

Petromax



Non Entry Case Study

Location:

Major Los Angeles Refinery

The Problem:

Economically remove and dispose of 5,700 bbls of tank bottom sludge without entering into the tank. The tank is 90 feet in diameter with sludge dunes ranging from 4 feet to 6 feet in height. There were no bottom level tank exterior valves available for non-entry sludge extraction. For sludge disposal, the only available delayed Coker Unit was located at a sister refinery slightly over 5 miles away. This off-site Coker Unit had been designated to process the sludge through its quench water feed system rather than transport and dispose of the waste out of the state.

On this tank, all previous conventional attempts at sludge removal had failed using Super Sucker trucks teamed up with inline trash pumps. Sludge was low enough at the two manways located on opposite sides of the tank so that they could be opened without spillage. However, even to stand next to the manway opening, a continuously flowing fresh air full faced mask was required due to high level ammonia vapors. In addition, the Lower Explosion Limit (LEL) readings inside the tank dictated that confined space entry was not permitted. Flammable vapors remained in the tank from failed attempts to circulate the tank sludge with diesel.

The Solution:

The closest we could locate two temporary storage tanks (500 bbl. capacity) was 260 feet away on a tank farm roadway at about 20 foot higher elevation than the tank sludge extraction points.

The sludge was conditioned with Petromax from a wand at 3,500 psi at a rate of 6 gallons per minute from the two available open manways. Since confined space entry was not permitted, the Petromax injection wand was attached to the end of lightweight aluminum vacuum piping and extended into the sludge from the outside of the tank at the manway. A *Guzzler* (super-vac air mover) vacuum truck was utilized to pull the sludge into the extended 6 inch aluminum piping which, in turn, was simultaneously off loaded from the *Guzzler's 3 inch unloading line* into the two 500 bbl temporary storage tanks on the adjacent tank farm roadway.

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Work scope highlights:

- The waste stream was increased by only 10% overall with the injection of Petromax while the tank sludge flowed easily from all hoses and containments.
- Simultaneous loading and unloading through a *Guzzler* vacuum truck was made possible since the Petromax sludge conditioning process does not allow the sludge to stick to interior hoses and containments. Therefore, the sludge removal process was completed quickly and efficiently without unnecessary vac truck movement and hose switching that result in manpower & tank sludge removal downtime.
- This non-entry sludge extraction method, although tediously restricted at the man way, still produced 400 bbls per day of sludge waste removal with only 10% Petromax content in the sludge.
- Conventional vacuum trucks transported the conditioned tank sludge from the temporary tanks to the sister refinery's Coker Unit facility (off-site). Loading and unloading of the sludge waste took less than 20 minutes for each task. Truck washouts were not required as no solids remained in the transporting vacuum trucks.
- The tank bottom sludge remained suspended and available for transport 24/7 in the temporary storage tanks.
- The final washout of the operational tank produced a 100% oil free tank for inspection and was ultimately put back into service far more quickly than if the project had been handled by conventional means.

Bottom line results:

- Savings of approximately \$350,000 were generated by using the Petromax sludge conditioning process when compared to all inclusive costs incurred if conventional methods of sludge removal had been utilized.
- This Petromax non-entry application proved to be both the quickest and safest process for sludge removal and waste handling.

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