

**NJDEP Air and Hazardous
Materials Compliance &
Enforcement**

*Underground Storage
Tank Inspection
Program*

BUREAU OF HAZARDOUS WASTE & UST COMPLIANCE AND ENFORCEMENT

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Administrative Assistant Krista McGee– 609-043-3019
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Brooks, Auradis	973-656-4415	609-462-5649
DeAppolonio, Paul	973-451-5620	609-468-3048
Marlowe, Kevin	973-656-4415	609-439-9589
Norville, Lorraine	609-292-6051	609-477-4263
Provost, Jenna	973-656-4415	609-672-1309
Stavash, John	973-656-4415	609-439-9602
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Silcox, Sonya	609-292-6051	609-209-1799
Davis, Greg		609-439-9414
Lenik, Jennifer (S)	856-614-3615	609-672-1802
Lenoir, Kristina (S)	856-614-3615	609-221-3306
Pierson, Janelle	609-292-6051	609-672-1327
Bailey, Eric		

What do we do??

- Standard compliance inspections of facilities with a regulated underground storage tanks
 - Vapor recovery inspections at UST regulated facilities
 - Incident investigations
 - Issue enforcement actions/settlements
 - Impose delivery prohibitions or cease use orders (NJDEP only)
 - Outreach/compliance assistance
-
- ❖ 2014 CEHA contract includes 67 SCIs performed and entered into NJEMS prior to 1/1/15. 25% of work should be performed each quarter.
 - ❖ No target numbers for FNOVs, though 50% or greater is average.

Remember...

- EVERYTHING we/you do is public record thanks to OPRA
- Be professional, be proficient, be consistent
- CEHAs are held to the same standard as DEP inspectors, so follow our procedures
- All inspection reports and enforcement documents/settlements are approved at DEP level **only** in this program
- The only stupid question REALLY is the one you don't ask (even if I get a chuckle out of it)
- Chronic poor performance or incomplete work leads to program suspension, withholding of grant funds, and possible removal from the program

TANK CONSTRUCTION

UNDERGROUND STORAGE TANK EQUIPMENT N.J.A.C. 7:14B REQUIREMENTS

UNDERGROUND TANKS

Single Wall

Double Wall

CONSTRUCTION

Fiberglass Reinforced Plastic (FRP)

1, 2, 3, 5 & 6

Coated Steel (epoxy/FRP/urethane: UL 1746 criteria)

1, 2, 3, 5 & 6

Steel w/Passive System

1, 2, 3, 4 (cathodic test every 3 years), 5 & 6

Steel w/Impressed System

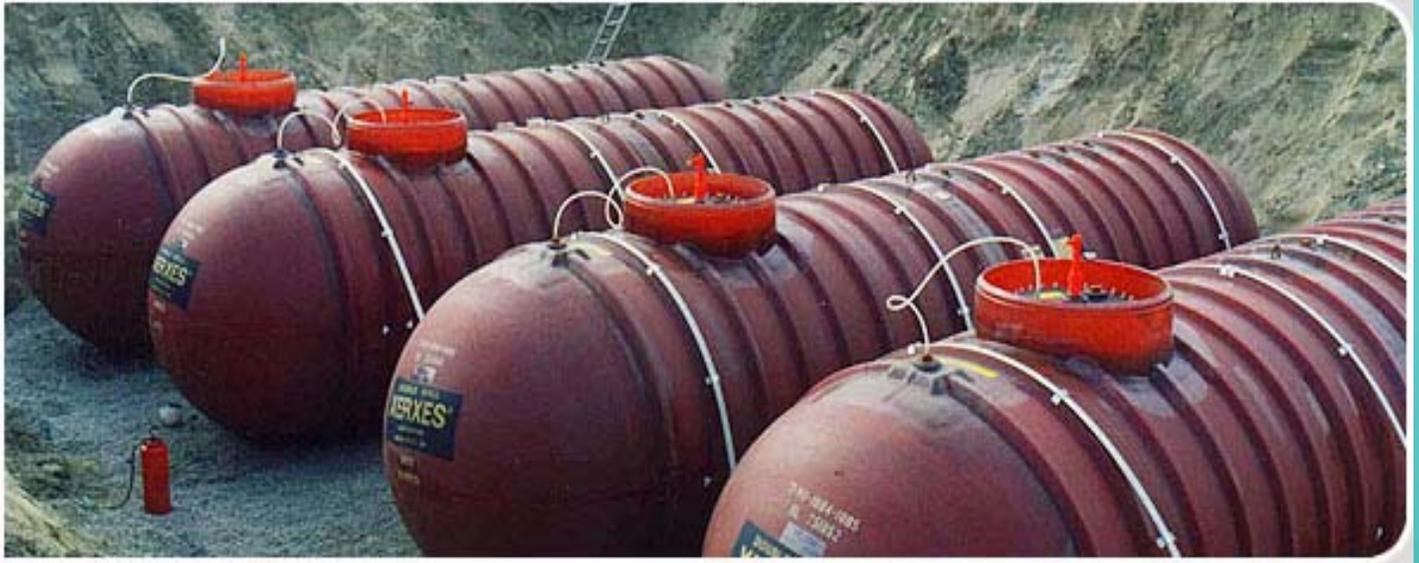
1, 2, 3, 4 (cathodic test every 3 years), 5 & 6

Steel w/Lining

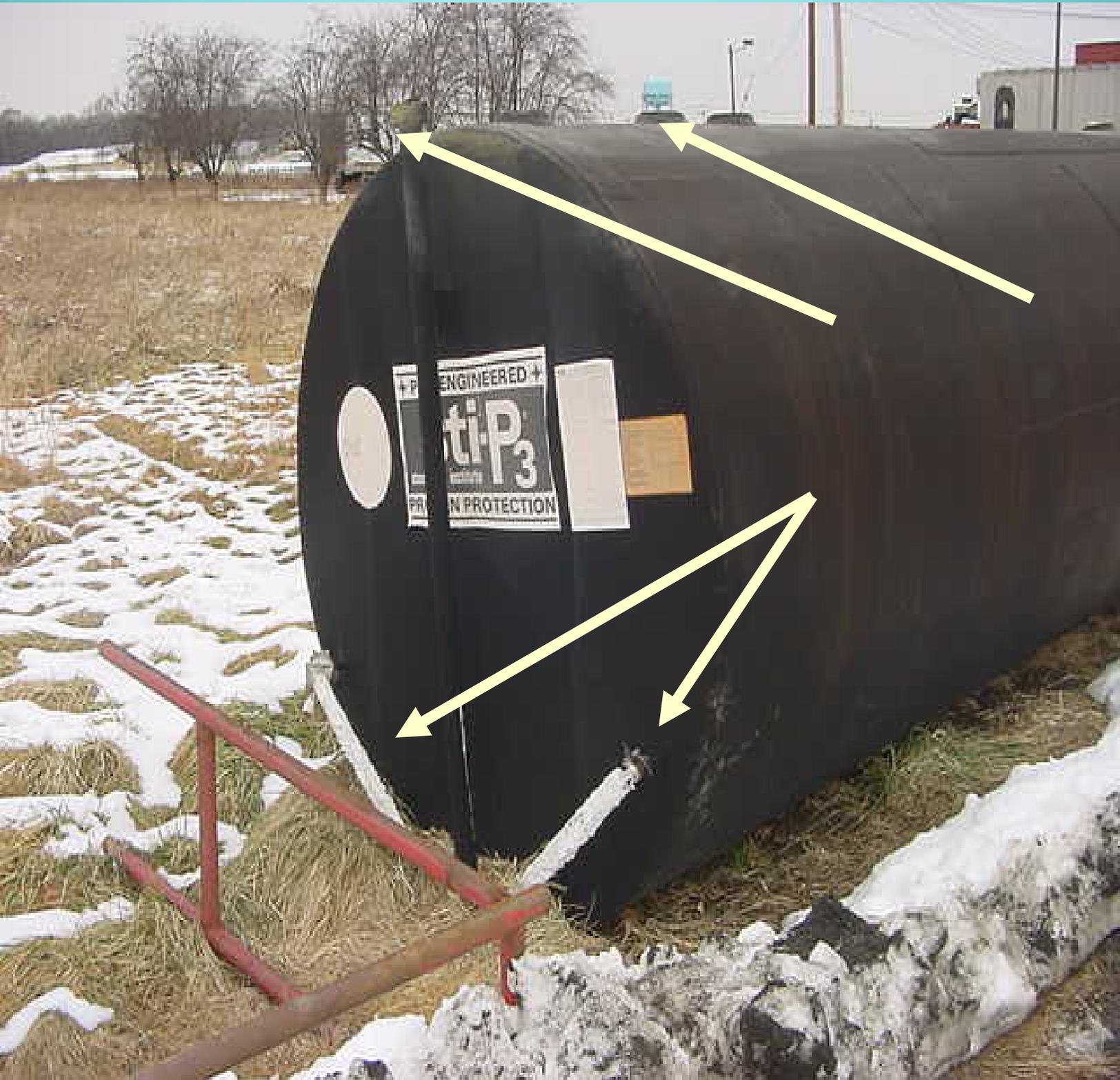
1, 2, 3, 5 & 6

Lining must be inspected FIRST TEN
YEARS & EVERY FIVE YEARS
THEREAFTER

If Passive or Impressed is present AND
tested every THREE YEARS, lining does
not require inspection

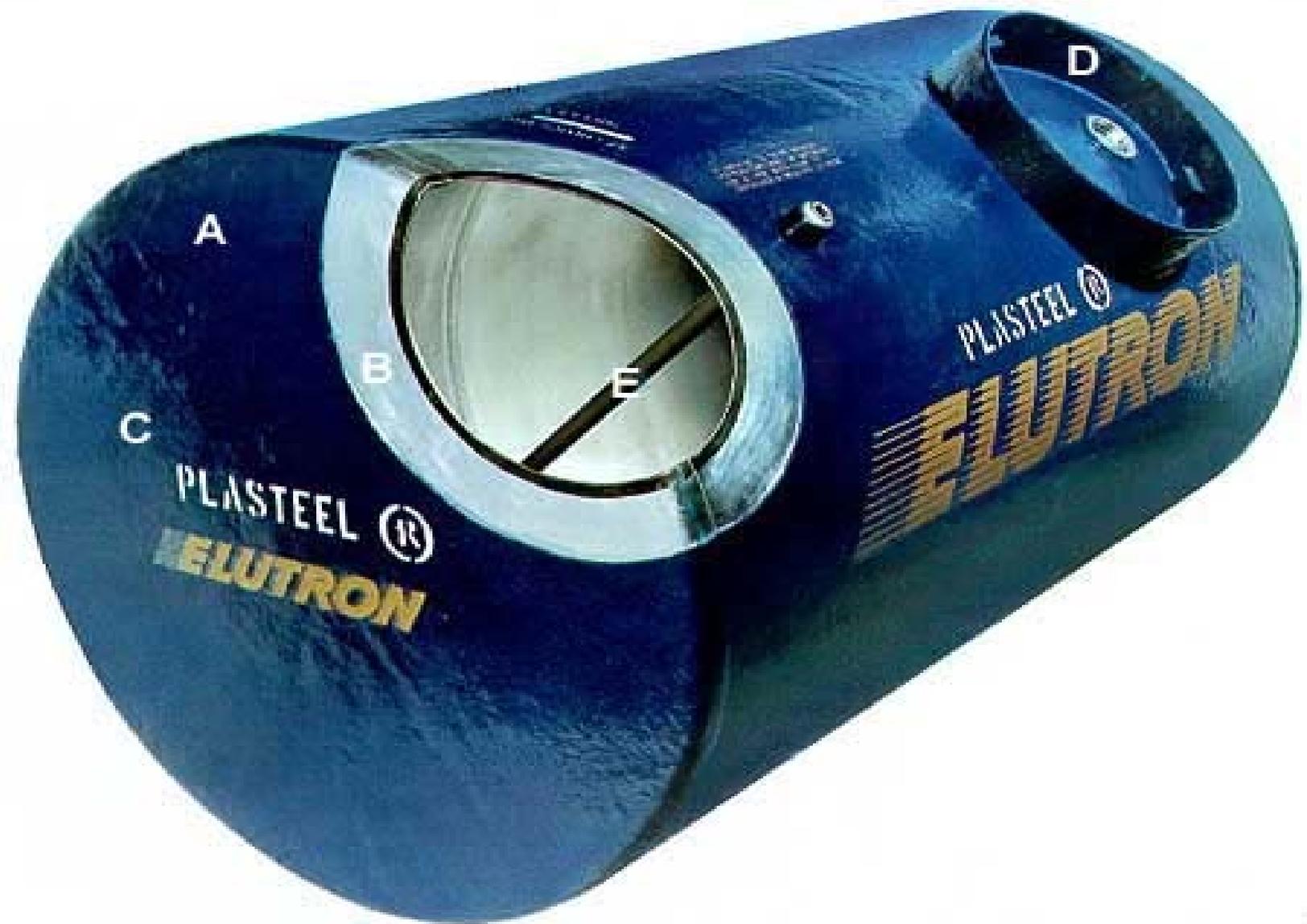












PIPING CONSTRUCTION

UNDERGROUND STORAGE TANK EQUIPMENT N.J.A.C. 7:14B REQUIREMENTS

UNDERGROUND PIPING

Single Wall

Double Wall

Pressure vs Suction

American/Angle Check Valve

◆ European/Safe/Union Check Valve

CONSTRUCTION

Fiberglass Reinforced Plastic (FRP)

1 & 3 (if ◆: RDM NOT Required)

Coated Steel (verify actual construction)

1, 3 & 4

Steel w/Passive System

1, 3 (if ◆: RDM NOT Required)

& 4 (cathodic test every 3 years)

Steel w/Impressed System

1, 3 (if ◆: RDM NOT Required)

& 4 (cathodic test every 3 years)

Flex Piping

1 & 3 (if ◆: RDM NOT Required)





