

SAFETY ALERT - #18-2009
POTENTIAL FOR CATASTROPHIC FAILURE OF PULSATION DAMPENERS
RELEASE DATE: OCTOBER 14, 2009

Function: Drilling Operations	Date: January 2009
Incident Type: Hazard Alert	Country and Region: Western Canada

Summary

Equipment damage may occur due to improper storage in sub-zero temperatures. Freezing may cause pulsation dampeners to crack or explode if liquids are trapped in the dampener bladder.

Description of Hazard:

Incident #1 (January 2009)

While a drilling rig was shutdown, the bladder in the pulsation dampener failed and lost its nitrogen pre-charge just before the rig shut down. The bladder then filled with fluid which was trapped when the pump pressure was bled off. The pump was properly drained and dismantled prior to the shutdown. However, sometime in the course of a two week shutdown (with -35 degree temperatures) the fluid that had entered the pulsation dampener bladder froze. The dampener shell exploded into about a dozen pieces of shrapnel, damaging the inside of the pump house (See Photograph #1). The concussion blew the tools off the tool board and the light covers out of their fittings. If anyone had been inside when it blew they may have been injured or killed.

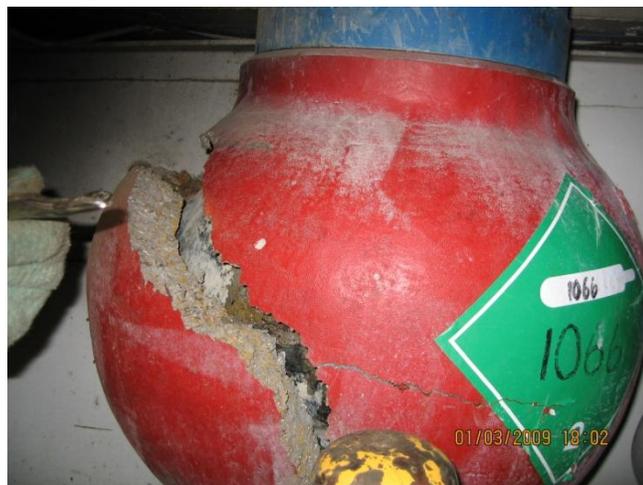
Incident #2 (February 2006)

A pump building was being transported by a third party trucking firm. The pump was not fully drained – and the dampener bladder was charged with nitrogen (N₂). Had rig move gone as planned, the pump would have been running again approximately 2 hours after the rig move. Unfortunately there were delays and the liquid filled pump sat in sub-zero temperatures. During the time it was sitting – approximately 24 hours, the pump and the pulsation dampener both froze. The dampener then failed and the N₂ bladder exploded as well. This resulted in the lid blowing off the roof top hatch and entirely shredding the pulsation dampener into two-inch size chunks inside the building. Again, this may have injured or killed anyone standing nearby.

Photograph #1



Photograph #2 – A Typical Dampener Failure





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Incident 3 (December 2008)

The pump was drained before drilling operations were shut down for Christmas. When starting up on January 3rd, the derrick hand found that the pulsation dampener had cracked open (See Photograph #2). Mud had remained trapped inside the dampener bladder.

Recommendations for Preventing Future Incidents:

Important hazard identification and control recommendations include:

1. Whenever storing a pump for extended periods or between use in cold climates, drain all liquids from the pump to prevent freezing and damage to the manifold or pump. Depending on equipment design, additional measures may be required to prevent freezing.
2. Review and confirm material specifications to ensure the suitability of the equipment. *(Note: Sub-standard material composition on foreign manufactured equipment has been a factor in some of the reported failures.)*
3. Gas-charged pulsation dampeners must be well maintained. Dampeners that are left unrepaired, have ruptured bladders or improper charge pressures, will perform poorly and may be prone to the conditions that resulted in the failures highlighted in this alert.
4. If a failed bladder is suspected, it should be completely bled-off and the bladder removed prior to shut-down. A new bladder should then be inserted, the unit flanged up and the bladder pre-charged with nitrogen according to the manufacturer's specifications.

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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.