



***UST INSPECTOR
TRAINING WEBINAR
SERIES:***

***EMERGENCY POWER
GENERATOR UST SYSTEMS –
PART 2***


12/14/2021

TODAY'S SPEAKERS

Tim Smith | *U.S. EPA*

**John Cignatta | *Datanet
Engineering, Inc.***





**NEIWPCC's
Emergency Power Generator
UST Systems Webinar
December 14, 2021**

Tim Smith

EPA Office of Underground Storage Tanks



Introduction

- EPG UST systems always covered by UST regulations
- Release detection no longer deferred
- RD options
- Recap of Part I – how to know if covered and key RD challenges
- EPA guidance
- Release response concerns



No Longer Deferred From Meeting Release Detection Requirements

- Original UST regulation became effective December 22, 1988.
- Did not have to meet release detection requirements.
- EPA adopted the revised regulation on July 15, 2015 with an effective date of October 13, 2015.

No Longer Deferred From Meeting Release Detection Requirements (Cont.)

Removed the 1988 deferral and requires release detection for all emergency generator tanks

- Required at installation for UST systems installed after October 13, 2015.
- By October 13, 2018 required for systems installed on or before October 13, 2015.





What Are The Release Detection Requirements

Subpart D

April 11, 2016

- Installed on or before – All method options available.
- Installed after – Secondary containment and interstitial monitoring.
- Tank
- Piping
 - Suction systems.
 - Pressurized systems.



What Are the Release Detection Requirements (Cont.)

Tank Options

- Interstitial monit.
- ATG
- SIR, CITLD
- Manual tank gauge
- Groundwater or vapor monitoring
- Other method

Piping Options

- Suction piping
 - Safe or
 - 3-yr. LTT or 30-day
- Pressurized piping
 - ALLD, plus
 - Interstitial monit. or
 - Annual LTT
 - or tank method applicable to piping.

What Are the Release Detection Requirements (Cont.)

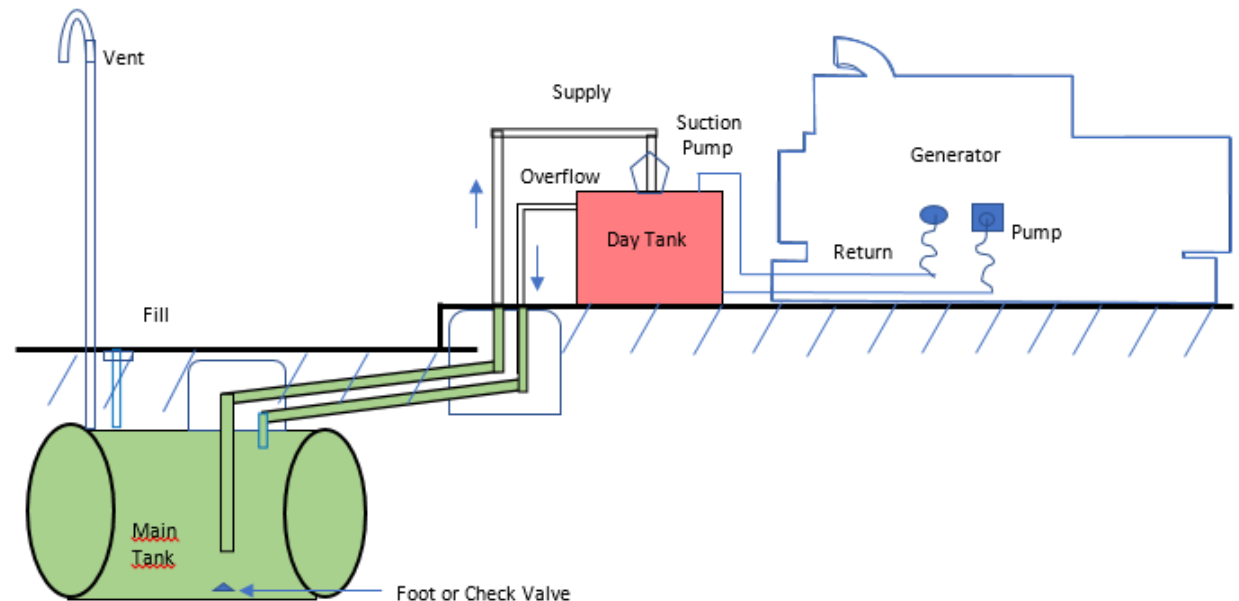
2015 Operational Requirements: Annual release detection equipment testing

- Ensure release detection equipment is operating properly.
- Completed by October 13, 2018.
- Keep records for 3 years.



Brief Recap of Webinar Part 1

- *“Does the power generator system have to comply with federal UST regulation?”*
- Is 10 percent or more of “total system” beneath the surface of the ground?





Does the Power Generator System Have To Comply? (Cont.)

- Does any federal UST regulatory exclusion apply?
- Most are unlikely to apply:
 - Farm or residential tank of 1,100 gallons or less capacity used for storing motor fuel for noncommercial purposes.
 - Septic tank.
 - Surface impoundment, pit, pond, or lagoon.
 - Storm water or wastewater collection system.
 - Flow-through process tank.
 - Liquid trap or associated gathering lines directly related to oil or gas production and gathering operations.



Does the Power Generator System Have To Comply? (Cont.)

- Does any federal UST regulatory exclusion apply?
- These are most likely to apply:

- **Heating oil exclusion**

Storage systems used for storing heating oil for consumptive use on the premises where stored.

