CONOCO

VCM Plant

Conoco Chemicals
Continental Oil Company
P.O. Box 605
Westlake, Louisiana 70669
(318) 882-0550

April 14, 1976

RECEIVED
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Mr. Bouwmeester
Unigas International
Flat "DeLeuve"
Schiedansedijk 50
Rotterdam 3001
Netherlands

Dear Mr. Bowmeester:

As you are aware, a serious VCM liquid and vapor release occurred on board the Delta Gas on April 6, 1976 during its loading at the CONOCO dock. This release resulted from the improper line-up of the ship's liquid loading line and hold vent valves. The sequence of events and actions taken during the loading are listed in the attached summary.

Such a VCM release is hazardous to both the Unigas and CONOCO personnel involved for the following reasons:

1) With a liquid VCM spill, there is the very real danger of an explosion and fire.

2) Both the CONOCO and Unigas personnel are potentially exposed to high concentrations of VCM.

Please take corrective action to prevent the recurrence of such a VCM release.

Also, please develop and implement standard, safe procedures for the ship's crew to follow in handling a problem like this should one recur. Clearing pipe lines of liquid VCM by draining the liquid to the ship's deck should be forbidden.

In addition to the above, our monitoring on board the ship during loading indicated that many of the ship's valves were leaking VCM vapor around the valve stem packing. Tightening the valve packing did not greatly reduce the valve leakage. The VCM concentration on board the ship (after loading was resumed following the dissipation of the large VCM release) ranged from 10 to more than 30 ppm VCM between the loading hose connection valves and the nearby hold tank. The VCM concentration at the stern of the ship ranged between 3 and 14 ppm. As you know, the Coast Guard requires that the ship's

crew take corrective action to keep their exposure to VCM below 1 ppm or shut down the loading. I question whether the Delta Gas could have reduced the crew's exposure below 1 ppm. This is somewhat disturbing since the Delta Gas is a relatively new ship and should be the best of the Unigas fleet in minimizing VCM emissions. Naturally the VCM concentrations measured on board the ship will be dependent on the direction and speed of the wind and the ship. However, the Coast Guard regulation must be met, regardless of the weather.

There is a real potential for a Coast Guard suspension of loading and the subsequent disruption of CONOCO's VCM business if this ship emission problem is not corrected. In addition, the CONOCO personnel who sample the ship tanks may be exposed to VCM concentrations over the 1 ppm 8-hour or 5 ppm, 15-minute limits established by the U.S. government's Occupational Health and Safety Administration (OSHA). Such exposure is hazardous to our employees and would subject the plant to enforcement action (citations, fines) by OSHA. Please investigate this ship VCM emission problem and notify me of the corrective action you will take.

Sincerely,

J. H. McCulley
Chief Process Engineer

is
Enc
CC + enc:
RDG-JAD-JF-CEG-JSR-JEC
George O'Brien-Refinery
Don Unruh-Refinery
Bob Cowden-Refinery
Ed Maddox-Refinery
John Pinkman - Houston
Dave Kuhn-Houston

SUMMARY OF THE DELTA GAS LOADING

APRIL 5 TO APRIL 8, 1976

Time	Action
4-5-76 8:45 p.m.	Delta Gas docked at CONOCO Dock #3.
10:05 p.m. to 10:30 p.m.	Liquid loading hose connected to the ship.
10:30 p.m. to 10:45 p.m.	Vapor vent hose connected to the ship.
10:45 p.m. to 11:00 p.m.	Pulled blind in vapor vent return line at dock.
11:15 p.m., 4-5-76 to 12:50 p.m., 4-6-76	Nitrogen purging ship hold tanks.
1:30 p.m. to 1:40 p.m.	Pulled blind in liquid loading line at dock.
2:10 p.m. to 2:25 p.m.	After getting approval from the ship's mate, the loading was started. CONOCO placed two of the dock gas chromatograph (GC) sample lines on board ship to monitor ship board VCM concentrations during the loading. The GC point #9 was placed on the deck between the ship's loading hose connection valves and a hold tank, and GC point #3 was placed at the stern of the ship. The ship was monitored by CONOCO to better define the causes for the high VCM exposures measured in the past of the CONOCO personnel who sample the ship tanks. VCM Plant Engineer, Dave Linderud, went on board the ship to monitor for leaking valves with the portable Century OVA total hydrocarbon analyzer. He noticed that some of the ship's crew were closing the liquid and gas sample valves on the six holds--nitrogen and VCM vapor was noisily blowing out these open valves at the time. In addition, he saw liquid VCM running out of an open vent valve in the ship vent header. He left the ship immediately and informed the CONOCO dock operator of what he had seen. They checked the dock GC: the #8 point, located on the north side of the dock, showed a VCM concentration of 27 ppm and sounded the high VCM concentration alarm. Dave went back on board the ship to determine if the ship's crew had corrected the problems. Liquid VCM was still running out of the ship's vent header vent valve so Dave told the dock operator to shut down loading. The dock operator had just finished notifying the VCM plant when the ship's crew also requested that loading be stopped. The dock loading valve was closed immediately. However, before the loading was stopped, a CONOCO dock operator saw liquid VCM running out the ship's vent stack.

