Specific provisions address the potential of oil discharges from areas of a facility where oil is stored or handled. The containment design, sizing, and freeboard requirements are specified by the SPCC rule to address a major container failure.

The *general* secondary containment requirements are intended to address, in accordance with good engineering practice, the most likely oil discharges from areas or containers such as mobile refuelers and other non-transportation-related tank trucks; oil-filled operational or process equipment; (non-rack) transfer areas; or piping. In determining the method, design, and capacity for general secondary containment, only the typical failure mode needs to be considered.

The *specific* secondary containment requirements are intended to address a major container failure (e.g., the entire contents of the container and/or compartment) associated with a bulk storage container; single compartment of a tank car or tank truck at a loading/unloading rack; mobile/portable containers; and production tank batteries, treatment, and separation installations (including flow-through process vessels and produced water containers). These specific provisions (see *Table 4-1* in *Section 4.1.1*) provide explicit requirements for sizing, design, and freeboard.

The purpose of this chapter is to clarify the relationships among the various general and specific secondary containment requirements of the SPCC rule, and to illustrate how these requirements apply. This chapter also discusses the rule's impracticability determination provision, which may be used when a facility owner/operator cannot install secondary containment by any reasonable method. The additional requirements that accompany an impracticability determination, the documentation needed to support such a determination,

Oil Transfer Areas

- Dispensers and tank fill ports are transfer areas
- UST transfer areas at SPCC plan locations are subject to the containment requirements in Chapter 112.7(c) even if the UST is exempt at an otherwise regulated SPCC facility
  - Most fuel retailers are not otherwise regulated unless they have ASTs
- Areas where oil is transferred but no loading or unloading rack present regulated under 112.7(c)

Loading and Unloading Racks

- Areas where oil is transferred and a loading or unloading rack is present regulated under 112.7 and 112.7(h)
- 112.7(h) has sized containment and other specific requirements for loading and unloading racks.

General Secondary Containment

- General Secondary containment may be passive or active
  - Passive containment includes dikes for containment or diversionary structures (remote impounding)
    - Containment must be sized based on good engineering practice

  - Active containment includes

    response actions, sorbent deployment

SPCC *40 CFR Part 112*
Lets Get Into the Weeds

Mark W. Howard
Office of Emergency Management - HQ

SPCC Short Course
March 26, 2018
NISTM

Revision to General Secondary Containment Requirement

This revision:

- Clarifies that the general secondary containment requirement is intended to address the *most likely oil discharge* from any part of a facility

> New text: "… In determining the method, design, and capacity for secondary containment, you need only to address the typical failure mode, and the most likely quantity of oil that would be discharged. Secondary containment may be either active or passive in design."

- Modifies §112.7(c) to expand the list of example prevention systems for onshore facilities
  - Additional examples: drip pans, sumps, and collection systems

Mark W. Howard
Office of Emergency Management - HQ

SPCC Short Course
March 26, 2018
NISTM

General Secondary Containment Requirement

- Requires secondary containment for all areas with the potential for a discharge
- Requires appropriate containment and/or diversionary structures to prevent a discharge that may be harmful (a discharge as described in §112.1(b))
- This is the **minimum** expectation for containment
  - General facility requirement with no sizing or freeboard requirements

Mark W. Howard
Office of Emergency Management - HQ

SPCC Short Course
March 26, 2018
NISTM

Example Methods of Secondary Containment listed in §112.7(c)

Examples include:

- Dikes, berms, or retaining walls
- Curbing
- Culverting, gutters, or other drainage systems
- Weirs
- Booms
- Barriers
- Spill diversion ponds and retention ponds
- Sorbent materials
- Drip pans
- Sumps and collection systems

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Office of Emergency Management - HQ

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Active or Passive

- The revision clarifies that the use of both active and passive secondary containment measures is allowed.
- Active containment measures are those that require deployment or other specific action by the operator.
  - These may be deployed either before an activity involving the handling of oil starts, or in reaction to a discharge.
- Passive measures are permanent installations and do not require deployment or action by the owner or operator.

Mark W. Howard
Office of Emergency Management - HQ

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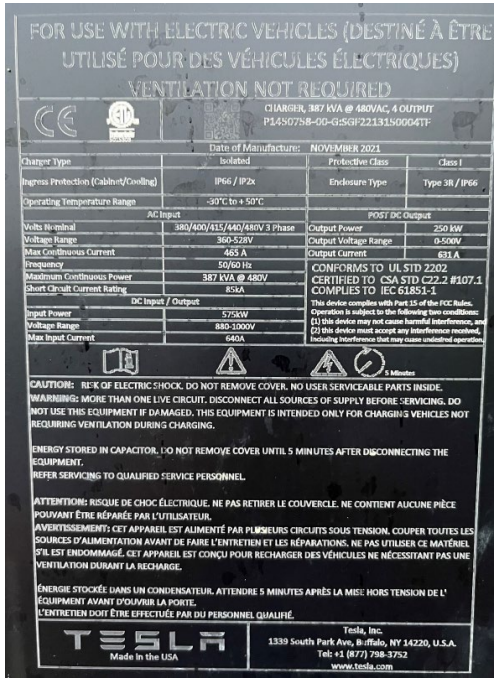
March 26, 2018
NISTM

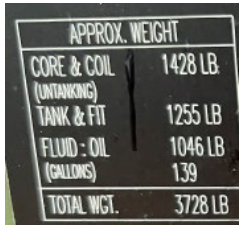
Active Measures vs. Contingency Plan

- Active secondary containment requires a deployment action; it is put in place prior to or immediately upon discovery of an oil discharge
  - The purpose of these measures is to contain an oil discharge before it reaches navigable waters or adjoining shorelines
- A contingency plan is a detailed oil spill response plan developed when any form of secondary containment is determined to be impracticable
  - The purpose of a contingency plan should be both to outline response capability or countermeasures to limit the quantity of a discharge reaching navigable waters or adjoining shorelines, and to address response to a discharge of oil that has reached navigable waters or adjoining shorelines

Near Future Issues

- Electric vehicle (EV) charging at UST locations
  - Electrical transformer- oil cooled (140 gallons)
  - EV vehicle chargers may be oil cooled
  - Latest generation of EV charger cables are liquid cooled (oil or glycol)





ASTs Regulated Like USTs

- Noted similarities with ASTs and USTs
  - Monthly walk around inspection
    - Method of leak detection-visual
    - Review equipment and general conditions

Pennsylvania Storage Tank Regulations

- 1989 The Storage Tank and Spill Prevention Act
  - 1988 Ashland Oil 3.5 Million Gallon diesel AST failure
  - Nearly 1 million gallon spill into the Monongahela River near Jefferson Hills PA
    - 20 miles upstream from downtown Pittsburgh PA

  - Affected drinking water source for about 1 million people in OH, WV, KY, and PA for 200 miles down the Ohio River
- After 1988 event, industry standards such as API-653 Inspection guidance was formulated (January 1991)

PA Underground Storage Tank Indemnification Program (USTIF)

- Fund created in 1994 to make claim payments for corrective actions and third party claims to or on behalf of UST owners or operators for a release occurring after February 01, 1994
- USTIF was a mandatory program
  - Optional for unregulated heating oil USTs
- Per gallon fee collected by supplier (distributor) which was passed onto the public consumer at the pump
- Initial funding rates was 2¢ per gallon delivered.
  - Diesel and kerosene fuel annual per capacity charge of 1.5¢/gal
- Deductible of $5,000 per tank for $1.5 million coverage

Motor Fuel Retailer Owner Business Plan

- In 1994, a good business volume for motor fuel retailer was approximately 100,000 gallons of fuel per month
  - Monthly USTIF fee $2,000
    - Annual USTIF fee $24,000

- Savvy UST owners knew adjoining states like New Jersey and New York had no fund.

- UST owners in NJ and NY purchased UST insurance from companies like Zurich, ACE, and Chubb
    - Annual tank insurance premium less than $24,000 annually

Alternate to USTs-ASTs in Vaults

- UST owners and installers developed a scenario where a shop built AST could be installed in a concrete vault
- Fire code regulations were revised allowing ASTs at retail motor fuel locations
  - The vault protected the environment as secondary containment
  - Single wall AST could be installed
  - AST owner exempt from USTIF
  - Motor fuel retailer would still charge the public the neighborhood UST motor fuel retailer price
    - Instant profit of 2¢ per gallon
    - Approximate $24,000 annual profit
    - **Motor fuel retailer now could buy a bigger, faster, fishing boat**
  - PA has 43 ASTs in vaults at 22 facilities

ASTs in Vaults in 1989
Exempted from UST Regulations

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 25, 1989

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

MEMORANDUM

SUBJECT: Whether a Concrete Vaulted UST System is Subject to the Underground Areas Exclusion

FROM: David O'Brien, Chief /s/
Standards Branch, OUST (OS-410)

TO: Wayne S.. Naylor, Chief
Underground Storage Tank Section (3HW31)

This is in response to your July request from Virginia as to whether a precast Concrete vaulted tank system housing a tank below grade is exempt from 40 CFR part 280 requirements. The answer to this request is yes,"if the tank sits upon or above the surface of the floor and there is sufficient space to enable physical inspection of the tank bottom." (53 FR 37121). As explained in the preamble, such tanks, although technically underground, are no different than above ground tanks and are therefore included in the Law's underground areas exclusion.