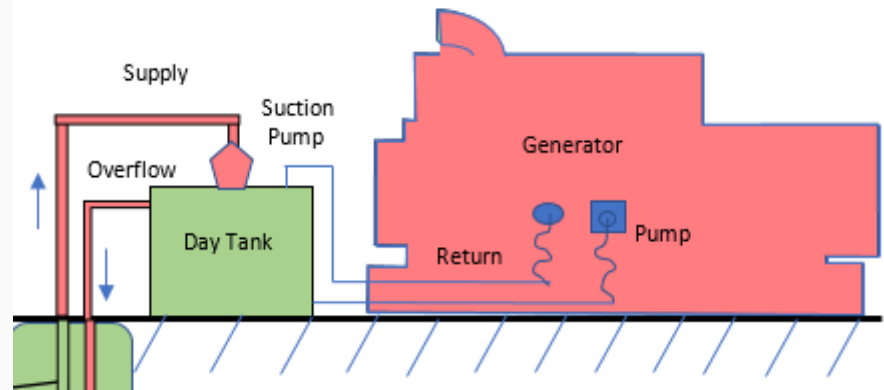
See www.epa.gov/ust/frequent-questions-about-underground-storage-tanks

- **Underground exclusions areas**

Storage systems situated in an underground area—such as a basement, cellar, mineworking, drift, shaft, or tunnel—if the tank or combination of tanks is situated on or above the surface of the floor. **No portion of any tank can be beneath the surface of the ground or otherwise covered with earthen material.**

Features Of These Systems That Present A Challenge To Meeting RD Requirements

- The power generator and other components regulated beyond UST regs
 - NFPA language about no valves in supply and return lines.
- Day tanks and other connected aboveground tanks
 - Regulated per definition of UST.
- Product return piping
 - Nonoperational components





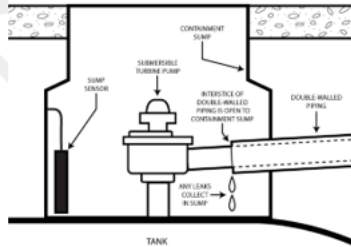
Available And Soon To Post Resources

- Straight Talk On Tanks.
- UST Technical Compendium.
 - <https://www.epa.gov/ust/underground-storage-tank-ust-technical-compendium-about-2015-ust-regulation#generators>
- Requirements For Emergency Power Generator UST Systems
- AIM (Automated Interstitial Monitoring) Systems Guidance (2 parts)
 - Using An Automated Interstitial Monitoring System To Meet Federal UST Requirements For Underground Pressurized Piping On Emergency Power Generator UST Systems
 - Federal UST Requirements: Automated Interstitial Monitoring Systems For Emergency Power Generator UST Systems

Draft Deliberative Document – Do Not Cite, Quote, Or Distribute 12/8/21

Using An Automated Interstitial Monitoring System To Meet Federal UST Requirements For Underground Pressurized Piping On Emergency Power Generator UST Systems

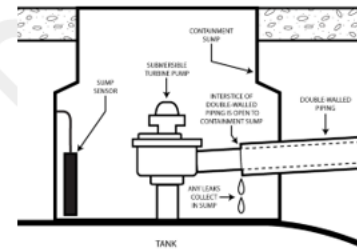
December 2021



Draft Deliberative Document – Do Not Cite, Quote, Or Distribute 12/8/21

Federal UST Requirements: Automated Interstitial Monitoring Systems For Emergency Power Generator UST Systems

December 2021





Highlights of New EPA Guidance Documents

AIM (Automated Interstitial Monitoring) Systems Guidance (2 parts)

- Part 1: User's guide
 - Descriptions & examples of systems
 - Checklists
- Part 2: Rationale, reg. allowance, technical
- 3 categories of AIM systems
- Relies on integrity of secondary containment
- Recommended for EPG UST systems only



Requirements For Emergency Power Generator UST Systems

EPA 510-K-21-001
2021

 Printed on Recycled Paper



Highlights of New EPA Guidance Documents

(Requirements For Emergency Power Generator UST Systems)

- Spill & overflow for *ASTs
- CP requirements for *ASTs
- RD for *ASTs.
- Piping in aboveground rooms such as basements.
- Recommended walkthrough inspection items for *ASTs.
- Addressing leaks and releases from aboveground components.

*ASTs that are part of the UST System



Release Detection And Broader Release Response Concerns

- Release detection concerns are not specific to underground components.
- Facility concern is for complete environmental protection.
- Actions may be required by federal UST regulation due to aboveground component impacts.
- Other local, state, and federal programs may apply.



Release Detection And Broader Release Response Concerns (Cont.)

- Facilities subject to the SPCC regulation
 - Intended to help facilities prevent a discharge of oil into navigable waters or adjoining shorelines) are required to follow certain federal reporting requirements.
 - In general, SPCC requires that any person in charge of an onshore or offshore facility must notify the National Response Center (NRC) immediately after he or she has knowledge of the discharge. Oil discharges that reach navigable waters must be reported to the NRC at 1-800-424-8802 or 1-202 426-2675. The NRC is the federal government's centralized reporting center, which is staffed 24 hours per day by U.S. Coast Guard personnel.



QUESTIONS?

Contact Info

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Emergency Power Generator UST Systems—Part 2

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**For Information on fuel tank courses go to
National Petroleum Training Institute at:**

<https://www.nptinstitute.com/>

Any E-Gen Fuel Release Is a Bad Fuel Release



Drawing from NFPA

- Generator fuel systems are immediately outside **or even inside** the facility they are providing back up power
- Undetected releases below grade, in tunnels or crawls spaces can continue for weeks (or until tank is empty)

E-Gen Fuel System Regs Are Poorly Understood and Enforced



- Few engineers/contractors can pass an exam on applicable regs from Mr. Tim Smith, EPA
- Consequently, diesel releases continue to be commonplace

E-Gen Fuel System Releases Are Avoidable:



IF ALL COMPONENTS ARE:

- Designed
- Installed
- Tested, and
- Maintained

per applicable regs, codes and industry standards

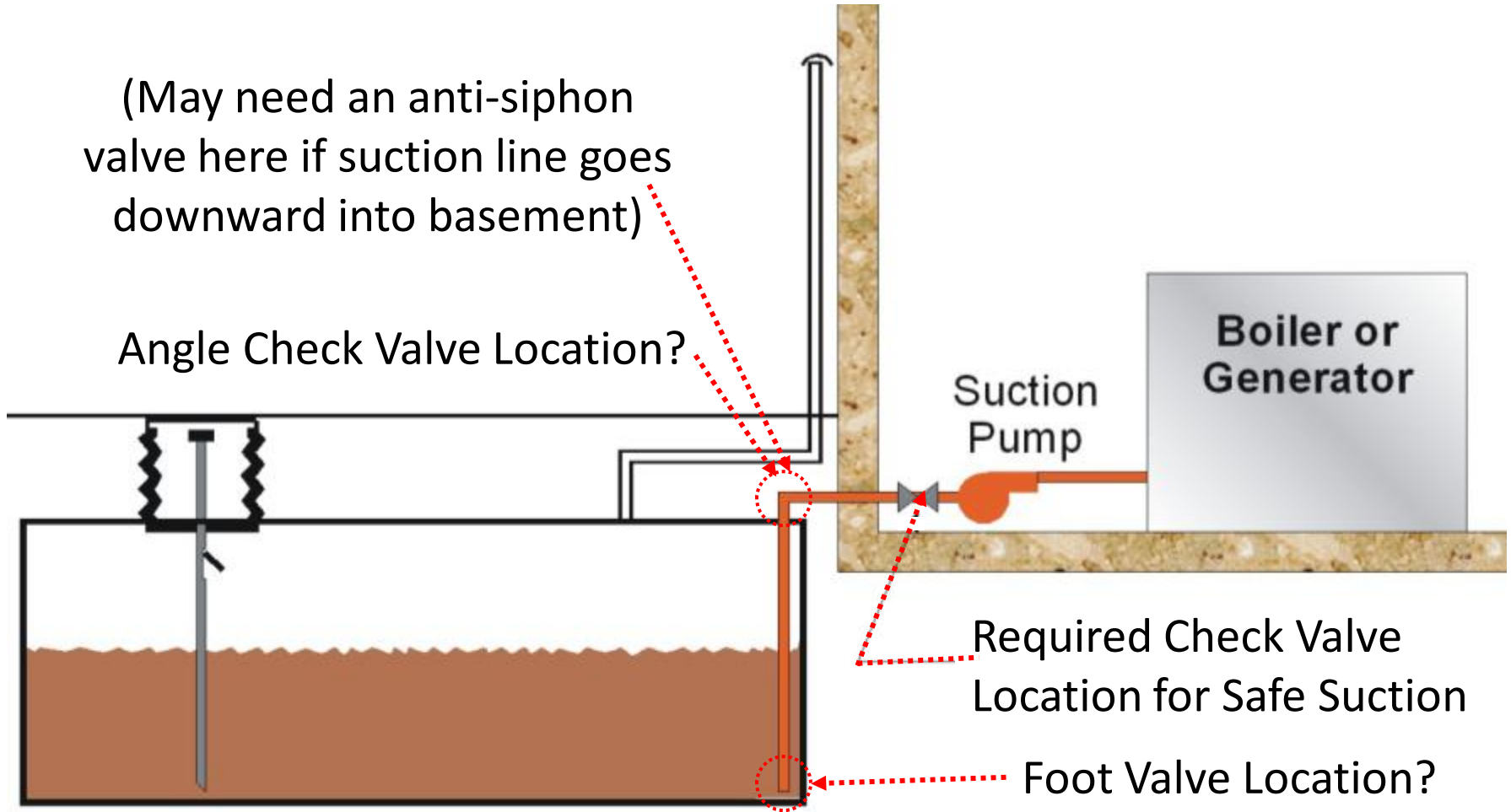
How are E-Gen fuel pipe releases both prevented and detected?

- **Pressurized lines:**
 - **Monitored double wall piping & ALLD**
 - **Single wall piping with testing & ALLD**
- **Suction lines:**
 - **Single wall piping with Safe Suction**
 - **Single wall piping with testing**
 - **Monitored double wall piping**

Critical Issues on Suction Piping:



- Are pipes single wall
- How are they monitored
- Is it safe suction?
 - Single wall piping
 - Must drain back to tank
 - Only one check valve at highest point in the system
 - Who proved there was only one check valve



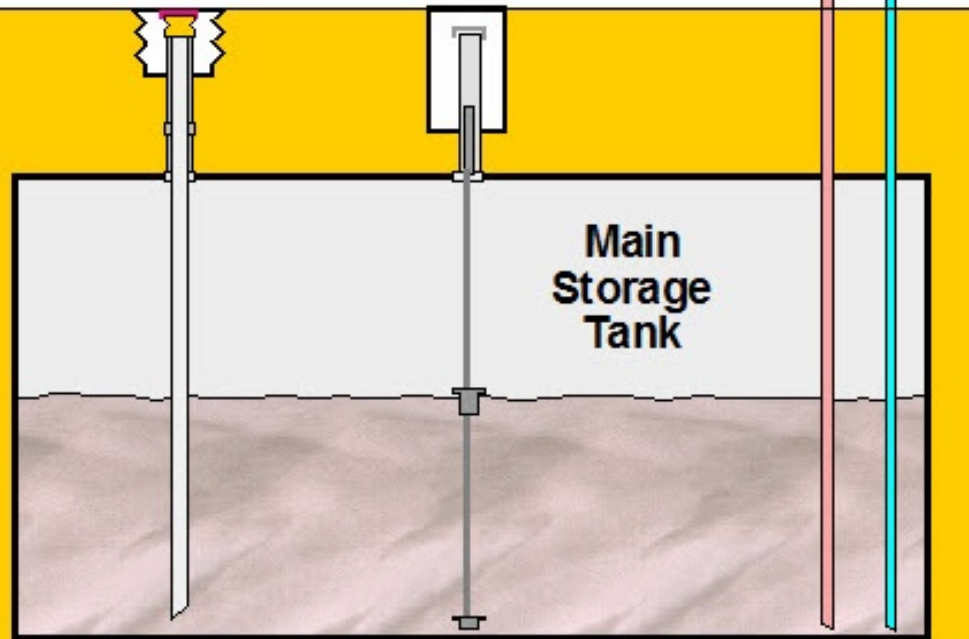
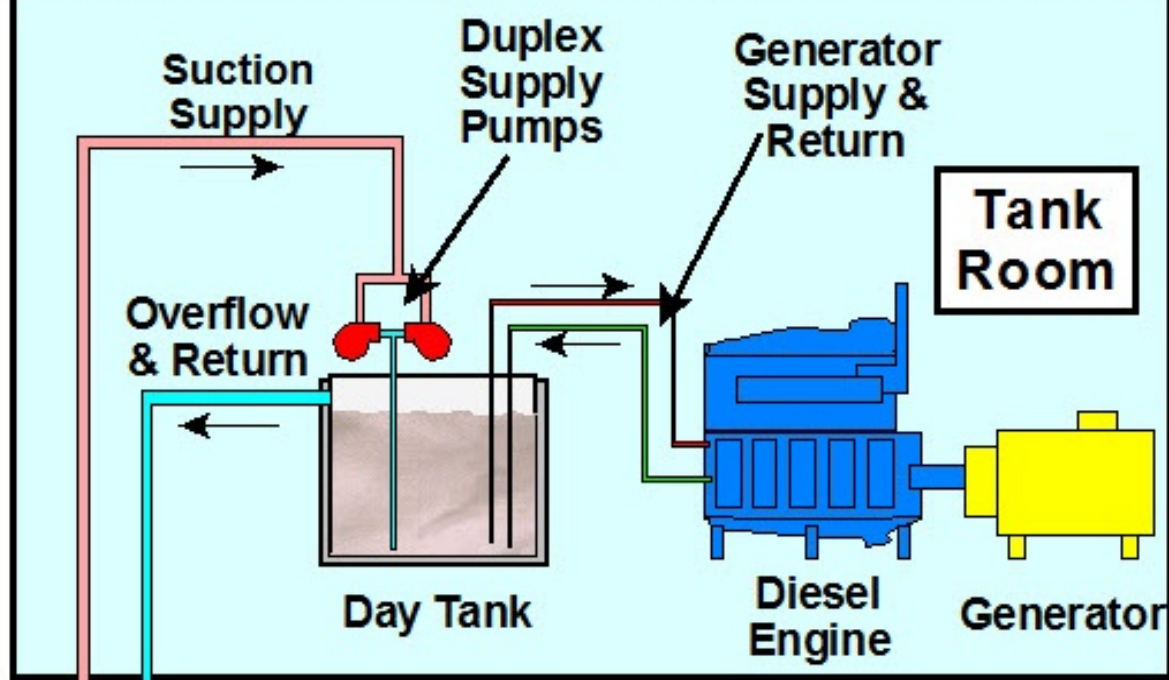
Typical suction system for boiler or emergency generator. Pump may be inside building or in a cabinet above the tank. Check valve location is critical.