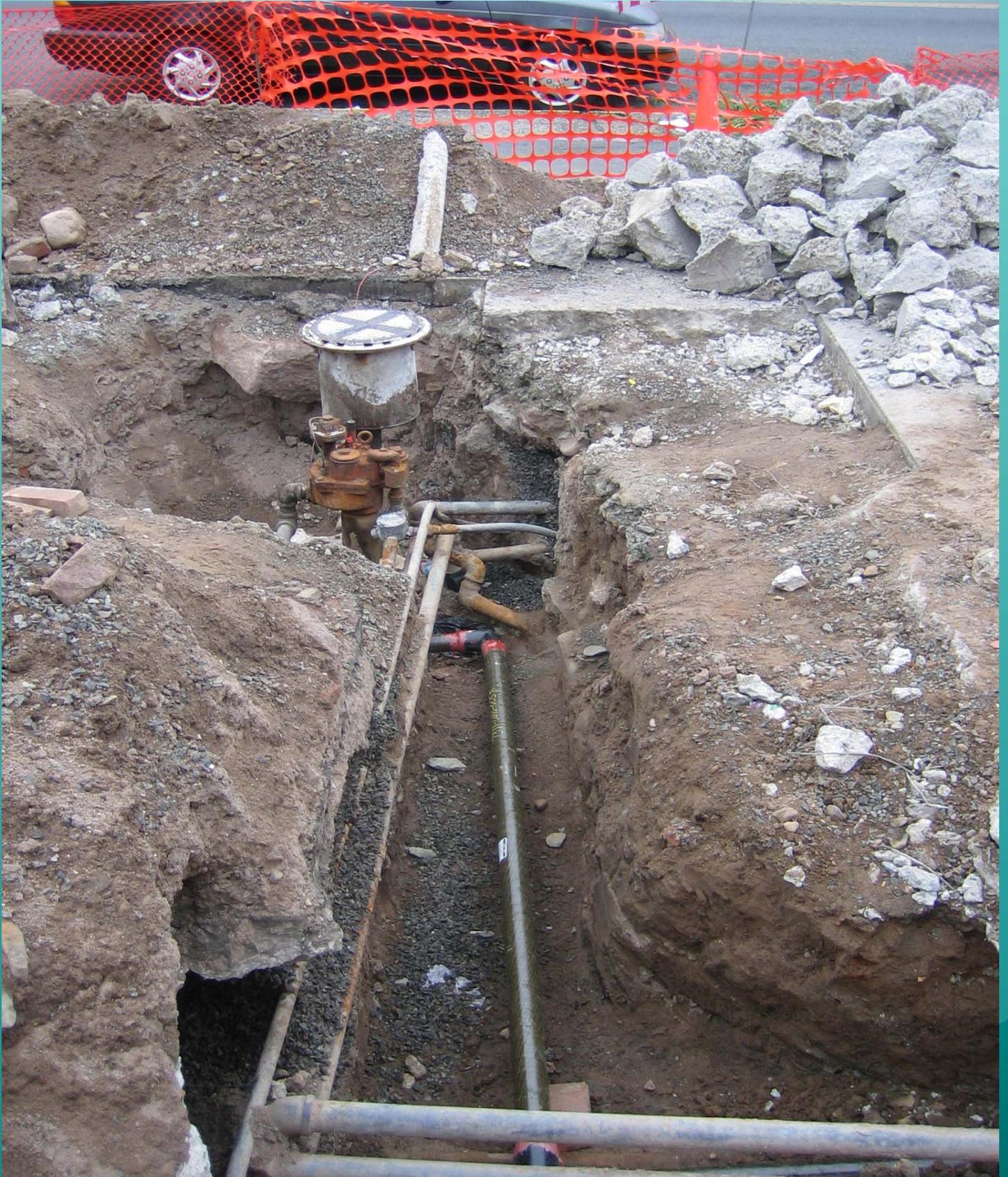




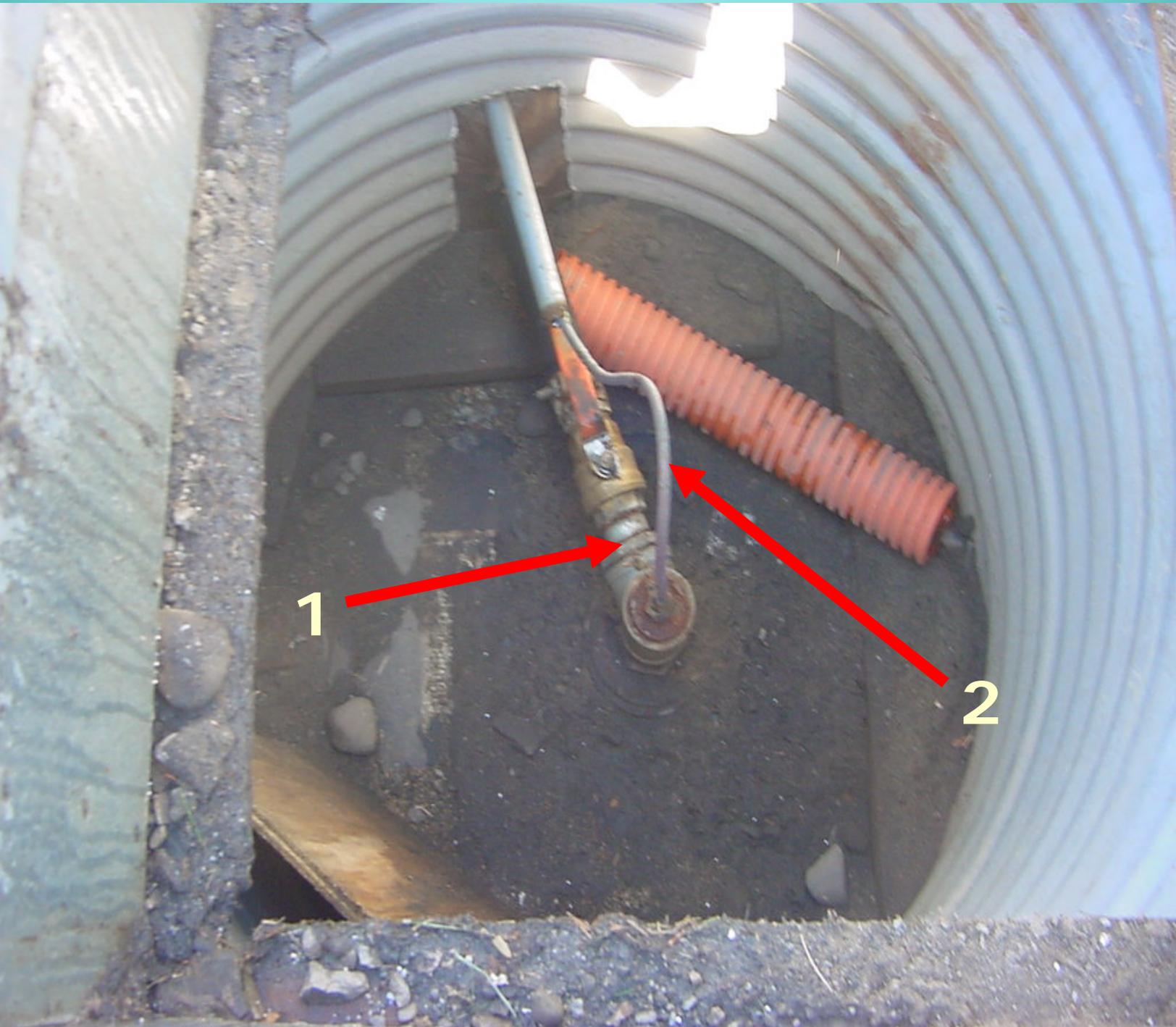












1

2

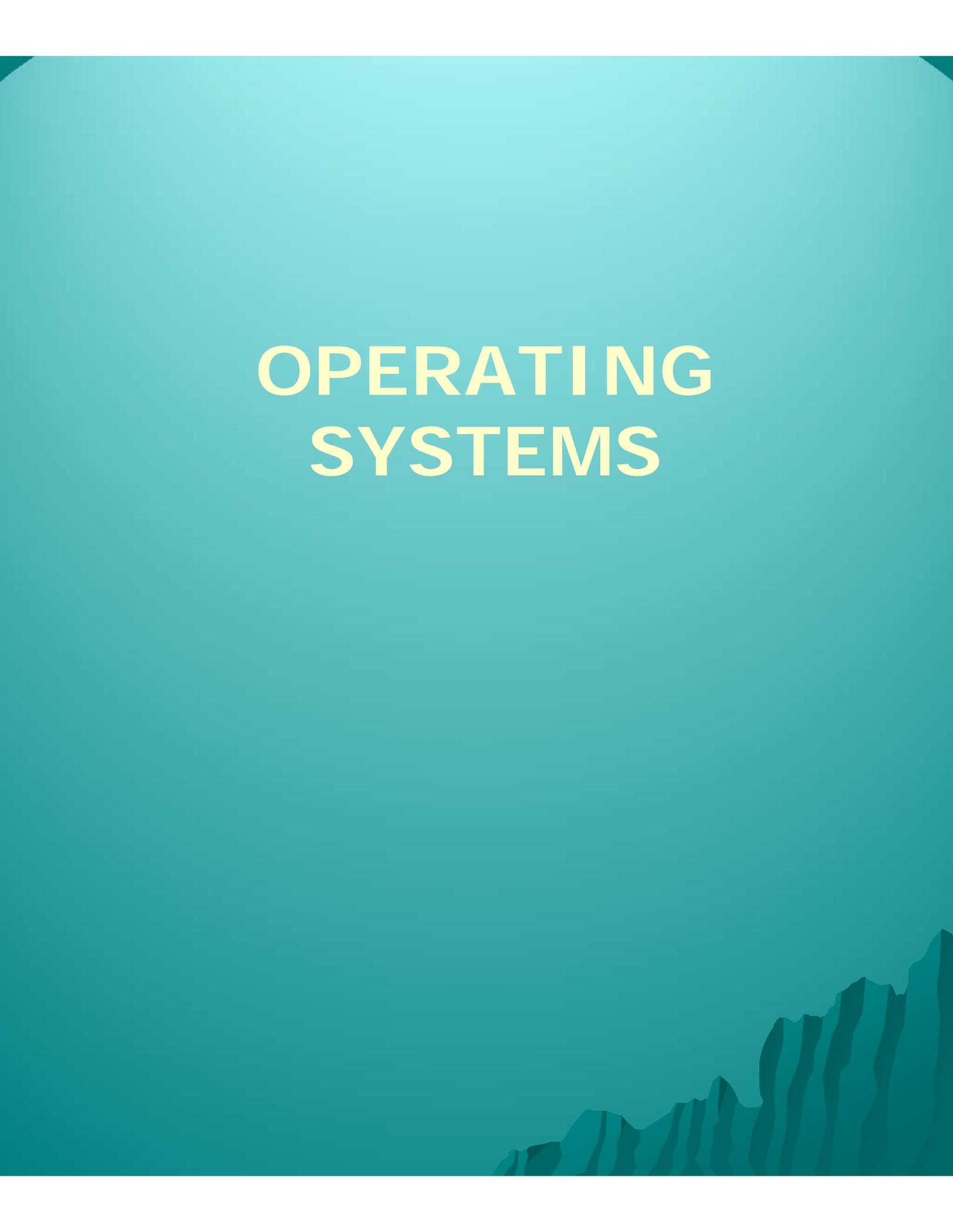


01/10/2007 11:45



03/15/2007 11:40

OPERATING SYSTEMS

The image features a solid teal background. In the center, the words "OPERATING" and "SYSTEMS" are stacked vertically in a bold, white, sans-serif font. At the bottom of the image, there is a dark teal silhouette of a jagged mountain range or rocky terrain.

Pressurized Piping

- ◆ Greater/faster dispensing ability (more dispensers, more customer volume)
- ◆ Piping is always product bearing and is always pressurized (greater pressure when turbine turns on).
- ◆ Monitoring requirements: some form of monthly monitoring or an ANNUAL test.
- ◆ Also, a Line Leak Detector is required to be installed and tested annually.
- ◆ Mostly commercial facilities









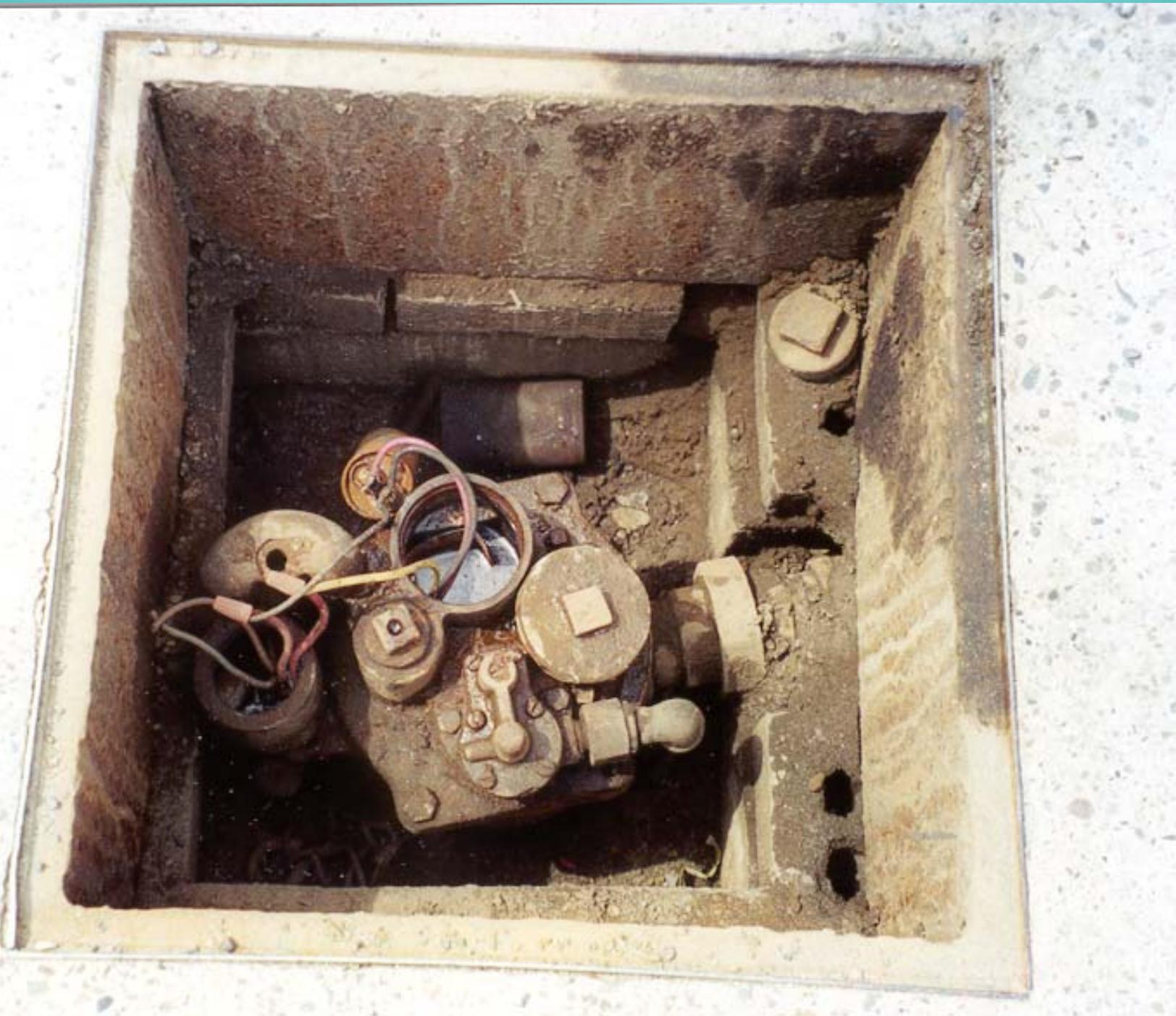




01/10/2007 11:45



02/27/2008 16:39





Suction (American vs. European)

- ◆ Union Check (Safe-European)
- ◆ Angle Check (American)
- ◆ Safe suction exempt from monitoring (why?)
- ◆ Any failure in the line will cause the product to drain back into the tank, preventing the line from holding suction to dispense.
- ◆ American suction will NOT drain back into the tank with a line failure due to the check valve on top of the tank.
- ◆ Monitoring requirements: Safe is exempt, American requires either monthly monitoring OR a **3-year** test.

353 9/10
ALL TAXES INCLUDED

Getty

\$ 57.00	Sale	Sale	\$ 40.00
16.106	Gallons	Gallons	10.647
\$ 3.539	Price Per Gallon Including Tax	Price Per Gallon Including Tax	\$ 3.759

87 Unleaded Regular **92** Premium Unleaded
DETERGENT GASOLINES

Getty

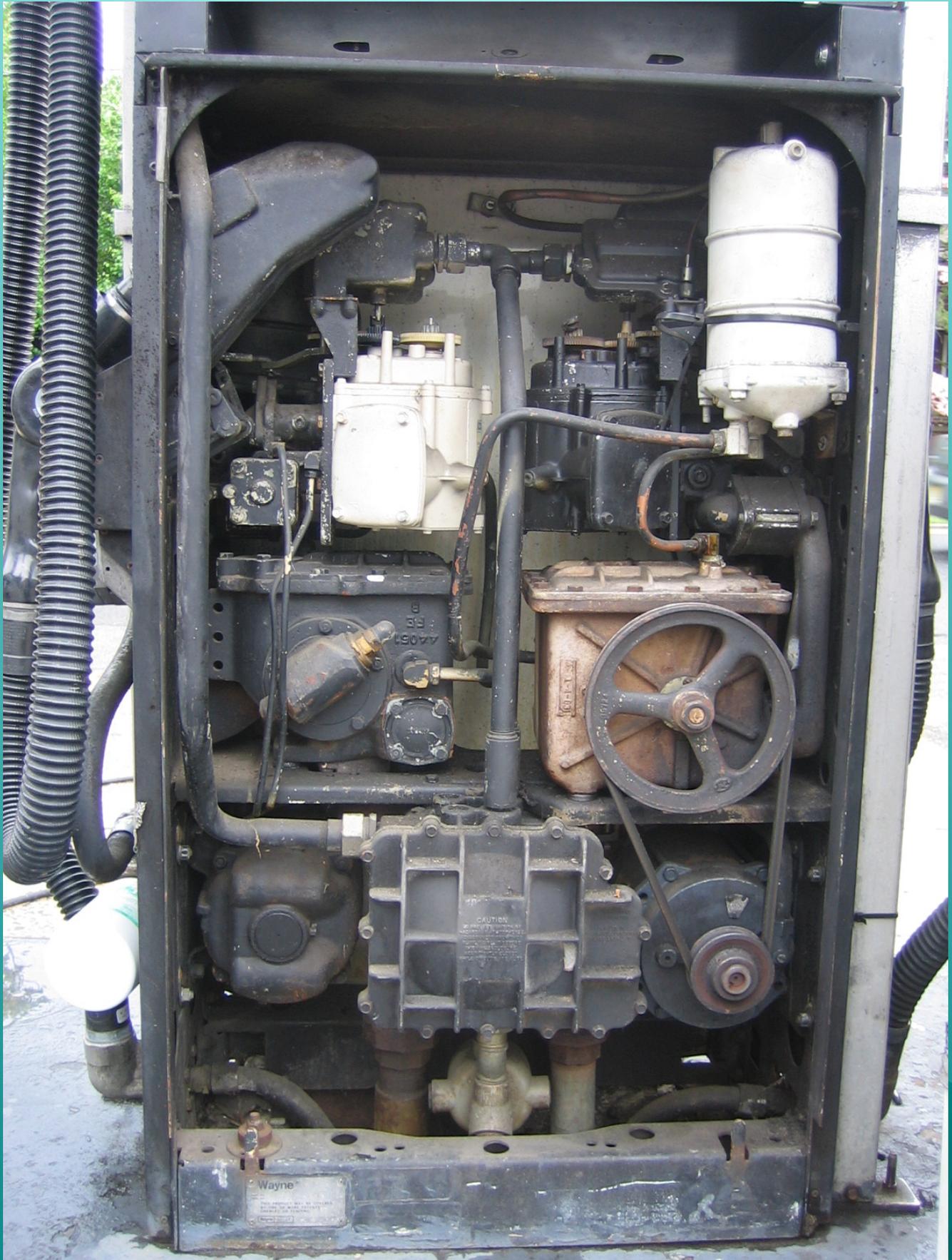
CREDIT CARDS
Discover, Visa, Mastercard, American Express, Diners Club

FLEET CARDS
LUBACOR, TRAVELER, FLEET

DEBIT CARDS
NYCE, pulse, STAR, Sunoco, Mobil



5078





THE BIG 6

12/98 CRITERIA

This is what we tag out
for folks....

Registration and Insurance

NJAC 7:14B-2.1, 5.9, 15

UNDERGROUND STORAGE TANKS

What is regulated:

a/ All underground tanks that contain a hazardous substance pursuant to N.J.S.A. 58:10A-21 and N.J.A.C. 7:14B (A minimum of 10% of the tank/piping volume is buried)

b/ There is no minimum capacity

c/ Commercial heating oil tanks > 2000 gallons capacity

d/ Requirements for Regulated Tanks

1/ **Registration**

2/ **Tank Insurance**

3/ Spill Containment

4/ Overfill Protection

5/ Corrosion Protection

6/ **Release Detection
Monitoring**

REGISTRATION

1. All regulated tanks must be registered with the NJDEP.
2. Registration period is for THREE YEARS, the fee is \$150.00.
3. When registering tanks facility **MUST include the fee AND the signed Registration & Billing form**. Failure to include BOTH will result in a PENDING registration status.
4. A PENDING or EXPIRED registration status means facility cannot take deliveries and penalties may be assessed. The mailing address for the Registration & Billing office has changed. Use the new address:
Division of Remediation Support
UST Program – Registration and Billing Unit
PO Box 420, Trenton, NJ 08625-0420.
5. In case you missed it the first time: When registering tanks the facility **MUST include the fee AND the signed Registration & Billing form**. Failure to include BOTH will result in a PENDING registration status.
6. Make sure they have a copy of the UST Certificate at facility

TANK SYSTEM FINANCIAL ASSURANCE

1. All regulated tanks must have insurance for “the purpose of remediation and for compensating third parties for bodily injury and property damage”.
2. Facility must have proof of insurance available for a tank inspection.
3. **Facility must include insurance information on the Registration & Billing Form when they renew their tank registration.**



DIVISION OF REMEDIATION SUPPORT
 UNDERGROUND STORAGE TANK PROGRAM
 P.O. BOX 028
 TRENTON, NEW JERSEY 08625-0028
 Phone: (609) 633-1464



UNDERGROUND STORAGE TANK SYSTEMS REGISTRATION CERTIFICATE

<p>The Department of Environmental Protection hereby grants this registration to operate and maintain the Underground Storage Tank System(s) described below in accordance with the laws and regulations of the State of New Jersey. This registration is revocable with due cause and is subject to the limitations, terms and conditions pursuant to N.J.A.C. 7:14B.</p>		Approval Date: 01/24/2008
		Expiration Date: 12/31/2010
Facility ID: 012345	Facility Contact (Operator): Joseph Smith (201) 555-1234	Total Number of Tanks: 3
Registration Activity ID: UST070001		Total Capacity (Gallons): 26000
Facility Address: JOE'S GARAGE 444 MAIN ST ANYWHERE, NJ 02854		Owner: JOSEPH SMITH 444 MAIN ST ANYWHERE NJ, 02854
Approved Tanks and Products Stored:		
TANK No.	TANK CAPACITY	TANK CONTENTS
5175	8000	Unleaded Gasoline
5176	8000	Light Diesel Fuel (No. 1-D)
5177	10000	Unleaded Gasoline
<p align="center">This Registration Must Be Available for Inspection at the Facility AT ALL TIMES</p>		



UNDERGROUND STORAGE TANK FACILITY CERTIFICATION QUESTIONNAIRE

FACILITY UST # (PROGRAM INTEREST ID): _____

Completion of this Registration Questionnaire will satisfy the registration requirements of the Underground Storage of Hazardous Substances Act, N.J.S.A. 58:10A-21 et seq., and the Underground Storage Tank Rules N.J.A.C. 7:14B et. seq.

Check appropriate box

- A. This is a registration of a proposed or newly installed underground storage tank. (This form must be filed at least 30 days prior to operation)
- B. This is a registration of an existing underground storage tank not presently registered.
- C. This is a correction or amendment to an existing facility registration. (Check type of change below)
- D. There have been no changes to the facility registration since last submittal. (Complete Section A, C & E)

If "C" is checked above, please check the appropriate type of change(s) below

- | | | |
|--|--|---|
| <input type="checkbox"/> Facility Name and/or Address Change | <input type="checkbox"/> Type of Product(s) Stored | <input type="checkbox"/> Financial Responsibility Change (Including Policy Renewal) |
| <input type="checkbox"/> Owner Name and/or Address Change | <input type="checkbox"/> Substantial Modification(s) (see 14B) | <input type="checkbox"/> Sale or Transfer (Complete entire form) |
| <input type="checkbox"/> Facility Operator and/or Address Change | <input type="checkbox"/> Tank(s) and/or Piping Changes | <input type="checkbox"/> Other (please specify) |
| <input type="checkbox"/> Owner Contact Person Change | <input type="checkbox"/> Closure (Complete Section B | |
- Questions 1, 4, 5, 12C)

SECTION A - GENERAL FACILITY INFORMATION

1. Facility Name _____

2. Facility Location _____

Address Line 1 _____

Address Line 2 _____

City or Municipality _____

_____	[N J]	_____ - _____	_____	_____
COUNTY	STATE	ZIP CODE	BLOCK	LOT

3. Facility Operator _____

ORGANIZATION (If applicable, e.g. Company) or INDIVIDUAL

Contact Person _____

PERSON

TITLE

PHONE NUMBER (INCLUDE AREA CODE & EXT)

E-MAIL ADDRESS

Operator Address _____

(if different than #2)

ADDRESS LINE 1 (NUMBER AND STREET)

ADDRESS LINE 2 (e.g. PO BOX, SUITE)

CITY OR MUNICIPALITY

STATE

ZIP CODE

4. Tank Owner _____

(Organization)

Contact Person _____

PERSON

TITLE

PHONE NUMBER (INCLUDE AREA CODE & EXT)

E-MAIL ADDRESS

Tank Owner _____

Address

ADDRESS LINE 1 (NUMBER AND STREET)

ADDRESS LINE 2 (e.g. PO BOX, SUITE)

CITY OR MUNICIPALITY

STATE

ZIP CODE

5. Billing Address: Check one below

Same as Tank Owner address listed in Section A4. Same as Facility Operator address listed in Section A3. Other and attach billing address.

6. Total number of regulated underground storage tanks at facility (Complete Section B for each tank unless there has been no change since last submittal)

7. Total regulated underground storage capacity at facility (gallons)

8. Facility Type: A State C County/Municipal E Charitable / Public School G Farm (as defined in N.J.S.A. 54:4-23.1 et seq.)
 B Commercial/ Industrial D Federal F Residential

NOTE: The facility site plan must be submitted when registering any underground storage tank pursuant to N.J.A.C. 7:14B 2.2.