For your information, we have no authority to withhold this interpretation (which is already provided in the final rule's preamble) from the Virginia Water Control Board contingent upon receiving a certification from a professional engineer to ensure the accuracy of the proposed design's structural integrity. Therefore, we did not review the structural calculations that were provided.

It may be worth pointing that such concrete vaulted system would appear to have to satisfy Virginia Building Codes, aboveground tank fire safety codes (e.g., NFPA 30), and if applicable, SPCC aboveground tank regulations currently under consideration for revision within EPA.

cc: Jim McCormick

How Much Space for a Visual Inspection in a Vault?

Answer: Tank 6 inches from Vault Wall on 3 Sides and Fourth Side has Room for Human Entry and Inspection

SOLID WASTE AND EMERGENCY RESPONSE

Mr. William G. Nowman, President
Halissco, Inc.
6601 North Black Canyon Highway
Phoenix, Arizona 85015

Dear Mr. Nowman:

This responds to your August 21, 1991 letter to Administrator Reilly about your need for clarification of a portion of the Environmental protection Agency's (EPA) underground storage tank (UST) regulations that were promulgated under Subtitle I of the Resource Conservation and Recovery Act as amended. Your question pertains to the way the 40 CFR Part 280 regulations address vaulted tank systems buried in the ground.

Your letter suggests there is a lack of clarity in the UST regulations about how much space is necessary between the tank vessel and the surrounding open vault to allow for physical inspection. This question is important because tanks that can be physically inspected for leaks are considered to be the same as aboveground tanks, and thereby excluded from the UST rules under the "underground areas exclusion" provided in the statutory definition of underground storage tanks. Your general concern is that there are some vaulted tank systems for sale in the market that do not allow complete physical inspection of all sides of the tank vessel because the tank shell is located too close to the side walls of the vault.

In your letter you provided a specific example of a tank that is within six inches of the vault's walls on three sides, but is, set back far enough along the fourth side of the tank to allow room for human entry and inspection. Such a tank system would be considered to be physically inspectable by EPA, and therefore not subject to the Agency's UST regulations under the "underground areas exclusion", if the access provided on the fourth side of the vaulted is sufficient to enable a person to observe evidence of a leak from anywhere on the tank vessel. Thus, if the tank is in a saddle and the bottom of the vault can be viewed. in order to check for evidence of a leak then the tank is considered to be inspectable.

STI SP001 first published in 2000

STI SP001 7.1.8.1

Visually inspect general condition of containment area…

STI SP001 7.3.1

Inspect shell plates and welds for indications of exterior corrosion…

Downside of AST in a Vault

- AST with a capacity greater than 1,320 US gallons requires a USEPA SPCC Plan
  - SPCC plan certified by Professional Engineer (>10,000 gallon aggregate capacity)
    - Risk management for containment with concrete 6-inch thick
  - Leak detection as compared to operating a UST has less requirements
    - Monthly walk around inspections still required
    - Monthly inspections in vault regulated by OSHA for confined space
      - Most motor fuel retailers not aware of OSHA confined space regulations
  - The vault may have sumps (water collection low points)
    - Pumps in the sump must be intrinsically safe for flammable combustible service
    - Sump discharge is problematic and most likely require permits for discharge to surface waters or to a public operated treatment works (POTW)

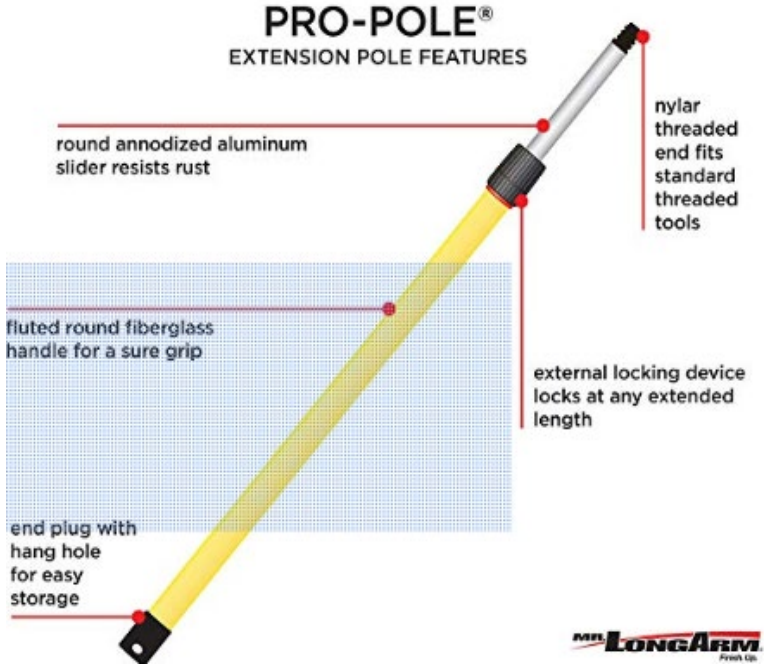
Monthly AST in Vault Inspection

OSHA Confined Space Entry

- Trained personnel
  - Entry person and outside attendant person
- Atmospheric monitoring
- Remove power sources
  - Stop dispensing fuels
- Confined space rescue and retrieval system
- Typical cost $800 per event

Compliant Monthly AST in Vault Inspections

- Need 6-18 ft. extendable pole
- GoPro camera in a hazardous location enclosure with remote viewing on an iPhone
- Explosion proof flashlight duct taped to pole



2018 OSHA Investigation

Pennsylvania AST in Vault Owner

Shop Vacuum Death

Accident Investigation Summary		
Summary Nr: 106477.015	Event: 06/12/2018	Employee Is Killed From Explosion Of Gasoline Vapors, Second
At 5:50 p.m. on June 12, 2018, two employees were removing excess water from underground concrete vault which contained a metal gasoline storage tank for an automobile gasoline station. Employee #1 was using a shop vacuum inside the vault that was not approved for a flammable vapor environment. Employee #2 was on the surface of the parking lot near the manhole entrance of the vault. Gasoline vapors were ignited which caused a large explosion and a fire plume. Employee #1 was entrapped inside the concrete vault and killed from the blast and fire. Employee #2 sustained severe burns to the body and was transported to a hospital.		

PA AST in Vaults Regulated like USTs

§ 245.523. Aboveground storage tanks in underground vaults.

The following requirements shall be met when an owner or operator chooses to install an aboveground storage tank in an underground vault:

(1) The vault shall completely enclose the aboveground storage tank. There may be no openings in the vault enclosure except those necessary for access to, inspection of, and filling, emptying and venting of the tank. The walls and floor of the vault must be constructed of reinforced concrete at least 6 inches thick. The top, walls and floor shall be designed to withstand the anticipated loading, including loading from traffic, soil and groundwater.

(2) The vault must be compatible with the stored substance and have a permeability of less than 1×10^{-7} cm/sec for substance stored and be water tight.

(3) An aboveground storage tank must be in its own vault. Adjacent vaults may share a common wall.

(4) There may be no backfill around the aboveground storage tank and there shall be sufficient space between the tank and the vault to allow inspection of the tank and ancillary equipment.

(5) Vaults and aboveground storage tanks must be suitably anchored to withstand uplifting by either water or released substance, including when the tank is empty.

(6) Connections shall be provided to permit venting of each vault to dilute, disperse and remove vapors prior to personnel entering the vault.

(7) A vault must be equipped with a continuous leak detection system capable of detecting vapors and liquids including water. The detection system must activate an alarm that automatically shuts down the dispensing system if vapors or liquids are detected.

PA AST in Vault Regulated like USTs

(8) A vault must have a means for personnel entry. The entry point must have a warning sign indicating the need for procedures for safe entry into a confined space. An entry point must be secured against unauthorized entry and vandalism.

(9) A suitable means to admit a fire suppression agent shall be provided for each vault.

(10) Aboveground storage tanks and ancillary equipment shall be installed, maintained and inspected in accordance with the requirements for aboveground storage tanks in this subchapter.

(11) Underground piping distribution systems for each aboveground storage tank system used to dispense class I or class II motor fuels for resale must be provided with release detection equivalent to underground piping release detection addressed in § 245.445 (relating to methods of release detection for piping) and monitored as required in paragraph (7) with monitoring records retained for 12 months as required under § 245.516 (relating to recordkeeping requirements).

Source

The provisions of this § 245.523 amended November 9, 2007, effective November 10, 2007, 37 Pa.B. 5979; amended December 21, 2018, effective December 22, 2018, 48 Pa.B. 7875. Immediately preceding text appears at serial pages (331102) to (331103).

What about the Pennsylvania 72 Hour Visual Inspection for ASTs?

