WHAT COULD GO WRONG, CASE STUDIES ON UNPREDICTABLE FAILURES/100412

Presented by

Xavier Bryant, Maria Duazo, Michael Duncan, & Adam Springer

3/16/2021

23Rd Annual California CUPA Training Conference
February 2 thru March 18, 2021
Virtual Conference

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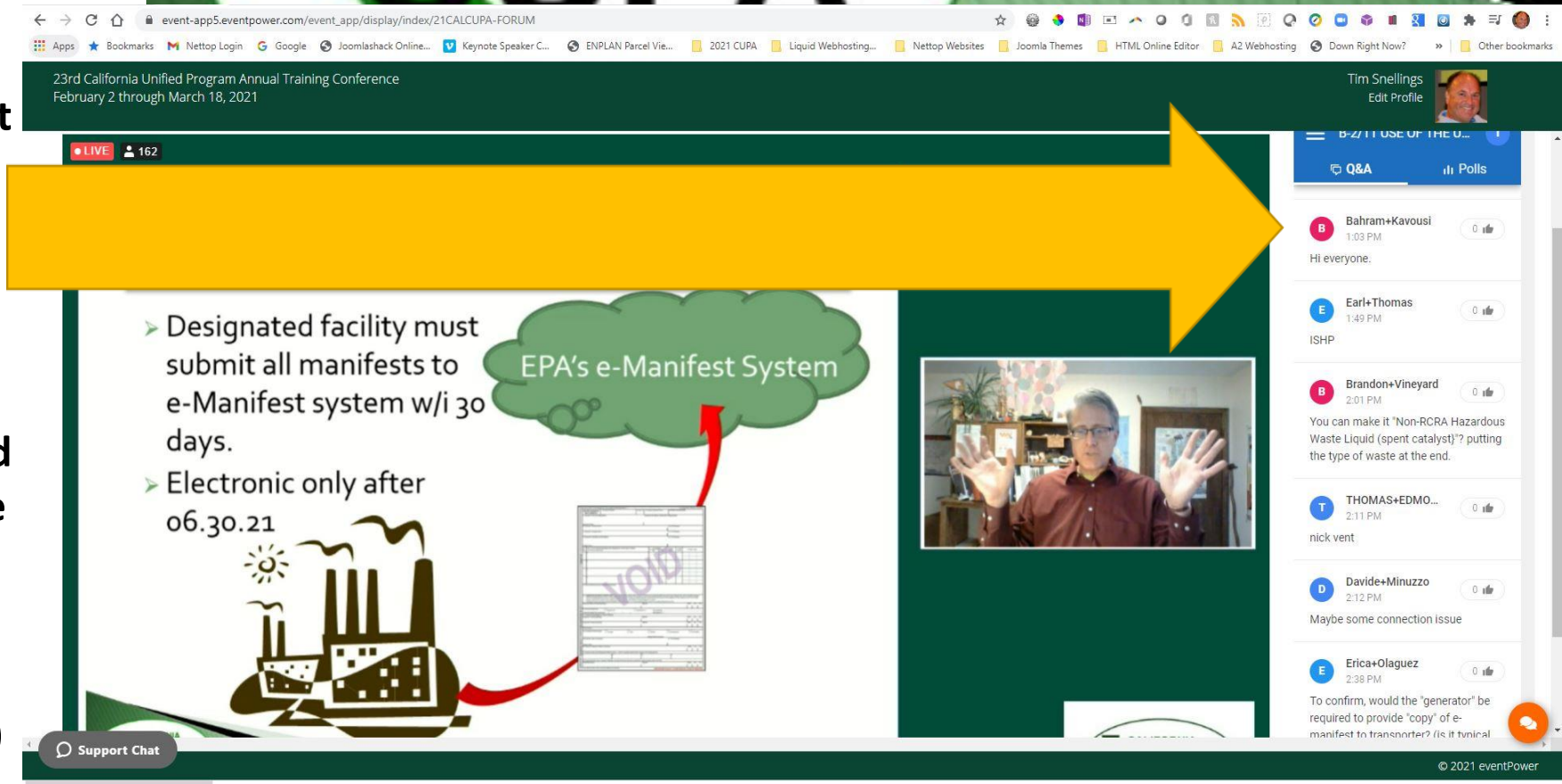

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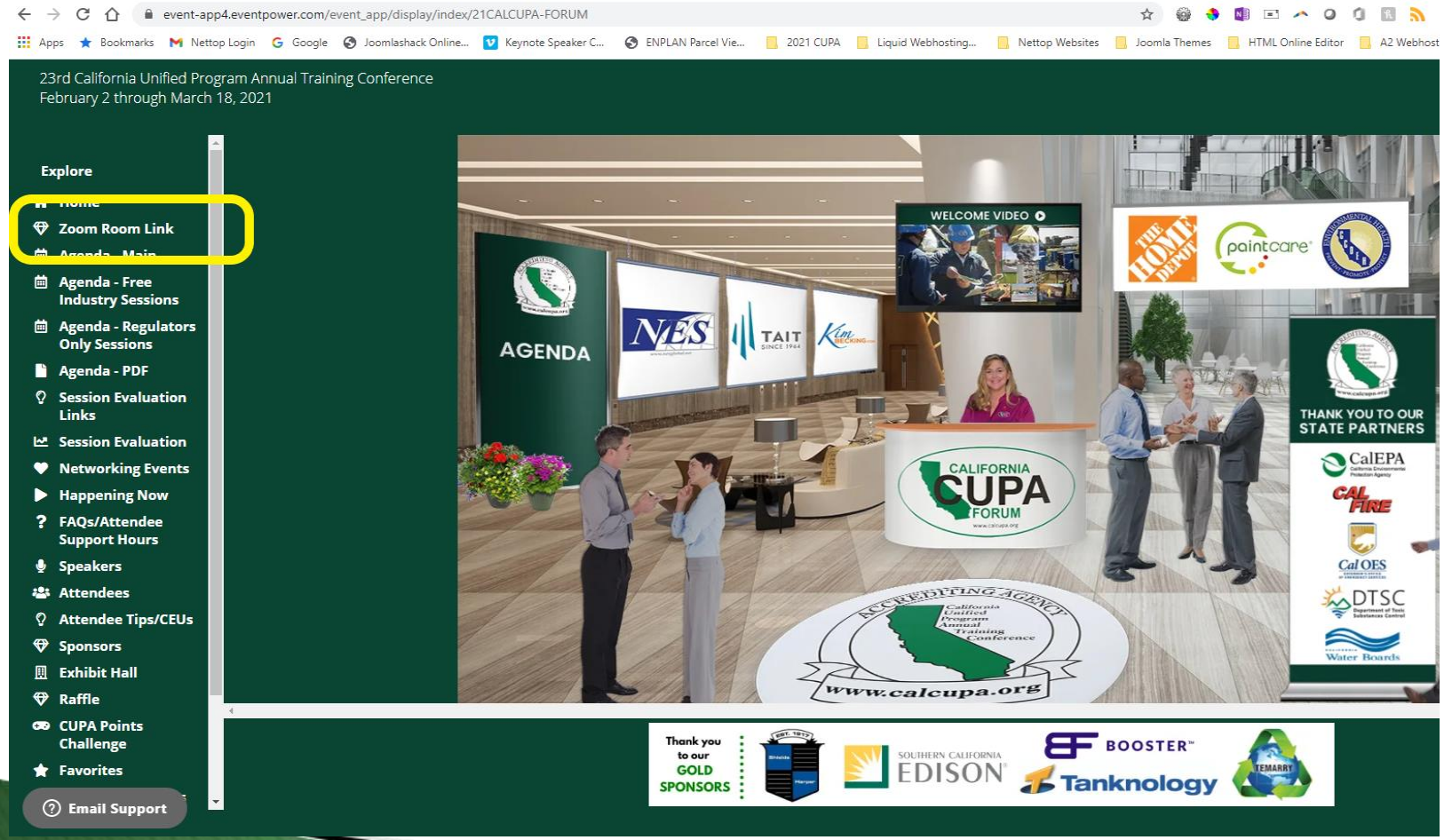