SECTION B - SPECIFIC TANK INFORMATION

ALL regulated underground storage tanks, including those taken out of operation (UNLESS THE TANK WAS REMOVED FROM THE GROUND PRIOR TO 9/3/86) must be registered. Report all tank/piping status changes. **DO NOT MARK SHADED AREAS**

1. Tank Identification Number	TANK NO.											
2. CAS Number (Hazardous substances only)	<input type="text"/>											
3. Date Tank Installed	<input type="text"/>											
4. Tank Size (gallons) - Please note that each compartment is considered a separate Tank System	<input type="text"/>											
5. Tank Contents (Mark one "X" for each tank)												
A. Leaded Gasoline												
B. Unleaded Gasoline												
C. Alcohol Enriched Gasoline												
D. Light Diesel Fuel (No. 1-D)												
E. Medium Diesel Fuel (No. 2-D)												
F. Waste Oil												
G. Kerosene (No. 1)												
H. Heating Oil (No. 2) Complete 13C												
I. Heating Oil (No. 4) Complete 13C												
J. Heating Oil (No. 6) Complete 13C												
K. Aviation Fuel												
L. Motor Oil												
M. Lubricating Oil												
N. Automatic Transmission Fluid												
O. Hazardous Waste (Specify ID Number)												
P. Coolant/Antifreeze												
Q. Other (please specify)												
6. Tank & Piping Construction (Mark at least one each for Tank and Piping)	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping	Tank	Piping		
A. Bare steel												
B. Cathodically Protected Metal (Mark SA or IC)												
1. Sacrificial Anode (SA)	Mo.	Day	Year	Mo.	Day	Year	Mo.	Day	Year	Mo.	Day	Year
*Date Sacrificial Anode Installed (TANK ONLY)												
2. Impressed Current (IC)	Mo.	Day	Year	Mo.	Day	Year	Mo.	Day	Year	Mo.	Day	Year
*Date Impressed Current Installed (TANK ONLY)												
C. Fiberglass-Coated Steel (TANK ONLY)												
D. Fiberglass-Reinforced Plastic												
E. Internally Lined (TANK ONLY)	Mo.	Day	Year	Mo.	Day	Year	Mo.	Day	Year	Mo.	Day	Year
*Date Internal Lining Installed												
F. Other (Please specify) (Include Brand Name)												
7. Piping Operation (Mark one for each tank system)												
A. Pressurized Piping (PIPING ONLY)												
B. American Suction Piping (PIPING ONLY)												
C. European Suction Piping (PIPING ONLY)												
D. Supply/Return (Heating Oil Piping Only)												
8. Tank & Piping Structure (Mark one for each TANK & PIPING)												
A. Single Wall												
B. Double Wall												
C. Secondary Containment (e.g. Externally Lined)												
9. Type of Monitoring/Detection (Mark all that apply for TANK & PIPING)												
A. Statistical Inventory Reconciliation												
Vendor Name & Phone Number												
B. Manual Tank Gauging (TANK ONLY)												
C. Inventory Control (TANK ONLY)												
D. Interstitial												
E. Tightness Test												
F. Ground Water Observation Wells												
G. Vapor Observation Wells												
H. In-Tank (Auto Monitoring Gauge) (TANK ONLY)												
I. In-Line Electronic Pressure Monitor (PIPING ONLY) See Definition Page 4												
J. Automatic Line Leak Detector (PIPING ONLY) See Definition Page 4												
K. None (TANK & PIPING)												

Tank Identification Number	TANK NO.				
10. Overfill Protection (Mark one X for each tank)					
A. Yes					
B. No					
11. Spill Containment Around Fill Pipe (Mark one X for each tank)					
A. Yes					
B. No					
12. Tank Status Information (Mark appropriate choice for each tank)					
A. In-Use					
B. Out of Service (See Definition Page 4)					
Date Taken Out of Service	Mo. Day Year				
C. Closed					
1. Removed					
Date Removed	Mo. Day Year				
Closure #					
2. Abandoned-In-Place					
Date Abandoned-In-Place	Mo. Day Year				
Closure #					
13. Tank Use Information (Mark if applicable)					
A. Emergency Back-up Generator					
B. Sump (See Definition Page 4)					
C. Heating Oil Tanks If you checked H, I or J under item B5 on Page 2, check one of the following					
1. Product for on-site consumption use					
2. Product for sale or distribution					
14. Other Information (Mark if applicable)					
A. Date of Sale or Transfer	Mo. Day Year				
B. Substantial Modification #					
C. ISRA #					
15. Is the tank within a wellhead protection area as defined on Page 4 (Mark for each tank)					
A. Yes					
B. No					

SECTION C - FINANCIAL RESPONSIBILITY

Please note: In addition to new submittals, any change in the Financial Responsibility Assurance Mechanism as per N.J.A.C. 7:14B 2.2 (including policy renewal date) for an existing facility shall be listed below.

Type of Mechanism (i.e. Insurance) _____ Carrier/Issuing Agency _____
 Effective Date _____ Expiration Date _____ Policy Number _____ S _____
 Amount of Aggregate Coverage _____

SECTION D - GENERAL GUIDANCE

- FEE:** (If applicable) Please make check payable to: "Treasurer, State of New Jersey". Registration and Billing Fee Schedule can be found in N.J.A.C. 7:14B-3.
- PENALTY:** Failure by owner or operator of a regulated underground storage tank to comply with any requirement of 7:14B et. seq may result in penalties set forth in N.J.S.A. 58:10A-12.
- EMERGENCY:** If a discharge or spill occurs, the NJDEP Hotline at (877) 927-6337 must be called IMMEDIATELY - 24 hours a day.
- EXEMPTION:** Residential heating oil underground storage tanks are exempt from the rules as per by N.J.S.A. 58:10A-21 et. seq. Please see N.J.A.C. 7:14B.-1.4(b) for other exemptions.
- PUBLICATIONS:** Operation and maintenance / record keeping / compliance publications are available on line at www.state.nj.us/dep/srp/bust
Suggested Publications: "Underground and Storage Tank Owner's Self-inspection Checklist" and "Tank Care".
- QUESTIONNAIRE:** Initial facility registrations can be submitted online at www.njdeponline.com (Renewal and modifications need prior DEP pin code approval to submit online).
- MAILING:** UST Registration Certificates are mailed directly to the facility to be displayed prominently as per N.J.A.C. 7:14B-2.6

SECTION E - CERTIFICATION

Must be signed as follows:

- For a corporation, by a person authorized by resolution of the Board of Directors to sign the document.
- For a partnership or sole proprietorship, by a general partner or the proprietor, respectively.
- For a municipality, State, Federal or other public agency, by either a principal executive officer or ranking elected official.
- For persons other than indicated above, by the person with legal responsibility for the site.

"I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attached documents, and that based on my inquiry of those individuals responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant civil penalties for knowingly submitting false, inaccurate or incomplete information and that I am committing a crime of the fourth degree if I make a written false statement which I do not believe to be true. I am also aware that if I knowingly direct or authorize the violation of any statute, I am personally liable for the penalties.

(Typed / Printed Name)

(Signature)

(Title)

(Date)

Facility UST #

SECTION F - DEFINITIONS

Section B7 C. **"European" Suction Piping** - Suction piping which has enough slope so that the product in the pipe can drain back into the tank when the suction is released, and which has only one check valve, located directly beneath the pump in the dispensing unit. Any underground storage tank equipped with "European" Suction Piping has no monitoring detection requirements for piping.

Section B9 I. **In-Line Electronic Pressure Monitor** - (Used with pressurized piping only) A monitor which checks for loss of pressure within piping when no product is dispensed. This method may be used once every 30 days or every time the dispenser turns off.

Section B9 J. **Automatic Line Leak Detectors** - (Used with pressurized piping - Must be able to detect a 3 gph leak within 1 hour of its occurrence). Types of detectors are:

1. Flow restrictors and flow shut offs which monitor pressure within piping. When a suspected leak is detected, either restricts the flow of product through the piping well below the 3 gph leak rate it detects, or completely cuts off product flow and shuts down the pump.
2. Continuous alarm systems which constantly monitor piping conditions and trigger an audible or visual alarm if a leak is suspected.

Section B12 B. **Out of Service Storage Tank** - Any underground storage tank system in which hazardous substances are contained or have been contained, but from which hazardous substances are not or have not been introduced or dispensed pending a decision to close the system begin reuse of the system.

Please Note: Underground storage tank systems which are out of service shall comply with the provisions of N.J.A.C. 7:14B-9-1. The owner or operator of an underground storage tank system which is out of service for a period greater than three months shall follow the guidelines in the current American Petroleum Institute Bulletin #1604. The owner or operator may request that the underground storage tank system remain out of service for a period of more than 12 months without having to permanently close the tank system by complying with the provisions of N.J.A.C. 7:14B-9.1(b) by submitting a Site Investigation (SI) Report at least 30 days before expiration of the 12 month period.

Section B13 B. **Sump** - Any underground storage tank used to collect or contain a hazardous substance for no more than 48 hours.

Section B15 **Wellhead Protection Area** -

1. The area within a 2,000 ft. radius surrounding a public community or public non-community water system well when there is an underground storage tank containing gasoline or non-petroleum hazardous substances located within that area.
2. The area within a 750 ft. radius surrounding a public community or public non-community water system well when there is an underground storage tank containing petroleum products other than gasoline located within that area.

Release Detection Monitoring (RDM)

NJAC 7:14-6

Tanks

A typical automatic tank gauging (ATG) control panel. Veeder-Root ATGs are the most common systems you will see during inspections. Some common models include the TLS-200, 200i, 250, 300, 350, 350 CSLD and Simplicity. These units monitor minute changes of the product levels in the tanks and can be programmed to do daily, weekly and monthly tank tests. If the station is using an ATG unit for leak detection, make sure that the unit is third-party certified to test the tanks at a maximum leak rate of .2 gph. (A copy of the 3rd party leak detection evaluations can be obtained on line at www.nwglde.org). The ATG can also monitor the lines through various sensors and related equipment. The interstitial space (lines and tanks) can also be monitored. If the unit is operating properly the liquid crystal display (LCD) (1) should have a message that reads "ALL FUNCTIONS NORMAL". Check to see if the power light (2) is on. Warning and alarm lights are also located on the panel at (2). If either of these lights are illuminated, a corresponding message will be present on the LCD. The printer (3) (not always present) may be used to print out test results and inventory checks. **Inspection Significance:** You should verify that the equipment used to conduct leak detection is present and operating, i.e., sensors and probes. Just because there is an ATG unit present, don't assume that leak detection is being conducted properly. The system can also be used for overfill protection. You will need to confirm this. If you are not certain about the operation of the unit, have the owner or operator document what the unit is monitoring and if the monitoring is done per the regulations. The owner or operator must be able to verify that the unit is performing a tank test at least every 30 days. See definitions: ATG, liquid sensor, tank probe, pressure transducer, CPT, overfill prevention and interstitial (ATG = another tank gone).



Veeder-Root also manufactures the Simplicity® system which is usually found at Exxon/Mobil sites. These units usually do not have a printer and are monitored by a third party at a remote location.

Inspection Significance: In many cases, the owner or operator will not have leak detection records present. You may require that the owner or operator contact the monitoring company (using the site ID number) and have these records forwarded to you. Typically, at Exxon/Mobil sites, the Simplicity® unit also monitors the lines using a pressure transducer (PLLD). See definitions: ATG, liquid sensor, tank probe, pressure transducer, PLLD, CPT, overfill, Swiftcheck, Simplicity and interstitial.



The Auto-Stik is another type of ATG unit which is manufactured by EBW, manufacturers of sumps, overflow equipment and spill buckets. This unit has a printer (1) as well as a liquid crystal display message panel (2). **Inspection Significance:** Don't assume that the unit is doing leak detection. The owner or operator is required to furnish documentation that tank tests are being performed monthly and that the unit is operating per the manufacturer's requirements. See definitions: ATG.



The INCON is another type of ATG unit. This unit has a printer (1) as well as a liquid crystal display message panel (2). **Inspection Significance:** Don't assume that the unit is doing leak detection. The owner or operator is required to furnish documentation that tank tests are being performed monthly and that the unit is operating per the manufacturer's requirements. See definitions: ATG.





Summary of Options

Common

- ◆ Automatic Tank Gauging
- ◆ Interstitial Monitoring

Less Common

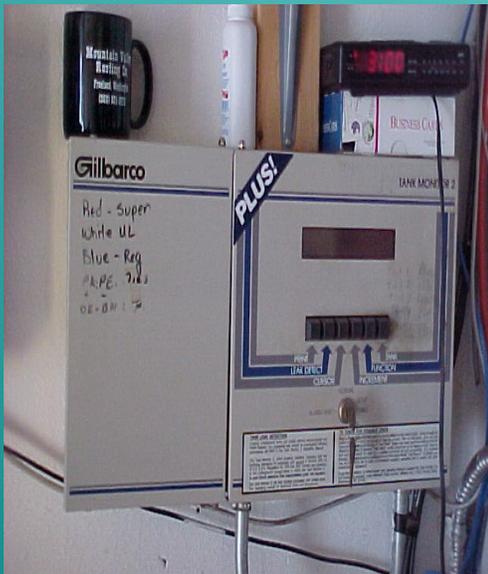
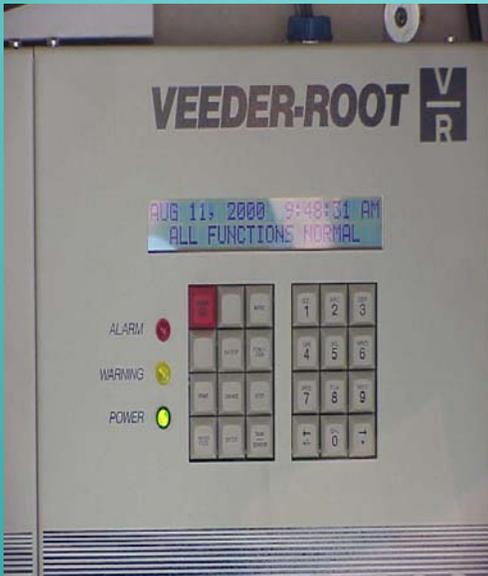
- ◆ Inventory Control and Tightness Testing
- ◆ Statistical Inventory Reconciliation

Uncommon

- ◆ Manual Tank Gauging
- ◆ Soil Vapor Monitoring
- ◆ Groundwater Monitoring



Automatic Tank Gauging



ATG Probes



General Requirements

- ◆ Must test for leaks at least every 30 days.
- ◆ Can detect a 0.2 gph leak.
- ◆ Must be a valid, passing test. (50% or greater volume)
- ◆ Is third party approved for the application.
- ◆ Must have maintenance performed per Manufacturer specifications.
- ◆ Must maintain last 500 months of tests for inspection. (yeah, right)
- ◆ 95 % probability of finding a leak and 5 % of a false alarm.
- ◆ Must measure for water monthly.
- ◆ If the station is open 24/7 or if tanks are manifolded, a CSLD or SCALD chip may be needed to pass a periodic test.
- ◆ For manifolded tanks, other option would be to manually shut off the siphon.

CSLD

Continuous Statistical Leak Detection

- ◆ 3rd Party Certified from 5-95% tank volume
- ◆ Maximum separate or combined tank volume is 38,170
- ◆ Veeder-Root chip compatible with TLS-300 and 350 models
- ◆ Also an option for stations that keep low volume of higher octane fuels

Find the Tank Gauge





Genius !

Do we have a problem here?

GEORGE DAPPER BUS CO
44 RODGERS ST
AVENEL NJ 07001
908-574-2882

MAY 7. 2008 1:30 PM

LEAK TEST REPORT
T 2:DIESEL TANK 2

LAST TEST STARTING TIME

JUL 5. 1999 12:01 AM

TEST LENGTH = 4.0 HRS
STRT VOLUME = 5463.7 GAL

MANIFOLDED TEST RESULTS:

MANIFOLDED RATE
0.00 GALLONS/HR
MANIFOLDED TANKS:
#:1.2

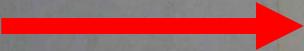
OOPS!

LIQUID STATUS

MAY 7. 2008 1:30 PM

L 1:ANNULAR TANK 1
SENSOR NORMAL

L 2:STP SUMP TANK 1
SENSOR NORMAL

 L 3:ANNULAR TANK 2
FUEL ALARM

L 4:ANNULAR TANK 3
SENSOR NORMAL

L 5:ANNULAR
SENSOR NORMAL

L 6:STP SUMP TANK 4
SENSOR NORMAL

Look Familiar?

FRANKS SERVICE STA.
273 WASHINGTON AVE.
SAYREVILLE NJ. 08872
908-254-7510

JUL 31. 2007 11:26 AM

LEAK TEST REPORT

T 2:REGULAR UNLEADED 1
PROBE SERIAL NUM 106706

LAST TEST STARTING TIME

JUL 31. 2007 12:00 AM

TEST LENGTH = 3.0 HRS
STRT VOLUME = 2955.0 GAL

MANIFOLDED TEST RESULTS:

MANIFOLDED RATE
0.18 GALLONS/HR

MANIFOLDED TANKS:
#:2.3

LEAK TEST TOO SHORT
PRODUCT LEVEL INCREASE
SEG 2 DELIVERY MIX ERR
SEG 1 TEST MIX ERROR

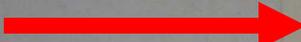
Doh!

TANK LEAK TEST HISTORY

T 2:REGULAR UNLEADED 1

LAST GROSS TEST PASSED:
JUN 15, 2004 10:30 PM
STARTING VOLUME= 3649
PERCENT VOLUME = 45.9
TEST TYPE = STANDARD

LAST PERIODIC TEST PASS:

 NO TEST PASSED

FULLEST PERIODIC TEST
PASSED EACH MONTH:



You're shutting me
DOWN?!?! DOH!!

You're
despicable!!!!



Here we go again...

WATER = 0.00 INCHES
TEMP = 52.5 DEG F

MANIFOLDED TANKS
INVENTORY TOTALS
T 1:REGULAR STORAGE
T 2:REGULAR MOTOR
VOLUME = 6185 GALS

***** END *****

237140 SICILIANO SUN
RT 35-SUNSET AVE
OCEAN NJ 07714
0007-7214

JAN 8. 2008 11:19 AM

LEAK TEST REPORT

T 1:REGULAR STORAGE
PROBE SERIAL NUM 022486

NO TEST DATA AVAILABLE

***** END *****

It's OK!!!

237140 SICILIANO SUN
RT 35-SUNSET AVE
OCEAN NJ 07714
0007-7214

JAN 8. 2008 11:19 AM

CSLD TEST RESULTS

JAN 8. 2008 11:19 AM

T 1:REGULAR STORAGE
T 2:REGULAR MOTOR
PROBE SERIAL NUM 022486

0.2 GAL/HR TEST
PER: JAN 8. 2008 PASS

T 3:ULTRA
PROBE SERIAL NUM 022490

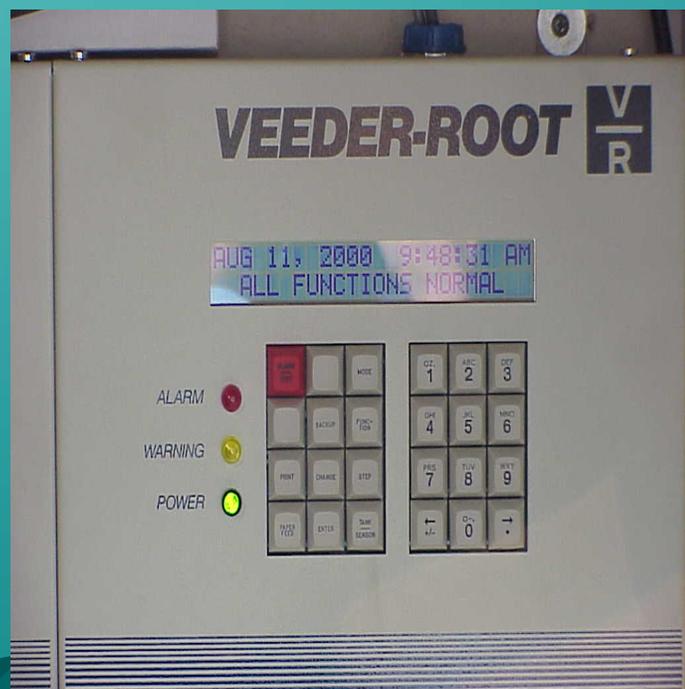
0.2 GAL/HR TEST
PER: JAN 8. 2008 PASS

* * * * * END * * * * *



Interstitial Monitoring

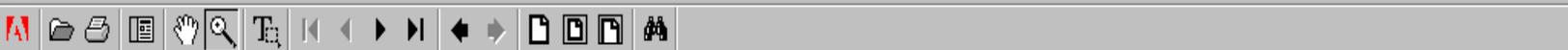
- ◆ Double walled tanks **only**
- ◆ Can be continuous or every thirty days
- ◆ Annular Sensors (liquid or discriminating) or sticking
- ◆ Location commonly depends on construction of the tank
- ◆ Sensors connect to an ATG panel
- ◆ Liquid Status (hit function button until you see that)



Statistical Inventory Reconciliation

- ◆ AKA – SIR
- ◆ Daily stick readings maintained in a log along with readings from dispenser totalizers sent to a third party.
- ◆ The certified third party plugs the numbers into a program and give a resulting pass, fail or inconclusive. This is a .2gph form of monthly monitoring.
- ◆ A secondary form of monitoring is required in case of failures of inconclusive results.

