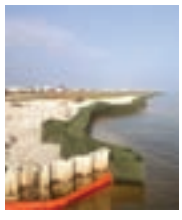
Recycle it!

The Gulf spill has put the spotlight on pollution control like never before – or at least since the Exxon Valdez spilt nearly 11 million litres of crude. One of the side effects of the massive effort to neutralise the disaster has been the adoption of innovative clean-up methods and products, writes Jose Maria Sanchez de Muniain.



Dauphin Island: the four-mile double-walled structure consists of baskets (supplied by Hesco-USA) which are staked into the ground, and which are filled with sand and a special powder-like blend of polymers that react with oil and within minutes turns it into a solid, rubber-like mass. The solidified hydrocarbons can be swapped with fresh polymers as and when necessary, and the solids taken away for non-hazardous disposal, or even recycling into products such as asphalt.

One such product has been used as part of the last defence to save four miles of Dauphin Island's shoreline. Dauphin Island happens to be home to several bird sanctuaries, and lies to the north of the Gulf of Mexico.

A four-mile double-walled structure that was initially designed to be filled with sandbags for use against floods or as bunkers during conflicts, was assembled here by BP employees, contractors and the Alabama National Guard.

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In London, *Industrial Fire Journal* caught up with Ross Atkin, who heads the European branch of CIAgent Solutions (the manufacturer of the polymer blend CIAgent), to find out more about potential applications in hydrocarbon pollution.

The idea for the seven-polymer blend came from company founder Dan Parker nearly ten years ago when he was looking for a solution for waste oils. A demonstration video clip of the polymer blend in action is certainly impressive. A beaker full of water has a layer of diesel poured on top. Agent-X is added, and within two minutes the diesel has turned into a white substance with the consistency of a pencil rubber – and a dry one at that.

According to Atkin, CIAgent will work with crude oil, diesels, and even ethanol mixes of different types – even if with the latter the result tends to be more like very thick porridge than solid rubber.

What is key with the resulting substance, however, is that it is classed as non-hazardous waste in the same way that – for example – vehicle tyres are. "In the USA and in Australia the waste has been classified as non hazardous, and tests have proved that the bonded hydrocarbons cannot leach into the ground. Here in the UK we are in talks with the relevant authorities to have it classified in a similar way," said Atkin. In the US it can be used as an additive for other rubber products and adhesives, for example to manufacture rubberised flooring for children's playgrounds.

Applications – marine

In Louisville, Kentucky, over 1,000 gallons of heavy slop oil ran into the Ohio river in March 2003. CIAgent Solutions was responsible for clearing half of the site, whilst the other half was cleared up using conventional methods. CIAgent granules were applied to the surface until the rubber-like blanket was produced and removed using swimming pool skimming nets.

Using this scenario, CIAgent estimates that its operation took just over 20 man hours as opposed to the traditional environmental crews' 500 man hours, for a fifth of the estimated cost. In terms of waste product, CIAgent had approx 2.5 tonnes, as opposed to 8 tonnes. "We would also recommend the use of the polymer blend for large spills, such as that being experienced in the Gulf of Mexico, where the agent could be applied to the middle of the spill. For 25,000 square miles it is a different game when you are trying to remove several thousands of tonnes of solidified rubber, several miles offshore, but it could be carried out using special collecting ships, and the waste recycled later onshore."

Applications – utilities sector

CIAgent is experiencing a high degree of success as a secondary containment solution for the electrical utilities and construction sectors, as part of a geotextile product called Agent-X.

Agent-X is a non-woven geotextile that contains CIAgent inside. It can be used to make a variety of containment/clean-up devices, including barrier booms.

Traditionally in the electrical power sector transformer sites are dotted around the country, typically involving a 30,000-litre mineral oil unit (housed within a bund) powering the transformer. In such scenarios, the bunds require regular checking and if necessary emptying by engineers.

The alternative, using Agent-X, dispenses with the bund altogether. Here, an impermeable base layer is laid on the ground, and on top of that is placed the barrier boom. A layer of gravel is then applied, on top of which is the transformer unit and the container with the mineral oil. "The idea is when it rains the water goes straight through the hydrophilic polymers, without reaction. But if there is a leak, our product immediately bonds with the hydrocarbon, creating a solid plastic barrier." There are over 6,000 such sites in the USA now, adds Atkin. "One of our customers in the US reckons it has reduced maintenance costs by 50-80%, because it is no longer necessary to send engineers regularly to 260 sites. And if a transformer needs to be closed down, it is possible to take out the boom and reuse it elsewhere."

The polymer has been tested for flammability and it has been conclusively established that the polymer would not combust in this type of application, where it is placed underneath gravel. "In normal circumstances the polymer is combustible if heated to a high temperature, but when it bonds with a hydrocarbon such as petrol, the flashpoint is much higher – you can hold a lighter to it for some time, and it won't easily ignite. Once it does it burns slowly rather like a firelighter and leaves less than 0.2 ash residue."

The company is keen to work with power companies to investigate possible applications. "Here in the UK we are attempting to understand what power companies are trying to achieve in terms of waste streams and regulatory requirements.

"What I like about this product is that you can go from having a very negative scenario, where things have gone really wrong, to a good positive ending. And in fact we are going one step further, by not putting the waste into land fill. Not so much going from cradle to grave, but cradle to cradle by recycling the polymer into a brand new product."

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