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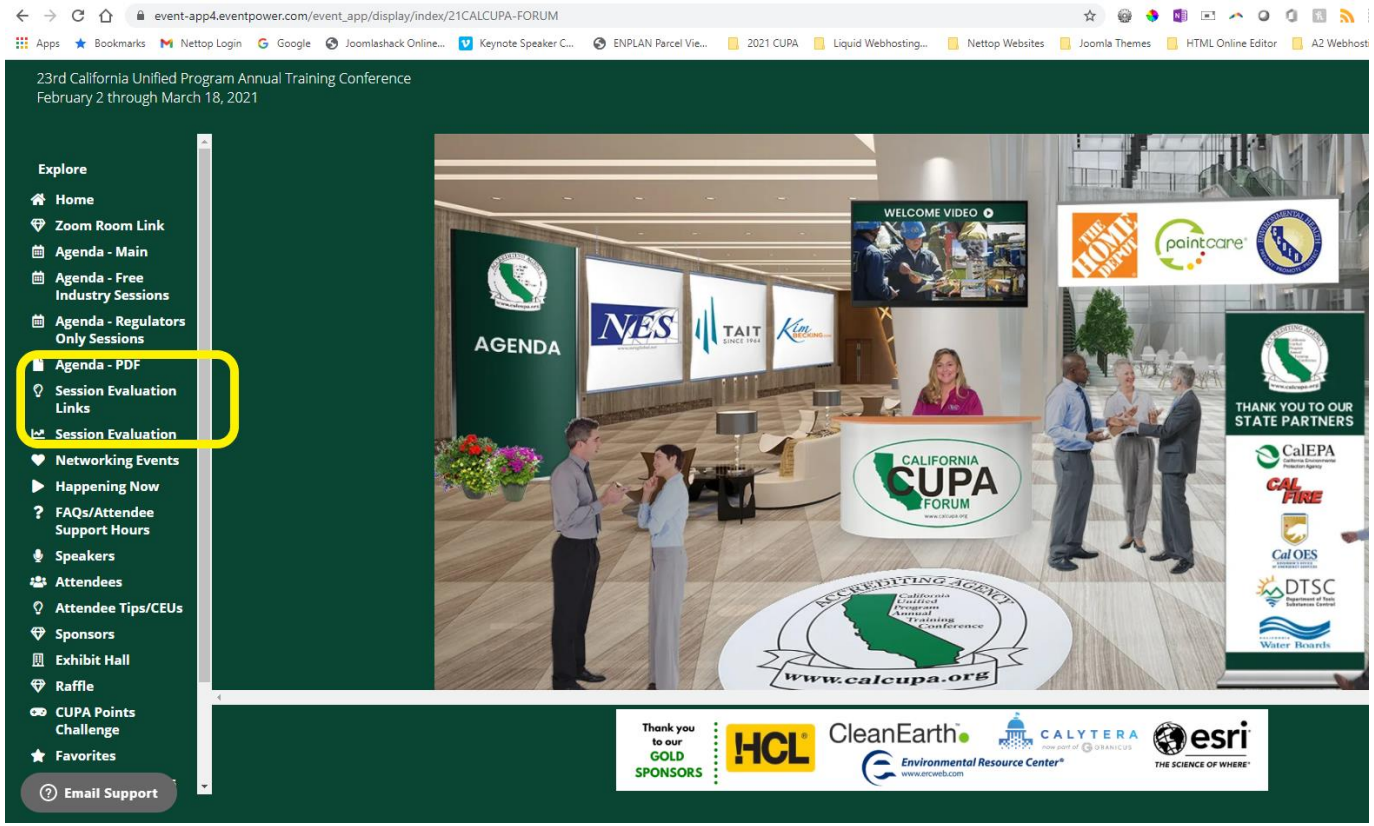

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What Could Go Wrong?