Houston, we have a problem



WARREN ROGERS ASSOCIATES, INC.
747 AQUIDNECK AVENUE, MIDDLETOWN, RHODE ISLAND 02842
1-800-WRA-SIRA

MONTHLY STATISTICAL INVENTORY RECONCILIATION (SIR) REPORT

04/11/2008

TANK OWNER	GETTY PETROLEUM MARKETING, INC.
	1500 HEMPSTEAD TURNPIKE
	EAST MEADOW, NY 11554
FACILITY NAME	GETTY PETROLEUM CORP - 56081 - 56081
TANK LOCATION	5 STELTON RAOD
	PISCATAWAY, NJ 08854

Tank ID-Product	Tank Capacity	Period Covered	Threshold	Minimum Detectable Leak Rate	Measured Leak Rate	System Status Pass, Fail Inconclusive	Monitoring Standards/Cause
	gallons		gph	gph	gph	P,F,I	
1 -R	12000	03/08/2008-04/07/2008	0.070	0.140	0.00	P	NO LOSS
2 -S	6000	03/08/2008-04/07/2008	0.085	0.170	0.52	F	LOSS
3 -P	6000	03/08/2008-04/07/2008	0.015	0.030	0.36	F	LOSS



Precision Testing

- ◆ This is a .1 gph method of testing.
- ◆ Must be performed by a state certified contractor.
- ◆ Results are only valid for 30 days.

Manual Tank Gauging

- ◆ Most commonly used for Waste Oil USTs
- ◆ Stick readings taken before and after a minimum 36 hours of “down-time” for the UST (no delivery or removal of product from the tank)
- ◆ Only valid for tanks less than 2,000 gallons capacity
- ◆ Precision test every 5 years for the first 10 years of the life of the tank
- ◆ After 10 years, a form of monthly monitoring is required

Manual Tank Gauging

Manual Tank Gauging Applications:

This method of release detection monitoring (RDM) can be used as a “stand alone” method of RDM for all tanks of 1000 GALLONS OR LESS (Both State & Federal Regulations indicate up to 550 gallons, BUT policy allows 1000 gallons (this change has been embodied in the proposed 2008 UST Reg changes). This includes tanks that contain motor fuels (gasoline/diesel) and waste/new motor oil. When using tank testing for leak detection, it must be in conjunction with inventory control and monthly reconciliation. However, **tanks from 1,001 to 2,000 gallons manual tank gauging may be substituted for the required inventory control with monthly reconciliation.**

Clarification of tank testing frequency:

After installing a new tank that has corrosion protection or after upgrading an old tank with corrosion protection, tank testing may be used for a period of ten years after the installation or upgrade date. The required tank testing frequency is every 5 years.

After the 10-year period, you must use a monthly monitoring method, such as interstitial monitoring or automatic tank gauging (ATG), however, the O/O may continue to use tank tightness tests which must be performed on a monthly basis. **The use of manual tank gauging does not meet the tank system's leak detection requirements for piping.** Pressurized and some suction piping must use other methods of leak detection, such as interstitial monitoring.

Refer to 6.5(a)2 for protocol concerning stick readings and the minimum 36 hour “quiet time”. The O/O is required to take two stick readings (to the nearest 1/8 inch) and average these readings. Then at the end of a minimum of 36 hours (no addition or removal of product) two more stick readings are taken and averaged. The difference between the beginning and ending readings (stick readings are converted to gallons) are compared to the “**Weekly Standard**” table 6.5(a)2v. This is done every week, and then once a month all four weekly readings are totaled and compared to the same table but under “**Monthly Standard**”. If the differences do not exceed the table values, the tank (not product piping) is considered not to be leaking.

Inventory Control w/Monthly Reconciliation (1% + 130 gal)

- ◆ Daily stick readings, totalizer readings, delivery totals calculated for 30 days, then total throughput is multiplied by 1% + 130 gallons. If that total is greater than 1% + 130 gallons, a tank discharge is possible.
- ◆ Precision tank test is required every 5 years.
- ◆ Method can only be used for the first 10 years of the life of the tank, or the first 10 years of the date of corrosion protection upgrade.

Release Detection Monitoring (RDM)

NJAC 7:14-6

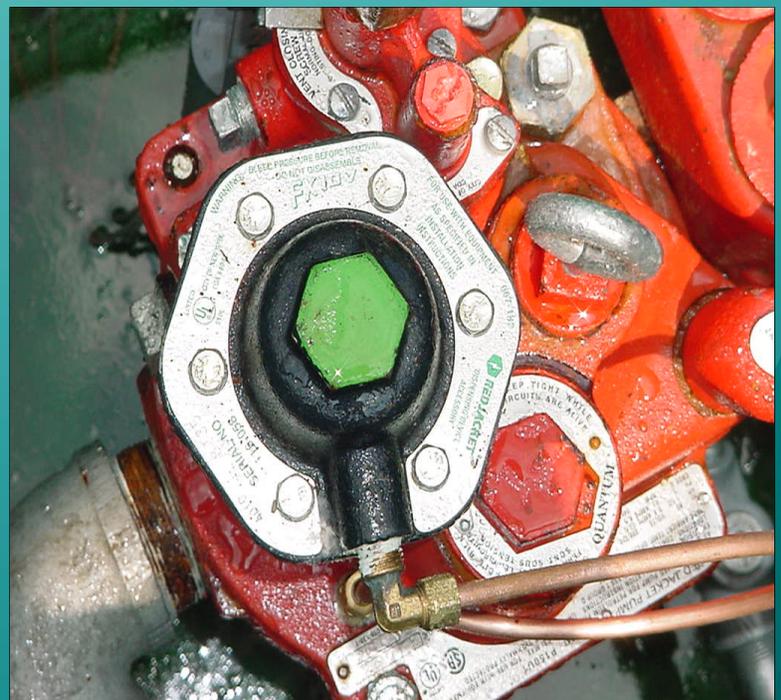
Piping

Pressurized Piping

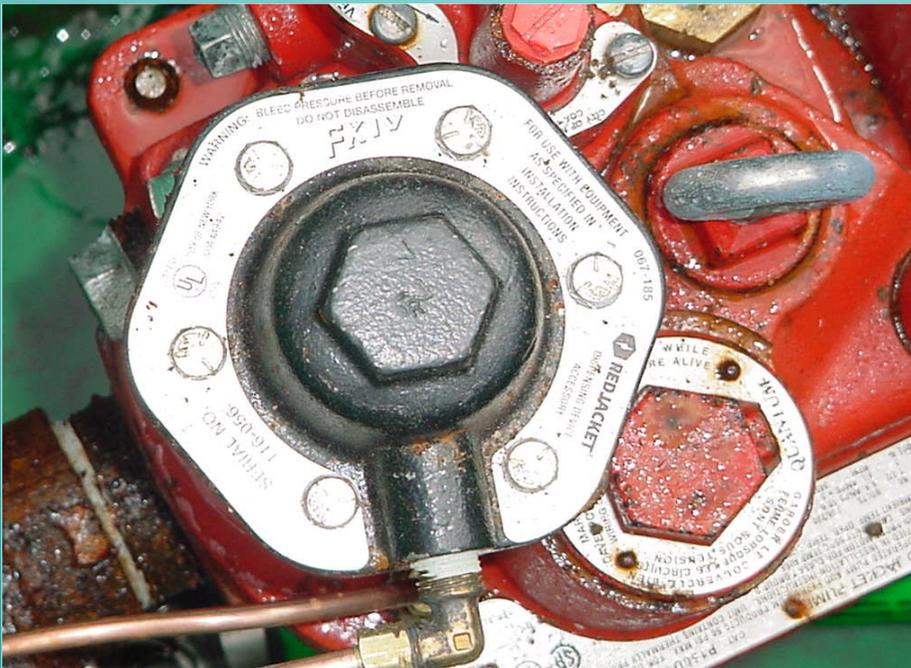
- ◆ Line Leak Detectors
- ◆ Interstitial
- ◆ Annual precision test
- ◆ Pressure Monitoring
- ◆ SIR

Automatic Line Leak Detectors

- ◆ Must be tested annually per manufacturer's specifications
- ◆ Plugged into the Submersible Turbine Pump (STP)
- ◆ Test for 3gph leak
- ◆ Required for ALL pressurized piping

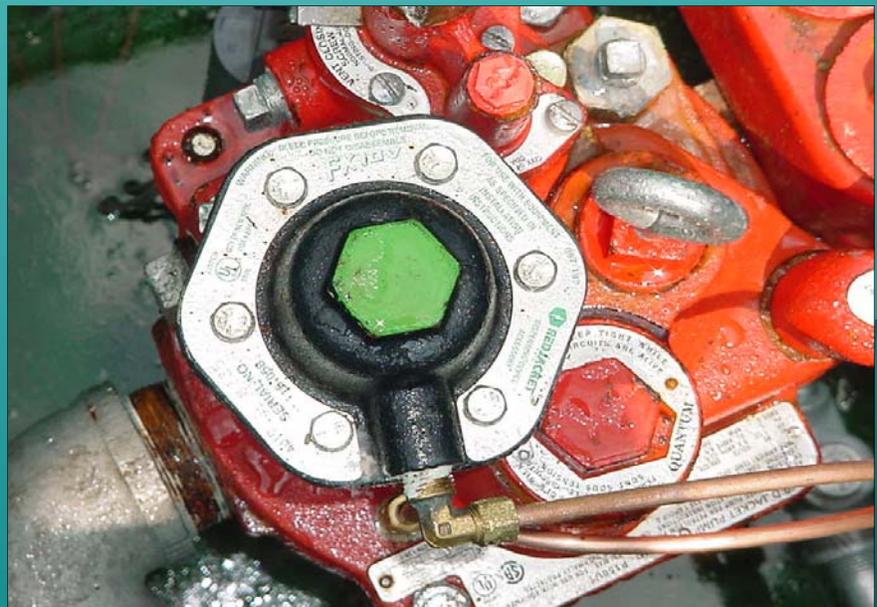


The mechanical LLD (1) is a “Red Jacket®” FXV series model FX1V and tests the lines to 3 gph. The FX1V is suitable for installation on all grades of gasoline STPs. The FX1V is quickly identified by the black color of the top and the silver identification label. The mechanical LLD (2) is a “Red Jacket” FXV series model FX1DV and also tests the lines to 3 gph. The FX1DV is suitable for installation on diesel fuel STPs. The FX1DV is quickly identified by the green color of the top and the silver identification label. **Inspection Significance:** The gasoline (black) and diesel (green) FXV mechanical LLDs are not interchangeable. If the facility dispenses both diesel fuel and gasoline under a pressurized system, confirm that the correct type of LLD has been installed on each STP if “Red Jacket” FXV series LLDs are used for automatic line leak detectors.



1

2 →

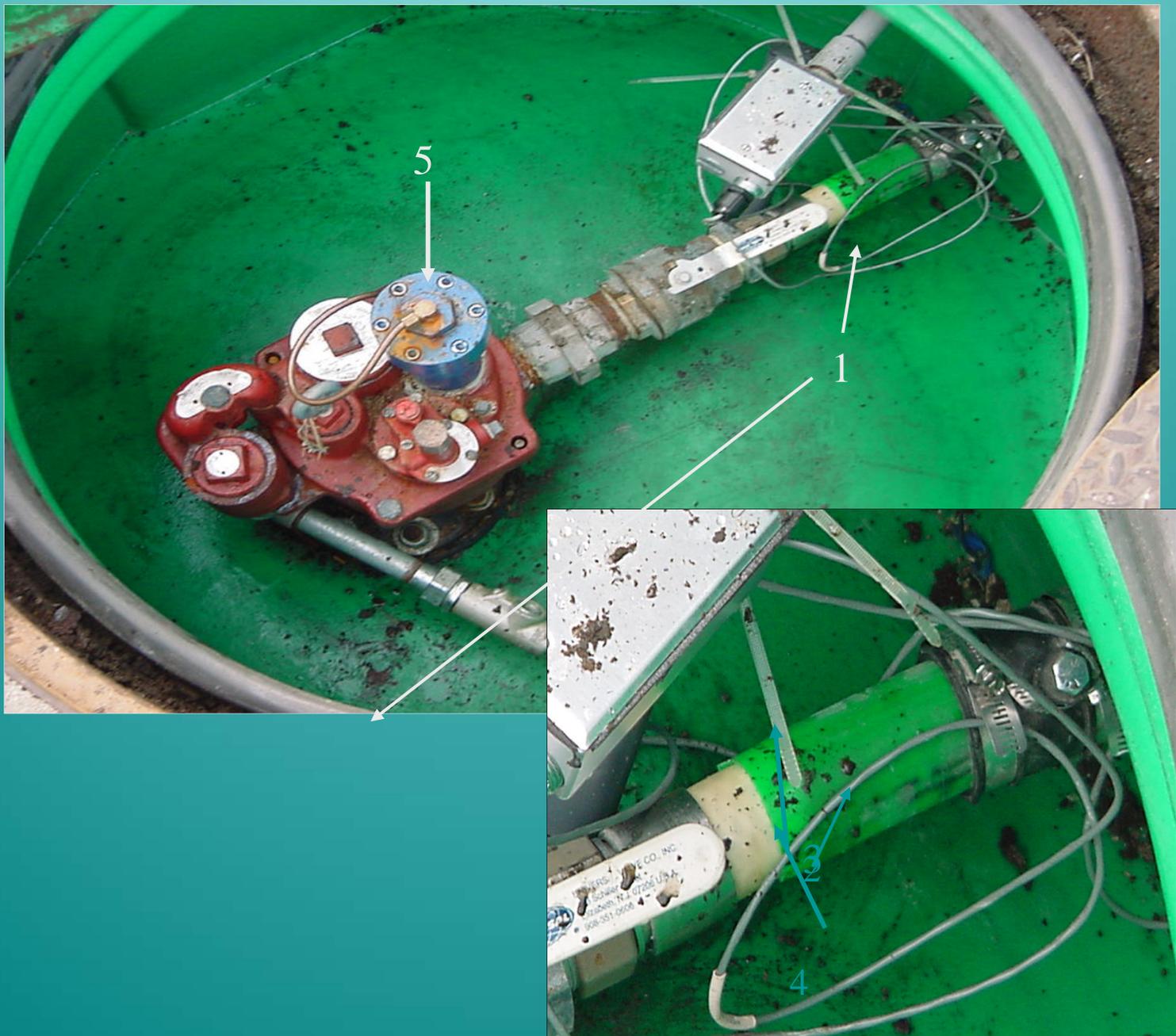


Interstitial

- ◆ Product tight secondary containment
- ◆ Double wall piping only
- ◆ Any test boots MUST be loose or open
- ◆ Liquid or discriminating sensors fixed to the bottom of the sump



The product piping is Geoflex® double-wall flex pipe (1). A sump sensor for line leak detection is present but not visible in the photograph. **Inspection Significance:** The initial reaction is that the owner or operator is not conducting line leak detection with the sump sensor because the nipple on the test boot (2) is plugged with a bolt (3) and therefore a line leak to the interstitial area cannot reach the sump sensor. Upon closer inspection it must be noted that a portion of the outer wall (green) of the double walled piping has been removed at (4). The inner wall (tan) can be seen and the test boot had been slid back exposing the interstitial area of the piping so a line leak can reach the sump sensor. To test the interstitial space of the line the test boot is slid back over the open space at (4) and the clamps tightened. The bolt (3) is then removed and a test line can then be secured to the nipple to either pressurize the space or draw a vacuum on the space to run the test. In this case determine if the sensor is functioning and if the FE Petro mechanical LLD (5) has been tested annually as required.



This sump contains a “Red Jacket®” STP (3), and is fitted with an VMI LD-2000 LLD (2). Although not as common as a “Red Jacket” or FE Petro LLD, these are seen at some sites. The sump has double-wall piping, and reducer boots (1) are present. The clamps on the boots are tight which would prevent leak detection of the lines using a liquid sensor in the STP sump. In this case, the fact that the boots are tight does not matter, because a liquid sensor is not present. **Inspection Significance:** In this instance, the inspector must determine what the owner or operator is doing for line-leak detection. The LLD is only capable of detecting leaks of 3 gph (i.e., catastrophic releases). In addition to the LLD, line leak detection includes either monthly line leak detection (i.e., .2 gph or 150 gallons in 30 days) or an annual line tightness test. Also verify construction of the piping here and at the dispenser to determine if corrosion protection is a requirement.. See definitions: liquid sensor, boot and interstitial



In this sump is part of a manifolded tank system. The sump pictured here does not have an STP, but is connected to a tank that does have an STP by means of the manifold line (1). **Inspection Significance:** Even though there is a minimal chance of a leak from the piping, the owner or operator has chosen to fit a liquid sensor (2) for leak detection. A tank bung (3) can be used for an optional riser. See definitions: STP, liquid sensor and manifolded.



This STP sump is located at a marina in Cape May. The purpose of the twin turbine installation is to service multiple dispensers at the dock area. The lines are double-wall Geoflex®. Also note that the tank system is manifolded to another diesel UST located adjacent to the photographed UST. This is evidenced by the manifold line (1). **Inspection Significance:** The method of line-leak detection can not be determined since no sump sensors are present. The owner or operator must document what monthly method of line-leak detection is being used. Also note that neither turbine has the required automatic line-leak detectors [plugged LLD port (2)] to meet the 3 gph leak rate for large releases. An NOV was issued for failure to perform required line-leak detection.



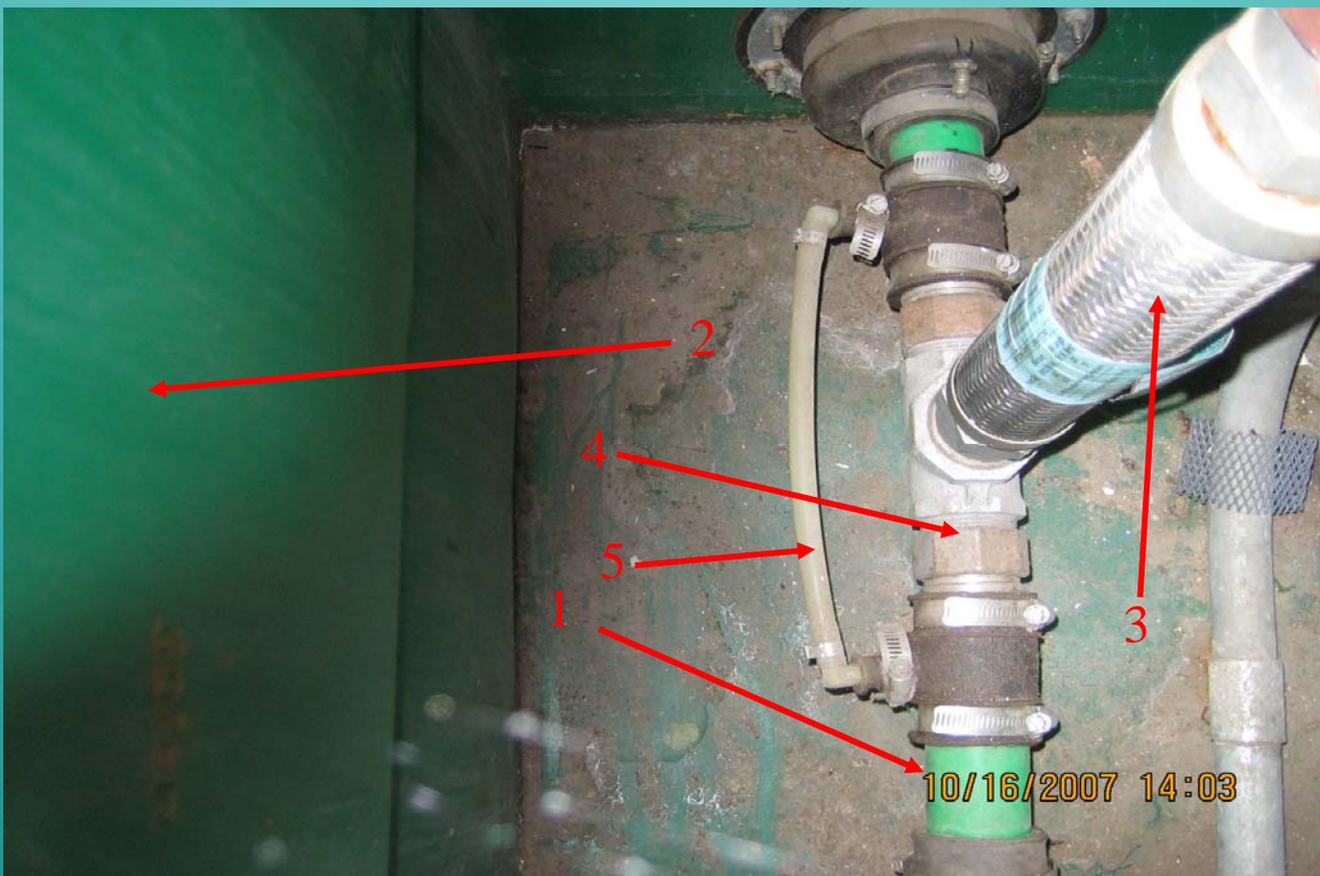
Huh?