- PADEP requires a 72 hour visual inspection
- Rational is dike containment water must be removed within 72 hours so the tank should be viewed every 72 hours
  - Inspection for no potential hazardous environmental conditions
    - Evidence of a release
    - Spill
    - Overfill
    - Leakage
    - Water in containment
- Suggest AST in vault owners to print out the vault water and leak sensors status report from the Automatic Tank Monitor (ATM) every other day (48 hours)
  - ATM installed to provide fuel level monitoring for deliveries

Storage Tank Fusion Summary

- If the UST facility has an AST or non SPCC exempt USTs, the facility may need a SPCC Plan.
- If facility has a SPCC plan, UST deliveries and dispensing must be reviewed in terms of active or passive secondary containment
- ASTs also require a monthly inspection and now must have a formal inspection schedule
  - Typically an industry standard or a risk based schedule.
  - ASTs may not need a formal inspection per Industry Standards (STI) but the state may require formal in-service inspections every 5 years
- ASTs in underground vaults in Pennsylvania must have monthly tank and product line leak detection like a UST
- ASTs in underground vaults in Pennsylvania now have an inspection schedule every 3 years (instead of 10 years) despite UST monthly leak detection in an impervious vault
  - No AST in every other state requires an inspection every 3 years

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Contact Information

Rmay@montrose-env.com

Field-constructed Tank Systems and Airport Hydrant Systems

Russ Brauksieck
EPA Office of Underground Storage Tanks

Key Definitions

UST means any **one or combination of tanks** (including **underground pipes** connected thereto) that is used to contain an accumulation of regulated substances, and the **volume** of which (including the volume of underground pipes connected thereto) **is 10 percent or more beneath the surface of the ground**. (plus list of things not considered to be UST)

UST system means an **UST**, **connected underground piping**, **underground ancillary equipment**, and **containment system**, if any.

All parts of the UST system will contain the same product

Key Definitions

Ancillary equipment means any devices including, but not limited to, such devices as piping, fittings, flanges, valves, and pumps used to distribute, meter, or control the flow of regulated substances to and from an UST

Beneath the surface of the ground means beneath the ground surface or otherwise covered with earthen materials.

- Tank, piping or ancillary equipment that is in an inspectable area or trench open for inspection is considered aboveground.
- Tank, piping or ancillary equipment beneath ground surface and is covered such that it is not seen (e.g., equipment in a tank top sump) is considered underground

Key Definitions

Airport hydrant fuel distribution system (also called airport hydrant system) means an **UST system** which fuels aircraft and operates under **high pressure with large diameter piping** that typically terminates into one or more hydrants (fill stands). The airport hydrant system begins where fuel enters one or more tanks from an external source such as a pipeline, barge, rail car, or other motor fuel carrier.

Field-constructed tank means a tank constructed in the field. For example, a tank constructed of concrete that is poured in the field, or a steel or fiberglass tank primarily fabricated in the field is considered field-constructed. (A field-constructed tank is regulated when it is part of a UST system)

What is included in the Storage system?

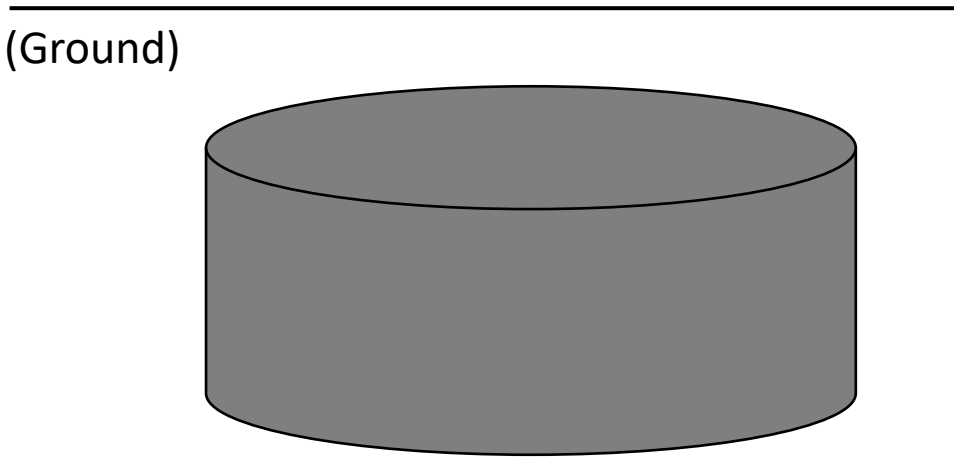
Product Receipt piping

- Underground Piping only
- UST definition exempts pipelines covered by requirements of US DOT Office of Pipeline Safety or state pipeline program
  - Jurisdictional valve typically separates pipeline from Tank System
- By policy, don't include Marine Receipt piping (MRP) covered by Coast Guard
  - Jurisdictional valve typically separates MRP from Tank System
- Truck and Rail receipt lines fully part of the Tank System

What is included in the Storage system?

Storage Tanks

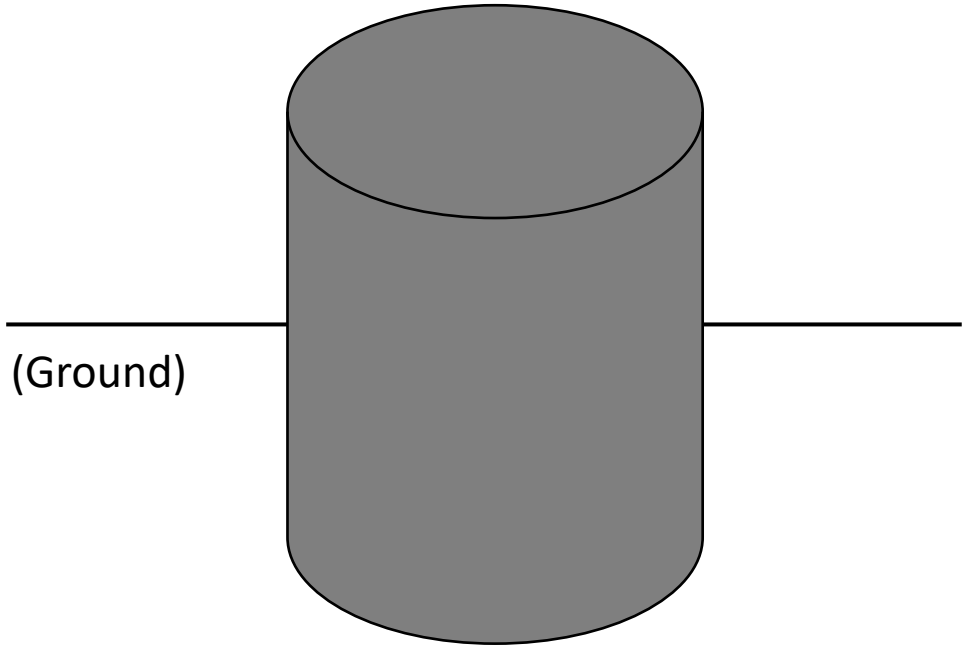
- Fully Buried tanks



What is included in the Storage system?

Storage Tanks

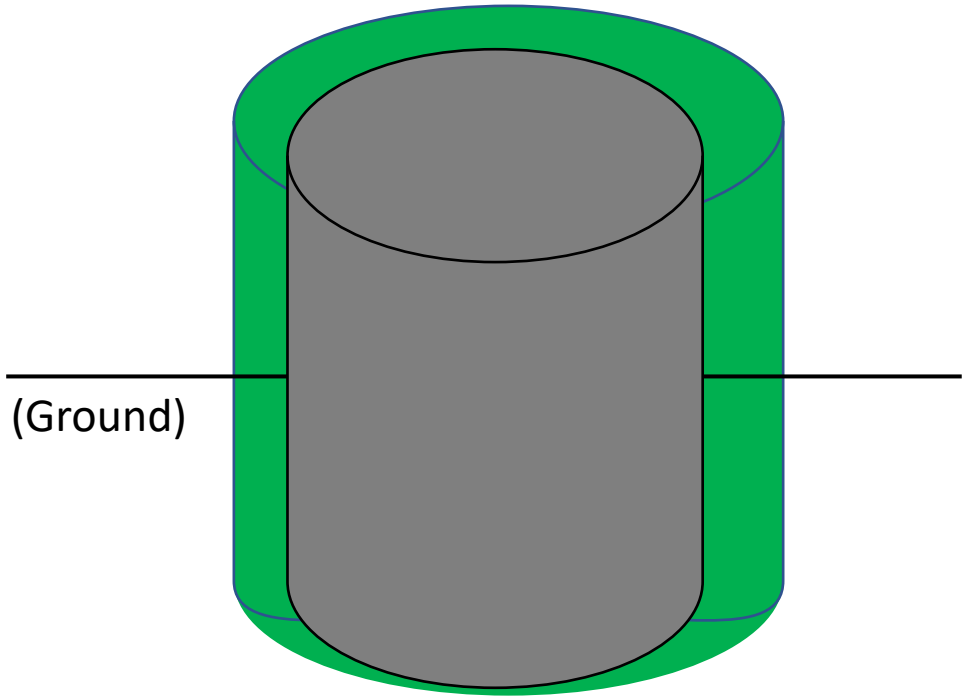
- Fully Buried tanks
- Partially buried tanks



What is included in the Storage system?

Storage Tanks

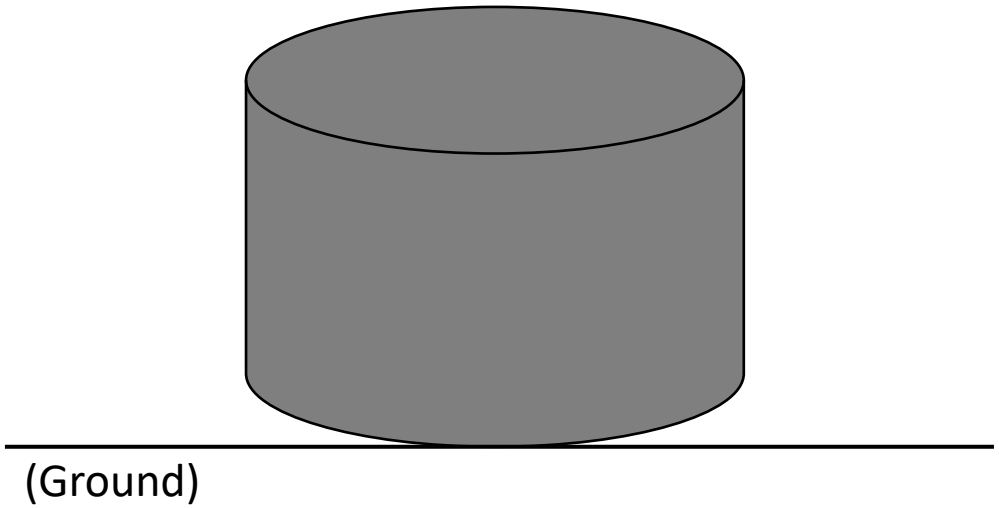
- Fully Buried tanks
- Partially buried tanks
- Bunkered tanks



What is included in the Storage system?

