NEWS ALERT

ISO 9001 • ISO 14001
ISO/IEC 17025

Caisson Legs on Offshore Platform Protected with a Vapor Corrosion Inhibitor

Steel frame setup for suspending VCI pouches.

In the offshore Umm Shaif and Zakum oil and gas fields near Abu Dhabi in the United Arab Emirates, multiple barge-type offshore platforms are constructed and operated on caisson legs.

The uncoated interiors of the caisson legs on a particular platform contained blasting grit, biocide-treated water, and suspended sacrificial anodes. After two decades of operation, a build-up of hydrogen gas generated by the depleted anodes inside a caisson leg led to an explosion. Recommendations of the ensuing investigation included removal of the anodes, biocide-treated water, and accumulated blasting grit.

A pilot study, discussed in CORROSION 2014 paper no. 4200, "Protection of Offshore Platform Caisson Legs with a Vapor Corrosion Inhibitor—A Case Study," by T.A. Rahman Al-Sayed, A.F. Eid, M.M. Al-Marzooqi, and U. Jacir, was then conducted to evaluate the use of vapor corrosion inhibitors (VCIs) to protect the integrity of the structure. Treatment started by spraying the internal diameter of the leg with a water-based solution containing a VCI with a biocide treatment. This was followed by fogging the internal space with an amine carboxylate VCI. Finally, a string of pouches containing VCI powder was suspended on hangers to assure continuous saturation of inhibitor in the space. Corrosion coupons were installed 6 m below the manhole before closing it. The corrosion coupons were retrieved and evaluated at different time intervals.

After one year and beyond, results were positive and the corrosion protection system was adopted for rectification of the problem. Results showed clear improvement in the VCI-treated caisson leg where acceptable low corrosion rates were maintained.

Developing a Scale Inhibitor for Subsea Applications

A number of challenges can arise when

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lecting a product for subsea field use is attaining an inhibitor that will remain stable for extensive periods under subsea and chemical injection conditions and not cause a blockage of the umbilical or chemical injection system, which is typically complex and consists of many different components. There is a risk of seawater entering the chemical injection system should a failure occur at any of the joints or valves.

For an oilfield located in the Norwegian sector of the North Sea, there was a potential for barium sulfate ($BaSO_4$) scale formation to occur shortly after the onset of seawater breakthrough; therefore, an environmentally acceptable scale inhibitor was required to mitigate subsea scale. A number of scale inhibitors were developed for use in this field. The performance of the scale inhibitors was assessed using a number of tests specifically required for qualifying a product for use in a subsea environment. Results demonstrated that the scale inhibitor was highly effective in preventing both $BaSO_4$ and calcium carbonate ($CaCO_3$) scale with a minimum inhibitor concentration of 5 ppm and 2 ppm.

Details of the testing project are discussed in CORROSION 2014 paper no. 4211, "The Challenges of Developing a Scale Inhibitor for Subsea Developments in Environmentally Sensitive Areas," by A. Jenkins and A. Fraser.

Cortec's CORROSION 2014 Paper #4200 Featured in June Issue of Materials Performance!

Cortec's CORROSION 2014 paper no. 4200, "Protection of Offshore Platform Caisson Legs with a Vapor Corrosion Inhibitor—A Case Study" by Cortec® Middle East's Usama Jacir, Talal A. Rahman Al-Sayed, Ahmed Fathi Eid, and Mahdi Mohamed Al-Marzooqi, is featured in the "Caisson Legs on Offshore Platform Protected with a Vapor Corrosion Inhibitor" article of the June 2015 Issue of Materials Performance.

This technical paper discusses a pilot study conducted by Cortec® to evaluate the use of vapor corrosion inhibitors (VCIs) to protect the integrity of offshore platform caisson legs. The uncoated interiors of the caisson legs on a particular platform contained blasting grit, biocide-treated water, and suspended sacrificial anodes. After two decades of operation, a build-up of hydrogen gas generated by the depleted anodes inside a caisson leg led to an explosion. By spraying the internal diameter of the leg with a water-based solution containing a VCI with a biocide treatment, fogging the internal space with an amine carboxylate VCI, and hanging a string of pouches containing VCI powder to saturate the space, Cortec® provided corrosion protection that lasted beyond a year. These positive results lead to the adoption of this corrosion protection system.

To see the full paper, visit www.nace.org