Common Covered Task 004
Inspect and Calibrate Breakout Tank Overfill Protective Devices

Directions

This training guide is to be used by a Veriforce Authorized Evaluator/Trainer and Trainee during on-the-job training (OJT) or prior to an evaluation as a resource. (S) Indicates a demonstration or skill task; (K) indicates a knowledge task.

OJT Reminder

OJT is an active hands-on process. Practice should be as similar to the actual job task as possible. However, if the training is being provided on an actual job site while a covered task is actually being performed, the Evaluator either needs to be qualified on that covered task or be assisted by someone who is qualified on the covered task. The Evaluator should closely monitor the Trainee's practices to ensure safe and correct task performance. At no time should a non-qualified individual perform, or train for, a covered task unless directed and observed by a qualified individual. However, if the ***"span of control"*** for that particular covered task is "1:0" (requiring only qualified individuals to perform the covered task), the training must be simulated. Training is simulated by "walking through" the task and simulating all actual manipulations (valves, switches, tools, etc.) an individual would use during the performance of a covered task. Simulating includes the use of safety and administrative requirements as if the task were being performed live. Refer to the Veriforce Evaluator Training Program for more on how to conduct formal OJT.

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Recommended Student Training or Resources:

- 1DOT 49 CFR 195.428

Introduction

An overfill protection device is a device used to prevent overfill or alert breakout tank operators that fluid level in the tank has reached a potentially dangerous level. Some devices can simply activate an alarm, while others may be able to shut down any flow into the breakout tank automatically with no operator interaction.

Knowledge: Explain what is required prior to performing this task.

Pipeline Operator-Approved Procedures and Appropriate Equipment/Material

Prior to performing this task, you will need to have the pipeline operator-approved procedures as well as the appropriate equipment and materials. The procedures will outline requirements for performing this task that are specific to the pipeline operator. Operators may also have specific requirements regarding the type of equipment that can be used to perform this task.

Therefore, it's important to follow the specific requirements of the procedures and only use operator-approved equipment. Doing so can ensure the task is performed correctly and according to the pipeline operator's standards.

Knowledge: Explain the key indicators used in categorizing breakout tank overfill protection systems.

Breakout tank overfill protection is divided into categories. The categories classify breakout tank facilities based on certain characteristics of the facility's overfill protection.

Category 1

Category 1 facilities are operated manually. Meaning that an individual must physically be at the tank to control fluid transfers in and out of the tank.

Breakout tanks at category 1 facilities either have to be measured or ***strapped*** manually for volume or may be equipped with some sort of automatic tank gauging system (ATGS), such as a ball float-operated volume meter.

The overfill protection for a category 1 breakout tank facility is totally dependent on the local tank operator. If there are no alarms, the operator will have to pay close attention to the amount of fluid that is entering the breakout tank. The operator will have to manually stop the fluid from entering the breakout tank to prevent overfill.

Category 2

Category 2 facilities can be run either manually or remotely or through a combination of the two. If a local operator is not present at a category 2 breakout tank, then an operator in a control room should be able to control the flow of fluid in and out of the tank.

Category 2 facilities should be using an ATGS for measuring fluid levels in the tank. The ATGS should also have an alarm. The alarm can be a light, siren, or combination of the two that activates when a dangerous fluid level is reached.

Category 3

Category 3 breakout tank facilities are very similar to category 2. They can be operated both locally at the tank and remotely from a control center.

Category 3 facilities will also have ATGS with alarms that should activate when a predetermined fluid level is reached inside the tank, just like category 2 facilities.

The difference between the two categories is that category 3 facilities must have an independent alarm system when the high-high fluid level of concern is reached. (Fluid levels of concern will be covered in our next objective.) This alarm is in addition to the ATGS and any other alarms associated with the ATGS. Having two different independent systems creates redundancy in the breakout tank's overfill protection. This means that should the ATGS fail for some reason, the additional high-high level alarm should continue to function.

AOPS

Many breakout tank operators believe there should be a fourth category for an automatic overfill protection system (or AOPS). An AOPS would more than likely be combined with category 2 or category 3 facility overfill protection systems. The AOPS can completely control the flow of fluid in and out of the tank, meaning that in the event of an overfill condition, the system will stop flow. The AOPS does not require an operator to perform this function. If the entire breakout tank facility is equipped with an AOPS, then there is no need for that facility to be manned.

The AOPS should be independent and in addition to any other systems, such as the ATGS, just like in category 3 facilities. This way, should the ATGS fail, the AOPS will continue to function and operate in an overfill situation.

Knowledge:	Identify the levels of concern used for breakout tank overfill protection systems.

Levels of concern (or LOCs) are the fluid levels in a breakout tank that are predetermined for normal operations and possible hazardous conditions. One of the main considerations when determining the levels of concern for a breakout tank is the response time of the breakout tank facility personnel to respond to an overfill situation. The following are some of the generally used levels of concern.

Maximum Working Level

The maximum working level is the maximum amount of fluid that the breakout tank should be filled to during normal tank operations. If needed, a breakout tank facility operator may need to check the ATGS or strap the tank to see if this level has been reached. Depending on the facility, there may or may not be an alarm or indicator that would activate if the LOC has been reached.

High-High Level

The high-high LOC is the first level at which category 2 and category 3 facilities need to have some sort of alarm indicating this level has been reached. For clarification of what to do if this level is reached, consult with the pipeline operator representative or pipeline operator procedures for the actions that may need to be taken to prevent further fluid from entering the breakout tank. An example of a breakout tank operator action could be the manual closing of the valve used to fill the tank with fluid.

AOPS (Optional Level)

As mentioned earlier in the course, some category 2 and 3 breakout tank facilities may have breakout tanks equipped with an AOPS. If an AOPS is in place, it may have its own LOC. If the breakout tank does have an AOPS LOC, then the system will begin to operate at this level. The independent AOPS alarm should register at this level, and the AOPS should automatically stop flow coming into the breakout tank.