Storage Tanks

- Fully Buried tanks
- Partially buried tanks
- Bunkered tanks
- Fully aboveground tanks



What is included in the Storage system?

Product Distribution Piping

- Piping from tank to another tank or end use (loading rack, hydrant, marine, pipeline)
  - Connections to marine and pipeline follow same rule as receipt piping
- Underground or underground portions only

Non-product piping (vent) NOT included as part of storage system

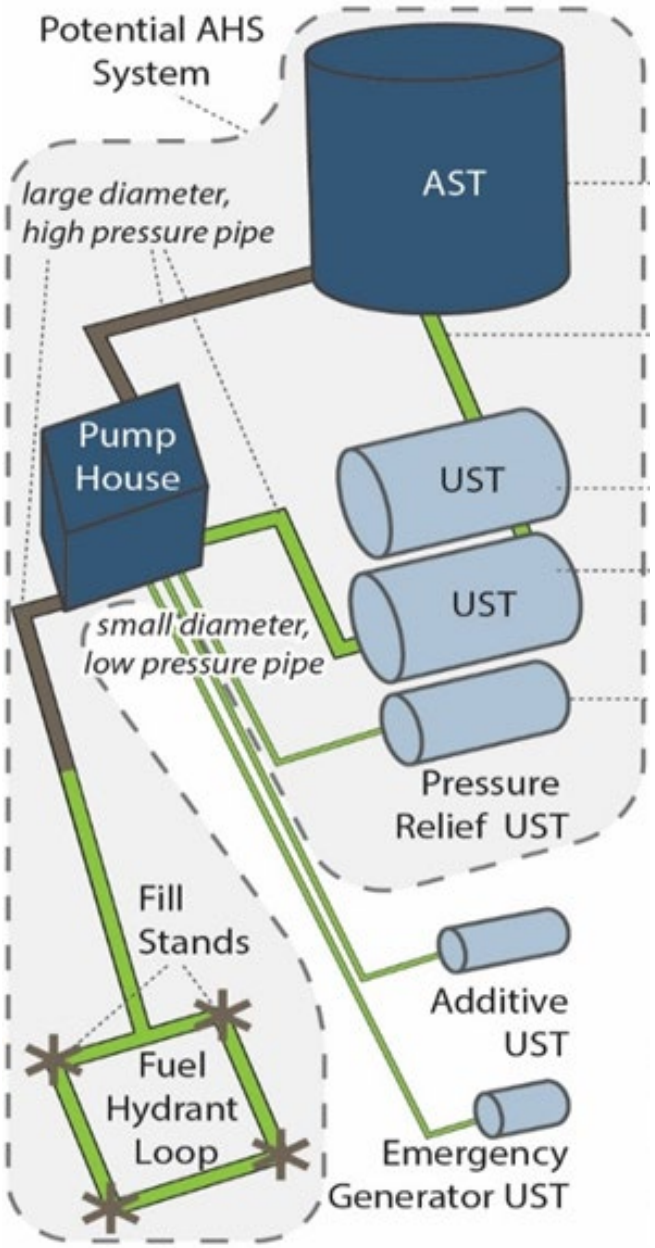
What is included in the Storage system?

Ancillary Equipment

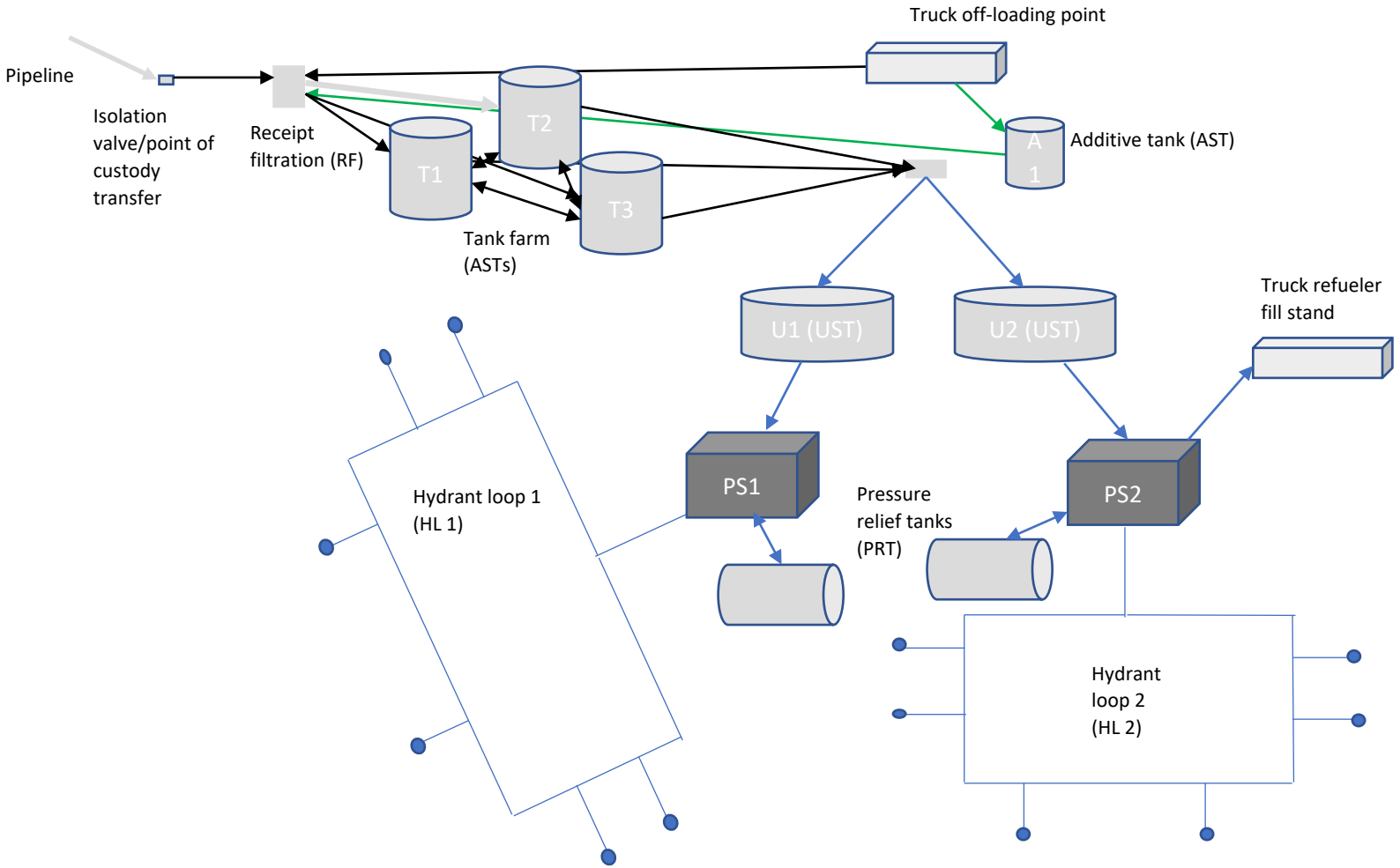
- Underground equipment included as part of the storage system
- Pumps
- Valves
- Filtration system

Where are these systems found?