Major Problems from Piping Between Main Tank → Day Tank

- **Suction Piping:**
 - Pump at E-Gen
 - Safe-suction?
 - Return/overflow line pressurized?
- **Pressurized Piping:**
 - Could be an STP in UST
 - Could be pump above UST
- **Overflow and Return Pipe Monitoring**

Suction System

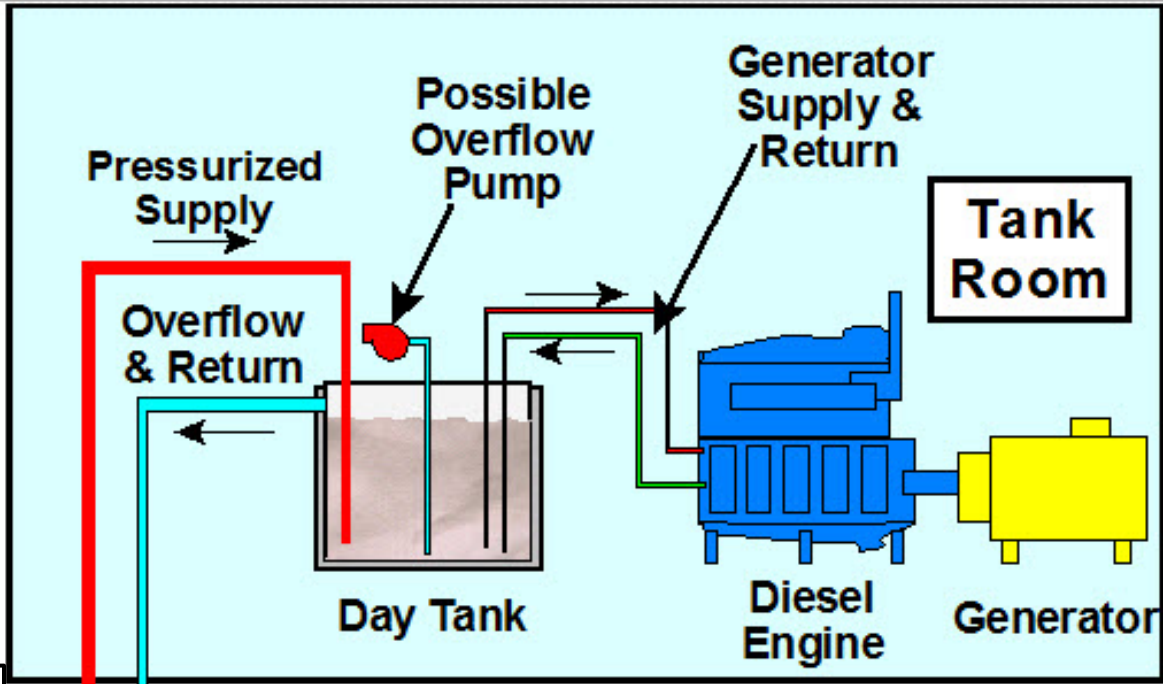
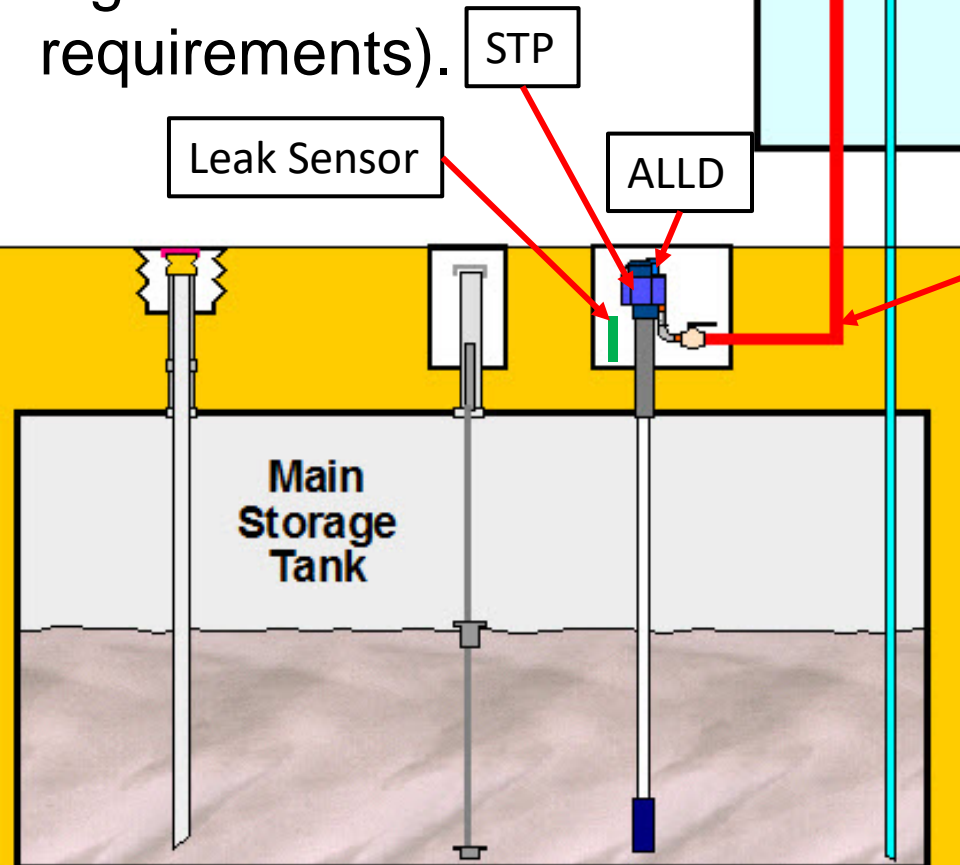
E-Gen day tanks provide immediate fuel adjacent to diesel engine. Needed due to codes for positive fuel pressure to diesel engine.



