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19 East

Paulsboro Terminal
Visit

A review of the Paulsboro terminal VCM loading, handling and recovery systems was made on June 7, 1973. This writer was accompanied by Mr. D. Dupre and yourself.

The engineering design of the terminal has incorporated some of the latest available technology to contain oil spills and reduce VCM emissions to the atmosphere from normal operations that this writer has experienced. George Barton and Paul Parchinski were most helpful in our review of the terminal pollution control program.

VCM Emission Sources

The terminal has installed equipment to recover or contain VCM emission resulting from repetative operations such as tank truck and tank car loadings. A provision to collect residual liquid VCM contained in the spool piece has been installed to return this VCM to the accumulator. When this system is properly operated there is no liquid losses that occur during truck and tank car "deadhead" loadings. VCM vapor losses occur when these vessels are "deadheaded", however VCM releases to the atmosphere can occur if these transport vehicles can not be filled because of impurities such as oxygen and nitrogen. This condition is rare at the Paulsboro terminal. When impurities are above specifications (oxygen) VCM is purged to the diked area (fire hazard protection). VCM impurity checks are made on incoming (empty) trucks and loaded trucks leaving the terminal. This check is made to determine oxygen content. An oxygen analyzer is connected to a valve after the line has been "blown down". This procedure releases about 10 ml of VCM. The above checks are made outdoors and constitutes a potential exposure to the employee performing these tests. VCM is unloaded from the US Puerto Rican through a closed system. The liquid VCM is displaced in the ship with vapors from the shore unit accumulator. Again, there can be VCM losses from the spool piece between the flexible hose butterfly valve and the ship's dead end. This connection is about 18 inches long and 10 inches in diameter. The usual practice is to leave the ship's valve open and close the butterfly valve on the dock thus permitting the VCM in the spool piece to drain back to the ship or vaporize into the ship's compartment before the connection

is broken at the dock. However, during cold weather there may be an occasion when this break is made and VCM will not vaporize. In this instance, a bucket is normally placed under the spool piece valve to catch the liquid VCM. The VCM is then permitted to flash off to the atmosphere.

The dock is constructed of all steel and has double 6 inch curbing (one under the unloading lines and the other around the perimeter of the dock). Traps are located within the diked areas. These traps collect waste (primarily oils) and drain towards shore wher an oil/water separator is located. Waste oil is collected and used for dust control on plant roads. The aqueous phase is pumped to a pit. This system is ideal for oil spill containment and liquid VCM from reaching the water, however VCM lost to this system due to a spill will flash off into the atmosphere during warm weather. During cold weather liquid VCM spills should be contained by this system. Periods of rainfall impose a substantial load on the small water pit.

The laboratory hood in the main office building was reviewed and this is adequate for tests procedure using VCM even with the slight modifications to the system, however, VCM from sample collection "bombs" is released inside these hoods. This constitutes another VCM loss to the atmosphere. The location of the fresh air intake for the air conditioner was discussed. This writer was told that the air conditioner is on 100% recirculated air. This aspect is questioned since most air conditioning units have some make-up air provisions.

In summary the Paulsboro terminal has many excellent design characteristics for containment of spills and emission discharges of certain product lines. In view of information that VCM has been reported to be experimental carcinogen (demonstrated in rats), this author's review of the losses of VCM has been extremely critical.

The terminal has provisions for recovery of most all VCM that is not contaminated. The blow down of tank trucks and cars that hav been contaminated poses a problem should it become necessary to prevent these vapor losses to the atmosphere. Some operational changes may have to be made as to the method for checking impurities where "blow-down" of the sample line is done before the test can be made. A smaller sample bomb may have to be used in the future to reduce vapor releases or the system revised so that VCM is captured in a closed system. Absorption of vapors on activated carbon, flares, etc. may have to be considered when impure VCM purge streams are discharged directly to the diked area. The application of molecular sieves for separation of nitrogen contaminated streams should be reviewed so that VCM vapor recovery in the accumulator-refrigeration system might be accomplished.

It would appear prudent to collect air samples in the area during unloading of VCM at the dock, truck and tank car loadings to establish area levels of VCM.

Personal air monitoring is recommended for operations during unloading of the Puerto Rican and during truck and tank car loadings. Documentations of the exposures with data is important. A list of all employees who work with VCM and their hours worked at each job should be made a permanent record. Employees who are assigned work with VCM should have medical surveillence. The type of medical program should be recommended by Dr. L. B. Grant. Some additional information on medical surveillence can be obtained from Dr. H. Lovejoy, our Lake Charles plant physican.

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