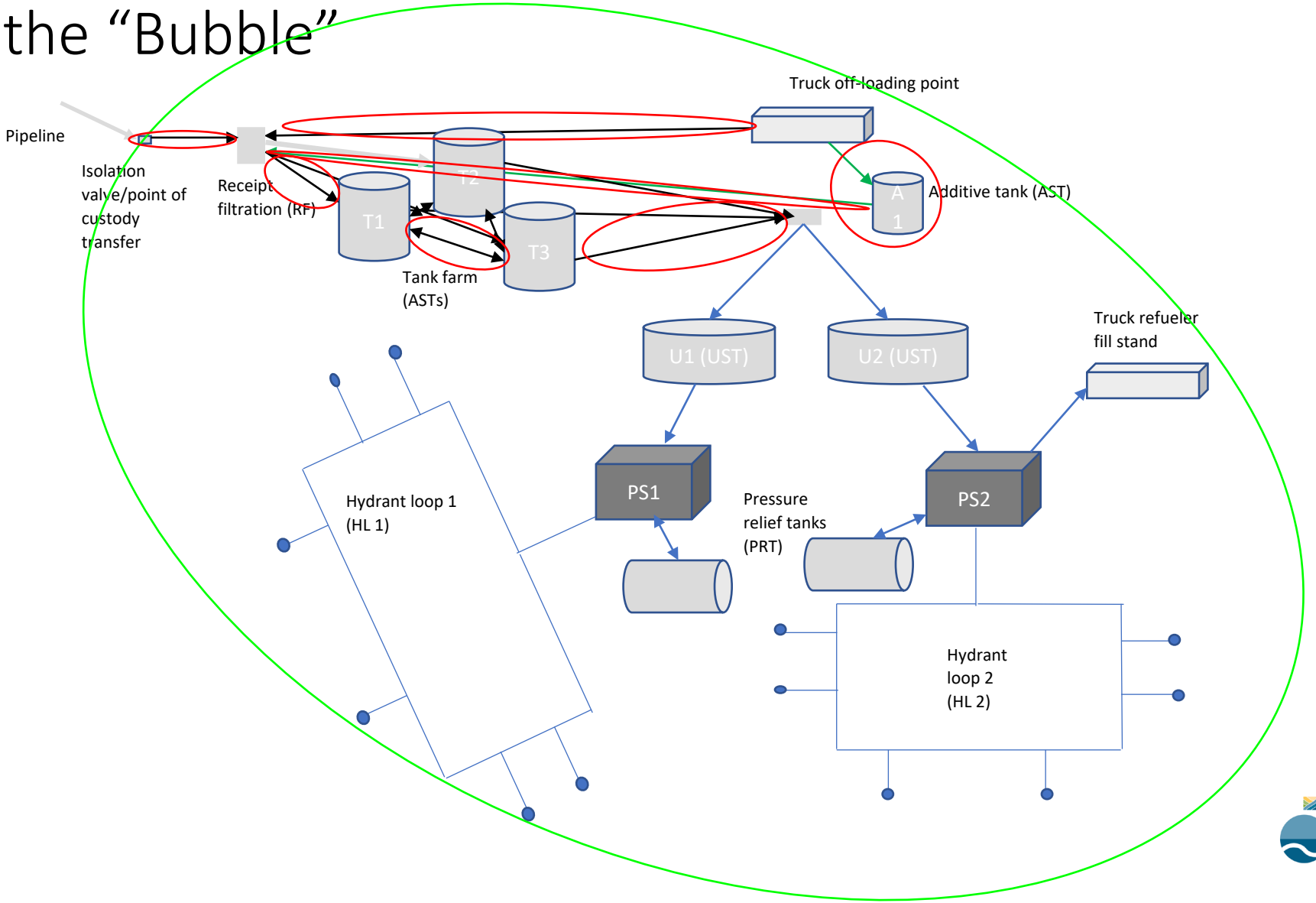
- Airports
- Helicopter Hydrants
- Cargo Plane Hydrants
- Fuel Terminals
- Utilities
- Truck Stops



Drawing the “Bubble”



Drawing the “Bubble”



Gather the Information

Listing Of Tanks

Tank ID	Product Stored	Location	Nominal Capacity (gal)	Shell Capacity (gal)	Tanks Connected?	Include In Underground Capacity?	Include In Storage System Capacity?
A1	Additive	AST	50,000	52,500	Yes	No (not Jet A)	No (not Jet A)
T1	Jet A	AST	1,000,000	1,050,000	Yes	No	Yes
T2	Jet A	AST	1,000,000	1,050,000	Yes	No	Yes
T3	Jet A	AST	1,000,000	1,050,000	Yes	No	Yes
U1	Jet A	UST	500,000	510,000	Yes	Yes	Yes
U2	Jet A	UST	500,000	510,000	Yes	Yes	Yes
PRT1	Jet A	UST	5,000	5,500	Yes	Yes	Yes
PRT2	Jet A	UST	5,000	5,500	Yes	Yes	Yes

Volume of **underground capacity** in tanks = 510,000 + 510,000 + 5,500 + 5,500 = **1,031,000** gallons

Volume of **storage system capacity** in tanks = 1,050,000 + 1,050,000 + 1,050,000 + 510,000 + 510,000 + 5,500 + 5,500 = **4,181,000** gallons

Gather the Information

Pipe Segment ID	Points Connecting		Location	Nominal Diameter (in)	Internal Diameter	Length (ft)	Volume	Include In Underground Capacity?	Include In Storage System Capacity?
PR1	Isolation valve/ Point of custody transfer	Receipt Filtration	Aboveground	---	---	---	---	No	No
PR2	Truck off-loading	Receipt Filtration	Aboveground	---	---	---	---	No	No
A1	Truck off-loading	Additive tank	Aboveground	---	---	---	---	No	No
A2	Additive tank	Receipt Filtration	Aboveground	---	---	---	---	No	No
TF1	Receipt Filtration	Tank T1	Aboveground	---	---	---	---	No	No
TF2	Receipt Filtration	Tank T2	Aboveground	---	---	---	---	No	No
TF3	Receipt Filtration	Tank T3	Aboveground	---	---	---	---	No	No
TF4	Tank T1	Tank T2	Aboveground	---	---	---	---	No	No
TF5	Tank T1	Tank T3	Aboveground	---	---	---	---	No	No
TF6	Tank T2	Tank T3	Aboveground	---	---	---	---	No	No
TF7	Tank T1	Junction	Aboveground	---	---	---	---	No	No
TF8	Tank T2	Junction	Aboveground	---	---	---	---	No	No

Gather the Information

$Vol = 0.0408(D)^2 * L$

Pipe Segment ID	Points Connecting		Location	Nominal Diameter (in)	Internal Diameter	Length (ft)			Include In Storage System Capacity?
TF9	Tank T3	Junction	Aboveground	---	---	---			No
J1	Junction	Tank U1	Underground	12	11.94	500	2,908	Yes	Yes
J2	Junction	Tank U2	Underground	12	11.94	500	2,908	Yes	Yes
U1L	Tank U1	Pump System 1	Underground	12	11.94	200	1,163	Yes	Yes
U2L	Tank U2	Pump System 2	Underground	12	11.94	200	1,163	Yes	Yes
H1	Pump System 1	HL 1 header	Underground	12	11.94	6,000	34,900	Yes	Yes
PRT1L	PRT1	Pump System 1	Underground	4	4.03	50	33	Yes	Yes
P1	HL 1 header	Hydrant pit 1	Underground	6	6.07	20	30	Yes	Yes
P2	HL 1 header	Hydrant pit 2	Underground	6	6.07	20	30	Yes	Yes
P3	HL 1 header	Hydrant pit 3	Underground	6	6.07	20	30	Yes	Yes
P4	HL 1 header	Hydrant pit 4	Underground	6	6.07	20	30	Yes	Yes
P5	HL 1 header	Hydrant pit 5	Underground	6	6.07	20	30	Yes	Yes

Gather the Information

Pipe Segment ID	Points Connecting		Location	Nominal Diameter (in)	Internal Diameter	Length (ft)	Volume	Include In Underground Capacity?	Include In Storage System Capacity?
P6	HL 1 header	Hydrant pit 6	Underground	6	6.07	20	30	Yes	Yes
H2	Pump System 2	HL 2 header	Underground	12	11.94	4,000	23,266	Yes	Yes
Truck Fill Stand Line	Pump System 2	Truck refueler	Underground	10	10.02	300	1,229	Yes	Yes
PRT2L	PRT2	Pump System 2	Underground	4	4.03	50	33	Yes	Yes
P7	HL 2 header	Hydrant pit 7	Underground	6	6.07	20	30	Yes	Yes
P8	HL 2 header	Hydrant pit 8	Underground	6	6.07	20	30	Yes	Yes
P9	HL 2 header	Hydrant pit 9	Underground	6	6.07	20	30	Yes	Yes
P10	HL 2 header	Hydrant pit 10	Underground	6	6.07	20	30	Yes	Yes
P11	HL 2 header	Hydrant pit 11	Underground	6	6.07	20	30	Yes	Yes
P12	HL 2 header	Hydrant pit 12	Underground	6	6.07	20	30	Yes	Yes
							Total underground volume = 67,963		

Perform Calculation

Volume of underground capacity in tanks = 510,000 + 510,000 + 5,500 + 5,500 = **1,031,000** gallons

Volume of storage system capacity in tanks = 1,050,000 + 1,050,000 + 1,050,000 + 510,000 + 510,000 + 5,500 + 5,500 = **4,181,000** gallons

Volume of underground capacity in piping segments:
2,908 + 2,908 + 1,163 + 1,163 + 34,900 + 33 + 30 + 30 + 30 + 30 + 30 + 30 + 23,266 + 1,229 + 33 + 30 + 30 + 30 + 30 + 30 + 30 = **67,963** gallons

$$\text{Percentage of volume underground} = \frac{\textbf{volume of storage system underground}}{\textbf{volume of storage system}} =$$

$$\frac{\textbf{Volume of underground capacity in tanks+volume of underground capacity in piping segments}}{\textbf{volume of storage system capacity in tanks+volume of underground capacity in piping segments}} = \frac{1{,}031{,}000 + 67{,}963}{4{,}181{,}000 + 67{,}963} = \frac{1{,}098{,}963}{4{,}248{,}963} = \textbf{25.9\%}$$

- Since the storage system capacity is 25.9 percent underground, this example of an airport hydrant system is a regulated UST system.