Main Tanks provide bulk of fuel for stand-by power. Tank may be either above or below ground and possibly also inside the building served. Many problems with suction supply and return piping.

Pressure System

E-Gen day tanks usually supplied from USTs with STPs. More common with larger sites (i.e., higher fuel flow requirements).



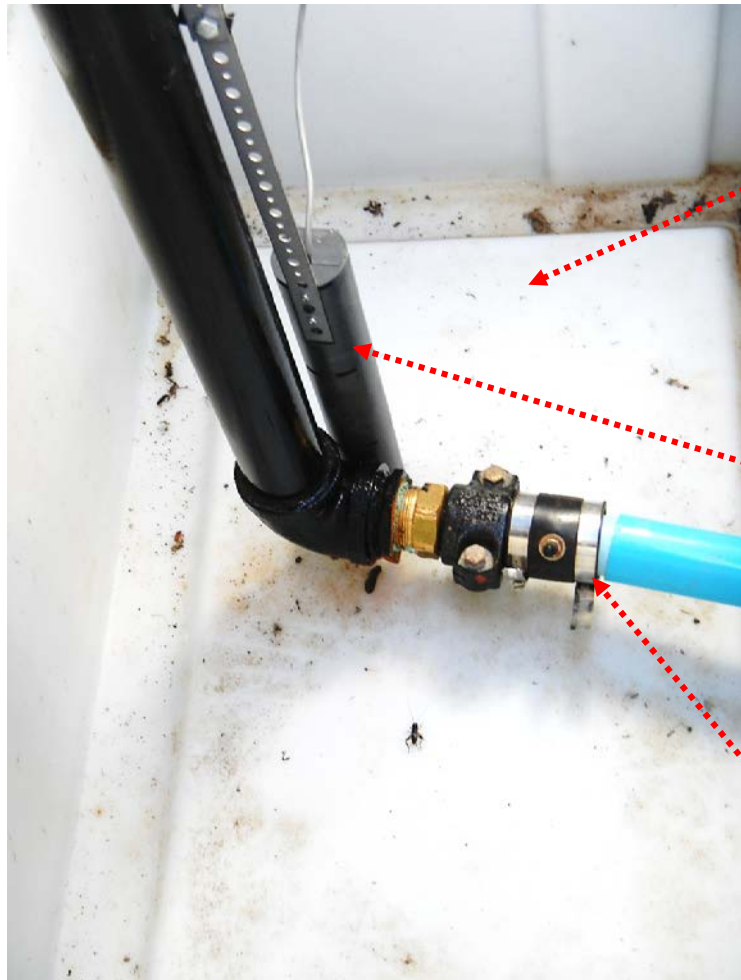
Double Wall Pipe

When using pressurized flow (i.e., STP), all requirements for remote fuel pumping systems must be met.

Types of Piping Release Detection Systems: (Pressurized or Suction)

1. Sumps equipped with liquid sensors
2. Sumps manually checked for releases
3. Double wall piping systems such as:
 - a. Monitored brine reservoirs
 - b. Monitored vacuum or pressure systems
 - c. Interstitial wire sensors

Typical Sump Sensors:



Sealed
Sumps

Electronic
Sensors

Open
Transition
Boots



Pressurized Piping Automatic Line Leak Detection Systems:

