

# ENVIROPEEL OFFSHORE

An early impetus in the development of the Enviropeel system was the need for better ways to protect equipment on offshore production platforms. The devastating effects of the marine environment on such structures has attracted many potential solutions but, where the deterioration is greatest, in bolted systems such as valves and flanges suffering from galvanic and pitting corrosion - Enviropeel offers the only real hope of complete protection, especially where corrosion already exists.

The whole question of bolted system design and the effects of corrosion is currently under long-term review by DNV, together with ConocoPhillips and BP - who spend a great deal of money every year on preventative and remedial work in these areas. Every year, around the world, more than \$20 billion (DNV JIP Summary) is spent on bolts and fasteners alone and a study for BP in the UK showed costs running between £150,000 and £250,000 for retrospective preservation on each of their North Sea assets.



Reports from the North Sea indicate that many bolts are corroding before an installation has been commissioned, with cadmium plated bolts

failing after only a year and PTFE coated bolts failing within weeks.

DNV invited Enviropeel representatives to join the committee for this testing programme as they felt the need to be able to offer practical solutions where material selection and design had either failed, or were insufficient or too costly to provide protection on their own.

Enviropeel's own experience with offshore facilities has shown that it can offer protection to the whole system - bolts, nuts and flanges. Instead of seized nuts and rusting valves, every component is immediately ready for use, flanges free from the tell-tale staining of streaming rust - and from the danger of failure that such corrosion brings.

Applications in the North sea, the Middle East and in South-East Asia have shown that Enviropeel offers cost-effective and long-lasting solutions with a system that is flexible and reliable to use. Enviropeel equipment is specifically designed for use in zone 2 areas with either a 10 or 19 metre hose in order to reach the most inaccessible areas.



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THERMOPLASTIC SYSTEMS



The flange assembly on the left shows all the problems typical of a bolted system. Aware of potential problems, engineers have used rubber caps to protect bolt heads and nuts but, typically, access is not possible to some areas because the flanges are too close together .

Attempts to use a caulking material have failed, as it is shrinking away from the surfaces, trapping moisture and making the situation worse. Rust streaming down the entire structure, accumulating at the base is making it very unlikely that the allen bolts at the bottom of the picture could ever be undone.

The complete breakdown of the coating on the flanges, and all the other problems outlined above, threaten the integrity of this entire assembly. Clearly, immediate remedial action is required, yet all previous attempts have failed. A new approach is needed, which is exactly what Enviropeel offers.

Nuts, bolts, flange faces and allen bolts would all be completely protected with one easy to apply coating. Difficulties of access, preventing the use of other methods, present no problem for Enviropeel - these areas could be just as easily protected as the rest of the assembly.



How well the Enviropeel system protects is demonstrated in these pictures from a 3000 hr ASTM B117 hot salt fog test. The unprotected mild steel test flange has severely rusted but, within the Enviropeel cocoon, no rusting has taken place. Nuts and bolts on the samples could be turned by hand, with no corrosion on any thread surfaces.



*Enviropeel Zone 2 equipment in use for the Japan Vietnam Petroleum Co, CPC Oil Platform, Rong Dong Oilfield, South China Sea, Vietnamon which Enviropeel was applied to a series of flanges. The 10-metre zone-rated hose is clearly shown in this picture as material is applied to flanges on the platform. Hoses are manufactured up to 19 metres in length allowing wide access.*





Above, left and right: Flanges on the Britannia platform in the North Sea, UK sector. Operated by Chevron and ConocoPhillips, the platform has undertaken a three year rolling programme of flange protection using Enviropeel for all flanges on 4" nominal bore pipes and below. For 2006, a full flange maintenance programme using Enviropeel was implemented

Right: As part of Enviropeel's ongoing development of asset maintenance services for its clients, a complete tagging and recording system has been implemented that identifies operator, time date and ambient conditions during each individual application.



## THE ZONE 2 UNIT

The applicator consists of a heating and pumping unit, an ATEX certified temperature-controlled hose and spray gun, all constantly controlled and monitored by the inbuilt microprocessor. All components are housed in a purpose-built mobile trolley and protected by a gas detection system, incorporating EXD electrical enclosures and an EX-rated Emergency Stop Station. It is DNV certified for use within a flammable atmosphere with ATEX and EXD components and a safety system that is designed to isolate the entire unit if any potential risk is detected.

