

Two valve actuator rupture incidents!

November 2010



1 – Gas leaked from the process through the stem of a 10 inch gear operated valve into the gear operator. The gear operator was designed to relieve gas if this happened, but the relief system did not work. The gear operator became pressurized and a 5 inch plate blew off the top of the valve operator. Fortunately, nobody was hit by the plate. The investigation found that the relief vent on the valve operator (and another one on a nearby valve) had been painted over (arrow) and it did not vent properly. Plant personnel were not aware of the potential for gas migration into the gear box, and the need to verify that the operator gear box was properly vented.

2 – A natural gas pressure reducing system used the natural gas to operate a control valve. The valve actuator ruptured, and a large fragment went flying several meters. We do not have enough information on this incident to know whether the valve actuator was overpressured, or if it was corroded, damaged, or otherwise defective, but these are possible causes of the failure. Again, fortunately, nobody was hit by the pieces of the failed valve actuator.

Do you know?

- It is possible for pressurized process gases and other fluids to leak from the process into valve actuators. The resulting pressure may be sufficient to cause the actuator to fail.
- Some equipment (for example, the valve actuator in Incident 1 above) includes small vent openings or relief plugs which should never be blocked, plugged with debris, or painted over.
- Some valves and other instruments may use process gases as the source of pressure to activate the devices.
- Any device under pressure, including valve actuators, can fail and potentially cause injury if it is subjected to excess pressure by mis-operation or improper maintenance practices.

What can you do?

- For all equipment that can be pressurized, understand how the high pressure relief systems are intended to function. Don't forget equipment such as valve actuators, especially if they use process gas for motive power.
- Make sure that you have complete documentation of excess pressure relief systems, and know how to recognize if they are not working properly or are compromised in some way.
- Many maintenance operations such as painting and insulation are done by contractors or temporary workers who do not understand the plant. They may inadvertently compromise safety, for example by painting over the valve operator vent as described above, or by insulating over the stem of a valve preventing movement. Assume that these workers do not understand the equipment and give them specific training on how to do the job before they start any work. Observe their work, and inspect the equipment that they have worked on before putting it back into service.

Know what protects all of your equipment against excess pressure!