- Human error, Training? You Know just enough to make things go wrong.
- Equipment failure
- Bad system design
- Fixing one problem creates another problem/side effect

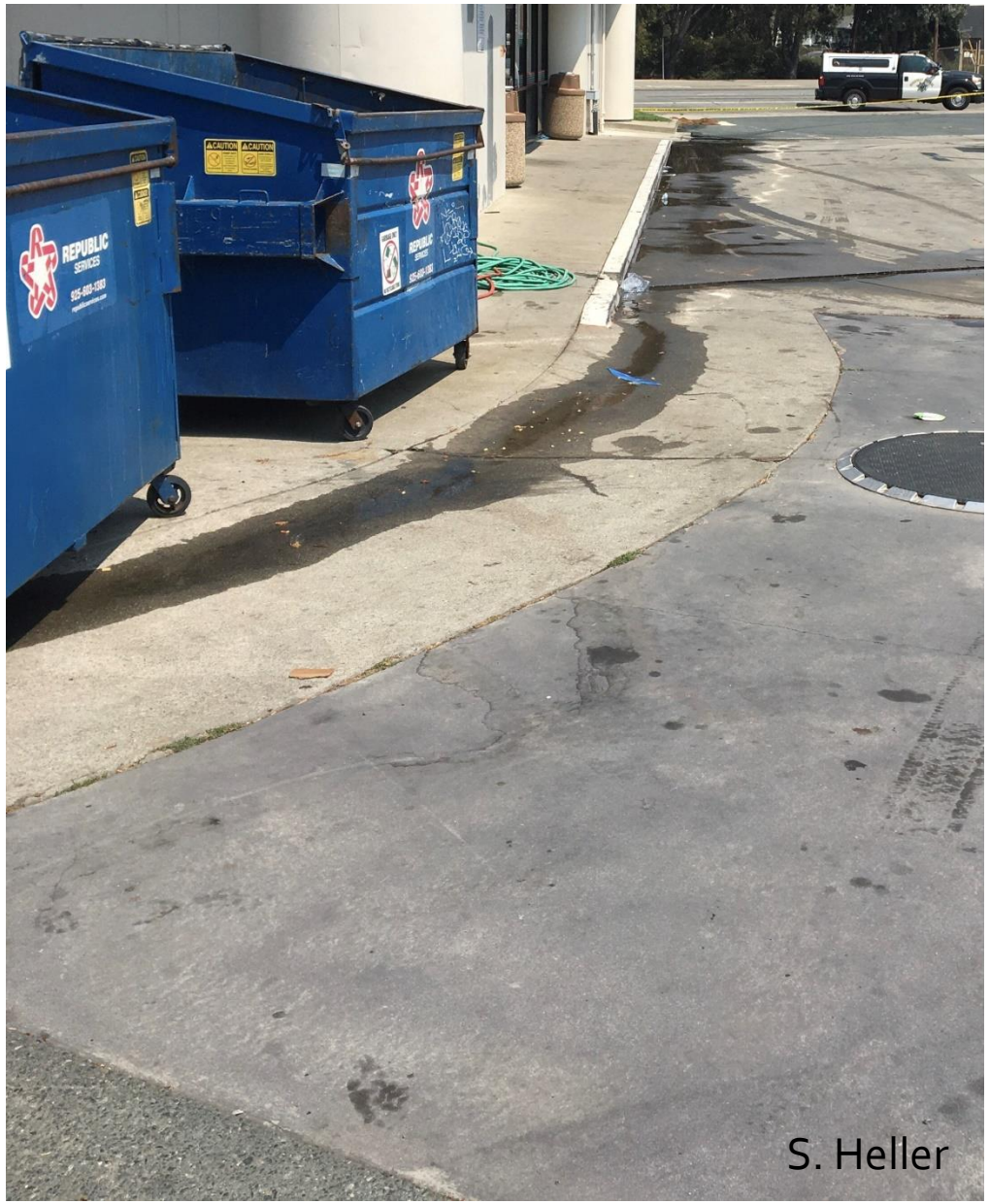
Not Your Typical Overfill

- We all have seen the typical overfill but what about the overfill without the tanker truck on site?
- We have 3 different examples of overfill that occurred at facilities that were not typical and were not caused by the failure of normal overfill prevention.
- There are plenty of classes on overfill prevention however not that many that make you think outside the box of the typical overfill device and the regulations created to make sure it is functioning.

Case #1 Retail Gas Station Diesel Overfill

- Diesel flowing out of the fill pipe at the tank pad
- Yes, as you can see people walked through the spill.

S. Heller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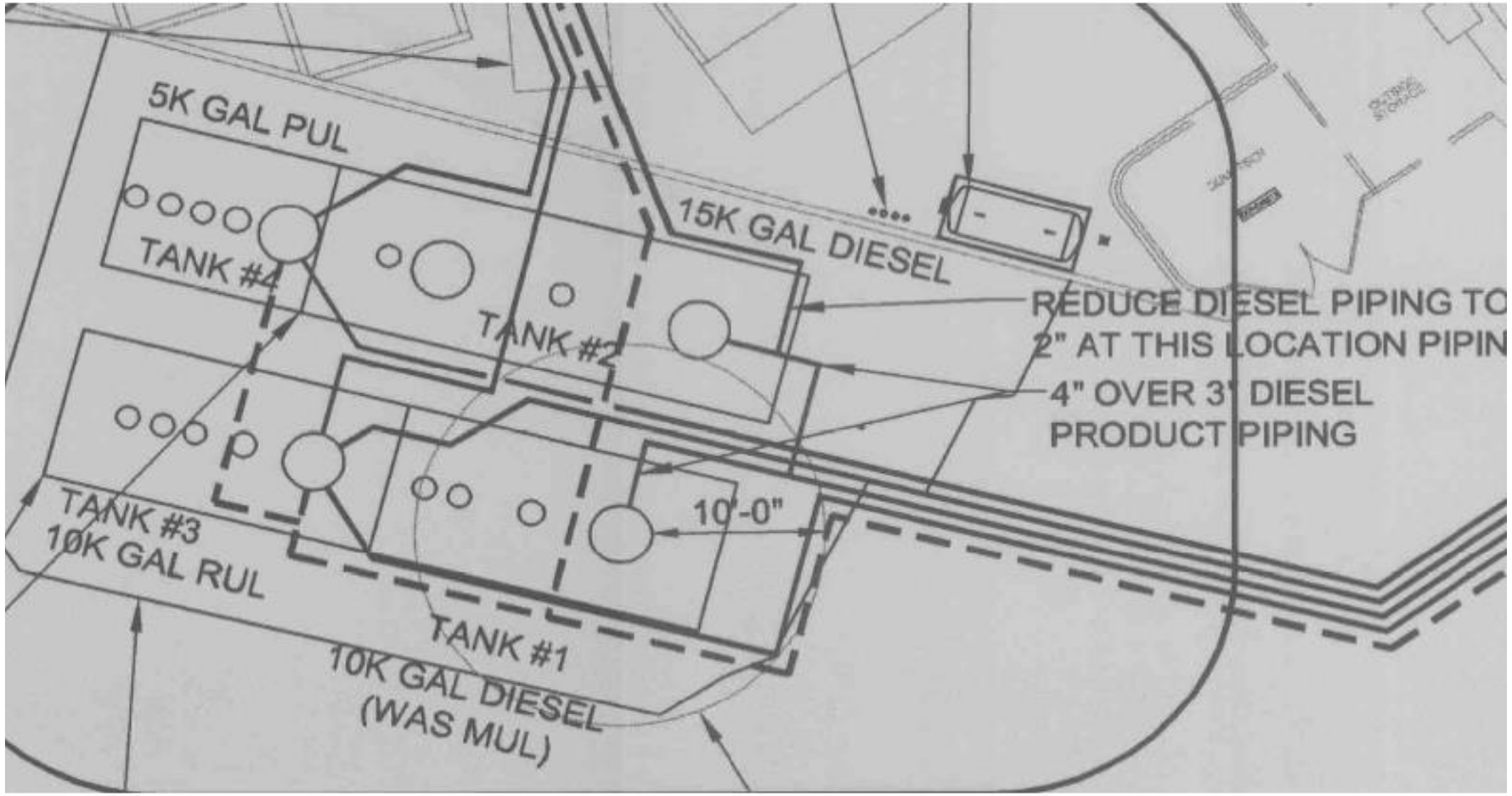
CAUTION
CAUTION
S. Heller

