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HIGH VALUE LEARNING

High Value Learning

Hydrocarbon Leak due to Corrosion of Incorrect Material Seal Ring

Who could be interested in this?

Professionals responsible for Process safety leadership, asset integrity management, operations & maintenance management, equipment specification & procurement, quality assurance & materials management, health & safety, equipment suppliers / manufacturers.

What is this all about?

During routine plant operation, a liquid hydrocarbon leak (produced oil & water) was identified and reported by the operations team. The leak occurred in the well bay, from a 6" hub / clamp connector on the production manifold. The plant was immediately shut down and the leak was isolated. There was no harm to people or the environment.

Subsequent investigation revealed the seal ring installed at the leaking joint was the incorrect material specification for the piping class. The seal ring was confirmed by material testing as carbon steel and was significantly corroded (see supplied photograph). No corrosion or damage was present on the connector hubs, clamps or bolts. By investigation of the seal ring installed and plant records, it was determined that the seal ring was installed during the original plant construction (and had been in service for approximately 30 years).

A programme of non-destructive in-situ testing was then completed, to assess the material of construction of seal rings installed in the well bay. The non-destructive testing identified two further seal rings installed with the incorrect material specification. These were removed and confirmed to be carbon steel. These seal rings were both corroded (although to a lesser extent) and determined to have been installed during the original plant construction (in service for approximately 30 years).

The operator had carried out prior assessments and inspection campaigns in response to industry alerts where corrosion of incorrect seal rings had been reported.

NOTES: The supplied photograph shows the corroded seal ring (and cause of leak). The second seal ring shown was removed from an adjacent hub connection to the leaking joint. The second seal ring is the correct material specification and same size specification as the corroded seal ring. The second seal ring was also determined to have been installed during original plant construction and in service for approximately 30 years.

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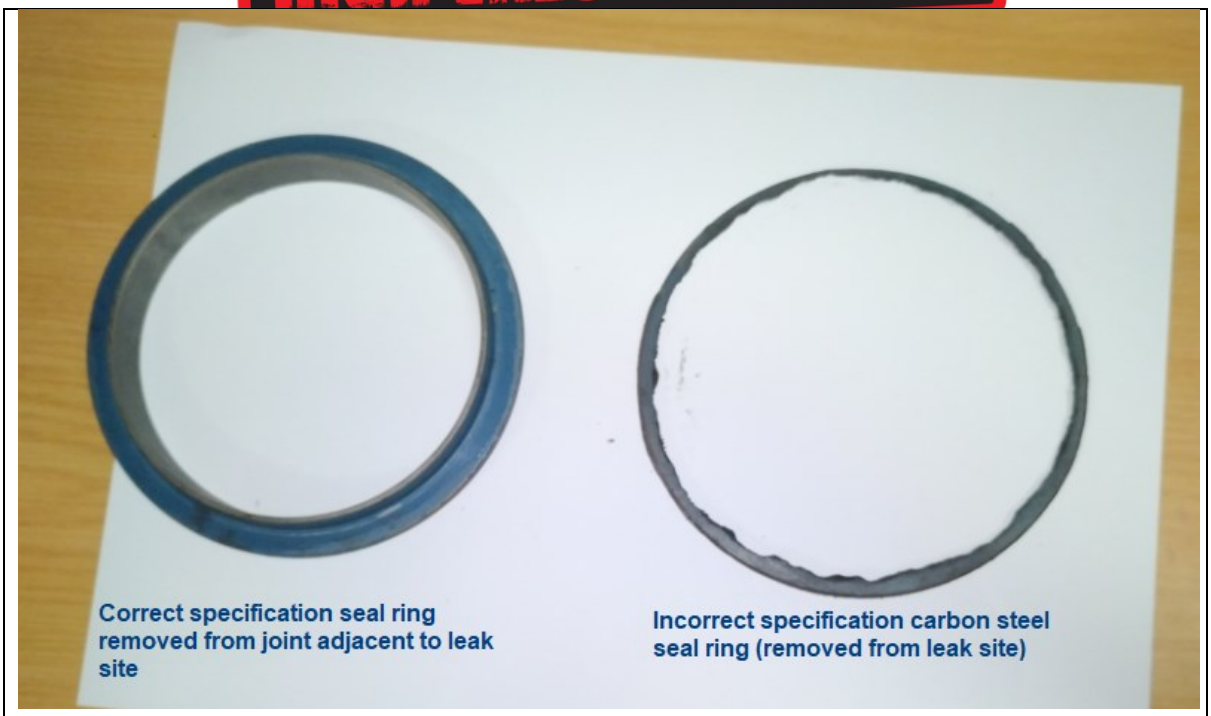

Some things to consider?

Plant owner / operators should consider:

Risks associated with possible historic installation of incorrect specification seal rings and how these are addressed through any asset integrity management strategy

Any prior response to industry alerts reporting historic installation of incorrect specification seal rings / gaskets.

Quality control and competence arrangements to ensure correct material identification and use.

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