- 1. Mechanical LLDs
(MLLDs)**
- 2. Electronic LLDs
(ELLDs)**

MLLDs Only Monitor Downstream Line Pressure



FE Petro

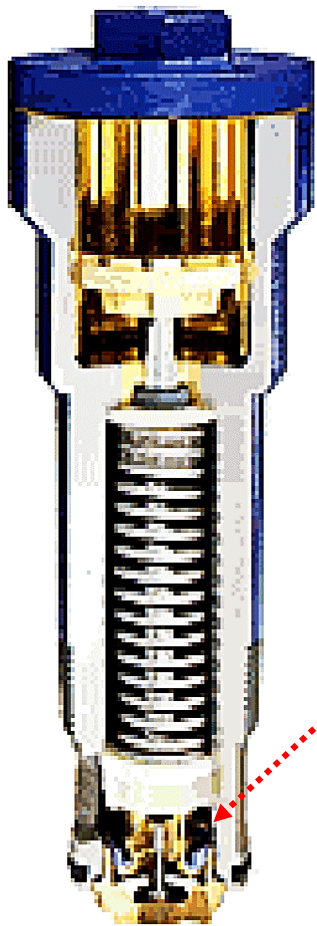


Red Jacket



VMI

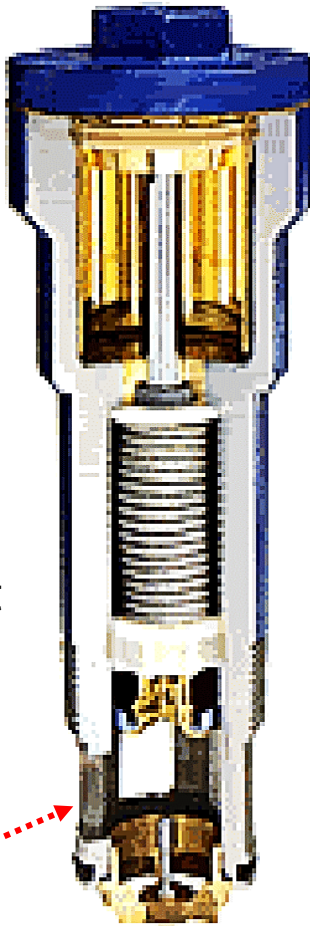




Valve closed
except for
metering port

Valve fully
opened

**Test or Tripped
Position**



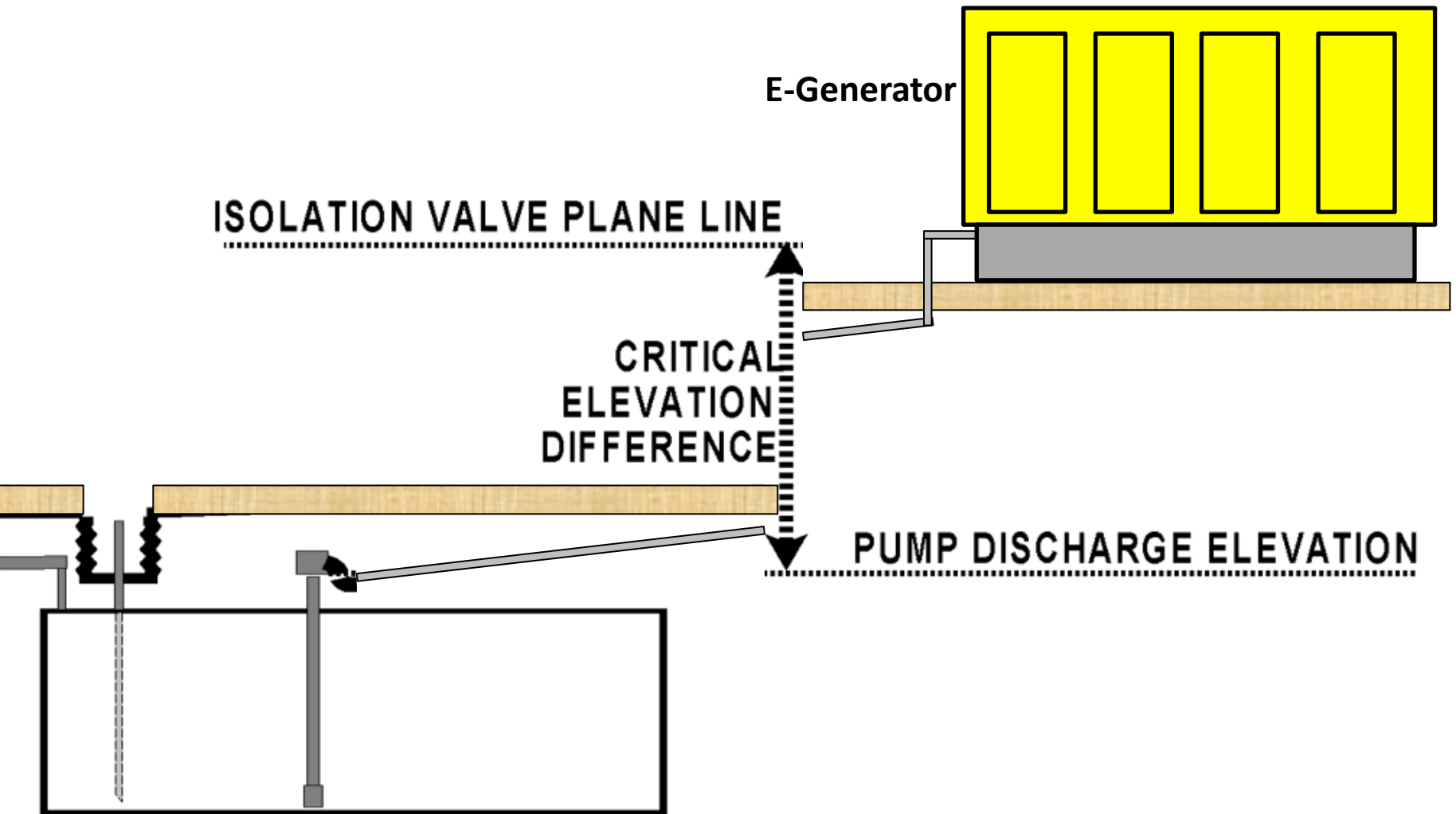
**Full-Flow
Position**

When downstream pressure in fuel line drops below ~ 1 psi, the spring force exceeds the piston, and the valve closes as shown in left photo.

When pump turns "ON", some fuel flows through metering port into downstream line. If downstream pressure rises above ~ 3 psi, then piston will overcome spring force and fully open valve to allow full flow as shown at right.

For LLD to activate, the pump must cycle "ON and "OFF". A continuously operating pump will keep pressure above tripped level and LLD will never sense a leak.

Critical Static Height LLD Limit:



Critical Static Height LLD Limit

- MLLDs with large static head of fuel pushing back (e.g., >11 ft) cannot detect leaks higher than their critical height limit
- Leaks higher than critical limit require extraordinary measures for MLLDs to work
 - VMI can provide custom unit for higher operating heights downstream of MLLD
 - Ladder circuit with sequenced solenoid valves might also work

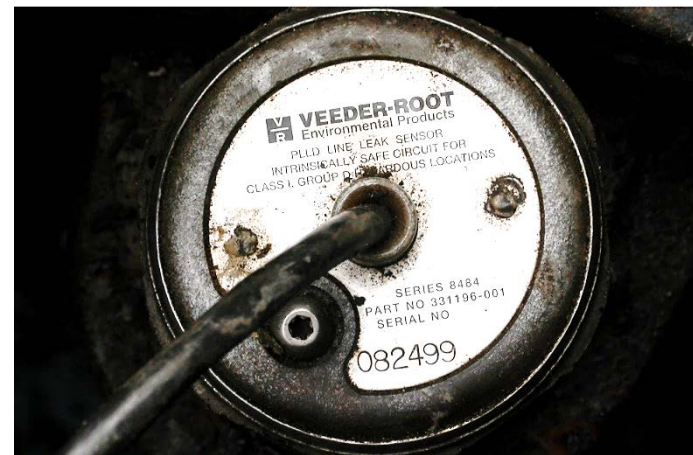
Typical ELLDs:



ELLD usually is positioned at in-pump position as shown at left.



