



**DEPARTMENT OF MINES
WESTERN AUSTRALIA**

SIGNIFICANT INCIDENT REPORT NO. 31

HOT OIL BOILER – POTENTIAL EXPLOSION

INCIDENT

A potentially hazardous situation arose when extensive cracking developed in the welded joints of a hot oil boiler operating in a Gold Mine Process Plant.

The cracks were found in welds in the tube sheet to shell, tube ends to tube sheet and furnace tube to tube sheet connections.

The location of the cracks led to oil leaks into the fire side of the boiler.

The unit was not installed in accordance with the manufacturer's instructions, and in particular:-

1. There was no low-oil control to cut out the flame in the case of a low level of oil in the boiler.
2. The flow rate of the oil over the heating surfaces was well below that recommended by the manufacturer.

Failure of welds on the unit occurred due to excessive stresses.

These stresses resulted from overheating of the fire tubes and tube plate as a consequence of lower than recommended flow rate over the heating surfaces.

With the oil leaks there existed a potential for an oil vapour, air mixture to form in the boiler which was liable to explode if severe overheating of the fire tubes or a flash through a cracked weld occurred.

COMMENTS AND PREVENTATIVE ACTION

All installations using "hot oil boilers" in gold recovery process plants must be checked for compliance with the manufacturer's specifications.

New installations must not be operated unless the systems are checked to comply fully with the manufacturer's design.

A regular check of burner controls must be carried out to prove that all safety systems are fully operational.

Regular servicing of these types of boilers must be carried out at periods not exceeding three months or as otherwise directed by the manufacturer.

J M Torlach
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SAFETY AWARENESS SAVES LIVES