The jumpers (1) are used to connect the interstitial spaces of double wall flex piping. The connectors (2) are single wall which prevent interstitial monitoring of the entire piping run (product can not transfer from one piping section to the next). The test boots (3) are tight, but fluid can transfer to the interstitial space by means of the jumpers (Remember: the product is under at least 10 - 12 psi). In this picture, interstitial monitoring could be performed without the jumpers if a liquid sensor was located in the transition sump (4), however the test boots must be loose to allow product to enter the containment sump if liquid sensors are used.



This is a picture of double wall flex piping (1) in a dispenser sump (2). The stainless steel riser (3) connects to the dispenser. Since the interstitial does not carry across the single wall metal fittings (4), jumpers (5) are required to allow monitoring of the interstitial space of the entire piping run. If jumpers are not used, then there must be a liquid sensor present in each dispenser sump to be in compliance with **interstitial monitoring**. Remember: if a liquid sensor is present, the test boots must be loose. [See Page 23-07 for more information.](#)



Pressure Monitoring

- ◆ Pressure Line Leak Detectors
- ◆ Can perform 3 gph, .2 gph, and .1 gph tests
- ◆ Connected to an ATG panel or dedicated LLD panel
- ◆ Can be used on single or double walled piping
- ◆ Some are wireless



A typical Exxon STP sump that has the following equipment: liquid sensor (1), single wall piping (2), a Veeder-Root pressure transducer (3) and the required SwiftCheck®(functions as a check valve) (4). **Inspection Significance:** Make sure the SwiftCheck® (4) is present (see inset photo for close up view) . If it is not, the pressure transducer (3) is not capable of performing monthly line-leak detection (.2 gph). It can only perform the function of an automatic line-leak detector (3 gph). See next photograph for further information regarding the SwiftCheck®. Also, the functional element (5) must be disabled when using the Veeder-Root pressure transducer. In this photo the installation contractor has left the spring and check valve of the functional element (6) on top of the STP as evidence that the unit was disabled. Since single-wall piping is used, the liquid sensor is only monitoring the STP for leaks. Verify line construction type. See definitions: liquid sensor, ATG, STP sump, Simplicity, Swift Check, LLD and pressure transducer.



An Emco® Electronics Line Leak Detector Model Q0011-002 (1) which is capable of detecting a line leak of 0.1, 0.2 and 3 gph. Therefore, a separate automatic line leak detector is not required. Also of note are the ATG probe (6) and the liquid sump sensor (7). **Inspection Significance:** When installed on a “Red Jacket” STP (this example), the STP must be equipped with a functional element (2). **Note:** the copper vent line (3) from the Emco® sensor to the tank test-port on the STP. This vent must be present for the unit to function on any type of STP. The unit can be installed with the electrical conduit (4) installed up or downward as a space-saving measure. This will not affect the functionality of the unit. **Note:** Model Q0011-002 (shown) must be installed in the STP LLD Port (5). Model Q0011-001, which looks like the Q0011-002 in appearance, must be installed in the pressurized product line (8). Determine which model is present during your inspection!



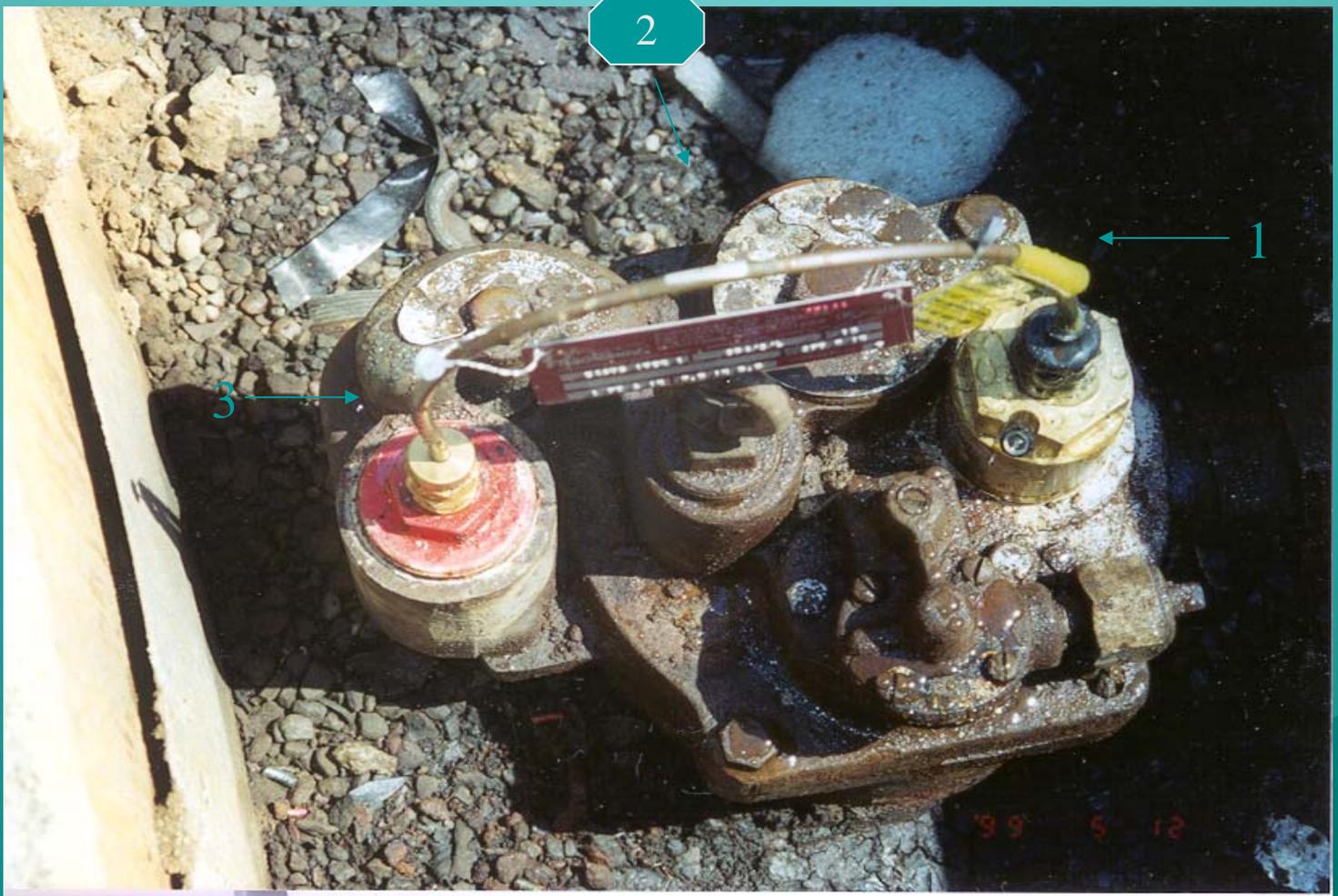
This is a typical Veeder-Root pressure transducer (1) which is capable of monitoring the product line leaks at a rate of .1, .2 and 3 gph. It is mounted where the mechanical Line Leak Detector (LLD) is usually located. The LLD in this case is not needed for leak detection because the pressure transducer is present. This unit is almost always present at Exxon/Mobil sites when a Simplicity unit is monitoring the tanks and lines. **Inspection Significance:** Unless the STP is a “Red Jacket” Quantum or CPT (identification labels may be found on the STP, see inset photo) the black steel SwiftCheck® riser (2) must be installed to allow the pressure transducer to detect line leaks as low as .1 and .2 gph. Note the functional element (3) must be disabled by removing the spring and piston (4). Ask the owner or operator to verify this. If the SwiftCheck® is not present, the pressure transducer can only test to 3 gph, which does not meet the required .2 gph monthly leak detection rate. This may be acceptable if an alternate monthly means of monitoring the line is used. See definitions: ATG probe, pressure transducers, CPT, Quantum, SwiftCheck® and Simplicity



A close-up view of a Quantum STP. Note the label (5) designating the model of the STP.

5

An example of a wireless line leak detector (WLLD); this unit is manufactured by Incon. A pressure sensor (1) monitors the STP output line pressure. Note: a mechanical line-leak detector is not required. A wire in a shielded housing (2) connects the pressure sensor to the switch (3) located in the wiring harness housing. A drop in line pressure from a leak prevents current from flowing to the STP motor, thereby stopping additional product loss. This WLLD can display a warning or alarm on the ATG panel by multiplexing through the 220 Volt AC that runs the turbine motor. The unit is capable of detecting a .1, .2 and 3 gph leak. **Inspection Significance: Look for records that the unit has been tested in accordance with the manufacturer's schedule. See definitions: WLLD,LLD, ATG and STP.**



Veeder Root Printout

Q 2:SILVER LINE LEAK

3.0 GAL/HR RESULTS:

LAST TEST:

JAN 16.2008 1:43PM PASS

NUMBER OF TESTS PASSED

PREV 24 HOURS : 37

SINCE MIDNIGHT : 13

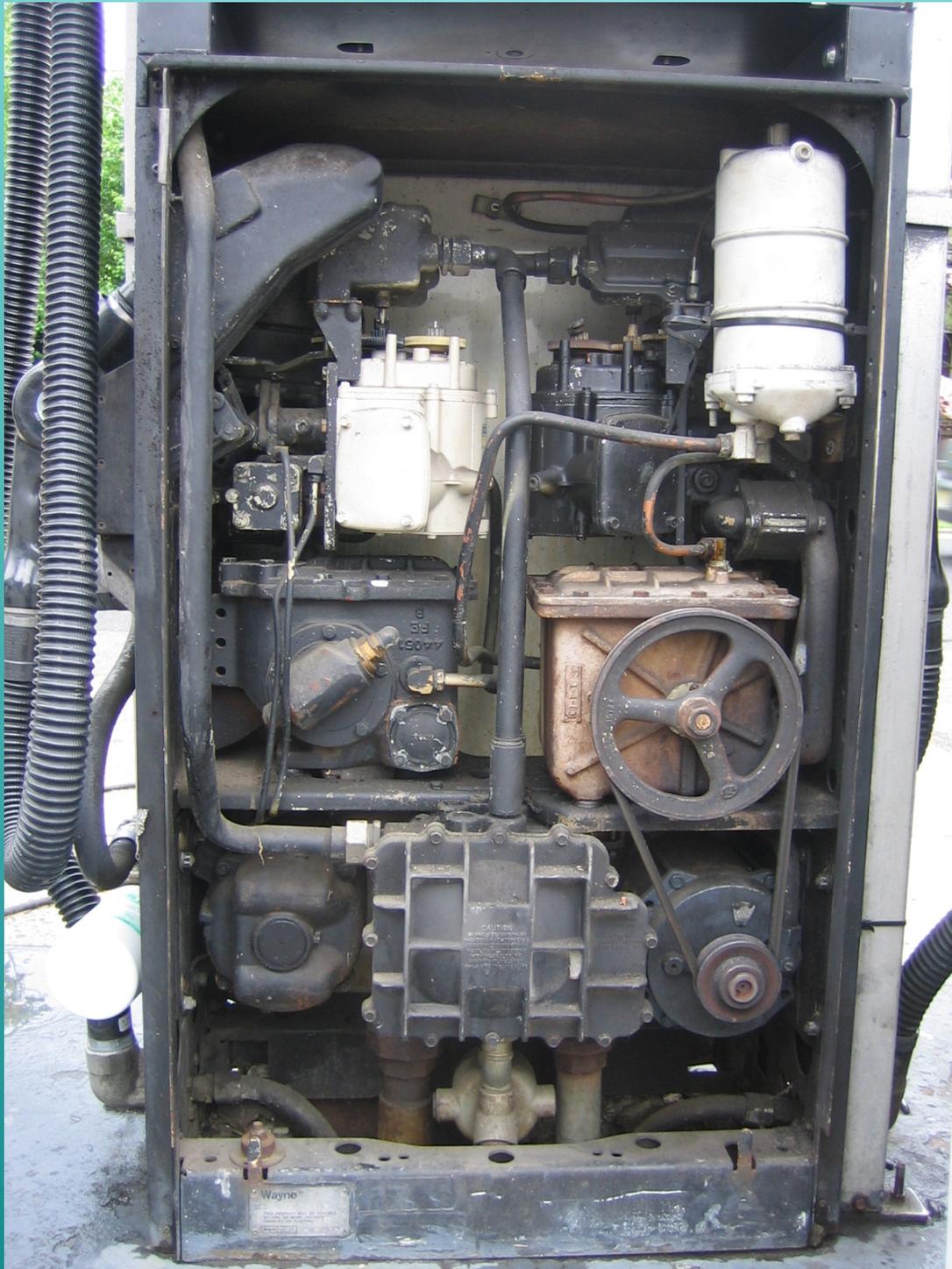
0.20 GAL/HR RESULTS:

JAN 15.2008	8:06AM	PASS
JAN 7.2008	9:47AM	PASS
DEC 30.2007	1:54PM	PASS
DEC 22.2007	8:09AM	PASS
DEC 14.2007	10:25AM	PASS
DEC 6.2007	1:37PM	PASS
NOV 28.2007	9:33AM	PASS
NOV 20.2007	3:50PM	PASS
NOV 12.2007	12:05PM	PASS
NOV 4.2007	10:14AM	PASS

0.10 GAL/HR RESULTS:

AUG 16.2007	8:56AM	PASS
FEB 13.2007	10:58PM	PASS
AUG 13.2006	9:22PM	PASS
FEB 10.2006	4:27PM	PASS
AUG 10.2005	5:47PM	PASS
FEB 7.2005	10:42PM	PASS
JUL 30.2004	7:59AM	PASS
JAN 28.2004	8:29AM	PASS
JUL 22.2003	5:11PM	PASS
JAN 19.2003	10:11PM	PASS

Suction Piping



Suction Piping

- ◆ American Suction (angle check valve, top of tank) – RDM required (precision test every 3 years or monthly monitoring)
- ◆ European Suction (“Safe” suction, union check valve, beneath dispenser) – exempt from RDM

A New LLD Issue

Oh Brother.....

- ◆ The Problem: Two or more lines manifolded together with associated MLLDs. Two LLDs = 6gph, Three LLDs = 9gph
- ◆ LLDs must operate according to manufacturer's specifications, or 3gph.
- ◆ Contractors get each LLD to pass a test by isolating it from the rest of the system
- ◆ Here's how it looks....

New LLD Issue (cont)



In this case, the tanks are also manifolded. This is the master tank STP sump. The slave ALSO has a functioning STP with an LLD. The problem was evident when ONE car pulled up to get regular gas and **BOTH** turbines turned on. Note the check valve between the turbine and the piping, the contractors use this to isolate the LLD for testing.

New LLD Issue (cont)



These pictures show the STP switches. Notice the lights to both switches are on, indicating both STPs are running. The problem is, only ONE car was getting regular gas. Thus, it is obvious that the piping is manifolded and the LLDs are installed incorrectly, allowing each to detect only a 6gph leak or greater. The O/O has a few options to correct this problem. We'll discuss that later..

New LLD Issue (cont)



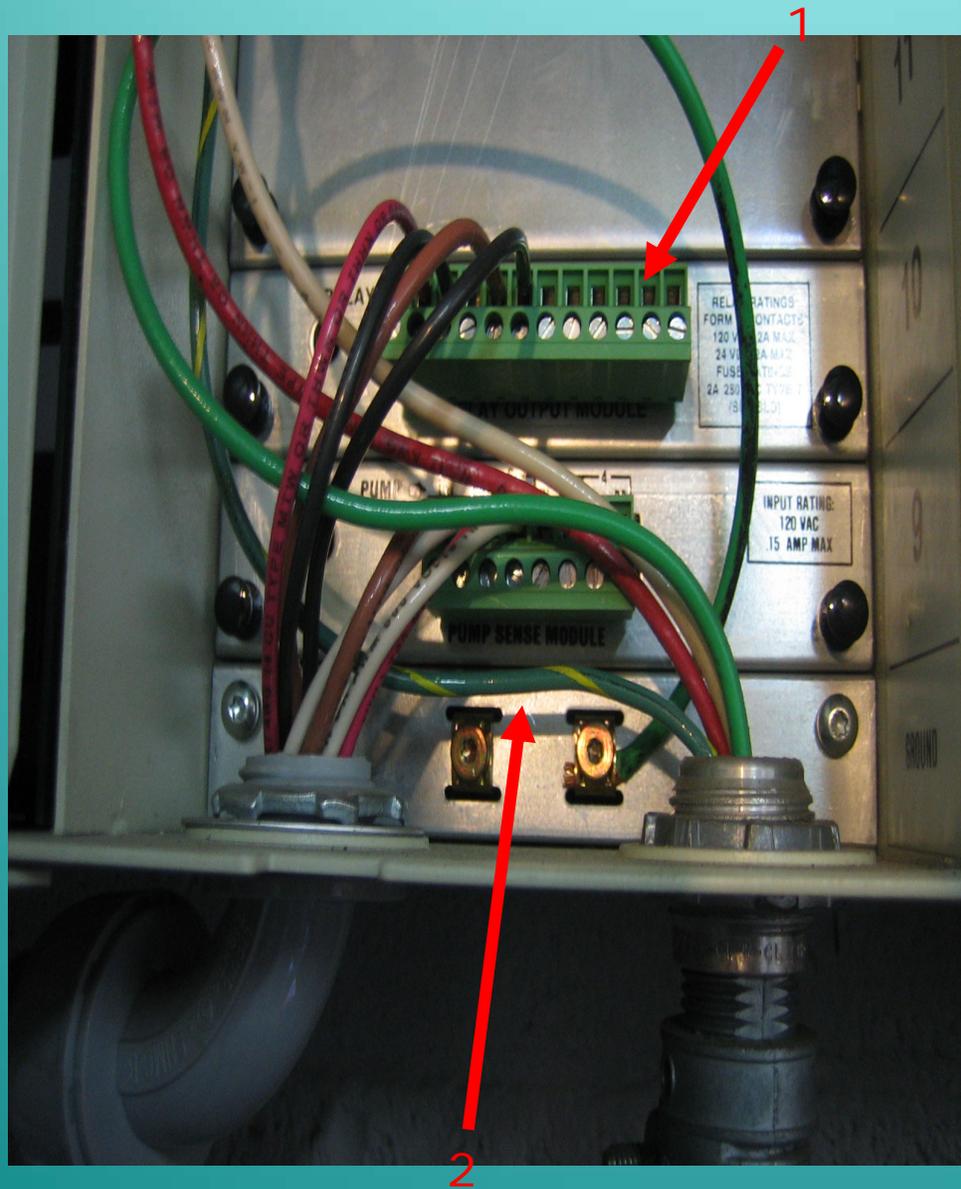
In this case, the piping ties together at the blend valve inside the dispenser. This station used to store 3 grades of gasoline, but recently switched out the mid-grade for a second regular tank. The blend valve here is blending 65% regular with 35% premium to sell mid-grade. Sure enough, all USTs have STPs with LLDs.

New LLD Issue (cont)



Believe it or not, this station is actually operating **in compliance** with their LLDs. The check valve is in place between the piping and the turbine, just like the earlier station, but notice in the picture on the right that only ONE regular turbine is switched on. How did they do this?

New LLD Issue (cont)



This picture was taken inside the station's Veeder Root TLS-350. (1) is the output relay module, while (2) is a "pump sense" module installed by the contractor to control the STPs and detect when a turbine is turned on. This module, along with the check valve, allows each LLD to detect at 3gph. In this case, the pump sense module detects which regular tank has more inches of product, and turns that turbine on to blend.

You do NOT need to open the Veeder Root to see if the pump sense module exists!! Simply print out the in-tank set-up, and it will appear there.

New LLD Issue (cont)



This is another facility with multiple regular tanks with STPs and LLDs. This station decided to install manual switches for their turbines rather than go the more expensive pump sense route. These switches have 3 settings, A, A&B, and B. The A&B setting leaves both turbines on, while the A, or the B setting selects one turbine. This station had considerably more product in one regular tank compared to the other, indicative of this type of practice.

