

SAFETY ALERT - #05-2001
CHOKE HEATER AND EXPLOSION FIRE
RELEASE DATE: JANUARY 15, 2001



Description:

A choke heater experienced significant damage resulting from a fire and subsequent explosion.

The operator arrived at the site and discovered that the well and heater had shut down as a result of a loss of fuel gas for instrumentation. The fuel gas scrubber was drained, and the instrumentation was checked for residual liquids. No liquid was evident in the instrumentation devices. As per proper safe work procedure, the operator opened the heater ignition port to allow for increased ventilation and waited for 15 minutes.

The operator introduced a flame source into the heater to light the heater pilot. **Condensate present in the arrestor was ignited at this time.** The operator withdrew the source, and moved to his vehicle to retrieve a fire extinguisher. When on the other side of his vehicle, the heater building exploded. The site continued to burn as it depressurized.

The operator then withdrew from the site, and attempted to call for backup to control the fire. No one could be immediately reached. An assessment was made by the operator to move to isolate the site from the pipeline and to close the master and wing valves to secure the wellhead. He withdrew again, and called for backup.

As the backup operator arrived on site, an assessment was made that the fire was in a smouldering state, and, with the lack of fuel, would soon burn itself out.

What Caused It:

- The site had a history of flooding the fuel gas system when the well is not producing and the heater is running. The fuel system flooding had caused condensate to leak from the devices and to accumulate on the floor of the choke heater building.
- The building has a history of leaking when it rains. To prevent accumulation of water, an operator drilled two 1/8" holes in the floor of the building to allow the rainwater to drain out of the building.
- Over time, despite cleanup efforts, condensate accumulated under the building from the combination of the flooded fuel system and the drain holes.

What The Investigation Revealed:

The vapor from the condensate under the building was ignited from the **burning condensate in the heater flame arrestor.** The vapor under the building exploded, buckling the floor beneath the fuel gas scrubber, and subsequently breaking several lines that run into and out of it. Gas from the fuel gas system was then released into the building. This gas ignited from the residual fire beneath the building, causing the explosion that severely damaging the heater and the structure.

Re-Medical Action Required:

- Check valves should be installed between the heater fuel gas point and the pipeline to prevent liquids from entering the fuel gas system when the well is down.
- The storm check (or fuel gas high level internal shut down device) was malfunctioning for some time. It should be updated to the newer 2" style that is more reliable.
- Holes in the floor with the intent of draining water in any building, is unacceptable. Any such holes should be welded shut. Please note: Any such work should be completed following Hot Work Procedures.
- The contamination under the building should have been detected by the Tier I audit procedure. Review of the Tier I requirement with the staff will be conducted. Periodic testing for contamination under the buildings of high risk sites will be implemented.
- If the well is to be scheduled down overnight, the pipeline should be isolated and the site allowed to draw fuel gas from the wellbore to maintain building heat and heater bath temperature.
- Heater/Treater lighting procedures will be reviewed with all relevant staff.
- Emergency response requirements for site response will be reviewed with all staff.

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