



Interoffice Communication

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APR 16 1984

To : R. D. Gamblin
From : John Friend
Date : April 12, 1984
Subject : VCM TANK FARM INCIDENT
ABERDEEN CHEMICAL PLANT

At approximately 4:40 p.m. on Thursday, March 1, 1984, a release of liquid VCM occurred from railcar number UTLX 98233. At the time of the incident, the car had been off-loading for approximately one hour and forty minutes. The car rolled south from its spotted position pulling the liquid and vapor unloading hoses loose from the railcar valves. The car rolled south until it coupled with the car at the next unloading station. When the hoses pulled out of the valves, the vapor excess flow check valve seated but the liquid excess flow valve did not seat. Due to the car's position and the direction of the liquid spray, the car valves were not accessible from the unloading rack. Personnel in Scott Air packs had to use a portable ladder positioned at the south end of the car to climb on top of the car. The railcar valves were secured at 5:05 p.m. with no injuries.

The in-plant team that reviewed this incident found defects in the air and hand brake systems on the affected railcar. In order to better understand what happened during this incident, the team conducted simulations and interviews. Several general conclusions were reached.

1. Both the air and hand brake systems failed. The air brakes failed because of a slow air leak. The hand brake failed because of improper mechanical adjustment under the car. These defects were not detectable during our normal pre-unloading check of the car. When checked prior to unloading, the air brakes were holding the brake in place since the slow air leak had not bled off enough air to release the brake shoes.
2. Simulations proved that a sloshing motion is set up in the liquid phase as a car unloads. This is due to the springs lifting the car as liquid is removed. Typically, this action is not uniform. First one end of the car will jump, then the other end. This motion causes the car to rock back and forth. If the brakes are not applied, the car rocks against the chocks and will ultimately push the chocks off the track.
3. An elevation survey of the rail tracks was conducted. The trackage at the unloading station where UTLX 98233 was "spotted" by the railroad crew was found to have a grade slope toward the south.

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Putting all of this together, our unfortunate incident probably happened as follows: The railroad switch crew spotted the VCM cars for unloading per their normal procedure of decoupling with the brakes applied (this also sets the emergency brake). They also set the hand brake tight and chocked the car. Plant yard personnel conducted pre-unloading checks, hooked up the cars and started unloading VCM. After the affected car had been unloading for a while, the air leak caused the brakes to begin releasing. Since the hand brake had improper mechanical adjustment underneath the car, when the air brakes failed the hand brake did not hold the brake shoes against the wheels. When the brakes released, the sloshing motion of the liquid caused the car to rock back and forth against the chocks which eventually fell off the track. Due to the grade slope of the track, the railcar rolled to the south pulling the hoses loose from the unloading valves.

During simulations, the team used the chocks that were used on the car at the time of the incident as well as a new set. The findings showed that metal chocks are ineffective by themselves in a situation like this. Currently, the plant is supplementing the metal chocks with a pair of oak wedges which have not fallen off the tracks during simulations. However, we will continue to investigate the chocking issue since the oak wedges are not the final answer in my opinion.

I think it is important that everyone recognize that this could happen to any unloading liquid car which suffers a brake failure. We have not normally been concerned with railcar brakes since we've relied on chocks to be our safety device. Our incident plus simulations have shown that normal chocks cannot be relied upon.



John Friend

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cc: AHS, CRM, PEM

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