New LLD Issue (cont)

Like the last station, this facility also is using manual switches to control their turbines. These are installed prior to the STP boxes to send power to one or the other turbine. Like the last station, these also have the same 3 settings: A, A&B, and B. So absent the STP boxes with the lights, how would you tell if both regulars are switching on or not? Simply pay attention in the tank field! You can either hear both turn on, or feel them turn on; your choice. (duh, or look at the setting on the switch!)



Cheap Fix

- ◆ This was an interesting solution to prevent both LLDs from operating simultaneously. Just when you think you've seen it all...



So, you're with me right?

I don't get it



Good!

New LLD Issue (cont)

Applications

4. Multiple Pumps on Same Discharge Line

Two Pumps on Same Line – Periodically, direction is sought concerning application of leak detectors, when two pumps are used to supply the same discharge line. This becomes a matter of logic and judgment on the part of the individual designing the system, utilizing the following information.

There are basically two approaches to the situation, as follows:

1. When installing a leak detector at each pump (Figure 5A) the main considerations are:

a. Considering that two leak detectors are involved, the flow rates referred to in Position 2, Figures 1 and 2 (leak sensing position) would double, i.e.

1) The metering rate being allowed to the discharge line would double to approximately 6 gph versus 3 gph. Therefore, it would require a loss from the discharge system of this amount (approximately 6 gph versus 3 gph) or greater to prevent the leak detector from opening to Position 3 and allowing full flow. See notice below.

2) The restrictive flow rate allowed by the leak detector when in Position 1 would double to approximately 3 to 6 gpm versus 1-1/2 to 3 gpm.

b. The test time, however, would decrease for the same reason as stated in a.1) above.

c. Assuming that the leak detectors were mounted directly in Red Jacket pumps, or in 038-072 housing as close to the discharge of the pumps as possible (Figure 5), most of the discharge line would be monitored by the leak detector as the leak detector monitors the discharge line downstream from itself.

2. When installing one leak detector in the main discharge line at a point beyond where the discharge lines from each of the two pumps manifold to it (Figure 5B), main considerations are:

a. The leak detector is dependent upon the total flow rate exposed to the main discharge line. (i.e. the diaphragm & piston type models 116-017 and 116-030 will accommodate a maximum flow rate of 70 gpm. The Big-Flo model leak detector model 116-012 will accommodate a maximum flow rate of 250 gpm.)

b. With one leak detector being used, as illustrated in 5B, the leak detector would operate as described in Figures 1 and 2 with stated flow rates and time being applicable.

c. Considering that the leak detector monitors the discharge line downstream from itself, the manifold portion and any piping previous to the leak detector would not be protected by the leak detector. Figure 5B.

More than Two Pumps on Discharge Line – When applying the leak detector to a system that would utilize more than two pumps to supply the same discharge line, it is important to note that the size of the leak rate which can be detected, using a leak detector in each pump, begins to reach an unacceptable level. For example, three pumps using a leak detector in each as shown in Figure 5D will only detect a leak of approximately 9 gph or larger ($3 \times 3 \text{ gph} = 9 \text{ gph}$). Also, in the event that an adequate leak rate did occur to activate the leak detector, the restricted flow rate would be 1-1/2 to 3 gpm for each leak detector and pump in service ($3 \times 3 = 9 \text{ gpm}$). It is possible that a flow rate of this size would not be recognized as a restricted flow rate or as abnormal. Each additional leak detector and pump used will increase the minimum detectable leak rate by approximately 3 gph and the restricted flow rate by 1-1/2 to 3 gpm.

Due to the above factors, we recommend the use of a Six-Inch Big-Flo Leak detector, model 116-012, installed as shown in Figure 5E, in this particular type of system.

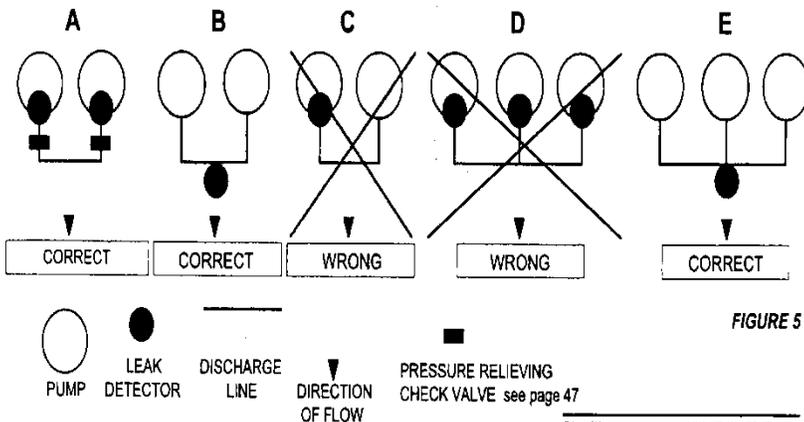


FIGURE 5

TO RETAIN THE PROTECTION PROVIDED BY ANY SAFETY EQUIPMENT, PERIODIC EXAMINATION AND TESTING IS MANDATORY. AN ANNUAL TESTING OF RED JACKET LEAK DETECTORS IS HIGHLY RECOMMENDED. (See p. 23 for Procedure.)

This is a printout from Veeder Root. It shows both proper and improper LLD installations. The illustrations are quite self-explanatory, so use this as ammunition for any questioning contractors. "Option A" should really include some kind of pump switch (or pump sense module). There are also other options for facilities to get their LLD configuration into compliance...

New LLD Issue (cont)

Fixes

- ◆ If not already in place, install check valves between product line and turbine. Also install some kind of pump switch or pump sense module.
- ◆ Install pressure transducers (these work differently than mechanical LLDs and would not have the same problem).
- ◆ Install an LLD after the manifold point (closer to dispensers) in the lines. Depending on how many lines are manifolded and flow rate, a "Big Flo" LLD might have to be used instead.
- ◆ If tanks are manifolded, the STP on the slave tank can be taken out of service, thus using the tank for storage only.

Pump Sense Module

It has other uses...

- ◆ This module allows the ATG to control the operation of the turbines, so it obviously knows when a turbine is turned on.
- ◆ This feature is useful to have in certain areas, where some customers are purchasing very small amounts of fuel at a time. (ie. for lawn mowers, very poor areas)
- ◆ Without the pump sense module, the ATG might recognize the dispensing as a leak, since it's such a small amount.
- ◆ Also, if a CSLD chip is installed, this module decreases the amount of idle time needed for the CSLD chip to work down to 5 minutes.

Truck Stops



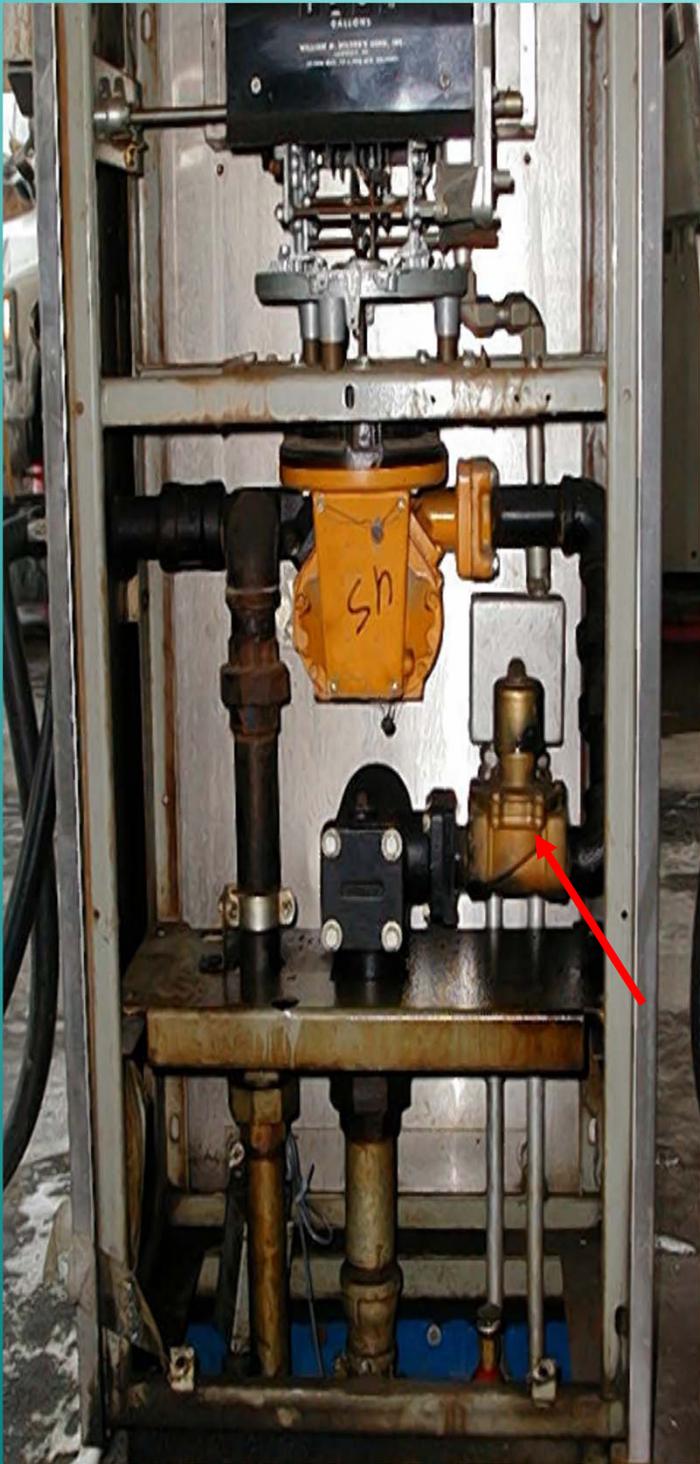
Here's a picture of a common saddle tank on a truck. Believe it or not, how truck fuel tanks are designed affects what we see out in the field. And away we go....



Just to be clear, we're NOT talking about horse saddles....

Satellite Dispensers

What?



The arrow is pointing to a solenoid valve in a “master” dispenser at a truck stop. This valve sits between the entering product piping and the outgoing piping to the satellite dispenser, isolating that portion of the pipe from the LLD or a line tightness test. This is a problem.

Satellite Dispensers



Once again the arrow points to a solenoid valve in the "master" dispenser. In this case, the valve is not between the two dispensers, but off to the side. So in this instance, the LLD and line test would NOT be isolated from the satellite dispenser (shown on next slide). This is good.

Satellite Dispensers



Here is the solenoid in the satellite dispenser. Notice this dispenser has no totalizer, as that sits in the "master". The solenoid here is at the end of the run, just as the hose is connected to the satellite. They get a gold star.

Corrosion Protection

NJAC 7:14B-4, 5

An **sti-P₃** tank (sti = Steel Tank Institute). All sti-P₃ tanks of 10,000 gallons or less are shipped with anodes (1) attached to each end. The anodes, in part, protect the tank from corrosion. In addition, the 2-inch riser (2) indicates that this UST is double-wall and the riser is connected to the interstitial space. The riser provides an access point for monitoring of the interstitial space by either electronic sensors or by manual checks. Not as apparent are the two additional methods of corrosion protection which are the outer coating and the dielectric bushings (3) where the system piping will be connected to the UST. When the UST is installed, a cathodic protection test port (PP4) with a test wire should be installed at ground surface to be able to conduct a corrosion test of the UST every 3 years. See definitions: dielectric, sti-P₃, interstitial, PP4 test port.





A rectifier for an impressed cathodic system. The rectifier converts alternating current (AC) to direct current (DC) which, through buried wires and cathodes, is introduced to the soil around the tank field and/or product lines. This current protects the steel tanks and lines from corrosion. Please refer to the section concerning cathodic testing.

Inspection Significance: Open the cover and determine if the system is running. Ask the owner or operator to verify that the rectifier is operating and to present documentation that its operation has been checked every 60 days. See definitions: *impressed system, corrosion and rectifier.*



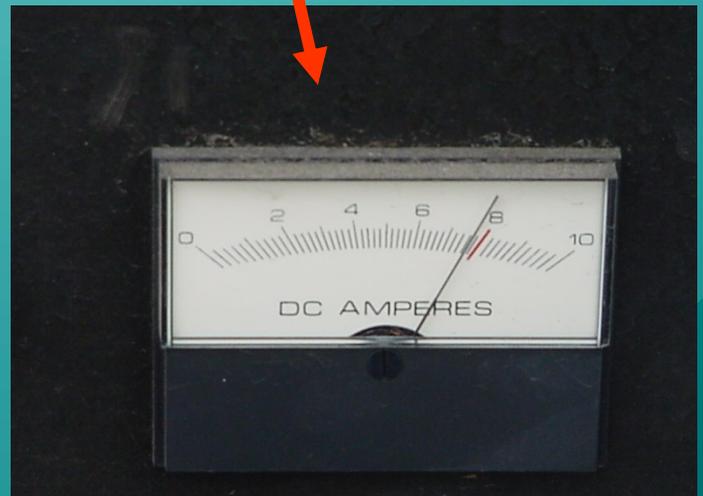
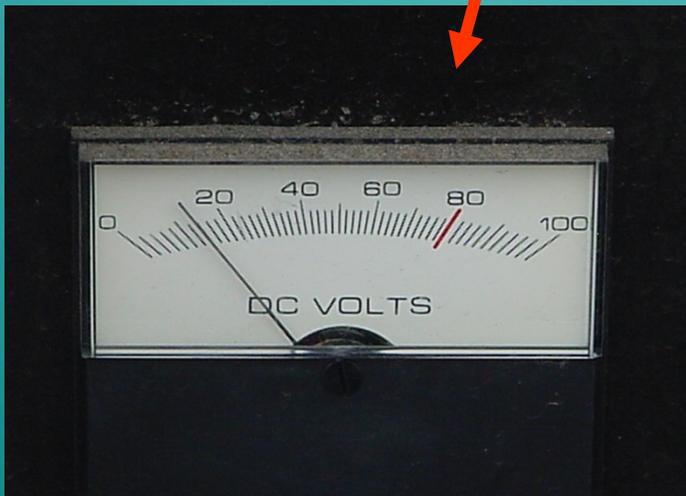
The cover on this rectifier has been opened for inspection. Be careful when opening a panel because 120 volt lines are present. The unit should be opened to confirm that it is turned on. This can be verified by an illuminated pilot light or readings above zero on the gauges (if present). **Inspection Significance:** The panel must be inspected and verified that it is operating by the owner or operator every 60 days. In addition, the system (cathodes and wiring) are required to be tested every three years (a cathodic test). The owner or operator should have records of the 60-day check as well as the results of the 3-year cathodic test. Please refer to the section concerning cathodic testing. See definitions: impressed system, corrosion and rectifier.



Another manufacturer's rectifier. This unit has both an ammeter and a voltmeter. The gauge readings (other than zero) are not important for the inspection but do indicate that the rectifier is operating. **Inspection Significance:** You must require that the owner or operator verify the 60-day panel inspection status and the required three-year cathodic test results. If you know how to do a cathodic test, you should turn the rectifier off when performing the 100-millivolt shift test. If you turn it off to run a test, make sure you remember to turn it back on before you leave. Refer to the cathodic test section for more information. See definitions: impressed system, corrosion and rectifier.



This rectifier contains both an ampmeter and voltmeter. To verify that the rectifier panel is on, these gauges should have values above zero. The readings do not tell you that the system is protecting the tanks and lines, it only indicates that the unit is operating. See *definitions: impressed system, corrosion and rectifier.*





Steel Transition Piping

Now THAT'S a bag!



Where it all began...



Some of this is
obvious



If unsure, test it!



Check Those Dispensers!

You just never know what's hiding in
there!



Stainless Steel is NOT Exempt









Hey Monmouth!

Something about glass houses rings a bell...



Flex Piping

Exactly how flexible is it? Not much.



Spill Prevention

NJAC 7:14B-4

Per N.J.A.C. 7:14B-5.1(d), the owner and/or operator of an UST system is required to:

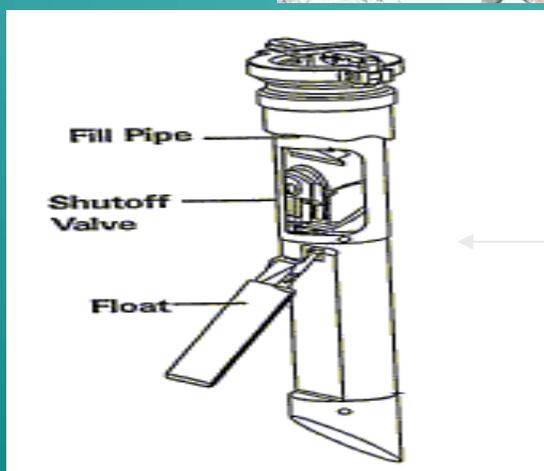
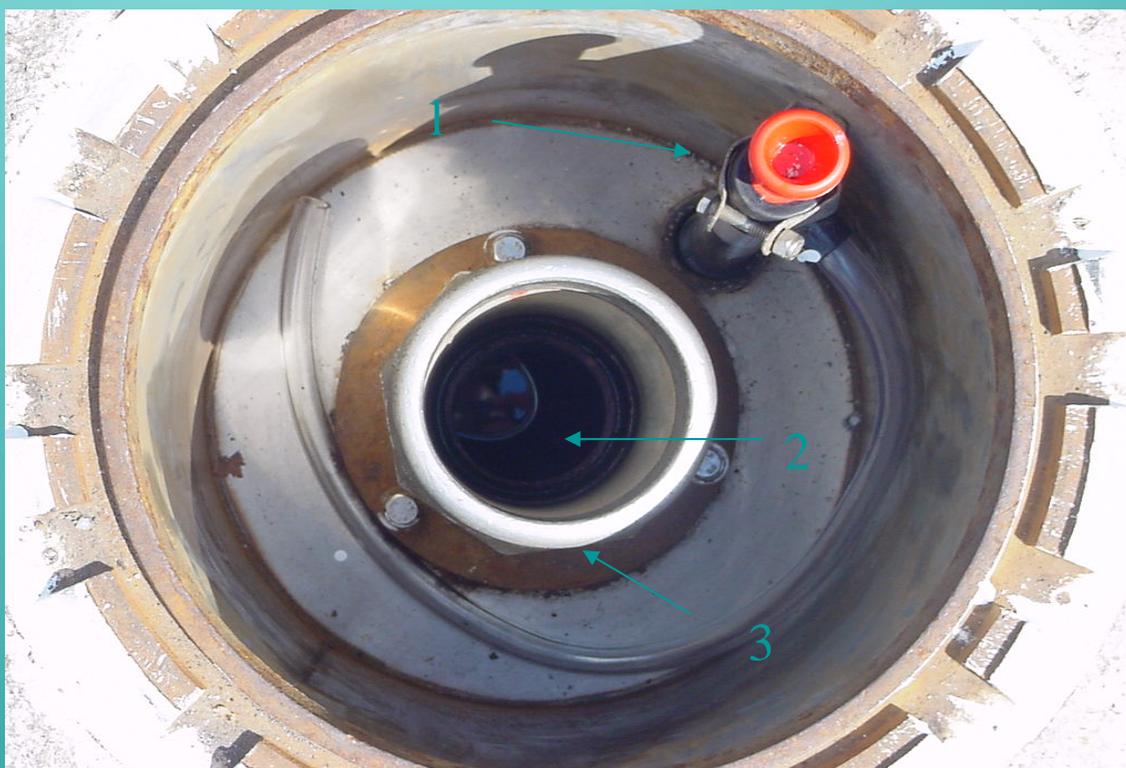
- ◆ Keep spill catchment basins, dispenser sumps and piping sumps clean of product, water, and debris.
- ◆ Visually inspect spill catchment basins before every delivery and visually inspect spill catchment basins, dispenser sumps and piping sumps once every 30 days, and properly dispose of any accumulation of debris and liquid collected.
- ◆ Ensure deficient equipment is repaired or replaced. Repairs and installation of new equipment shall be in compliance with N.J.A.C. 7:14B-4.1(a)3i, 4.1(n), 4.2(d), and 5.4.
- ◆ Not accept product delivery to any tank if the spill catchment basin contains product, water or debris.

