

Drain Stub Bore Hole Cracking

Purpose

This plant service bulletin alerts customers to inspect drain line stub bore holes for radial cracking.

Problem

Numerous incidents have been reported of header cracking caused by water quenching the drain line stub bore hole and header ID, especially reheater headers. This problem occurs when drain lines from boiler, superheater and reheater headers of a single unit or of multiple units are connected to a common blowdown tank. The quenching

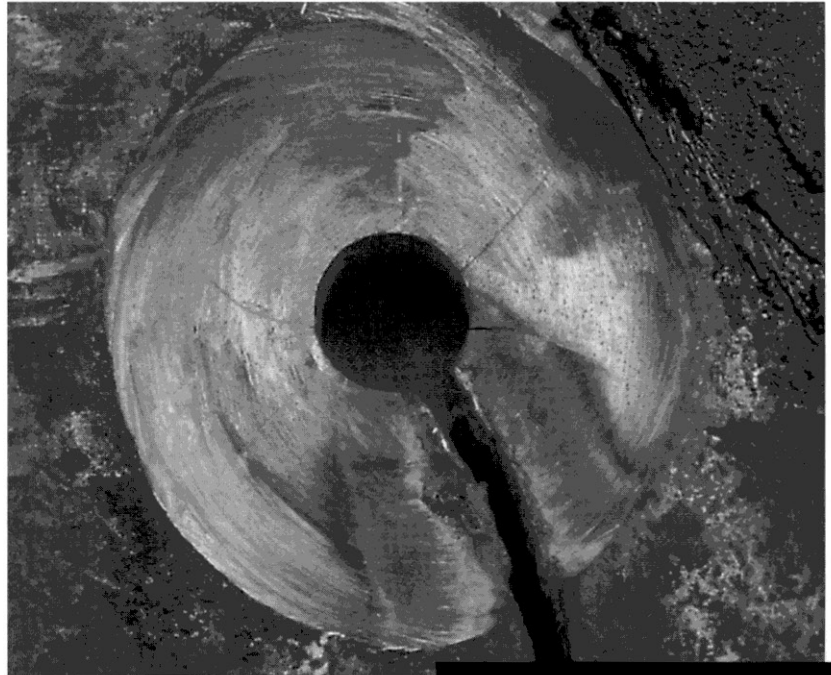


Figure 2 Cracks from external bore holes on Figure 1 component.

may result in cracks in welds, bore holes or other sections of the headers.

Background

During start-up and normal operation, the blowdown tank experiences unit operating pressure. Since the reheater operates at a much lower pressure than the boiler or superheater, faulty or unclosed drain valves could allow water from the blowdown tank to flow back up to the reheater header through the drain line and header drain line bore hole. This backflow of water from the drain line could be at a much lower temperature than the header itself and could subject the header, the drain line, and the drain line bore hole to thermal shocks, which may cause cracks. Craze cracks may form directly

downstream of the drain and can be recognized by an “elephant-hide” appearance on the inside diameter of the component (see Figure 1). The cracks emanating from the drain bore hole typically appear as radial cracks (see Figure 2) which could extend through the header wall and result in drain stub leaks.

Recommendations

All units having drain piping from boiler, superheater or reheater headers connected to a common blowdown tank should be inspected. Those units that already have experienced drain line stub leaks should be inspected first, with other units having a lower priority for scheduling inspections.

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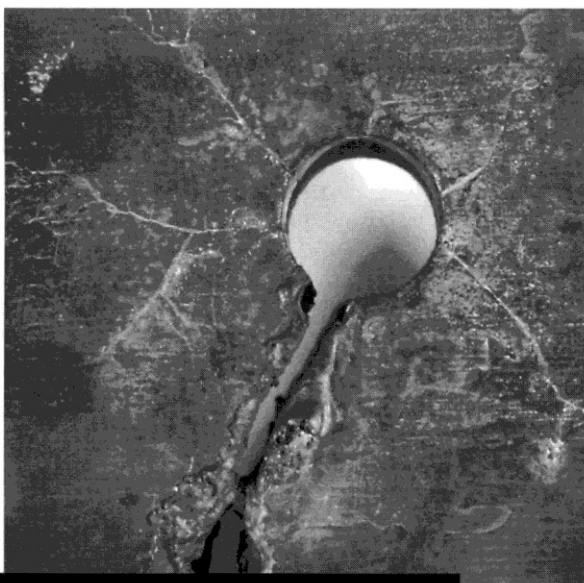


Figure 1 Typical cracking on inside diameter looking at bore hole.

Inspections should be performed to evaluate the extent of possible cracking. These inspections should include the following examinations:

1. Header and Stub Bore Hole Inspections

An internal inspection should be conducted to evaluate damage. The internal inspection is important because investigations to date have shown that extensive cracks may be present in the inner surface of the header, even though external examinations may not reveal any damage or appreciable swelling.

2. Fiber Optics Inspection

The drain stub should be cut to provide access to the header. The bore of the stub and adjacent inside surface of the header should be cleaned of

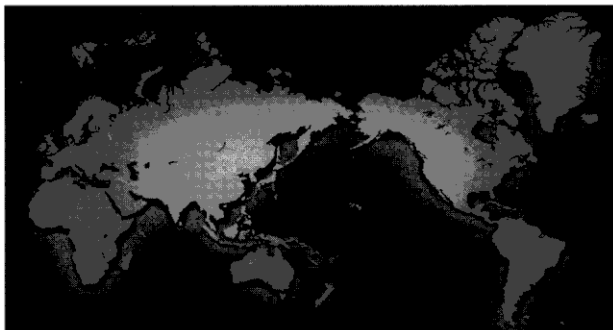
the internal oxide scale and inspected using special fiber optics. A fluorescent dye penetrant examination is recommended.

If cracking is detected, the severity should be determined as the recommended repair varies with the extent of the cracks.

Support

Contact Field Service Engineering through your local B&W district service office to coordinate your inspection and repair efforts, and to answer any questions.

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