Overfill - What Went Wrong

- **Description of system**
- Two Diesel tanks
- Manifolded product line between the two tanks to the dispensers
- Two turbine system with alternating system depending on fuel level through TLS.


5K GAL PUL
TANK #4
15K GAL DIESEL
TANK #2
REDUCE DIESEL PIPING TO
2" AT THIS LOCATION PIPIN
4" OVER 3" DIESEL
PRODUCT PIPING
10'-0"
TANK #3
10K GAL RUL
TANK #1
10K GAL DIESEL
(WAS MUL)

Diesel Overfill - What Went Wrong

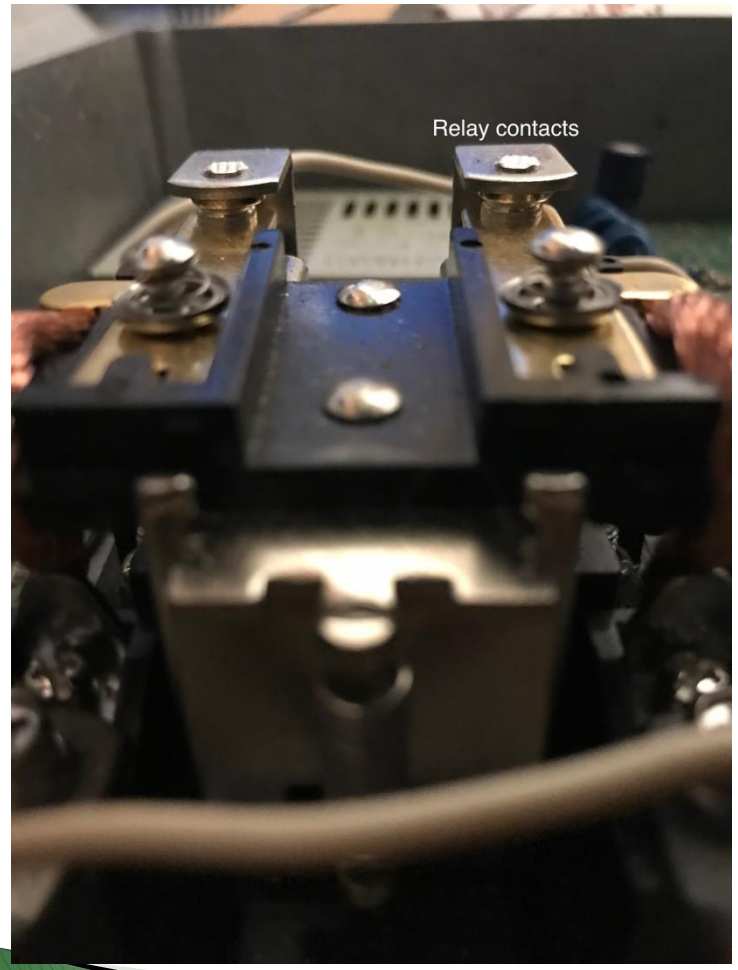
- Diesel from Tank 1 filled Tank 2 due to 3 key failures "it's never just one thing"
- Check valve in Tank 2 had failed
- Turbine Relay for Tank 1 failed in the closed position
- Staff did not recognize high product or max product alarms in the Tank 2 until they visually saw diesel fuel flowing down the sidewalk

Check Valve on Turbine Head Tank 2

Check valve currently in closed position "seated"

Direction of flow in this overfill event "reverse of normal due to other tank 1 pump running

Older Style Contact Relay



Relay on right is old and has a significant amount of overloading. See the discoloration of brass contact?