Perform Calculation

Screening Tool

Volume of underground capacity in tanks = 510,000 + 510,000 + 5,500 + 5,500 = **1,031,000** gallons

Volume of storage system capacity in tanks = 1,050,000 + 1,050,000 + 1,050,000 + 510,000 + 510,000 + 5,500 + 5,500 = **4,181,000** gallons

Percentage of volume underground $= \frac{\textbf{volume of storage system underground}}{\textbf{volume of storage system}} =$

$\frac{\textbf{Volume of underground capacity in tanks}}{\textbf{volume of storage system capacity in tanks}} = \frac{\textbf{1,031,000}}{\textbf{4,181,000}}$ **= 24.7%**

- The screening tool gives 24.7 percent underground instead of the real answer of 25.9 percent underground
- This screening tool still shows that airport hydrant system is a regulated UST system.

Perform Calculation

Screening Tool 2

Volume of underground capacity in tanks = 500,000 + 500,000 + 5,000 + 5,000 = **1,010,000** gallons

Volume of storage system capacity in tanks = 1,000,000 + 1,000,000 + 1,000,000 + 500,000 + 500,000 + 5,000 + 5,000 = **4,010,000** gallons

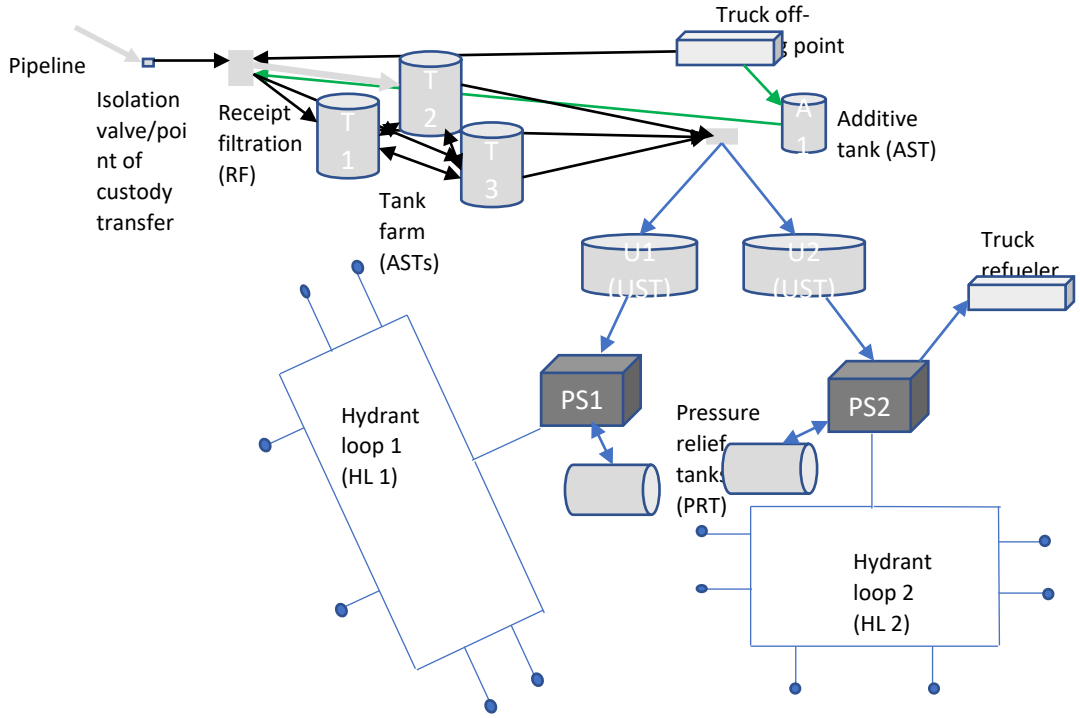
$$\text{Percentage of volume underground} = \frac{\textbf{volume of storage system underground}}{\textbf{volume of storage system}} =$$

$$\frac{\textbf{Volume of underground capacity in tanks}}{\textbf{volume of storage system capacity in tanks}} = \frac{\textbf{1,010,000}}{\textbf{4,010,000}} = \textbf{25.2\%}$$

- The screening tool 2 gives 25.2 percent underground instead of the real answer of 25.9 percent underground
- This screening tool still shows that airport hydrant system is a regulated UST system.

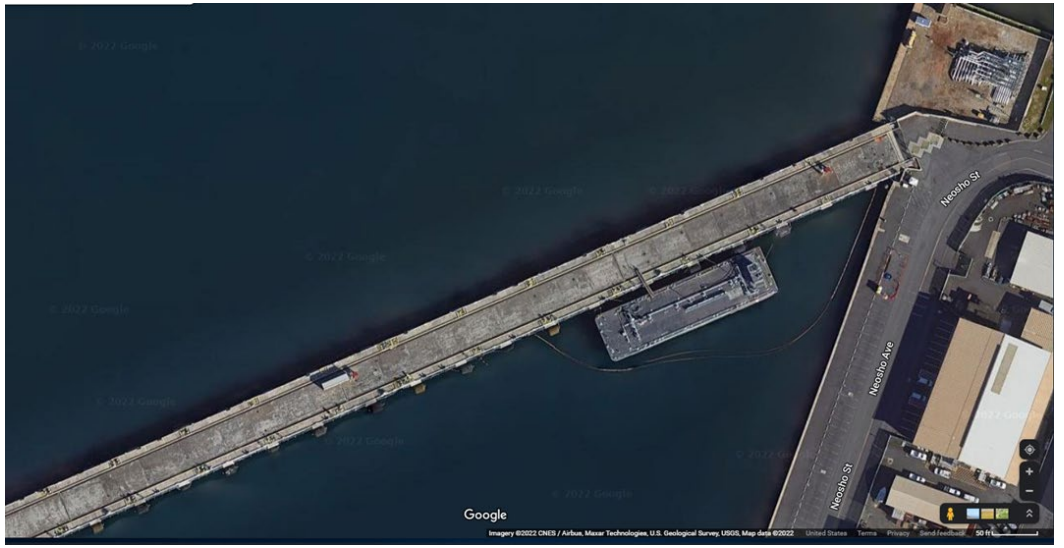
What Equipment is used?

- Where to find info on equipment:
  - SPCC plan
- Tank System Design:
  - Product Receipt
  - Product Storage
  - Product Distribution



Product Receipt

- Product can be received by pipeline (common), truck, rail or ship/barge
  - Many complex systems will have more than one delivery method
- Pipeline deliveries do not require spill prevention equipment
- Marine transfers (ship/barge) are overseen by Coast Guard and by policy not covered by UST regulations. Coast Guard also has spill prevention requirements. (33 CFR § 154.530 - Small discharge containment)



Product Receipt

Spill Prevention equipment needed for truck and rail

- SPCC will look for secondary containment for the transfer area and is more than a spill bucket
- Concrete bermed areas may be acceptable spill prevention equipment for the UST regulations

Product Receipt

- Spill Prevention
  - Catchment Basin or Concrete Berm
  - Testing for liquid tightness in accordance with PEI RP 1200 or UFC 3-460-03 Appendix B

APPENDIX C-3

SPILL BUCKET INTEGRITY TESTING HYDROSTATIC TEST METHOD SINGLE- AND DOUBLE-WALLED VACUUM TEST METHOD

Facility Name:			Owner:			
Address:			Address:			
City, State, Zip Code:			City, State, Zip Code:			
Facility I.D. #:			Phone #:			
Testing Company:			Phone #:		Date:	
This procedure is to test the leak integrity of single- and double-walled spill buckets. See PEI/RP1200 Section 8.2 for hydrostatic test method, Section 8.3 for single-walled vacuum test method and Section 8.4 for double-walled vacuum test method.						
Tank Number						
Product Stored						
Spill Bucket Capacity						
Manufacturer						
Construction	☐ Single-walled ☐ Double-walled	☐ Single-walled ☐ Double-walled	☐ Single-walled ☐ Double-walled	☐ Single-walled ☐ Double-walled	☐ Single-walled ☐ Double-walled	☐ Single-walled ☐ Double-walled
Test Type	☐ Hydrostatic ☐ Vacuum ☐ Single-walled ☐ Double-walled	☐ Hydrostatic ☐ Vacuum ☐ Single-walled ☐ Double-walled	☐ Hydrostatic ☐ Vacuum ☐ Single-walled ☐ Double-walled	☐ Hydrostatic ☐ Vacuum ☐ Single-walled ☐ Double-walled	☐ Hydrostatic ☐ Vacuum ☐ Single-walled ☐ Double-walled	☐ Hydrostatic ☐ Vacuum ☐ Single-walled ☐ Double-walled
Spill Bucket Type	☐ Product ☐ Vapor	☐ Product ☐ Vapor	☐ Product ☐ Vapor	☐ Product ☐ Vapor	☐ Product ☐ Vapor	☐ Product ☐ Vapor
Liquid and debris removed from spill bucket?*	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
Visual inspection (No cracks, loose parts or separation of the bucket from the fill pipe.)	☐ Pass ☐ Fail	☐ Pass ☐ Fail	☐ Pass ☐ Fail	☐ Pass ☐ Fail	☐ Pass ☐ Fail	☐ Pass ☐ Fail
Tank riser cap included in test?	☐ Yes ☐ No ☐ NA	☐ Yes ☐ No ☐ NA	☐ Yes ☐ No ☐ NA	☐ Yes ☐ No ☐ NA	☐ Yes ☐ No ☐ NA	☐ Yes ☐ No ☐ NA
Drain valve included in test?	☐ Yes ☐ No ☐ NA	☐ Yes ☐ No ☐ NA	☐ Yes ☐ No ☐ NA	☐ Yes ☐ No ☐ NA	☐ Yes ☐ No ☐ NA	☐ Yes ☐ No ☐ NA
Starting Level						
Test Start Time						
Ending Level						
Test End Time						
Test Period						
Level Change						
Pass/fail criteria: Must pass visual inspection. Hydrostatic: Water level drop of less than 1/8 inch; Vacuum single-walled only: Maintain at least 28 inches water column; Vacuum double-walled: maintain at least 12 inches water column.						
Test Results	☐ Pass ☐ Fail	☐ Pass ☐ Fail	☐ Pass ☐ Fail	☐ Pass ☐ Fail	☐ Pass ☐ Fail	☐ Pass ☐ Fail
Comments:						

*All liquids and debris must be disposed of properly.