Common ELLDs



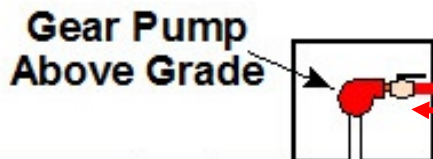
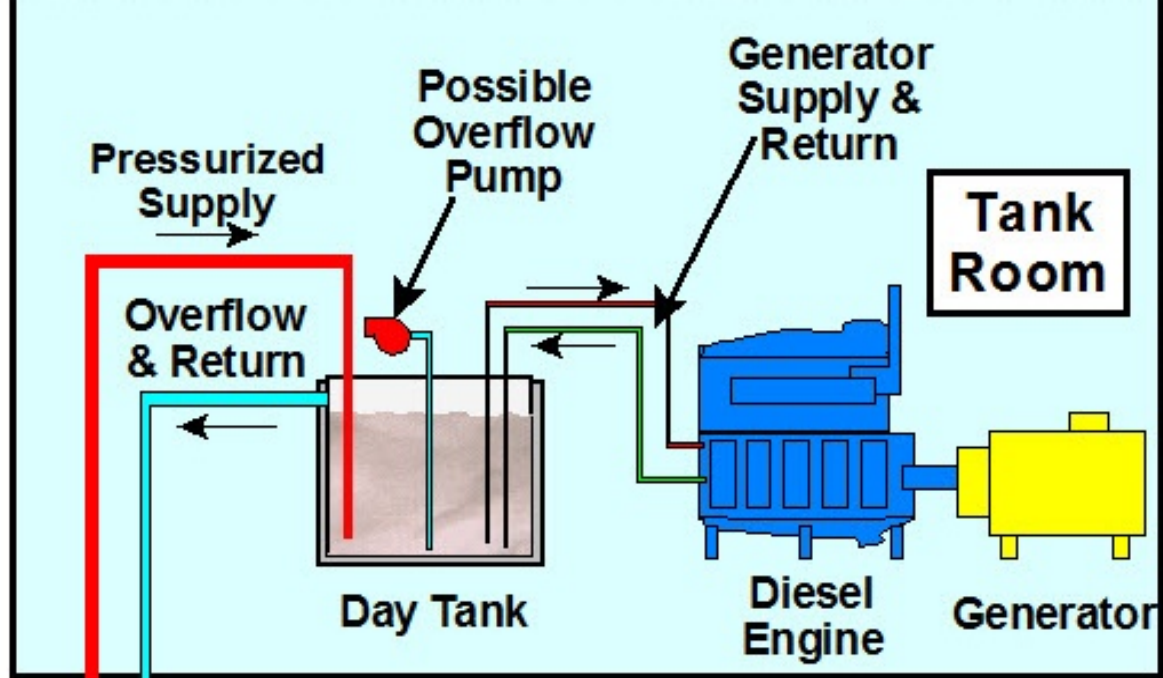
MLLD and ELLD Differences:

- **MLLDs are cheaper**
- **MLLDs are more reliable**
- **MLLDs do not stop flow**
- **VMI MLLD can be supplemented to shut down pumps**

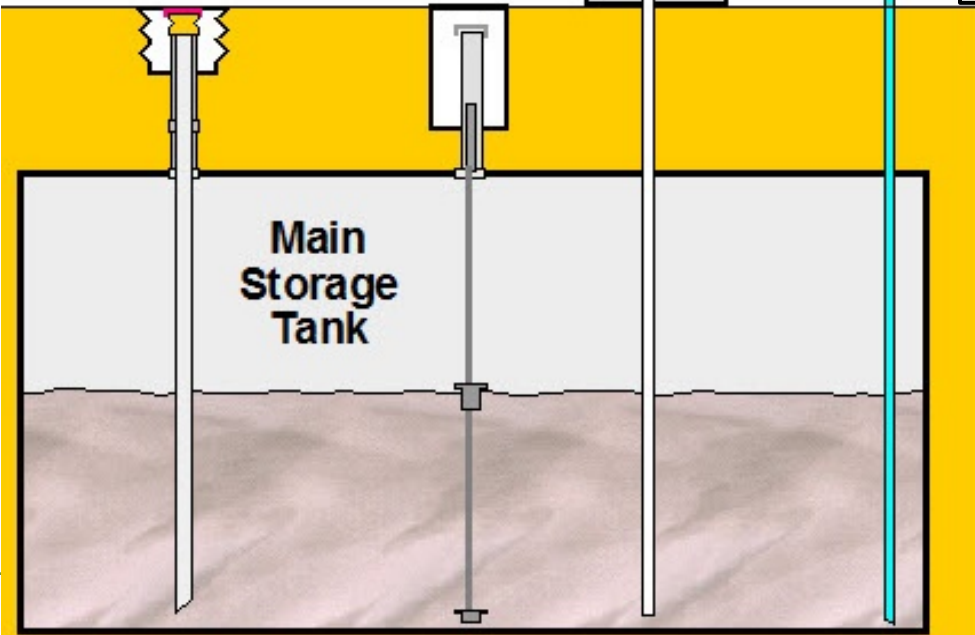
MLLD and ELLD Differences:

- **ELLDs are more expensive and require an ATG**
- **ELLDs are more sensitive and can detect smaller releases**
- **ELLDs can trigger alarms**
- **ELLD alarms can be ignored by site personnel**
- **ELLDs can have ATGs equipped & programmed to shut down pumps**

E-Gen day tanks can also be supplied with above ground pumps. This is still a remote pressurized pipe run.