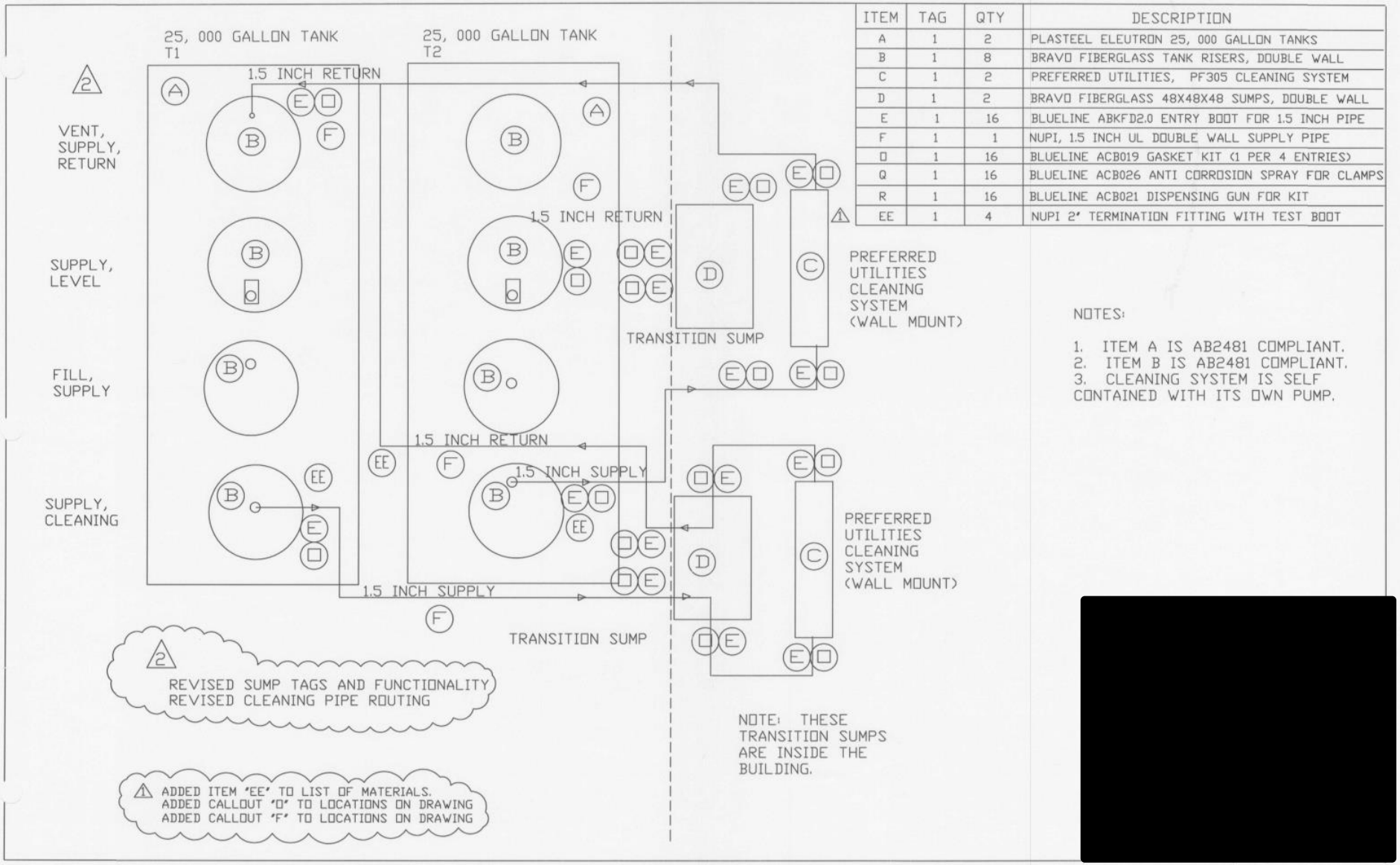
Case #2 Manual Fuel Transfer Overfill

- Backup generator system
- Facility was able to transfer fuel from one tank to another
- No clear procedure
- Shift Change in middle of transfer

Diesel Overfill Due to Self Transfer adam

050052067

Plans



ITEM	TAG	QTY	DESCRIPTION
A	1	2	PLASTEEL ELEUTRON 25, 000 GALLON TANKS
B	1	8	BRAVO FIBERGLASS TANK RISERS, DOUBLE WALL
C	1	2	PREFERRED UTILITIES, PF305 CLEANING SYSTEM
D	1	2	BRAVO FIBERGLASS 48X48X48 SUMPS, DOUBLE WALL
E	1	16	BLUELINE ABKFD2.0 ENTRY BOOT FOR 1.5 INCH PIPE
F	1	1	NUPI, 1.5 INCH UL DOUBLE WALL SUPPLY PIPE
□	1	16	BLUELINE ACB019 GASKET KIT (1 PER 4 ENTRIES)
Q	1	16	BLUELINE ACB026 ANTI CORROSION SPRAY FOR CLAMPS
R	1	16	BLUELINE ACB021 DISPENSING GUN FOR KIT
EE	1	4	NUPI 2" TERMINATION FITTING WITH TEST BOOT

Diesel Tank Release - No Fault of Overfill Prevention

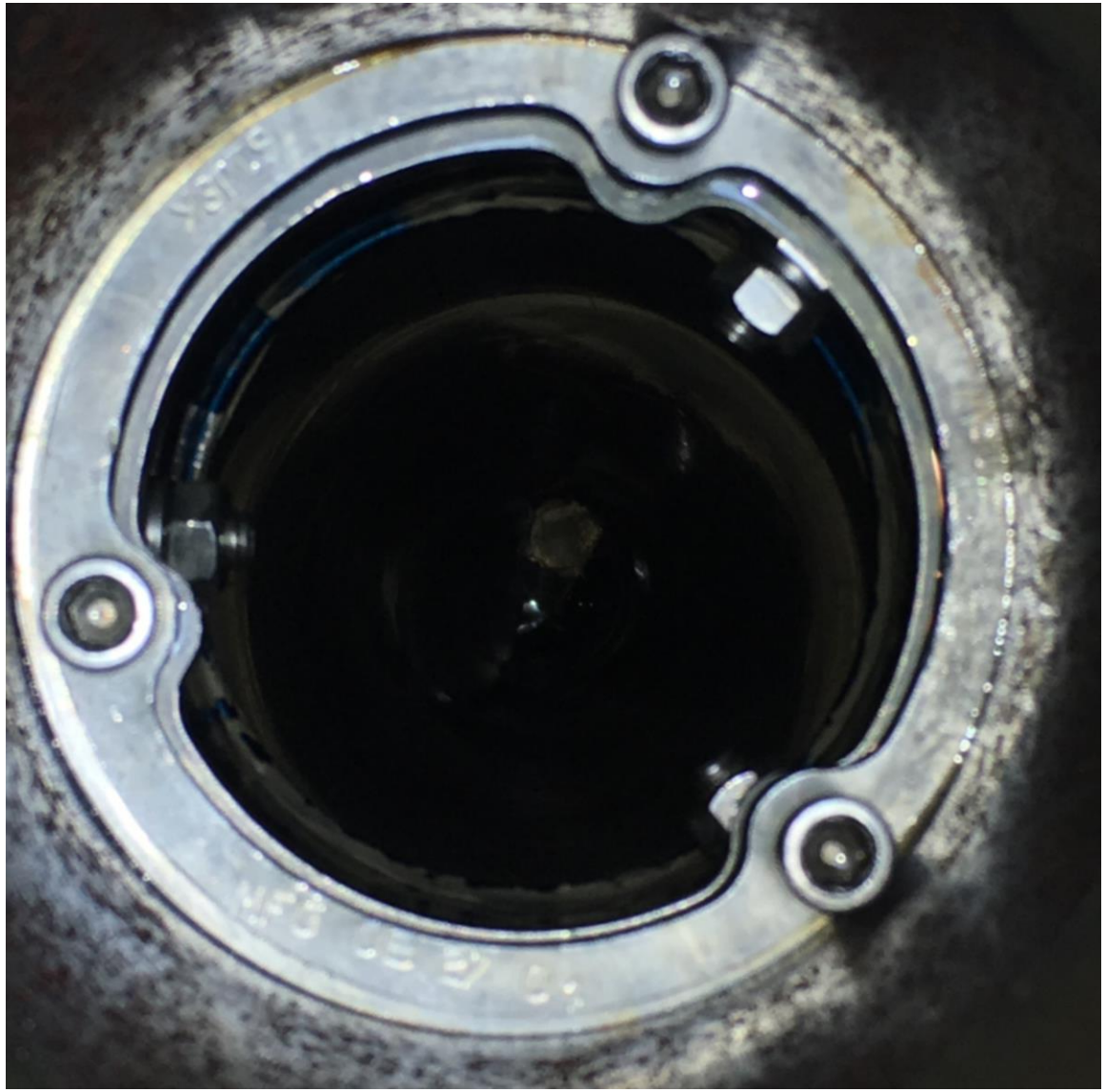
- Contractor had inadvertently left the vent shut off valve located in the turbine sump in a closed position
- With the shut off valve in the closed position and the fuel being delivered, the fuel tank built up pressure.
- This pressure pushed the fuel into the least restrictive outlet. Those outlets being the submersible pump fuel port and inventory probe riser cap, both within the turbine sump. Fuel traveled from the turbine sump via the vacuum pipe chase into the fill sump. The turbine outlet was not to be connected to the piping on this plan because the turbine function was to provide vacuum for vacuum monitoring secondary piping only, no transfer of fuel.