Tester's Name (print) _____ Tester's Signature _____

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APPENDIX B CONTAINMENT INTEGRITY TESTING CHECKLIST

Secondary Containment/Drainage System Integrity Testing			
UST Facility		**Person Conducting Test**	
Facility Name	Facility ID#	Tester's Name:	
Physical Address		Testing Company:	
City	State	City	State
Testing Requirements			
Type of Test	☐ Code of practice developed by a nationally recognized association or independent testing		
Purpose of Test	☐ Notice of Alleged Violation ☐ Required Annual Test ☐ Post Repair Test		
Liquid Tight Test Procedure			
1. Clean containment of any debris. 2. Visually exam containment area for problem areas (gaps, cracks, sealant failure, etc.) 3. Make sure drainage valve is completely closed, *IF* adding water. 4. Add water to observe standing water at a highest point within the containment area (or conduct this test after a rain event where water has filled the secondary containment area). 5. Ensure water is calm (i.e. it is not still raining), and mark and record the high water line (e.g. using a tape measure with 1/16-in increments). 6. Leave water in containment, undisturbed for one hour (i.e. no operations are taking place). 7. Compare the starting water level to the ending level: • If the water level is the same or changed less than 1/8th (vertical) inch, the containment passed the test. • If the water level has dropped 1/8th inch or more, an investigation must be conducted. 8. After the investigation, justify why this is not a leak or identify the leak and necessary repairs.			
Test Data Table			
Test Date			
Containment Item ID No.			
Test Start Time			
Test End Time			
Test Beginning Water Level			
Test Ending Water Level			
Test Result (P/F)			
Comments:			
I hereby certify that all the information contained in this report is true, accurate, and in full compliance with legal requirements. Maintain six (6) years of test records. (Two Test Periods) Tester's Signature: _____ Date: _____			

Secondary Containment Drainage System Integrity Testing

Product Storage

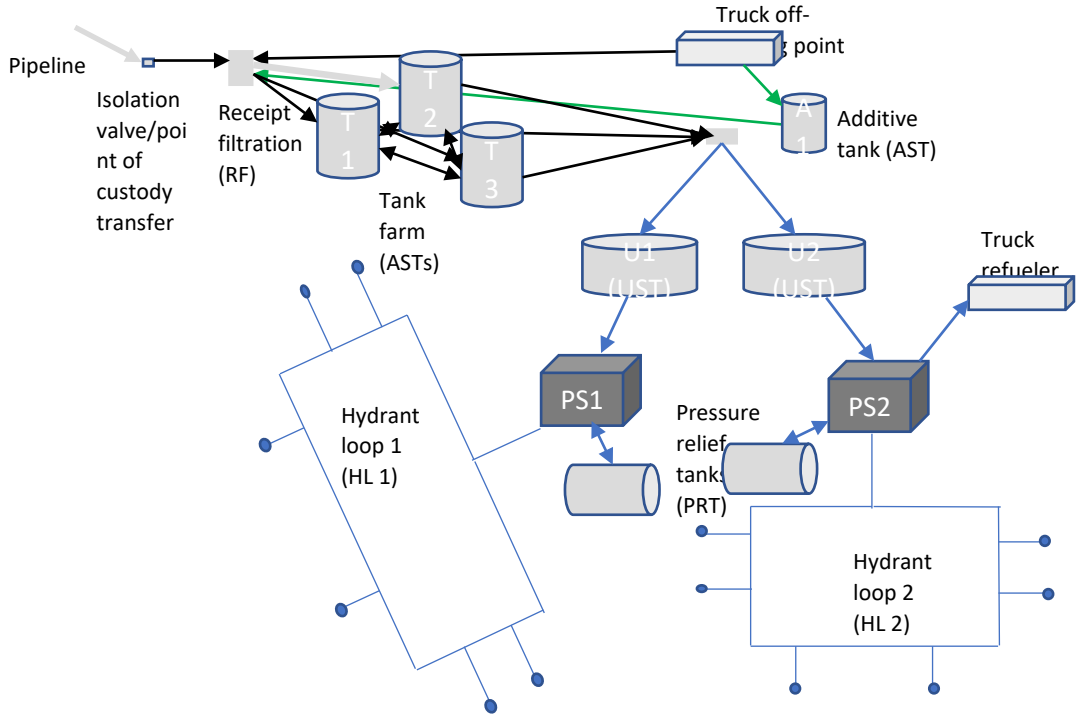
- For AHS, product filtration between all or most product movement (before going into storage and during distribution)
- If transfer line is underground, then need to know if line is normally empty. If empty, then no prevention requirements. If holding product, then treat like product piping.

- ASTs partially excluded
  - Requirements limited to corrosion protection and compatibility for tanks installed after May 8, 1985 and before October 13, 2015

Product Storage

Underground tanks (fully buried, partially buried and bunkered) need:

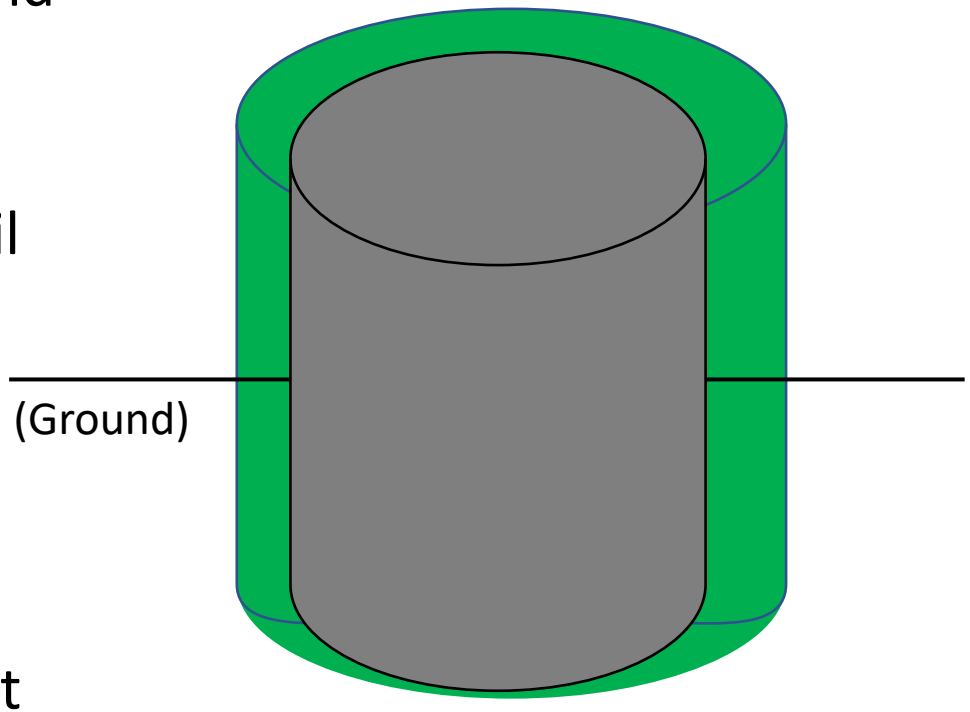
- Overfill Prevention
  - High level alarms + functionality testing
  - Procedures for preventing overfilling a tank
  - How is delivery/fuel movement stopped if overfill prevention alarm is activated?



Product Storage

Underground tanks (fully buried, partially buried and bunkered) need:

- Corrosion Protection
  - Bunkered tanks that have no contact with soil (contact with just concrete) - no cathodic protection required
- Release Detection
  - New installs – secondary containment with interstitial monitoring
  - Others typically use tank tightness testing but other options are available



