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Sulfuric Acid

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Moisture-free surface cleaning technology: NitroLance™

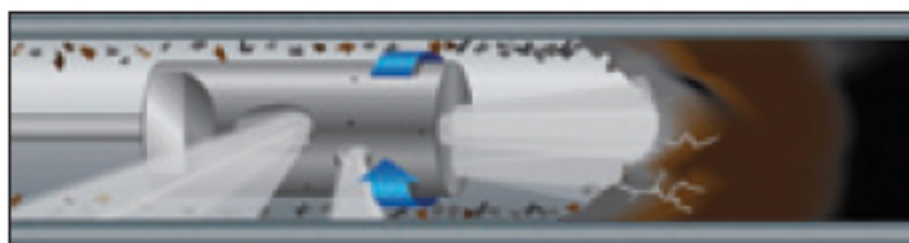
By: William Putman, NitroLance™ application specialist, Conco Services Corp.

For decades, traditional industrial tube cleaning methods that brought renewed vigor to plant equipment have used water to either propel mechanical cleaners or flush out debris with high-pressure streams. In nature, as in industry, water is a powerful driver and mechanism for change. But in 2016, we're wisely rethinking our use of water: water is valuable; in some places, scarce; increasingly regulated and always vulnerable to contamination. Consequently, a heightened emphasis on good stewardship of water, the need for a safe method of removing toxic tube deposits, combined with regulatory concerns over the secondary waste streams that water-driven cleaning methods produce, motivated Conco Services Corp. to invest in a safe and effective alternative: a moisture-free, waterless cleaning method using liquid nitrogen. Others have laid the groundwork for the use of liquid nitrogen as an effective catalyst, and Conco has brought this technology to industrial cleaning applications with the NitroLance™.

In the 1990s, the United States Department of Energy developed the use of high-pressure liquid nitrogen as a tool for cleaning and cutting when it needed to cut into storage tanks that contained radioactive materials. Pressurized liquid nitrogen was a smart choice because it did not spark, allaying concerns about the contents of the storage tanks catching fire or exploding. Disposal concerns were simplified when using liquid nitrogen because after use it evaporated into the atmosphere. The absence of water in the cleaning process eliminated any secondary waste stream or cross contamination issues. In 2003, NASA went on to use liquid nitrogen to safely clean the surface of the



Hot heat exchanger before and after cleaning with NitroLance.™



NitroLance™ nozzle inside tube.

Space Shuttle. Sandstone rubble lifted off of the Shuttle like powder, revealing a clean surface.

NitroLance, developed by Verona, Pa., based Conco, uses pressurized liquid nitrogen in a supercritical state to clean a variety of heat exchangers, boilers, reactors, economizers and other industrial surfaces. Liquid nitrogen is highly effective at removing tenacious fouling deposits found in petroleum refinery process equipment and power generation condensers and heat exchangers. Through three

mechanisms of action—mechanical pressure, super cooling and thermal/volumetric expansion—units that are cleaned with pressurized liquid nitrogen, as compared to high-pressure water, see significant improvements in process flow rates and control, process energy and pollution management and downtime reduction.

During two recent applications, the NitroLance demonstrated the benefit of using a moisture free waterless cleaning system, saving time and money. The first application was conducted on a heat exchanger within the catalytic converter at an acid plant located in the Southwestern United States. The acid plant needed an efficient, waterless cleaning solution for the heat exchanger that would eliminate the need to remove the catalyst from the converter for fear of damage from moisture. The NitroLance effectively removed all of the caustic deposits in and on the tubes, so there was little if any effluent to be collected.

At a sulfur recovery unit in the Northwestern United States, two waste heat boilers were cleaned with the NitroLance. The NitroLance completely removed the coke-like iron pyrite deposit from the tube walls, and the tubesheet refractory and ceramic ferrules were left in good working order after cleaning. Follow-up remote field testing resulted in the retubing of one of the waste heat boilers. The boiler cleaned with the NitroLance performed as well as the completely retubed boiler.

For more information, including case studies and videos, please see www.conco.net. □