

SAFETY ALERT - #22 -2009
WELLHEAD PIPING: FREEZING HAZARD
RELEASE DATE: NOVEMBER 13, 2009

Function: Production Operations	Date: October & February 2009
Incident Type: Hazard Alert	Country and Region: Western Canada

Summary

Wellhead piping damage may occur in sub-zero temperatures, if wells are shut-in with liquids trapped in the piping. Freezing has resulted in valve failures leading to potential injuries and spills.

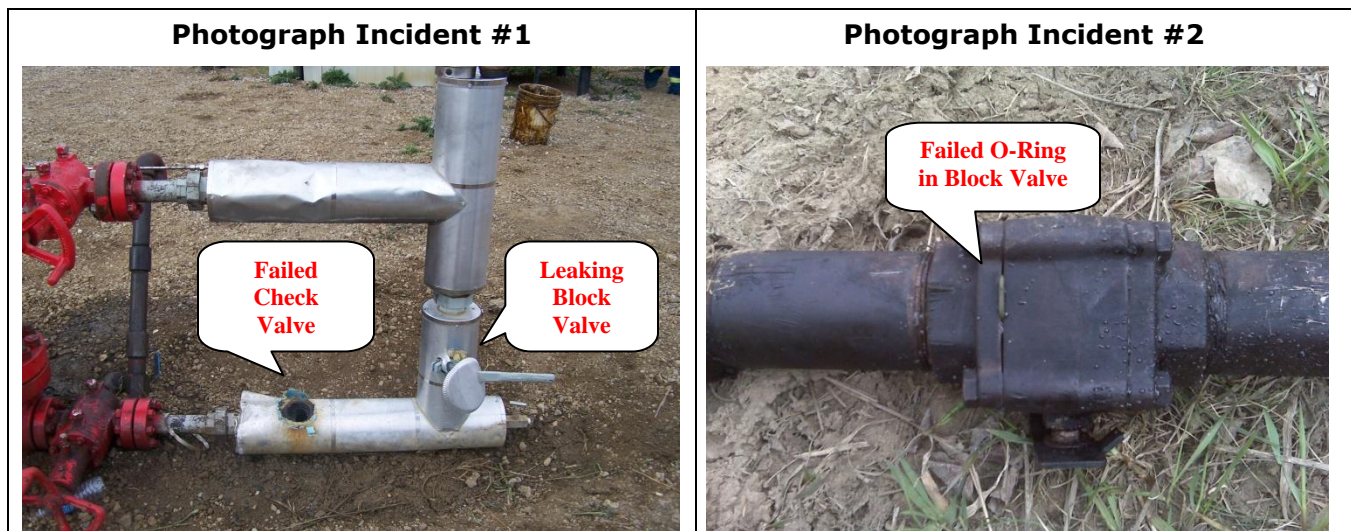
Description of Hazard:

Incident #1 (October 2009)

While pressure testing wellhead piping prior to re-starting a shut-in well, the cap on the check valve on the casing piping blew out. The crew began by testing the tubing side piping. The tubing valve was leaking resulting in the casing side piping also being pressurized. At this point the threaded check valve cap blew out (See Photo #1 below). Two nearby workers were sprayed with fluids trapped in the piping. Neither worker was injured; however this incident had the potential to be fatal. A visual inspection after the incident identified that the check valve failed due to internal stresses, which were probably caused by the freezing of water trapped inside the valve body. Water originated from a leaking block on the casing piping. The threads on the check valve cap were stripped / deformed. A formal failure analysis was not completed.

Incident #2 (February 2009)

The company received a call from Alberta Forestry who reported that there was oil leaking from a wellhead. The operators drove out to the lease and found the well was still leaking oil out of the casing valve. The valve failure resulted in a 30 m³ spill. A failure analysis confirmed that the valve failed due to internal stresses caused by the freezing of water trapped inside the valve body (See Photo #2 below). In addition to valve failure, the downstream valve flange and connecting nipple were also deformed. The water in the piping is believed to be the result of a wellhead operation that was completed several months prior to the valve failure. The investigation was unable to confirm if the piping was depressurized and if the trapped liquids were drained.





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Recommendations for Preventing Future Incidents:

A range of important hazard identification and control recommendations were identified by the two companies who reported these incidents. These recommendations included:

- Review well shut in pressures. Identify all wells that have potential to flow to surface when shut in. Review surface equipment configuration for flowing wells and confirm well shut-in and start-up procedures to reduce risk of a spill.
- Identify wells with worn equipment or equipment with a history of previous failures and replace as required to reduce the risk of leaking.
- Review suspended well inspection standards. Confirm timing and inspection standards if wells are not immediately placed on production following well servicing operations. Need to communicate and confirm well inspection intervals.
- Ensure pre-job planning is completed prior to commencing work. Identify the hazards and ensure required controls are in place. Communicating these hazards to the personnel on lease is mandatory. (i.e. Safe Work Permit or Task Hazard Assessment.)
- Highlight potential freezing hazard in future well handover meetings between production operations and well servicing personnel. The need to confirm that all lines have been flushed and properly secured by either the wellsite supervisor or operator prior to leaving a wellsite.
- Reinforce the importance of inspecting equipment closely for valve damage or piping corrosion prior to starting any type of work activity on a shut-in or suspended well. If necessary, cladding and insulation may need to be removed to permit such an inspection.
- Review required procedures and equipment for pressure testing surface piping with a controlled source of pressure. It is not acceptable to pressure test with well fluids. This is especially important when there is any level of H₂S present. Alternatives include using Baker pump and a non-compressible fluid that is not susceptible to freezing (i.e. RV Antifreeze).

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DISCLAIMER:

This Safety Alert is designed to prevent similar incidents by communicating the information at the earliest possible opportunity. Accordingly, the information may change over time. It may be necessary to obtain updates from the source before relying upon the accuracy of the information contained herein. This material is presented for information purposes only. Managers and supervisors should evaluate this information to determine if it can be applied to their own situations and practices.