

Stamm, Eric

From: Riggs, Eric -RZ
Sent: Friday, August 21, 2009 11:38 AM
To: Bartley, Jonathan
Cc: Ottenberg, Geoffrey; Ellis, Kevin
Subject: Unit 3 SSF ASW leak cause analysis in 2006

Jonathan,

The text given below was copied verbatim from the licensee's cause analysis in PIP O-06-3954. It looks like the corrosion was external in nature not MIC.

Thanks for the support, and have a good weekend.

Eric

F.8 PIPE PROTECTIVE COATING DEGRADATION

Information Needed to Evaluate: Locate leak and examine pipe

SUPPORTED: This is a likely cause of failure. The pipe protective coating was missing in a 4-5 in. diameter area around the leak. Degradation of the coating started at small defects (holidays) in the coating that allowed water to get under the coating. This allowed galvanic corrosion to progress to the point of a pinhole leak

The Met Lab report provides the following detailed discussion:

"The leak in the ASW pipe was attributed to a long-term failure of the external coating. The external coating had a bubbled appearance around the leak site. These bubbles are formed where tiny holidays in the coating allow the penetration of groundwater to the steel surface. The rust which forms is voluminous and will lift the coating away from the pipe surface and bulge it outward. Water and oxygen will continue to seep in and slow corrosion will continue.

There is no way to know for sure if the coating had been damaged at the leak site during installation, or whether the coating integrity had been compromised during welding. The pipe did not appear to have been dented on the OD surface; wall loss surrounding the pit created the appearance of a sunken spot, but there was no corresponding protrusion on the ID surface. If the coating were damaged as-installed, through-wall corrosion may have been expected to have occurred far earlier.

Coatings greatly extend the life of buried pipe but do not provide unlimited protection. The loss of coating integrity tends to occur at isolated sites and is related to age. No coating is perfect and so will eventually be compromised in a moist, oxygenated environment. Any resulting leaks will be in the form of pinholes. The shallow pits observed on the other side of the circumferential weld may have been produced by a less-advanced occurrence of the same type of corrosion process which caused the leak."

Determined to be the Failure Mode (Root Cause)

F.9 PIPE PITTING (CATHODIC)

Information Needed to Evaluate: Locate leak and examine pipe

SUPPORTED: This is a likely cause of failure. It appears that pipe pitting as a result of galvanic corrosion where the coating was degraded resulted in development of a pinhole leak. Although not specifically discussed, this is supported by the Met Lab report.

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