Needs ALLD?



When using pressurized flow even from an aboveground pump, all requirements for remote fuel pumping systems must be met.

How to Install MLLD on Remote non-STP Pressurized Line

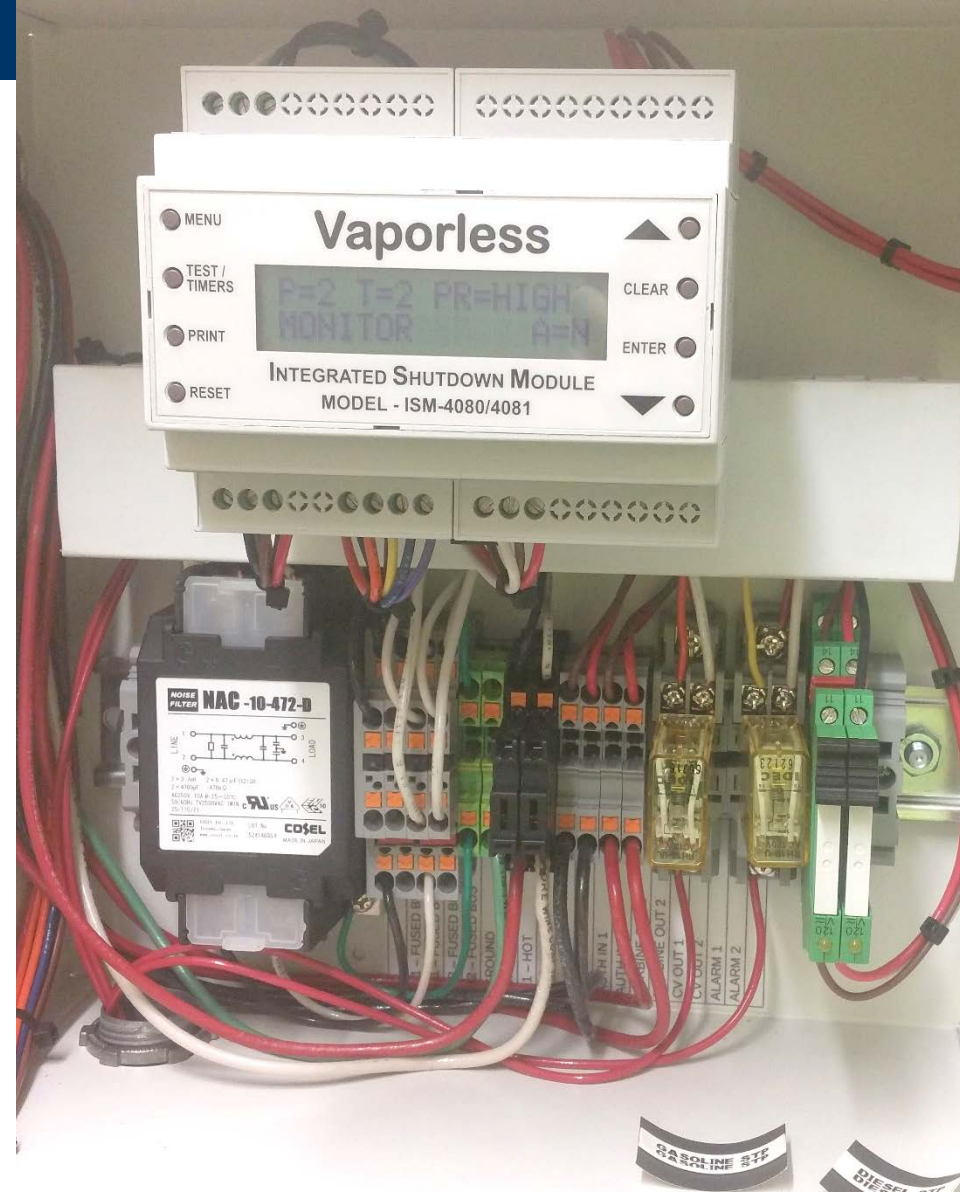
- All piping downstream of a pump is considered “pressurized”
- Absence of STP does not eliminate need for ALLD
- ALLD can be provided on any pressurized line with a pilot operated valve



Sump at left contains a pressurized line highlighted with yellow arrow that is feeding two other buried fuel lines. The red valve is a pilot operated diaphragm valve. It is controlled by a Red Jacket MLLD. No power is required since it is the pressure of the fuel that powers the valve. The MLLD merely switches the valve open or closed.

How to Shut Down Fuel Pump with MLLDs:

- **Need VMI LLD at STP**
- **Add VMI piston sensor atop MLLD**
- **Add VMI Integrated Shutdown Module (ISM) to pump motor control**
- **Wire ISM to sensor and pump controls**
- **If ISM senses pump is “ON” yet MLLD is “CLOSED”, pump shuts down**



VMI LLD with sensor at left monitors piston movement. VMI controller at right shuts down STP if LLD stays closed.

How to Test MLLDs:

- Annual requirement
- Industry standard is PEI RP1200
- Simulates 3 Gal/hr release furthest from LLD
- If LLD trips, system passes



Before You Run Off:



- **Big difference between heating oil USTs and E-Gen fuel systems**
- **E-Gens far more complicated**
- **Releases from E-Gens can make national news when they light off or leak badly**

Enforcement for E-Gen Fuel Systems



- E-Gen fire every 5 days
- Most compliance officers not trained on any aspect of system except UST
- Most of the releases and causes of releases/fires are **NOT** the UST
- Solution is Education

**For Course Information on
Upcoming UST and AST Classes,
Contact the National Petroleum
Training Institute
at 855-955-NPTI or
www.NPTInstitute.com**





Next UST Inspector Course is April 11-15, 2022
Next AST Inspector Course is March 7-11, 2022
at NPTI Training Center near Baltimore

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Questions?



THANK YOU, SPEAKERS!

Tim Smith | *U.S. EPA*

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UST Inspector Training Series: <https://neiwpc.org/our-programs/underground-storage-tanks/ust-training-resources-inspection-leak-prevention/webinar-archive-inspector-training/>

LUST Corrective Action Series: <https://neiwpc.org/our-programs/underground-storage-tanks/lust-training-resources-corrective-action/webinar-archive-corrective-action/>

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Thank you for your participation!