Case #3 Diesel in Sump From Crossover Pipe

The shiny reflection is from the diesel in the sump.

What is Inside the Fill Pipe?

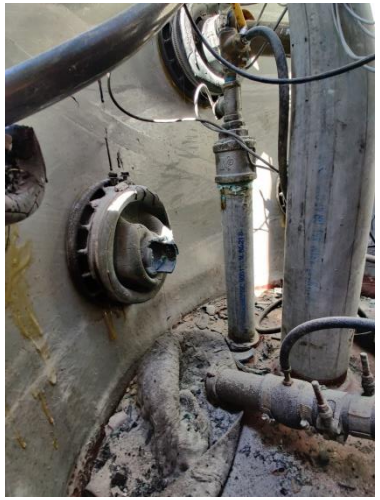
What is supposed to
be inside the fill pipe?

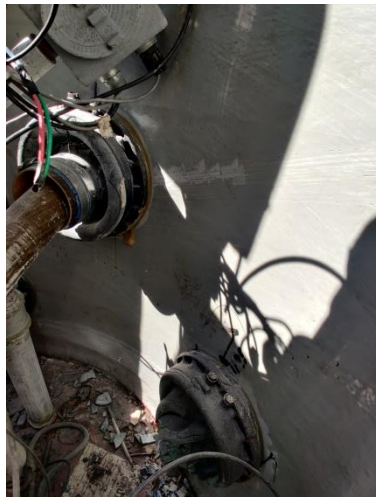


Fill Pipe Continued

Video – Courtesy of a tester at an undisclosed location

Blue Line Pipe





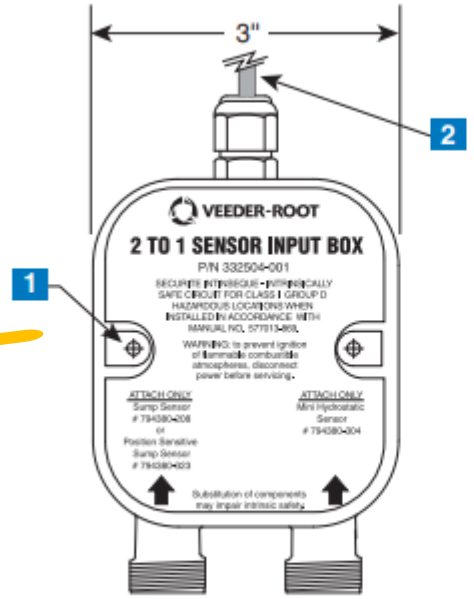
Finding allowed piping systems failing their SB989 Testing.

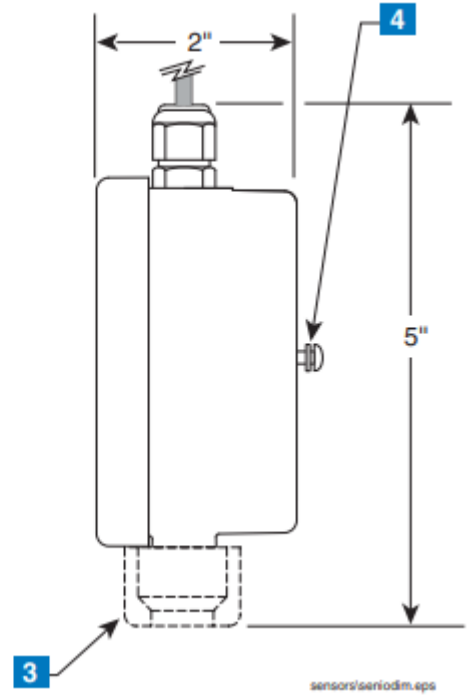
New Install, Do You See What's Wrong?

