Wellhead Corrosion Prevention Services

Case Study

APDE
Asia Pacific Drilling Engineering

OXIFREE®
METAL PROTECTION

Life Asset Extension for Corroded Wellhead

Location	Gulf of Thailand
Local Environment	Offshore Platform
Date	23 Dec 2016 – 15 Jan 2017
Condition	Cold & Strong wave activity
Total Coatings	16 wells of wellhead
Substrate Type	All rust part of wellhead
Duration	25 Days

Summary

APDE were asked by a major global Oil and Gas Operator to protect all corroded parts of wellheads with Oxifree TM198.
The wellheads were in reasonable condition; however extensive corrosion could be seen on certain areas.
After encapsulation with TM198 the wellheads would be completely protected from any further corrosion damage caused by the harsh offshore environment.

Introduction

The platform is a wellhead platform located in the Gulf of Thailand.
The environment is very corrosive due to the mixture of high salinity and humidity in the atmosphere which accelerates the corrosion process. This is especially so with complicated shapes which trap moisture such as valves, flanges and wellhead other bolted structures.

Objective

APDE were asked to coat all corroded parts on 16 Wellheads/Xmas Trees.
The wellheads are all exposed to the elements with the wells in the middle of the well cluster the most corroded. This is due to the lack of wind which would normally remove any trapped moisture that falls from the deck, caused by frequent rain in the tropical weather and environment.
No shutdown to the equipment was necessary which speeds the process and reduces costs for the client.

Flanges

After

Before

After

Case Study

Process

Oxifree TM198 requires minimal surface preparation - loose rust being removed with a wire brush. No sandblasting is necessary, which significantly saves costs. Weather conditions such as humidity and temperature are also not an issue saving the client further costs and eliminating the 'failure rate' of traditional coating systems such as paint.

The Field Manager at the platform said: "We had previously experienced costly maintenance projects where changing weather conditions meant our equipment was left in a half-finished state and more vulnerable as a result. With Oxifree applications we know this is not an issue and the project will be completed."

Work areas were then set up using fireproof tarpaulin to collect any dripping TM198 material, which could then be put back into the machine for re-use.

Aluminium tape was used to cover the flange gap in order to reduce material usage and therefore lower costs. Silicone sealant was used to protect the leading edges of the material and to prevent coating from being tampered.

The underside and hard to coat areas were applied to first before moving on the easier reached areas.

The Polymelt 50 ATEX machine was used as this is safe for working in hazardous environments. A team of two Oxifree trained technicians carried out the work.

Solution

The Oxifree TM198 coating was applied throughout all corroded parts of wellhead to protect them from further corrosion and contaminants. The coating provides protection immediately and will provide 100% protection against further corrosion and contamination. The coating may be removed for inspection at any time.

Wellhead Body

Conclusion

There was severe corrosion on almost all the substrates that were inspected on the platform during the initial inspection on the 23rd December.

- Traditional solutions of blasting/painting for these complicated shapes has clearly not been effective over the years.
- Painting is difficult due to the high humidity.
- Oxifree TM198 applications do not require sand-blasting and the material can be applied in any weather condition and humidity as high as 99%.
- The Base Plates are especially important as they cannot be easily replaced and they form are structural to the wells. They are also in a very badly corroded state.
- Oxifree TM198 is the only viable cost-effective solution.
- Protection of 16 wellheads over 25 days even in inclement weather is at least 100% more efficient than other solutions used.
- TM198 will provide many years of protection extending the life of these assets.

Follow up inspection After 15 months

Introduction

It has been 15 months since the coating was performed on 16 wellheads in January 2017. APDE had requested an inspection exercise from the Operator to be conducted. This is to ensure the earlier objective of asset life extension to be met.

The major Oil and Gas Operator granted the inspection in March 2018 and a thorough inspection was carried out in 1 day.

Process

Using Oxifree inspection procedures, APDE have performed inspections on the coating applications. The following are the inspection methods carried out on all the coated 16 wellheads.

1) Visual inspection on all the coated wellheads.
2) Perform coating thickness check by using DFT gauge of Elcometer 456.
3) Remove small circular sample window (10-40mm/0.5-2”) to do an inspection of the application.

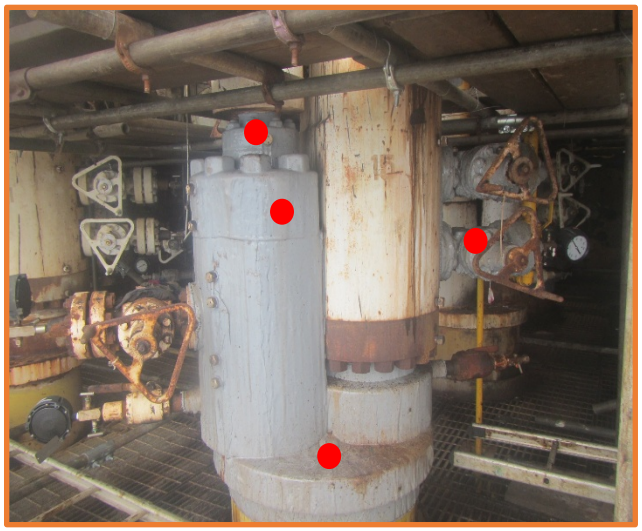
(Recommended randomly sampling 10% of the applications)

Base Plate

Results

The inspection outcome showed TM198 had provided 100% corrosion protection to the wellhead.
There was some contamination/grease/dust which had settled on the outer surface of the coating. This is part of the passive barrier that Oxifree is providing to the substrate.
The coating is intact and there was no damage to the coating which is able to withstand impact from any scaffolding activities.
A uniform and minimum thickness of 4mm remained using measurement from Elcometer.

Small circular cuts to the coating were made in line with inspection guidlelines (red dots in the picture on the right) and zero corrosion was observed. There were inhibitor oils on the surface of the substrate where the coating removed, which was exuded by the material upon application. These oils actively protect the surface of the substrate.
These holes can be simply refilled as new material will adhere to the existing coating.



Conclusion

The project has been a success as Oxifree TM198 has met the objective of the Client in preventing all the wellheads from further corrosion and maintaining integrity of the wellheads. This is very important to extend the asset life, thus lowering the OPEX and CAPEX spending.