Company develops method to clean and protect galvanized steel deluge systems

Fabricated from galvanized steel, older versions of critical deluge firefighting systems used on offshore and onshore assets in the oil and gas industry commonly sustain corrosion damage. Typically located on the interior of nozzles that direct seawater to put out fires, corrosion product can block 85% of a nozzle's spray—a direct threat to worker safety. A U.K. company recently announced that it has found a way to dramatically reduce the amount of corrosion inside these nozzles.

"A deluge system is made up of a seawater pump, automated system control valves connected to heat/fire/smoke detectors, and small-bore pipework fitted with high-volume spray nozzles," explains Allan Durham, Managing Director of Corrosion Solutions, Ltd. (CSL) (Aberdeen, U.K.). "Most of these systems are dry until the fire pumps kick in." Pumping filtered seawater through the systems causes the galvanized pipework to degrade; the resulting corrosion product blocks the flow from the nozzles. Delamination is not an issue with newer deluge systems, which typically are fabricated from an alloy containing copper, nickel, and iron rather than galvanized steel.

Many operators monitor the condition of older deluge systems by performing wet testing, which involves pumping seawater through a system to determine the extent of nozzle blockage. The evaluation often is conducted once a year at a facility to keep delamination under control, but the test itself can cause another problem: corrosion under insulation. "Large volumes of seawater being sprayed around a process plant means wetting of insulation materials and other areas," notes Durham. "Electrical equipment has to be bagged off to prevent water ingress during wet tests. Most companies wet test annually, although they are trying to push back tests due to consequential problems arising with the spraying of large volumes of seawater around a production plant.

Continued on page 56

CTNews Chemical Treatment

Company Develops Method to Clean and Protect Galvanized Steel Deluge Systems—*Continued from page 55*

If companies can prove their systems are adequately maintained, it is possible and acceptable to move to 2-to-3-year wet testing intervals."

CSL developed a deluge system cleaning method that reportedly can lower the required testing frequency, thereby decreasing the likelihood of corrosion under insulation and reducing nozzle blockage to less than 10%. The technique entails filling a deluge system with an organic acid solution—VpCI®-422 by Cortec Corp. (St. Paul, Minnesota)—and allowing it to soak for 12 hours. The solution then is collected for reuse, and the deluge system is flushed out with seawater to remove disbonded corrosion product. Durham points out that the ability to reuse solution is significant in itself. "There can be 20-plus deluge systems on a platform offshore," he says. "One batch of solution is good to treat a full platform, depending on the levels of contamination." The final step in the process is internally fogging the system with a seawater-compatible vapor-phase corrosion inhibitor (Cortec's VpCI®-645) to slow down further development of corrosion.

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—M.V. Veazey