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NEWS BULLETIN # 2 Proper Venting of Storage Tanks

Proper venting of oilfield storage tanks has always been a concern but recently environmental concerns and regulation changes have made it a priority. Below is a list of some of the equipment one can use on storage tanks to ensure proper venting is addressed: The list is in the correct order for set points from the lowest to the highest.

Blanket Valve
VRU (Vapour Recovery Unit)
PVRV (Pressure Vacuum Relief Valve)
Thief Hatch
EPRV (Emergency Pressure Relief Vent)

Proper venting must be looked at as system. The above listed devices have to be engineered so that their set points do not interfere with each other and that during normal operation no one device can cause a backpressure in the tank that will cause another device to open during normal operation. Frequently the tank is purchased from one supplier and comes with a thief hatch on it, the VRU from another supplier, the PVRV from another and the EPRV from another. An understanding of the interdependence of each device has been missed. How do we prevent this from happening? The best way is to contact someone who understands venting and can work with you to design your specific venting system that ensures there will be no interference between these devices.

Venting tanks is covered by API 2000 which is a guideline that supplies us with formulas to calculate both normal venting and emergency (fire case) venting. Normal venting is made up of two components, thermal venting and product movement in and out of the tank. Thermal venting is the effect of ambient temperatures on the product in the tank. Product movement is the maximum pump-in and pump-out rates for the tank. Emergency venting is usually based on wetted surface area. Emergency conditions such as a treater valve stuck or a malfunction of the blanketing system open should also be taken into consideration.

The blanket valve is set the lowest. This valve is to prevent the tank from developing a vacuum as well as providing a blanket gas (frequently N2) to replace oxygen in the tank, to prevent corrosion, or to prevent the vapour from reaching a flammable level.

The VRU is used to recover the vapours from the tank, knock out any liquid carry over, and either sends the vapours to a flare or back into the blanket system.

We suggest that if you are going to use a thief hatch you choose a lock down model with no venting capabilities. Some thief hatches can start to relieve vapours at 70% of set point. This may result in wasting valuable blanket gas, in increased emissions and perhaps odor complaints, and an ineffective use of the PVRV.

The PVRV should be sized according to API 2000 for your normal venting requirements. Correct sizing of the PVRV is important in order to mitigate fluttering of either the Pressure or Vacuum seats at maximum flow. Blanket gas failure can be calculated into the PVRV relieving rates to prevent the EPRV from opening if the blanket gas valve fails open.

The EPRV is the final defense in preventing tank damage due to over pressure situations. It should also be sized as per API 2000 and to ensure the pressure in the tank does not rises above the maximum design pressure of the tank. The set point must to be a minimum of 0.5 oz higher than the pressure in the tank when the PVRV is flowing the required amount.

These points will help you to design a proper operating venting system. A ZIRCO sales consultant would be happy to review the sizing program and help you to design your own system.