API #1637 COLOR CODING FOR FILLPORT COVERS

<p style="writing-mode: vertical-rl; transform: rotate(180deg);">LEADED GASOLINES</p>	<p style="text-align: center;"></p> <p style="text-align: center;">Super premium</p> <p style="text-align: center;"></p> <p style="text-align: center;">Regular</p> <p style="text-align: center;"></p> <p style="text-align: center;">Sub-regular</p>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">DISTILLATES</p>	<p style="text-align: center;"></p> <p style="text-align: center;">Diesel</p> <p style="text-align: center;"></p> <p style="text-align: center;">No. 1 fuel oil</p> <p style="text-align: center;"></p> <p style="text-align: center;">No. 2 fuel oil</p> <p style="text-align: center;"></p> <p style="text-align: center;">Kerosine</p>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">UNLEADED GASOLINES</p>	<p style="text-align: center;"></p> <p style="text-align: center;">Premium</p> <p style="text-align: center;"></p> <p style="text-align: center;">Super</p> <p style="text-align: center;"></p> <p style="text-align: center;">Regular</p>		
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">VAPOR</p>	<p style="text-align: center;"></p> <p style="text-align: center;">Vapor hose connection</p>		
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">GASOLINE WITH EXTENDER</p>	<p style="text-align: center;"></p> <p style="text-align: center;">Super unleaded gasohol</p>		

A product tight spill bucket. A manual pump (1) is used to pump water or product out of the spill bucket. An in-tank float (2) is present in the drop tube (3). The float (2) closes the drop tube when the tank is filled to 95% of its capacity. Item (4) is a diagram and photograph of the in-tank float valve contained within the drop tube.

Inspection Significance: This UST is equipped with the required spill prevention (spill bucket) and has a method of overfill prevention (float valve). See definitions: spill bucket, overfill protection.



Another type of spill bucket and inner-cover is shown here. The outer, color-coded cover has been removed for the photograph. The cover has a locking bar (1) which ensures that the cover is held securely tight to prevent debris and rain water from entering the spill bucket. A rubber gasket on the inside of the cover (2) helps keep rain water out of the spill bucket (3). Also seen is the cap (4) on the fill port. **Inspection Significance:** If debris, water or product is present in the spill bucket require the owner or operator to remove these in your presence. All liquid must be properly containerized and disposed. Look for obvious signs of a lack of integrity such as cracks or a separation of the spill bucket from the fill droptube. See definitions: spill bucket, drop tube.



1

2

3

4



These large spill buckets are usually found at Amoco sites. The steel grating is to prevent debris from entering the spill bucket. **Inspection Significance:** If debris, water or product is present in the spill bucket require the owner or operator to remove these in your presence. Look for obvious signs of a lack of integrity such as cracks or a separation of the spill bucket from the fill droptube. See definition: spill bucket.

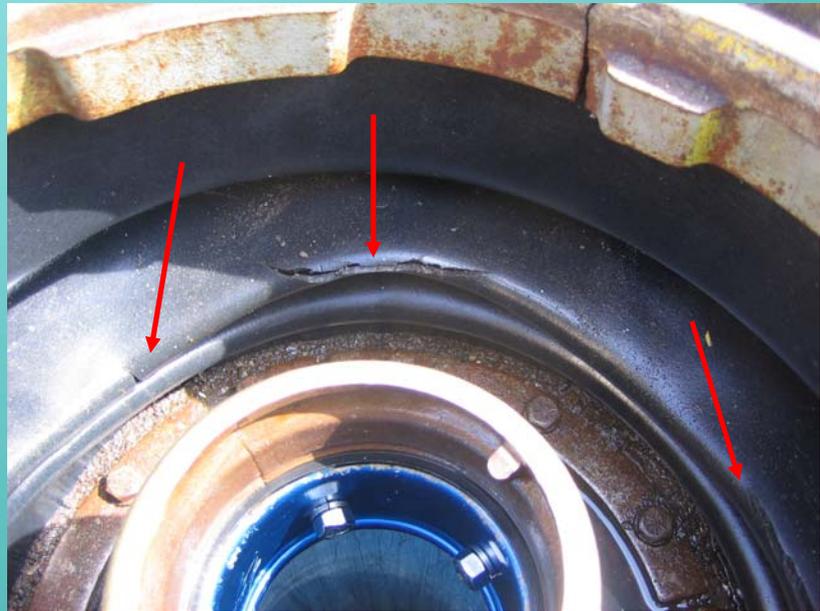


TYPICAL SPILL BUCKET SETUP AT A CURRENT/FORMER AMOCO/BP STATION

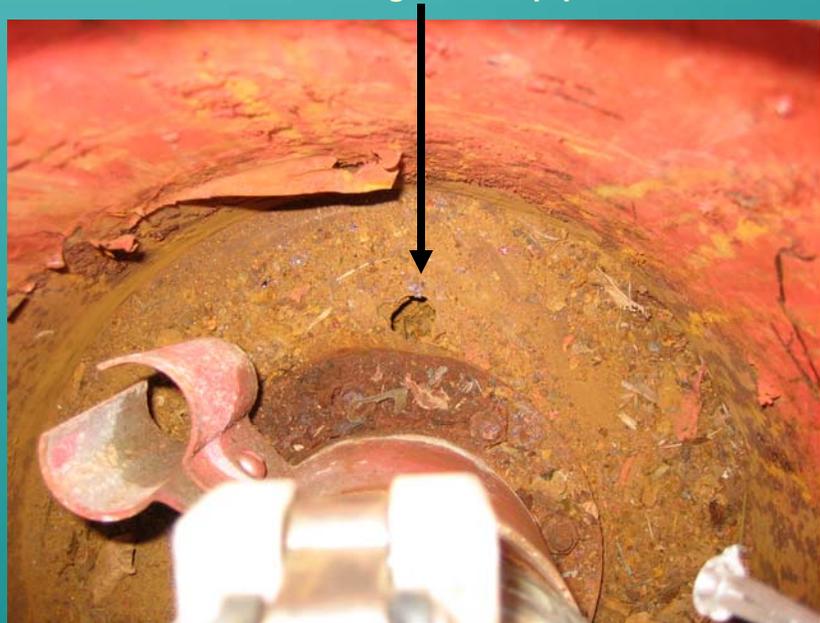


WHAT TO LOOK FOR:

- ◆ Warping or bulging in the sides/bottom of the spill bucket.
- ◆ Cracks or splits.
- ◆ Excessive rust/flaking.
- ◆ Looseness of fittings and/or the spill bucket itself.
- ◆ Damage to the top ring of the spill bucket.
- ◆ Obvious exposure/deterioration due to the elements.
- ◆ Presence of sealant/gooch in the spill bucket.



Cover the shadow, and the hole virtually disappears



***WHEN IN DOUBT, REQUIRE A HYDROSTATIC TEST TO BE PERFORMED**



=



=



WHAT YOU DON'T WANT TO SEE

Prolonged exposure to road salt led to severe corrosion of this spill bucket. Notice that the threaded connector has almost entirely corroded away.



MORE OF WHAT YOU DON'T WANT TO SEE



DOES THIS MEET 12/98 REQUIREMENTS?



INCON STS System

Franklin Fuel



Test Console

Sump Probes

Sherlock Test System

*This is a vac test, and does not require liquid.



Overfill Protection

NJAC 7:14B-4

This unit, which should be located outside the building and near the tank field, contains a red light (1) and a horn (2). The unit is connected to the ATG panel and should give a visual and audible warning when the UST is filled to 95% of its capacity. The bell (3) in the inset photograph is another form of an alarm that can be used for overfill compliance. **Inspection significance:** An alarm must be located in view or hearing of the delivery driver to serve as a warning to prevent overfill of the UST. If this is the method that the owner or operator is using for overfill protection, it must be located within view of the driver. If it is not within sight or hearing of the tank field, the owner or operator should be cited for a lack of overfill protection. See definitions: ATG and overfill prevention



Overfill Alarms

Just when you thought you had it figured out...

- ◆ Veeder Root has the test button on the unit
- ◆ Both Veeder Root and Incon can test from the output relay, but does that tell us if it really works?
- ◆ No, of course not! We need to know the relay setup and in-tank setup. So you've got it now right? Don't worry, follow the hand-outs...

Overfill Alarms

OUTPUT RELAY SETUP

R 1:OVERFILL ALARM
TYPE:
STANDARD
NORMALLY OPEN

IN-TANK ALARMS
ALL:OVERFILL ALARM
ALL:MAX PRODUCT ALARM

R 2:
TYPE:
STANDARD
NORMALLY OPEN

- NO ALARM ASSIGNMENTS -

R 3:
TYPE:
STANDARD
NORMALLY OPEN

- NO ALARM ASSIGNMENTS -

R 4:
TYPE:
STANDARD
NORMALLY OPEN

- NO ALARM ASSIGNMENTS -

OUTPUT RELAY SETUP

R 1:OVERFILL ALARM
TYPE:
STANDARD
NORMALLY OPEN

IN-TANK ALARMS
ALL:OVERFILL ALARM

OUTPUT RELAY SETUP

Overflow Alarms

OUTPUT RELAY SETUP

R 1:OVERFILL ALARM
TYPE:
STANDARD
NORMALLY OPEN

IN-TANK ALARMS
ALL:OVERFILL ALARM
ALL:HIGH PRODUCT ALARM

R 2:SECURE ALL
TYPE:
STANDARD
NORMALLY OPEN

IN-TANK ALARMS
ALL:LEAK ALARM
ALL:SUDDEN LOSS ALARM

LIQUID SENSOR ALMS
ALL:LIQUID WARNING

OUTPUT RELAY SETUP

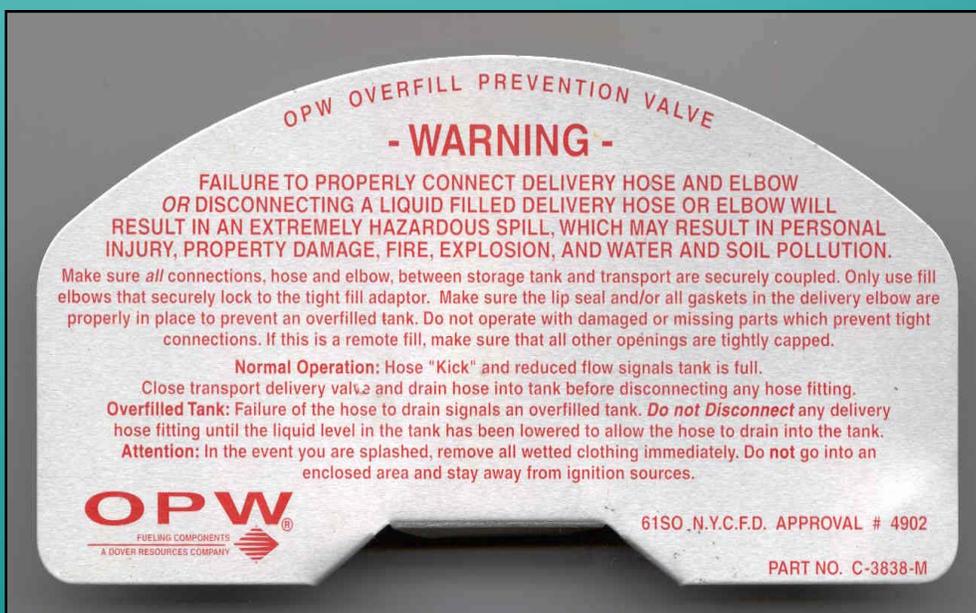
R 2:OVERFILL
TYPE:
STANDARD
NORMALLY OPEN

IN-TANK ALARMS
ALL:LEAK ALARM
ALL:HIGH WATER ALARM
ALL:OVERFILL ALARM
ALL:LOW PRODUCT ALARM
ALL:SUDDEN LOSS ALARM
ALL:HIGH PRODUCT ALARM
ALL:INVALID FUEL LEVEL
ALL:PROBE OUT
ALL:HIGH WATER WARNING
ALL:MAX PRODUCT ALARM

LIQUID SENSOR ALMS
ALL:FUEL ALARM
ALL:SENSOR OUT ALARM
ALL:SHORT ALARM
ALL:WATER ALARM
ALL:WATER OUT ALARM
ALL:HIGH LIQUID ALARM
ALL:LOW LIQUID ALARM
ALL:LIQUID WARNING

This is a coaxial drop tube that also includes a method of overfill protection as well as being one of two methods of Stage I vapor recovery. The inner pipe (1) conducts fuel from the tanker to the UST. The vapors return to the truck through the space between the inner and outer pipe (2). The warning labels (3) indicate that the coaxial is made by OPW and also contains an in-tank float valve that prevents overfilling the tank. Item (4) is a photograph of the in tank float valve contained within the drop tube.

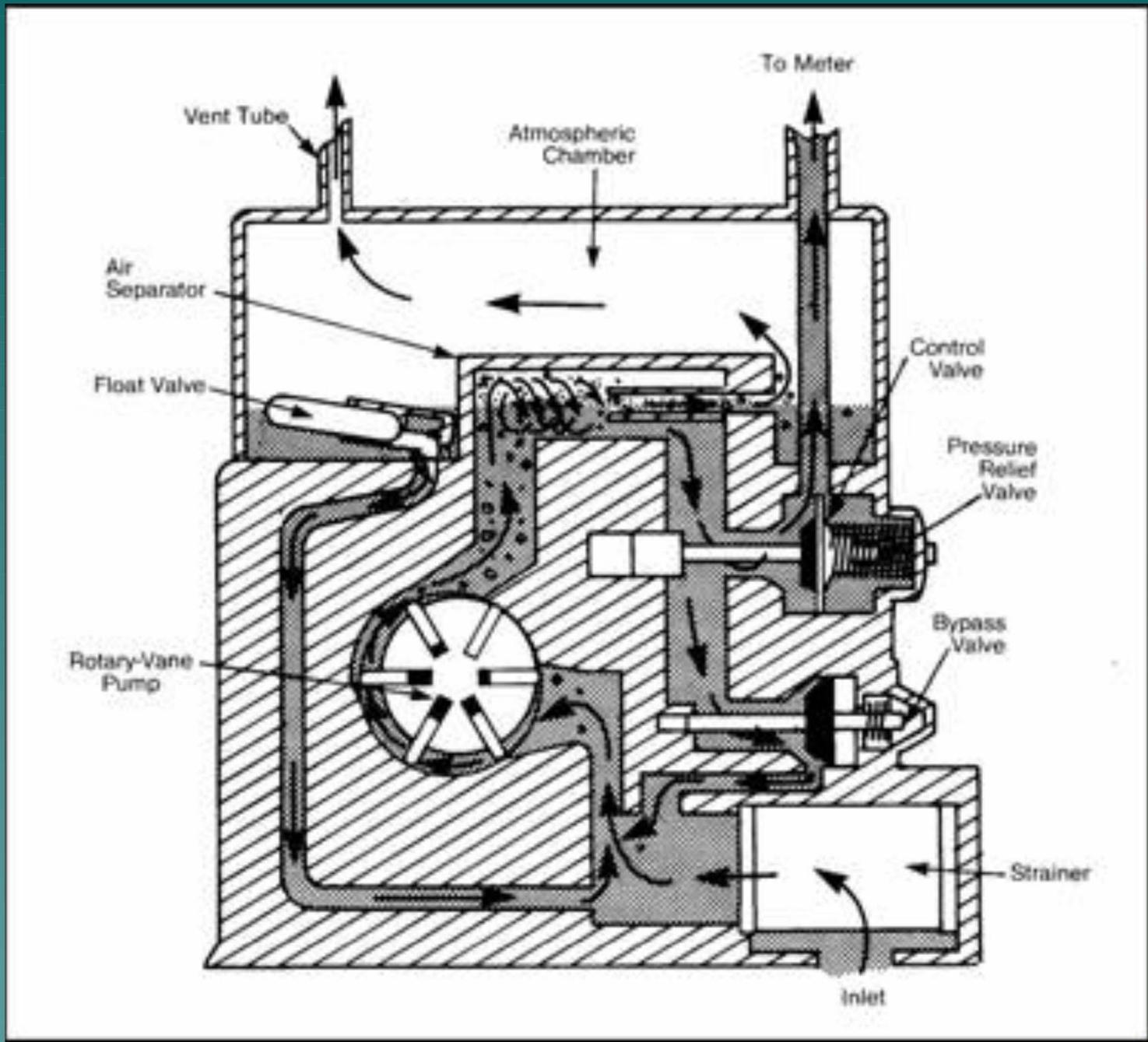
Inspection Significance: Verify the presence of the float valve by looking down the drop tube with an intrinsically safe flashlight. The presence of the coaxial drop tube and the warning label do not guarantee that an in-tank float (overfill protection) is present. If no float is present, verify what method of overfill is used for the UST. See definitions: Stage I, co-axial and overfill protection.



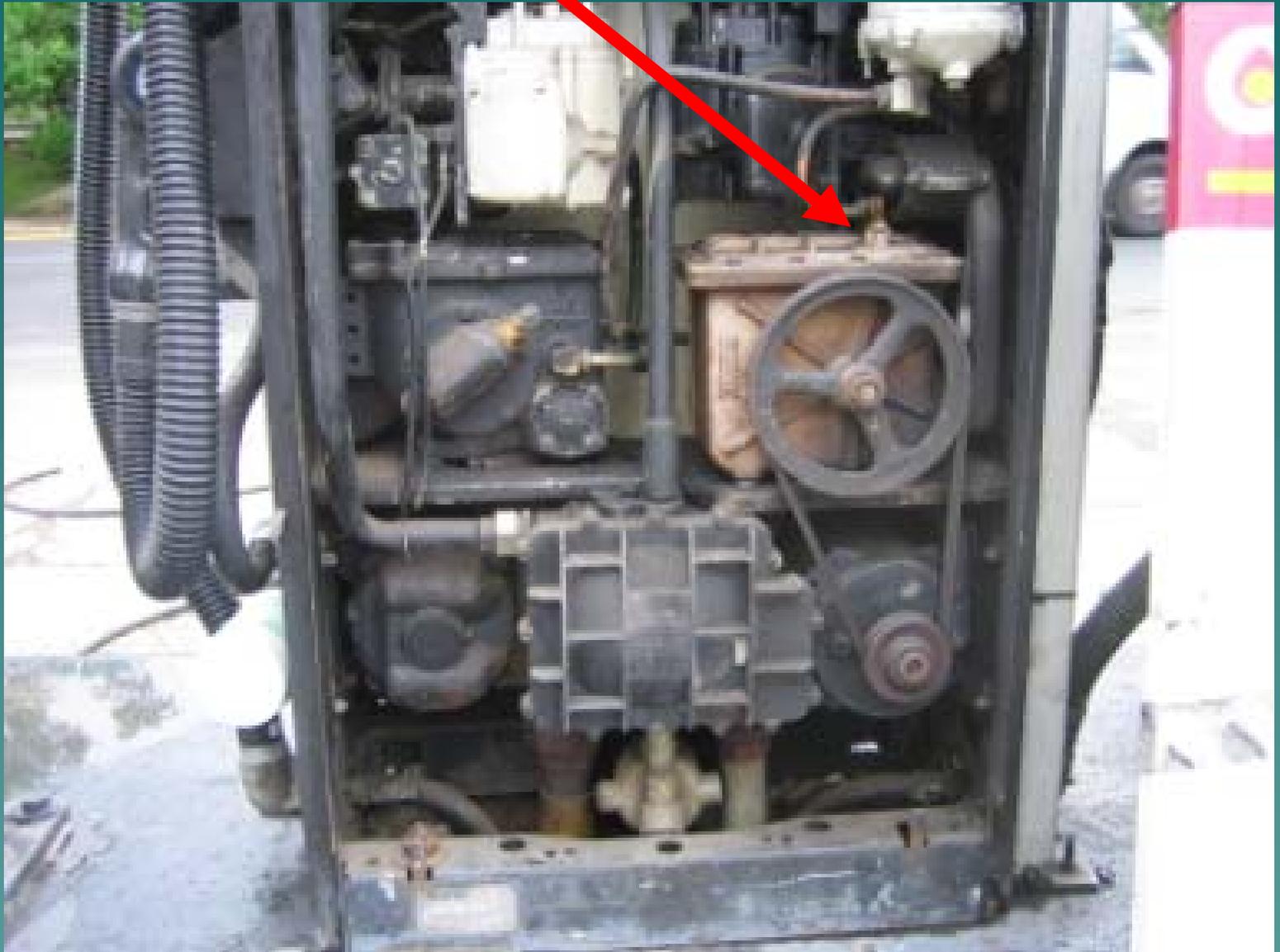
Overfill ball float commonly referred to as a 90% flow restrictor. This device is located in the UST and is connected to the vent line which is located just above the top of the UST. As product is introduced into the UST and it reaches the ball (1) at the bottom of the device, the ball floats on top of the product. When the ball reaches the end of the sub (2), it restricts the air flow out of the UST through the vent line. At this point, the UST is 90% full. This restriction causes a significant slowdown of product delivery into the UST signaling to the delivery person to shut off the valves on the delivery truck to avoid an overfill. Because the UST is only 90% full, this allows the product remaining in the delivery hose to drain into the UST without overflowing the tank. The cap (3) is typically what is seen under a small cover at the tank field for this type of overfill protection. **Inspection Significance:** This type of overfill protection should not be used for suction systems, systems with remote fills or systems that receive deliveries under pressure. Since the ball and sub are located within the tank, the cap (3) must be located along the center line of the tank to indicate the presence of a 90% flow restrictor. See definitions: *Overfill prevention.*







