



The Safety Association for Canada's  
Upstream Oil and Gas Industry

## Ruptured Piston on Mud Pump leads to Pump House Fire Property Damage

SAFETY ALERT

ISSUE #: 21-2011

### Enform: Your Partner in Safety

Enform is the upstream oil and gas industry's advocate and leading resource for the continuous improvement of safety performance. Our mission is to help companies achieve their safety goals by providing practices, assessment, training, support, metrics and communication. Our vision is no work-related incidents or injuries in the Canadian upstream oil and gas industry.

### An Industry Product

This document was developed by industry for industry. Working collaboratively, Enform works with the submitting organization representative in developing these documents to improve the industry's hazard awareness. Canada's leading oil and gas industry trade associations support the use of shared information to help companies of all sizes improve performance.

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### Details

Release Date: November 23, 2011  
Incidence Type: Near Miss  
Country and Region: Alberta, Canada

For more information on this event, please contact: [safety@enform.ca](mailto:safety@enform.ca)

### Description of Incident:

- On September 1, 2011 the crew started daylight shift at 7:00 AM.
- The rig was drilling at approximately 2030m with invert mud drilling fluid in the tanks, pumping with approximately 21,500 kPa pump pressure. At 14:00 hours it was noticed that smoke was coming out of pump house #1.
- The crew gathered all the fire extinguishers on site and attempted to extinguish the fire. Five – 30lb extinguishers and Two – 150lbs extinguishers, from the tank farm, were used to attempt to put out the fire.
- The crew was unsuccessful, therefore, the Driller and Rig Manager shut-in the well. The fire spread to pump house #2, then over to the mixing area of the mud tanks. The fire continued over the top of the mud tanks and across the shakers.

### What Caused It:

- The piston/pump rod covers on the on the F-1000 mud pump were left in the upright position and made from expanded metal screen material which allowed the drilling fluid to spray out from the ruptured mud pump piston cavity and back to the engine area.
- Fire originated in pump house #1, particularly on the turbo charger on the 3412 Cat engine contained within the pump house building.
- The proximate cause of the fire was a ruptured piston in the F-1000 mud pump that allowed invert (mud and oil mixture) to spray throughout the pump house.
- Because of the extreme pressure in the mud pump system, and aided by the turbulence in the pump house from the cooling fan on the opposite side of the engine, the oil in the invert was atomized (reduced to a fine spray) which then ignited when it came into direct contact with the nearer of the two turbochargers on the engine.
- From Pump house #1 the fire migrated to pump house #2.
- Fire migrated through both buildings and caused some fire damage to the platform (mud Tanks) behind the buildings and to the contents on the platform. All electrical and all mechanical causes for this fire were considered and eliminated.

By industry, for industry



**Corrective Actions / Preventive Actions:**

- All mud pumps will install hinged plated covers or covers with Lexan Glass inserts to ensure any drilling fluid from ruptured pistons will be contained within the piston rod cavity of the mud pump.
- Some plate covers may require a slot to accommodate the lubricator hose.
- All covers are to be kept closed during pumping operations.
- All engines located in the mud pump house will have exhaust blankets or wraps to protect the turbochargers and exhausts on the engines from being sprayed with drilling fluid.
- Speak to your Drilling Superintendent for further details.