Product Distribution

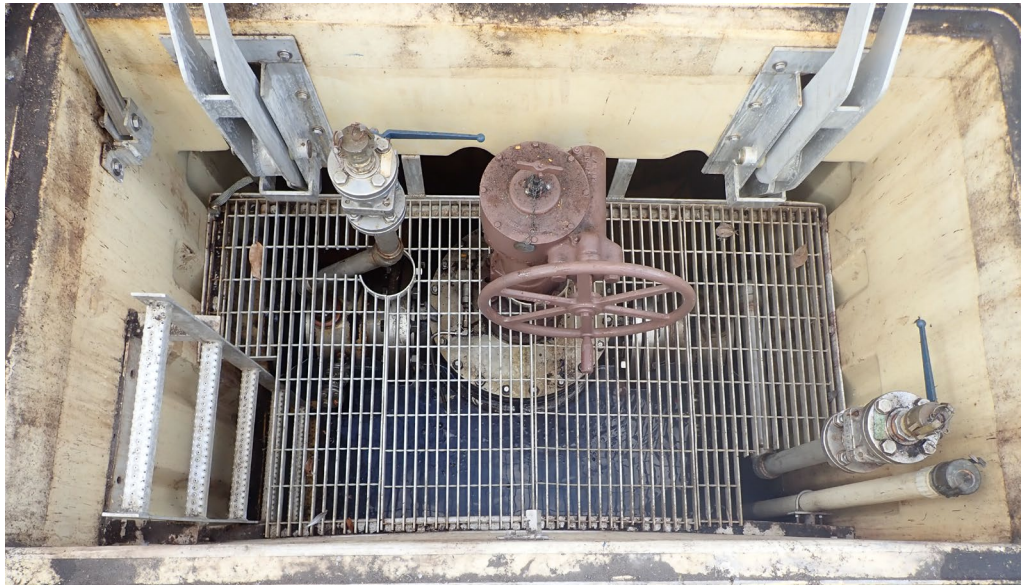
Underground piping

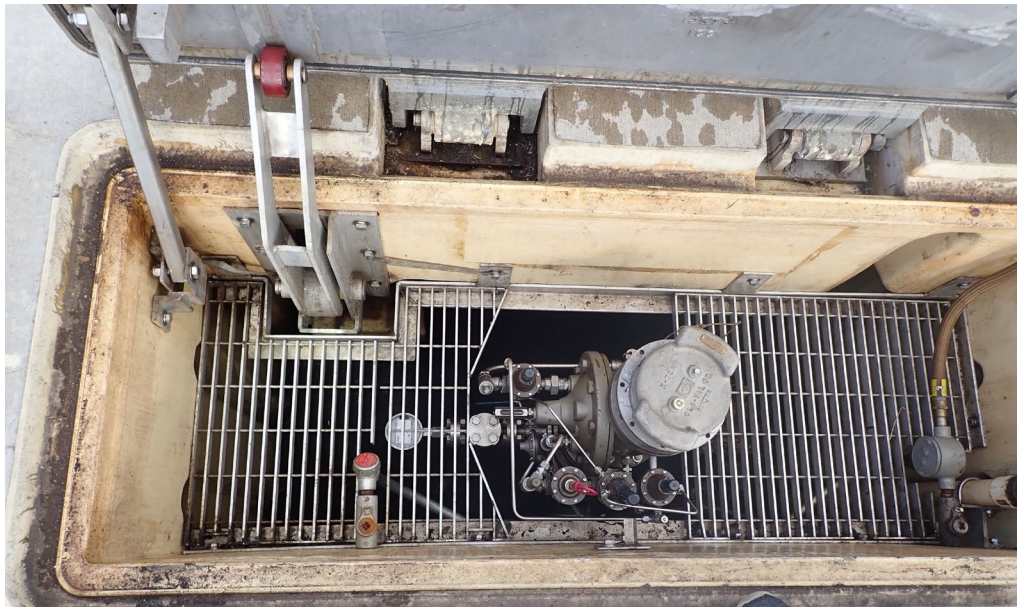
- Corrosion Protection
  - DoD – airport hydrant uses stainless steel – CP still required
  - May see combination of impressed current for storage tanks and sacrifical anodes for product piping
- Release Detection
  - Line testing requirement is based volume of line segment
  - Likely need to isolate piping segments using double block and bleed valves
  - Secondary containment and ALLD not required for hydrant systems or piping connected to field-constructed tanks larger than 50,000 gallons

Product Distribution

Underground piping

- Walkthrough Inspection
  - Hydrant vaults
  - Hydrant pits
  - Containment sumps associated with the operations of the tank system





Inspection Issues

- General Questions and then follow product flow through the facility
- General Questions
  - Operator Training
  - Financial Responsibility
  - What repairs to the tanks and piping network have been made? What was the cause for making the repair? Was testing completed at the conclusion of the repair?

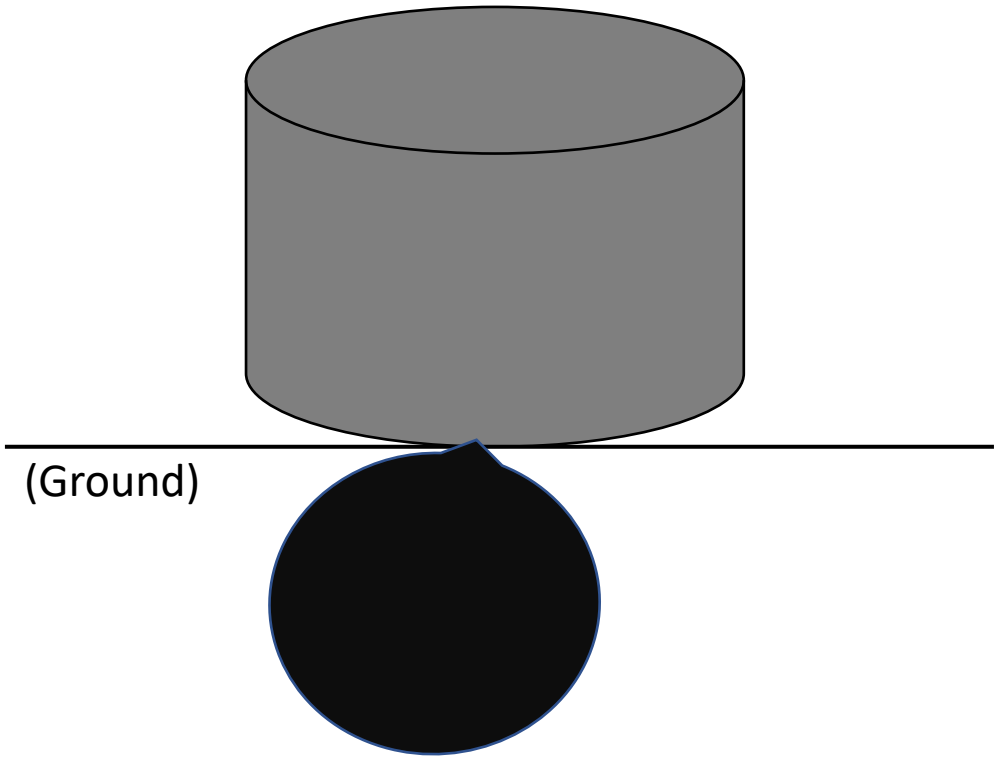
Inspection Issues

Closure Issues

- Options for closure includes
  - Removal of tanks
  - Closure in place by filling with solid inert material
  - Method acceptable to implementing agency
- Site Assessment
  - Must evaluate for releases at all locations at the site where contamination is likely to be found
  - Includes portions of storage system that remain in-service after closure of underground portion.

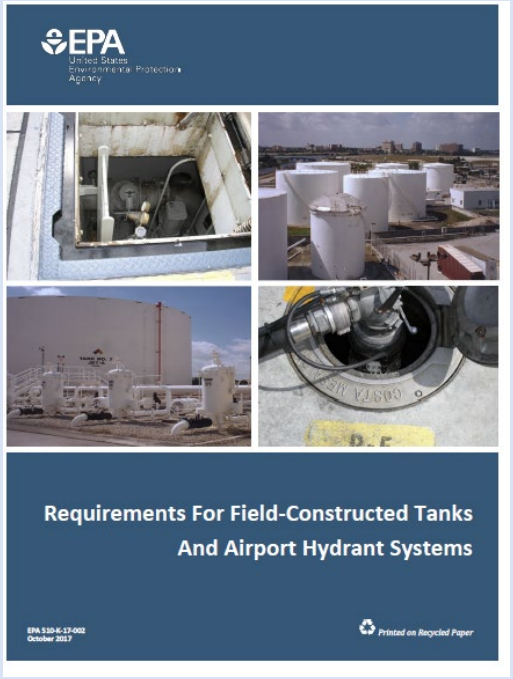
Inspection Issues

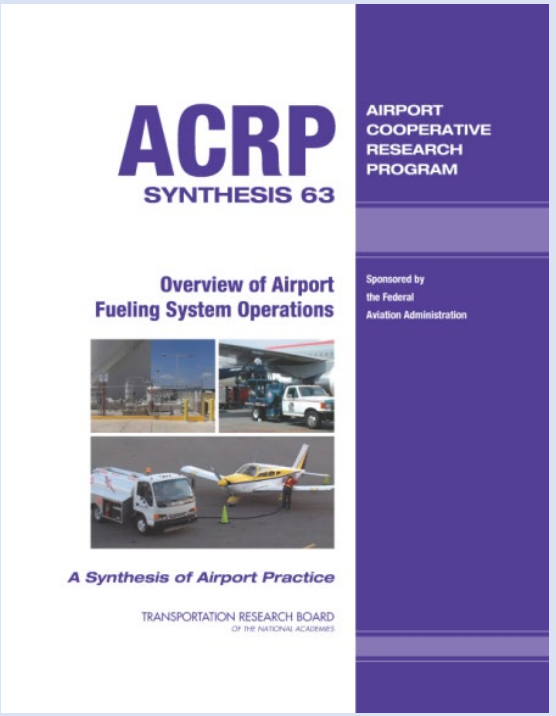
- Release Response
  - Any leaks/releases from UST system
  - Include aboveground piping and aboveground storage tanks



Resources

- EPA: Requirements For Field-Constructed Tanks And Airport Hydrant Systems
- National Academy of Science: https://nap.nationalacademies.org/catalog/22141/overview-of-airport-fueling-operations





NEIWPCC EPA ASTSWMO pennsylvania
NTC 2022

Next steps

- Inspection support
- Inspection training
- Revised EPA manual

- Webinar for State and Federal inspectors on UST and SPCC requirements in January 2023

Questions?