

Process Safety Forum

The Process Safety Forum consists of representatives from UKPIA, TSA, CIA, OGUK and NIA

Process Safety Alert 006

Issued on:

1st June 2011

Issued by:

Process Safety Forum

Subject:

Floating Roof Tank Rainwater Drains Integrity Issues

Issue

An incident involving external floating roof tanks highlight the risks associated with open and closed roof drain valves.

Incident

A gas detector alerted operations to a possible hydrocarbon leak near the tankfarm area. Shift personnel immediately investigated the area and found gasoline/condensate escaping from the roof drain outlet at one of the double deck floating roof tanks. The gas cloud that formed had triggered a nearby gas detector. The release led to excess emissions and a difficult cleanup but no injuries.

How did this happen (Causes of incident)

The release of gasoline came from a six inch floating roof drain system that is provided to remove rainwater from the tank roof to the tank bund. The system has a series of arms moving at the swivel joints as the roof moves up and down (see figure 2).

The connection between the drain system and the floating roof failed. The failure of the drain system led to material flowing through the normally open drain valve into the dike area.



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Figure 2 – Articulated Roof Drain System



Figure 3 – Roof to Drain Connection (prior to failure)

Learning

There are potential risks both with having external floating roof drains open and with having them closed (or the flow restricted). Sites have systems for managing all floating roof drain valves, but the final decision on how to operate tank roof drain valves should be made by each site through a risk study which addresses a range of factors, including whether the floating roof is single deck or double deck. These considerations may include:

- Valve isolation on the tank's shell nozzle, requiring manual opening after rain.
- Rain water drain system connected via automated valves which operate based on detection of the density difference between water and oil.

Reference should also be made to following which provide guidance in this area:

- HSE guidance on drainage of floating roof tanks, SPC/Enforcement/163
- EEMUA 159
- API 653

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