Time	Action
	The liquid VCM spill was caused by the ship's crew leaving a valve on the bottom of a filter in the ship's liquid loading piping open to the ship's vent header.
2:25 p.m. to 4:00 p.m.	During this period, the VCM concentrations on board ship and in the dock area all averaged above 25 ppm. A cloud of VCM vapor was running over the sides of the ship. The ship's crew were draining liquid VCM from the ship vent header and stack onto the deck, and were then washing the liquid VCM off the ship deck with water. About 30 minutes after the ship's crew started this, the CONOCO dock operator requested the ship to stop draining the liquid to the deck. The liquid still trapped in the vent system continued to weather off through the vent stack. During this period, Mr. Ed Maddox of CONOCO notified the Coast Guard of the liquid VCM spill. The Coast Guard said they would send two men to the dock.
4:00 p.m. to 7:00 p.m.	CONOCO decided to try evacuating the liquid VCM remaining in the ship's vent system with the dock vacuum ejector. This ejector discharges into a small knockout pot which is vented to the atmosphere through a 148-foot tall vent stack. This was done for approximately 15 minutes before being stopped by Mr. Maddox due to the large amount of VCM vapor flowing out of the CONOCO vent stack. The ship's captain did not want to stop the vacuum clearing operation. After it was stopped, he suggested that the liquid VCM could be removed by pressuring his vent system into CONOCO's dockside vent recovery system. This was tried unsuccessfully. During this period the VCM concentrations monitored on board the ship ranged from 5 to 15 ppm. The dock VCM concentrations ranged from 0 to 3 ppm. The liquid in the ship's vent system continued to weather off through the ship vent stack.
7:00 p.m. to 8:00 p.m.	The ship's crew decided to speed up the liquid VCM evaporation by spraying water on the vent header to warm the line. The ship may have done something in addition to this. In any case, the dock and ship area VCM concentrations increased to the 20 to 30 ppm range.
8:00 p.m. to 9:00 p.m.	The two men from the Coast Guard arrived. Their principal concern was to determine if the surrounding area needed to be evacuated. After discussing this with CONOCO personnel, they decided that an evacuation was not needed. They reported this by phone to their base and were told to remain at the dock until the area was "safe." CONOCO decided that once the ship vent headers were free of liquid VCM and the dock

Time	Action
	VCM concentrations were below 5 ppm, ship loading would be resumed. The Coast Guard did not disagree with this decision.
9:00 p.m., 4-6-76 to 1:30 a.m., 4-7-76	CONOCO decided to blow nitrogen through the ship's vent system and out the ship vent stack in an effort to evaporate the remaining liquid VCM more rapidly. Area concentrations during this period ranged from 3 to 25 ppm VCM.
1:30 a.m.	The dock area concentrations had dropped below 5 ppm and the ship vent system was free of liquid VCM by this time, so loading was started again. The two men from the Coast Guard left the dock after loading was started.
2:45 p.m. to 3:15 a.m.	The ship hold heel samples were caught.
5:50 a.m. to 7:50 a.m.	Hydroquinone was added to the ship holds.
7:50 a.m.	The CONOCO dock side vent recovery system was started.
8:00 a.m.	The #3 (stern) and #9 (deck, near loading hose connections) GC points on board the ship were ranging between 1 and 14 ppm and 10 to 30+ ppm., respectively. Mr. Dave Jones of CONOCO and some of the ship's crew checked most of the ship's valves for leaks. Although the ship's crew attempted stopping the leaks by tightening the valve packing, many of the leaks could not be stopped.
4-8-76 3:30 a.m. to 4:23 a.m.	The final ship hold samples were taken.
5:40 a.m. to 7:00 a.m.	The loading was shut down at the ship mate's request while a ship valve problem was corrected. Twice during the loading operation the ship's hydraulic operated loading valves malfunctioned and closed.
9:35 a.m. to 10:20 a.m.	The liquid loading and vapor return hoses were removed from the ship.
10:20 a.m. to 10:35 a.m.	The blinds were reinserted in the liquid loading and vent return lines on the dock.
11:00 a.m.	The Delta Gas sailed.