Best Practices for Crude Sulfate Turpentine Storage Tank Cleaning

Scope

The following best practice consists of guidelines that a facility could use to develop their own detailed procedure for effectively cleaning crude sulfate turpentine systems for confined space entry purposes. A facility's detailed procedures shall be evaluated for safety using a process hazard analysis protocol. Also, users must be very familiar with the hazards of crude sulfate turpentine and have read the safety data sheet.

Key objectives of this process include:

- Isolation of the system during the cleaning phase to prevent misdirected flows of the cleaning solutions.
- Minimizing crude sulfate turpentine to the sewer.
- Following pH policy regarding effluent to the sewer.
- Safe entry into the system.
- Proper startup.

General Procedure

Following are the steps that need to be taken to prepare the crude sulfate turpentine (CST) system for entry so that internal work or an internal inspection can occur.

1. Empty the system (tank, vessel) of CST and/or foul condensate.
2. Circulate fresh water in the system for a few hours.
3. Circulate a solution of Tide or Dawn detergent in hot water for four to five hours. This should be repeated until the drained liquid is soapy.
4. Lock out the entire system for confined space entry.
5. Open the system for forced ventilation and atmospheric checks.
6. Complete the confined space entry permitting process.
7. Enter the space per confined space entry procedures and perform necessary work.
8. Unlock and startup for normal operations per procedures specific to startup after cleaning.

The following commentary is provided or each step.

1. Empty the system

Note that CST is toxic to biological wastewater treatment plants, so the CST inventory should be minimized, and residual CST can be transferred to alternate storage locations, such as approved shipping containers, per the facility's procedures.

2. Water Flushing

Once the system is drained of foul condensate and CST, close the drains. Isolate the system to prevent water from being misdirected to other process areas, and begin filling the system with water. It is important that fresh water be used because Mill white water can contain reduced

sulfur compounds and/or traces of CST. Circulate for a few hours, collect a water sample and test for pH. If it is in an acceptable range per the facility's wastewater protocols, drain the tank, ensuring a vent is open.

3. Detergent Cleaning

Fill the system with hot water and liquid Tide or Dawn. Circulate the water/detergent mixture for four to five hours. Drain the system and repeat. After the second cleaning, check to see if the drained liquid has soap bubbles in it. If it doesn't, then the procedure will have to be repeated until the drained liquid is soapy. Because soap is a surfactant, it will not produce soap bubbles unless all residual oils (CST) are gone.

4. Locking the System

Follow the facility's lockout procedure for the CST system appropriate for confined space entry. See also PCA's Best Practice for Control of Hazardous Energy.

5. Opening the System

Open the tank and ventilate with forced air. Measure the vapor space at various elevations using continuous monitoring for confined space entry. If any atmospheric test fails, consult with technical personnel on how to further clean the system.

6/7. Completing the Confined Space Entry Permitting Process and Entry

Follow the facility's permitting procedure for confined space entry. This includes life critical safety items such as proper equipment isolation and verification, atmospheric testing, pre-entry briefings, and responsibilities for the attendant, entrants, and Entry Supervisor. See also PCA's Best Practices for Confined Space Entry and for Control of Hazardous Energy.

8. Startup

Note that not only were valves manipulated to isolate the system for confined space entry, other valves were operated to isolate the cleaning solutions from being misdirected. A startup procedure specifically developed for startup after a cleaning protocol should be used.