Critical High Level

At this level, overfill is likely to occur. Besides damage to the breakout tank, injury to operator personnel and impact to the environment could occur. Another alarm should sound at this level. Emergency overfill procedures must be consulted and activated when this level is reached.

Skill:	Describe how to test an overfill protection device to ensure proper operation, alarm activation, and relief or system shutdown device reaction to an overfill condition.

An overfill protection device (OPD) is useless if it doesn't operate as intended. Therefore, these devices must be tested to ensure they are operable and the alarms and relief or system shutdown devices are capable of acknowledging and responding to an overfill condition. To accomplish this, you will need to inspect the OPD, calibrate and adjust the OPD, and verify the alarm parameters.

Inspect the overfill protection device.

Before inspecting an OPD, you need to check with the specific pipeline-operator procedures for information on how and what to inspect on the OPD. You will also want to check the manufacturer specifications for the OPD you are inspecting.

An example of a component to inspect on an overfill protection device is the control panel and switches that operate the device. Look for any signs of corrosion, moisture, or any other issues that could possibly keep the controls from operating properly both internally and externally.

When you need to inspect the OPD visually, inspect at any components of the overfill protection device that are outside of the breakout tank as applicable. Look to see that all cables are in good working order and not frayed or kinked. Look for any signs of corrosion on any of the OPD components.

Any time the breakout tank is out of service for internal repairs or inspections, you should try and use this opportunity to check the internal parts of the overfill protection device. Make sure that if the OPD has any displacers that they are hanging freely. Now is the time to repair or replace any components of the overfill protection device since the tank is not currently being used.

Calibrate and adjust the overfill protection device.

OPDs are sensitive devices that need to be calibrated in order to perform correctly. This section provides basic considerations to take into account when calibrating an OPD. Because there are many different types of OPDs, you should always follow the pipeline operator procedures and manufacturer's specifications for calibrating the device you are working with.

When calibrating, the levels of concern will need to be determined for the breakout tank that the overfill protection device will be operating on. The OPD needs to be calibrated to detect fluid levels. During calibration, the OPD levels may need to be adjusted in order to ensure proper operation.

A condition that may need to be considered when calibrating an overfill protection device is the fluid in the tank. Some fluids have different characteristics that the OPD will need to be calibrated for. Some examples of characteristics of fluids to be considered are the fluids viscosity, how often the fluid is agitated, and if the fluid foams or bubbles when agitated. The overfill protection device may need to be calibrated to detect or ignore these conditions.

Another example of a condition that may need to be considered when calibrating an overfill protection device is what type of breakout tank the device is operating on. For example, coned roof breakout tanks are very different from external floating roof breakout tanks. The overfill protection device might need to be calibrated differently for each of these tanks.

Verify the alarm parameters.

Once the OPD has been inspected, calibrated, and adjusted as necessary, the next step is to verify the alarm parameters. To do so, the set points, which correspond to the applicable levels of concern, will need to be

triggered in order to test whether the alarms will activate and the relief or system shutdown devices will respond to the overfill condition. Most systems have provisions for simulating conditions that activate the detector and alarm. Under no condition should the test require filling the tank above its normal capacity. Refer to the operator procedures and manufacturer's recommendations for specific testing instructions for the OPD you are working on.

Abnormal Operating Conditions (AOCs)

Candidates are required to possess the ability to **RECOGNIZE** and **REACT** to the listed AOCs for each task. Be prepared to answer questions concerning additional AOCs that may be relevant. Evaluators may ask questions about AOCs throughout the evaluation.

An AOC is defined in **49 CFR §§ 192.803** and **195.503** as:

A condition identified by the pipeline operator that may indicate a malfunction of a component or deviation from normal operations that may:

- Indicate a condition exceeding design limits; or
- Result in a hazard(s) to persons, property, or the environment.

Recognize: Unintentional releases, vapors, or hazardous atmosphere could be signs that an abnormal operating condition has occurred. Examples could include, but are not limited to:

- Puddles
- Ice accumulation
- Vapors

React/Respond: Proper reactions and/or responses to take in the event of an unintentional release, vapors, or hazardous atmosphere include the following:

- Eliminate potential ignition sources.
- Move to a safe location.
- Notify emergency response personnel, as appropriate.
- Notify the designated pipeline operator representative.

Recognize: Material defects, anomalies, or physical damage of a pipe or component are abnormal operating conditions. Examples could include, but are not limited to:

- Broken/damaged components
- Plugged devices
- Corrosion

React/Respond: Proper reactions/responses to take in the event of material defects, anomalies, or physical damage of a pipe or component include the following:

- Stop the activity and notify the designated pipeline operator representative.
- Mark the location so it may be easily located.

Recognize: An unintended fire and/or explosion on or near the facility is an abnormal operating condition.

React/Respond: Proper reactions/responses to take in the event of an unintended fire and/or explosion on or near the facility include the following:

- Move to a safe location.

- Notify emergency response personnel, as appropriate.
- Notify the designated pipeline operator representative.

Recognize: Failure or malfunction of facility component(s) is an abnormal operating condition. Examples could include, but are not limited to:

- Alarm/lights failure
- Instrumentation failure
- Leaking tubing
- Unexpected relief valve operation

React/Respond: Proper reactions/responses to take in the event of failure or malfunction of facility component(s) include the following:

- Stop the activity.
- Notify the designated pipeline operator representative.

Glossary

AOC
abnormal operating condition

CCT
common covered task

CFR
Code of Federal Regulations

strapping

Measurement of storage tank fluid used to calculate the amount of fluid in the tank and how much more fluid the tank can hold.