New Install Continued

- Rock Size…

Fuel Filter – Low Liquid vs. Fuel Alarm





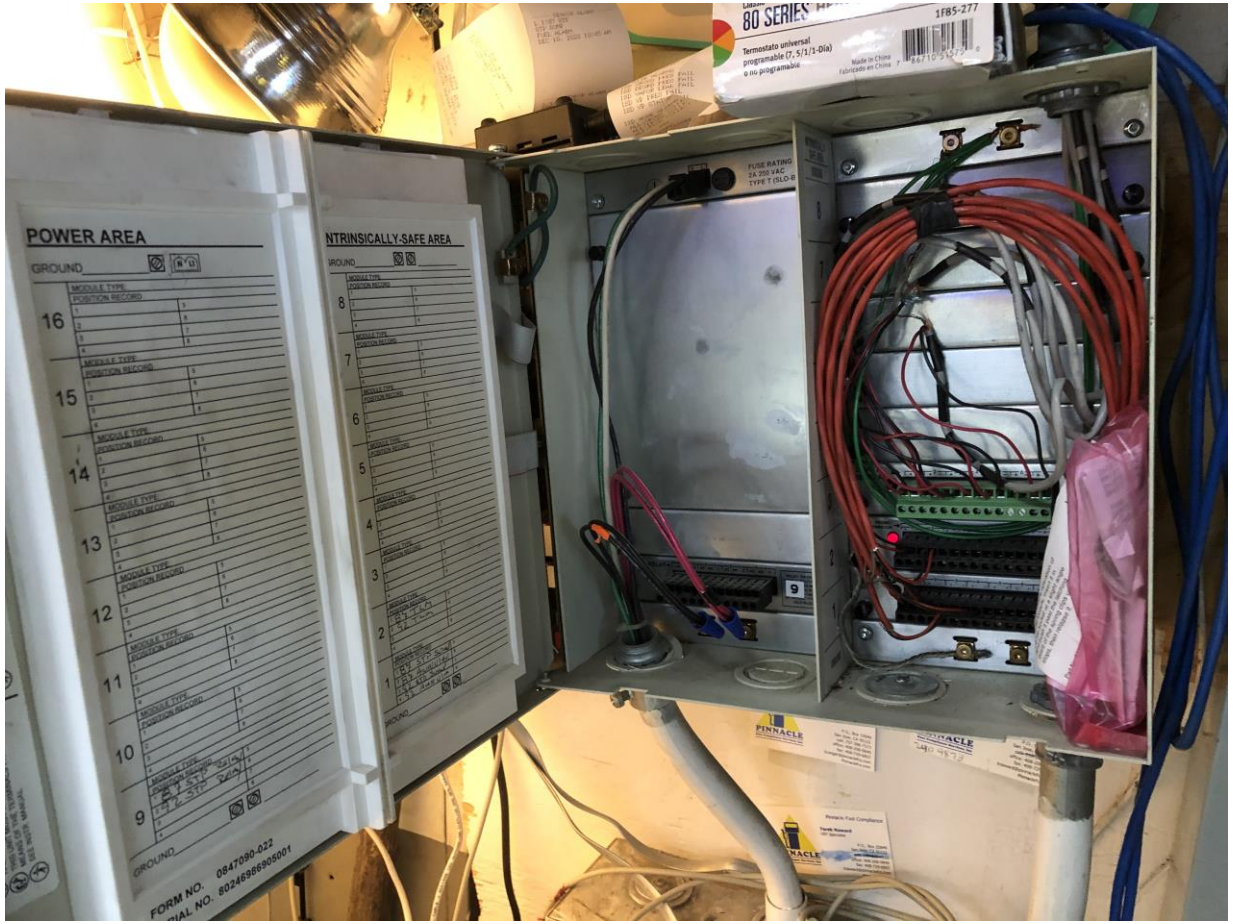
Water intrusion…

Violation?

High ground water due to heavy rainfall. Water is flowing from above the top hat and flowing into the sump.

Not VPH, so no violation. Sensor pulled during testing.

Positive Shutdown Bypass – STP sump 208 sensors weren't shutting down the turbines. The thought after the first sump was the sensor was bad. But after they all failed to shut the turbines down, we take a look at the panel for programming. They were programmed to shut down.



Line Leak Detector Failed

After the detector was removed a disc blocking the "piston" preventing it from going into slow flow.

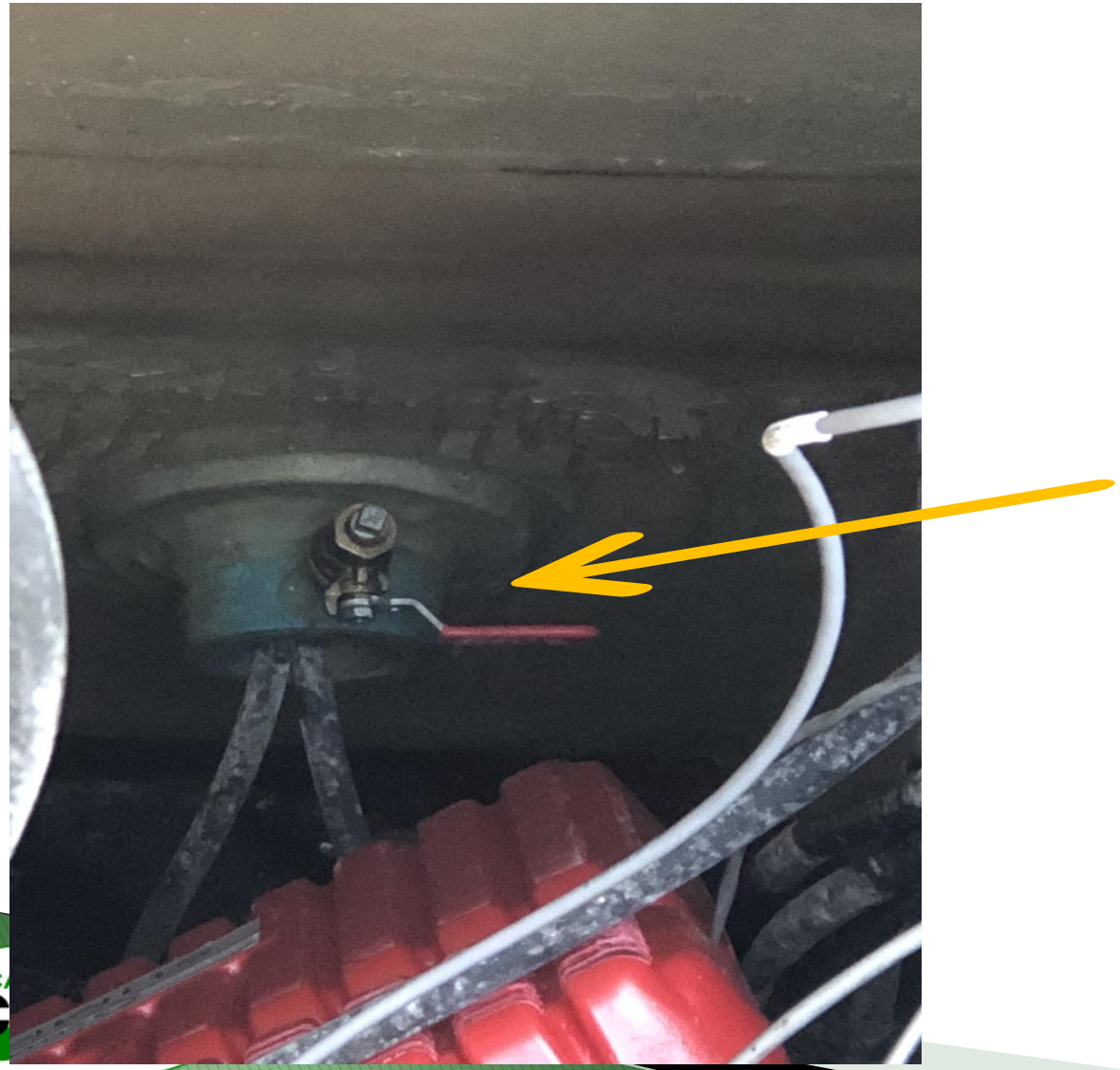
Electrical conduits installed very low in the STP sump. During Secondary Containment testing the sump is failing. Water was observed draining into the adjacent STP sump.