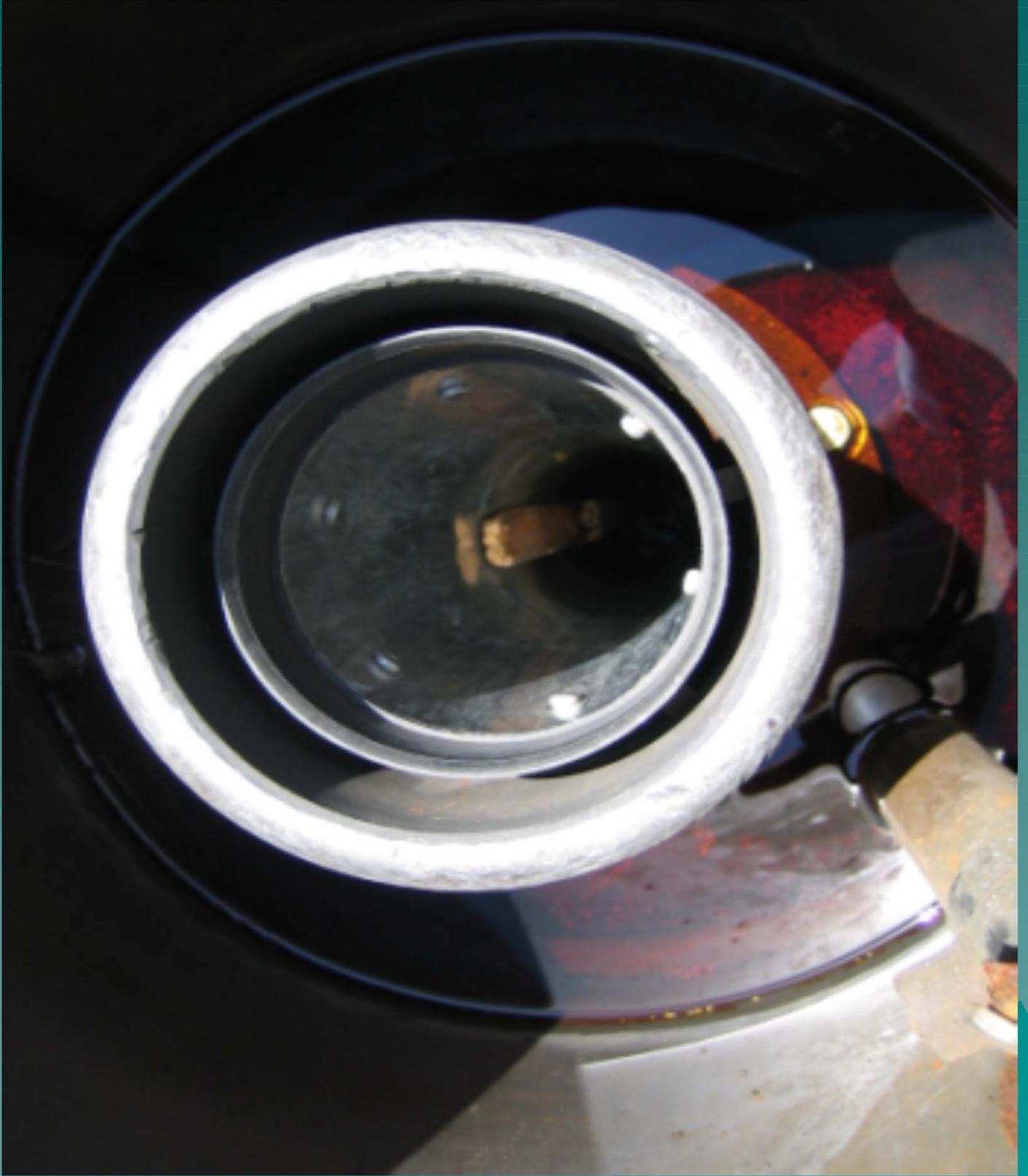
AIR ELIMINATOR VENT





WARNING
HOSE JUMP INDICATES FULL TANK
SHUT OFF TRUCK VALVE
DRAIN

THIS FULL
QUANT 2000
GNS 47









07/20/2005 14:46



UST Compliance Inspection

Protocol
and
Procedures



06/12/2007 12:46







I'll be back



DIVISION OF REMEDIATION SUPPORT
 UNDERGROUND STORAGE TANK PROGRAM
 P.O. BOX 028
 TRENTON, NEW JERSEY 08625-0028
 Phone: (609) 633-1464



UNDERGROUND STORAGE TANK SYSTEMS REGISTRATION CERTIFICATE

<p>The Department of Environmental Protection hereby grants this registration to operate and maintain the Underground Storage Tank System(s) described below in accordance with the laws and regulations of the State of New Jersey. This registration is revocable with due cause and is subject to the limitations, terms and conditions pursuant to N.J.A.C. 7:14B.</p>		Approval Date: 01/24/2008
		Expiration Date: 12/31/2010
Facility ID: 012345	Facility Contact (Operator): Joseph Smith (201) 555-1234	Total Number of Tanks: 3
Registration Activity ID: UST070001		Total Capacity (Gallons): 26000
Facility Address: JOE'S GARAGE 444 MAIN ST ANYWHERE, NJ 02854		Owner: JOSEPH SMITH 444 MAIN ST ANYWHERE NJ, 02854
Approved Tanks and Products Stored:		
TANK No.	TANK CAPACITY	TANK CONTENTS
5175	8000	Unleaded Gasoline
5176	8000	Light Diesel Fuel (No. 1-D)
5177	10000	Unleaded Gasoline
<p align="center">This Registration Must Be Available for Inspection at the Facility AT ALL TIMES</p>		



06/29/2005 08:58





State of New Jersey

Jon Corsine
Governor

Department of Environmental Protection

Lisa Jackson
Commissioner

Tank Field Legend

BF =Ball Float

DB =Dry Break

I =Interstitial Riser

CP =Cathodic Protection
TP Test Port

FP =Fill Port

PS =Piping Sump

STP =Submersible Turbine
Pump

MW =Monitoring Well

STP =Submersible Turbine
Pump with Containment

TFW =Tank Field Well

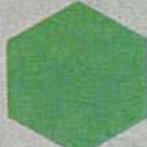
ATG =Automatic Tank Gauging

H =Healy

OR =Optional Riser

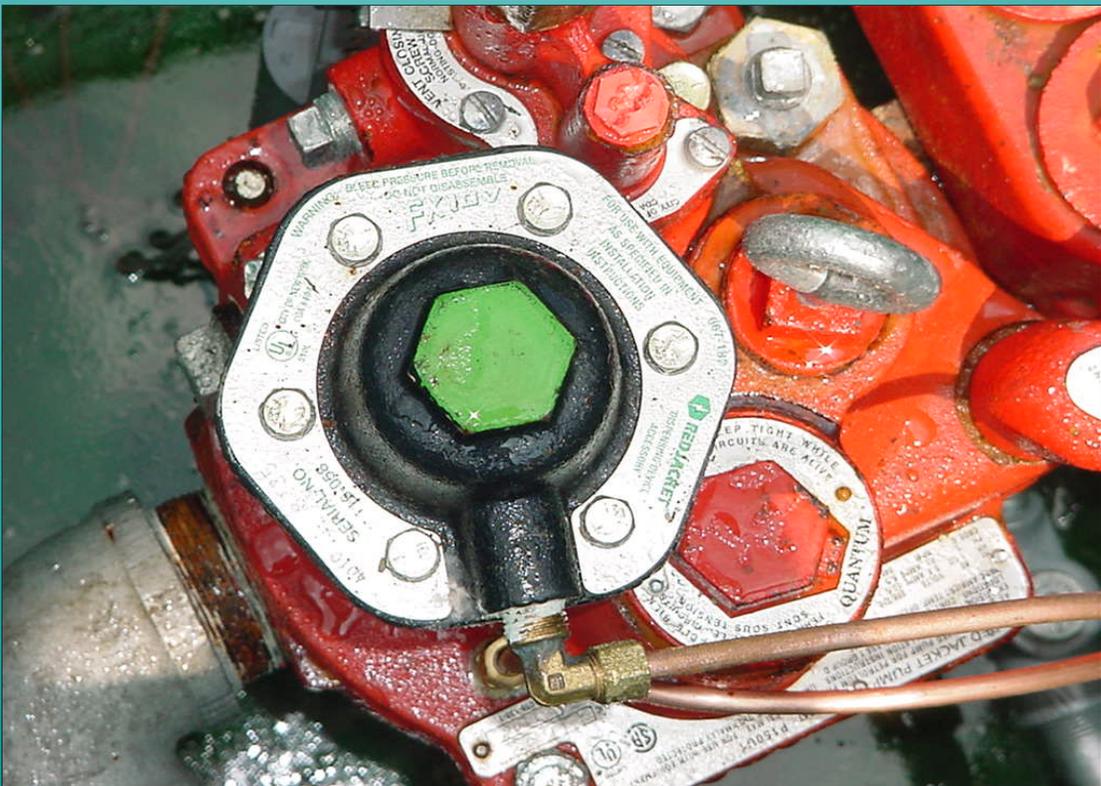
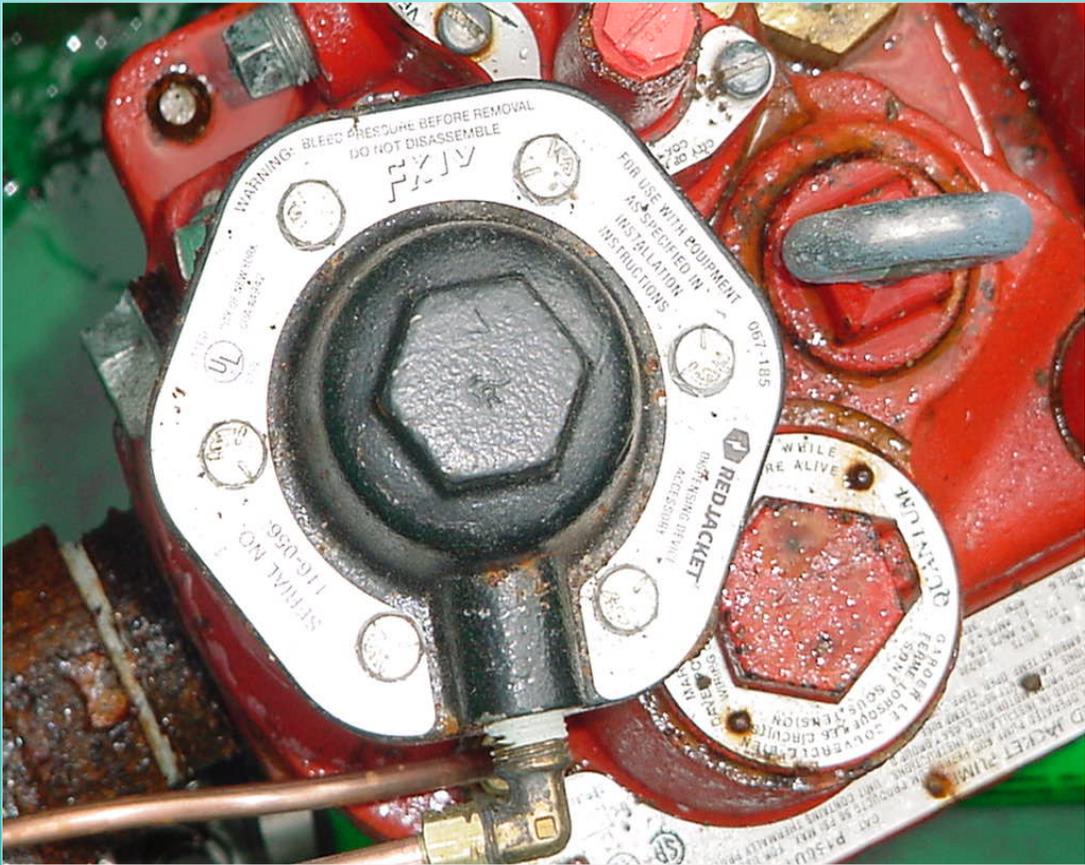
2X =Double Wall Piping
LLD =Line Leak Detector
PLLD =Pressure LLD
TBT =Test Boot Tight
Flex =Flex Piping
FRP =Fiberglass Reinforced Piping

Reg =Regular Unleaded
Plus =Mid-grade Unleaded
Pre =Premium Unleaded
Coax =Coaxial Drop Tube
SS =Straight Shot (drop tube)
OPW =95% Flapper valve

LEADED GASOLINES	 Super premium  Regular  Sub-regular	DISTILLATES	 Diesel  No. 1 fuel oil  No. 2 fuel oil  Kerosine
UNLEADED GASOLINES	 Premium  Super  Regular		 Diesohol
VAPOR	 Vapor hose connection		
GASOLINE WITH EXTENDER	 Super unleaded gasohol		























08/23/2006 11:05





CO-AXIAL STAGE I

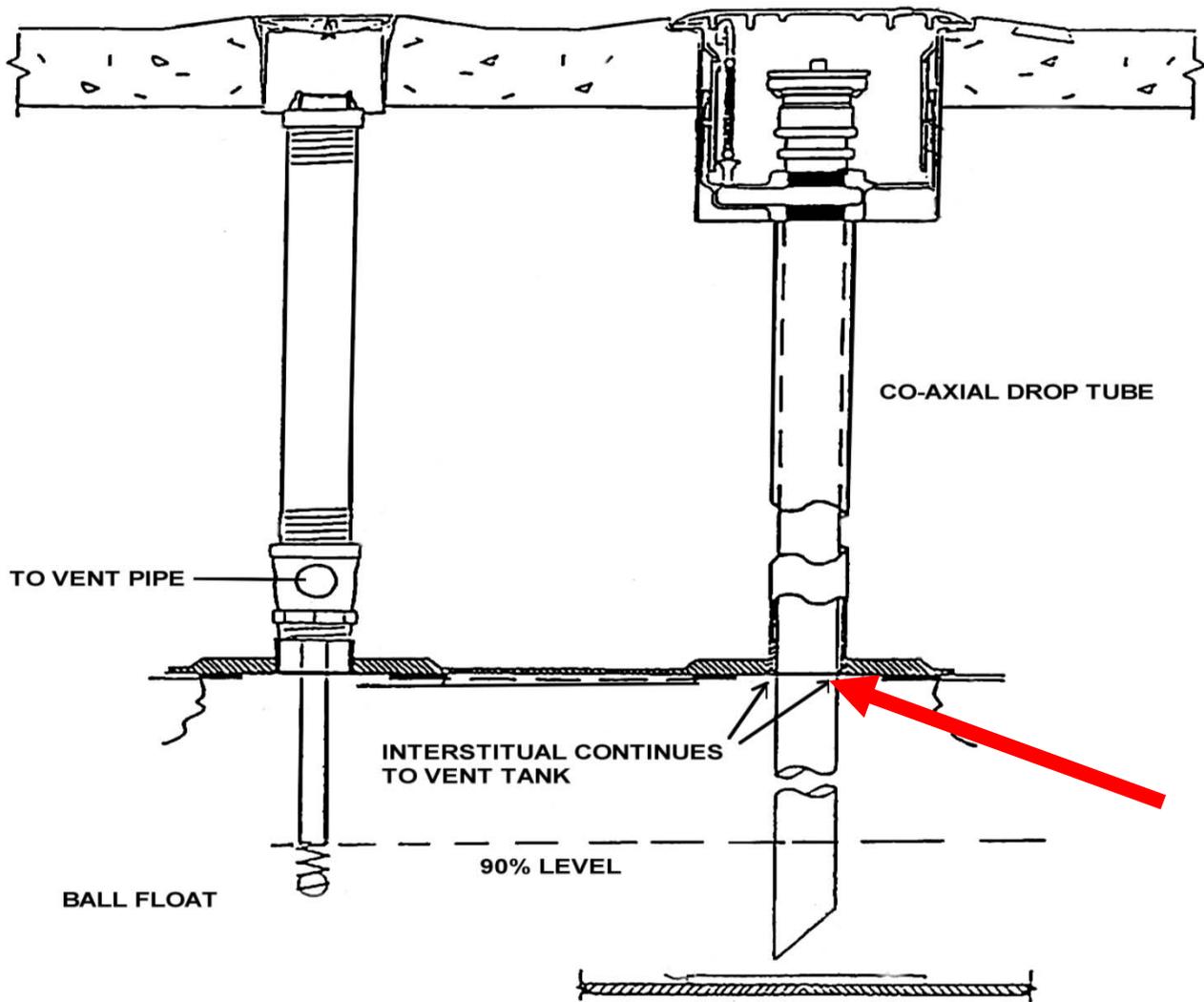


FIGURE 1







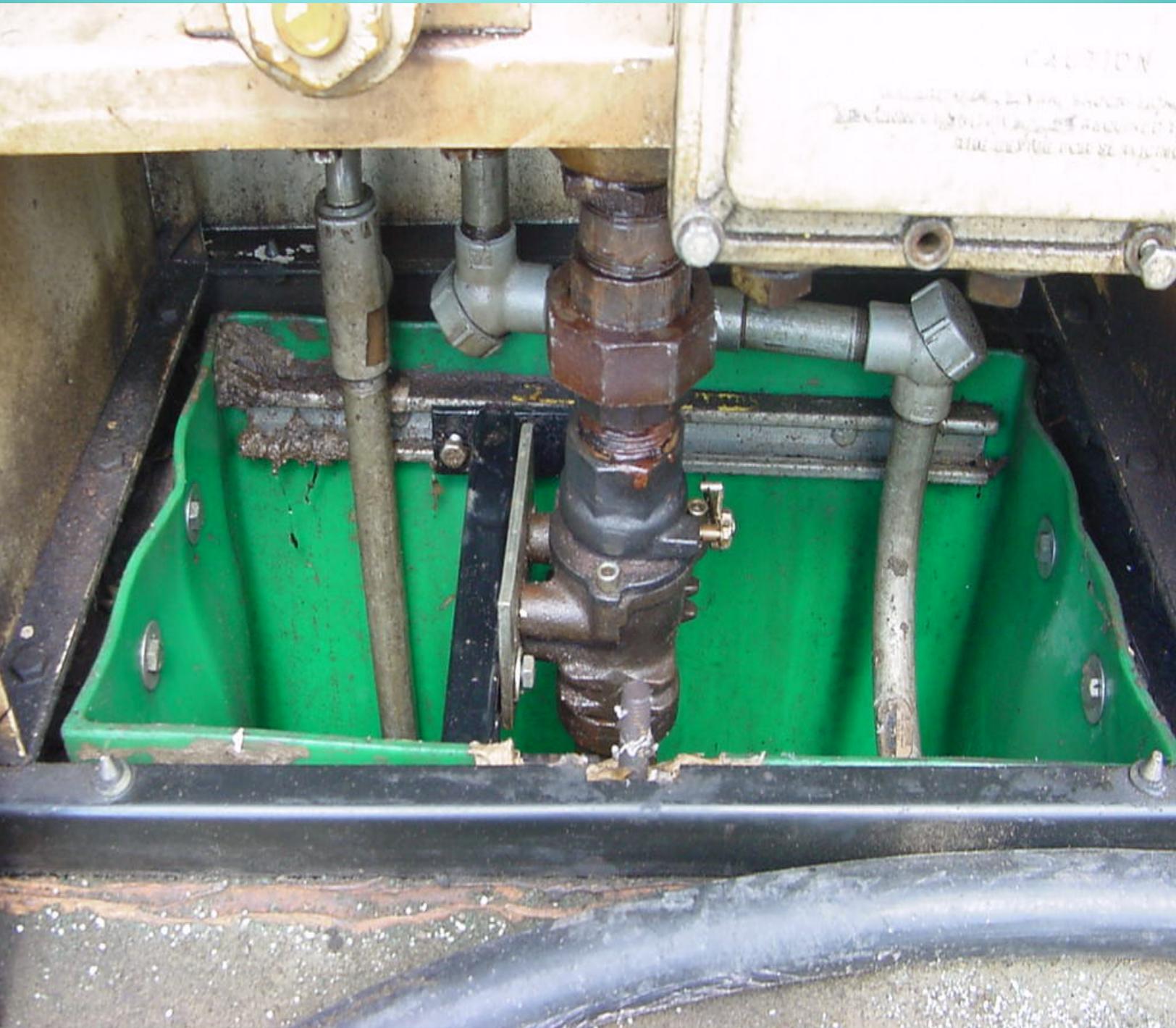












Pre-located
anchoring system

Product penetration
fittings with secondary
hose termination

Powder epoxy
coated paint

12-gauge steel

1 1/2" single poppet
product shear valve

Product valve brackets

Patented float-trip shutoff
amplification mechanism