Water Outlet?

Other things that we found that are actual issues

Secondary Containment Piping - Test Port Pointing Up and Closed

Unmonitored Chase Secondary Piping

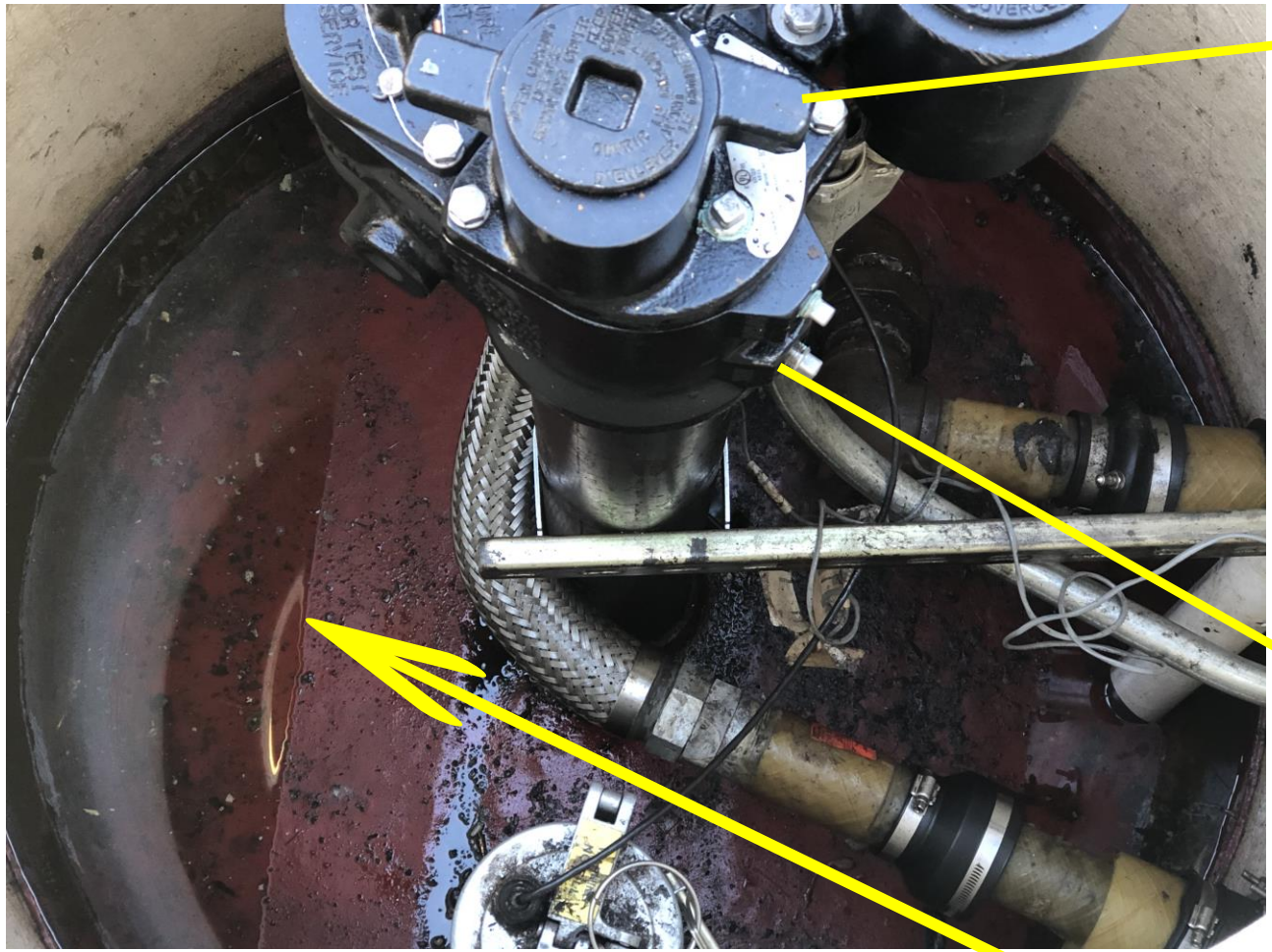


Ball Float Fell Apart After it Was Removed

- UST was installed after July 1987.
- Can they just replace it?

It depends… If it is in the vapor return then it can be replaced, but if it the OP then no.

Fuel leaking from the turbine/piping observed. Poor electrical installaton. Fuel may have leaked into the electrical conduit.



Fuel

Bollards Can Work, Except…

Not Every Issue is Obvious

Same incident from another angle after some time has gone by.

Theories?

Leak

How is this happening?

Why is this happening?

Watch Where You Stand During a Removal Inspection

Any Questions???

Final Slide – Include your name, agency, email, phone

STP Sump Has Inner Bowl Installed Around the Turbine

- Where should the leak sensor be installed?
- Inside the bowl or outside the bowl?
- Does this set up require two sensors to meet the earliest opportunity requirement?

Come to our Zoom Room to discuss…

Insert Slide for Zoom Room Instructions…?