

PREVENTING ANOTHER SERVICE FAILURE OF THE SOUR WATER STRIPPER

PROBLEM

Refinery experienced in-service failure of the Sour Water Stripper column. Various sections of the vessel were cut and replaced and other areas found to be below minimum thickness spec were weld built-up. The refinery also needed a long-term strategy to protect the rest of the exposed shell against corrosion.

SOLUTION

IGS was contracted to apply an HVTS cladding to prevent further corrosion attack on the vessel shell. The material applied is a high Nickel Chrome alloy with Molybdenum content for pitting resistance and some trace elements to reduce stress and oxide formation.



Unplanned Shutdown

During December 2017, a US Refinery experienced in service failure of the Sour Water Stripper column. This was an unplanned shutdown, consequently causing other equipment to be shut down and compounding the effect of the outage. The inspection of the column found corrosion on the shell between tray 1-7 and extensive corrosion behind vertical down comers.

The refinery was looking for robust protection which would facilitate the column's quick return to service. Welding repair would have required post weld heat treatment and an organic coating would have taken days to cure due to low ambient temperatures (50°F / 10°C).

Agile Corrosion Protection

IGS Alloy Cladding was applied utilizing a High Velocity Thermal Spray process, with high bond strength and no requirement for bond coat. The bond interface is mechanical and does not create any heat affected zones (HAZ), therefore there is no need for post weld heat treatment.

1003ft² (93m²) area was protected in 2 ½ days in 5 shifts. The project was executed in accordance with the IGS Safety Program. Safety is Integrated Global Services' first and highest priority. IGS performed work in accordance with the approved QCP/ITP on a 24hr basis by having a dayshift and nightshift crew on site.



Problem Area

Area behind downcomers showing extensive signs of corrosion.



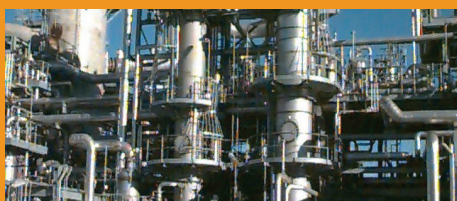
Weld Build-Up

Weld Metal Build-Up (WMBU) behind the downcomer.



HVTS Protection

IGS High Velocity Alloy Cladding (HVTS) was applied to protect the shell and WMBU.



IGS EXPERIENCE WITH AMINE COLUMNS

Since 2000, IGS have protected ~100 amine columns in various regions, including Middle East, Asia and North America among others. Contact your local IGS representative for a reference list and further information.

Schedule and Completion

Scope area was from Tray 7 (Chimney tray) up to Tray 1 including the dome, two manways and 8" nozzle in the elliptical head. Other areas included downcomers, obstructions and tray rings. Total area was 1003ft² (93m²). Operators performed grit blasting and cladding activities for five twelve-hour shifts in the unit during day shift and night shift. Refinery personnel provided IGS with a hole/fire watch for the duration of the project.

IGS executed the project successfully and handed the vessel back to the client within the time allocated and expects a significant extension in the life of this vessel.

IGS has a program which allows us to mobilize personnel to this and similar refineries more effectively, by pre-qualifying and pre-training personnel and maintaining a roster of eligible personnel, readily available for rapid future mobilization.

Inspection

Hydrogen flux monitoring inspection has since been completed to verify the performance of HVTS protection. All readings were found to be acceptable within IGS recommendations and did not indicate any signs of corrosion. The cladding will be inspected further during the next shutdown in Q1 2020.

IGS Experience and Expertise

IGS stops corrosion mechanisms such as pitting, crevice corrosion, flow enhanced corrosion and general corrosion loss in amine process vessels. We use High Velocity Thermal Spray (HVTS) applied Alloy Cladding of high nobility Corrosion Resistant Alloys (CRAs) in-situ to protect existing columns during T/A. Since 2001, IGS has protected ~100 of amine units for upstream and downstream operations, internally cladding more than 3000 m² of steel.

HVTS is faster than welding, with no heat affected zones and no need for PWHT. Unlike organic coating systems, HVTS metal claddings are robust, long-term and durable with high mechanical toughness, abrasion resistance and wide service temperature and pressure ranges, resistant to vessel steam out and cleaning processes. We utilize our equipment and technology to apply CRA metal spray cladding almost anywhere in the world.

IGS carefully controls and monitors our application standards through strict QA/QC protocols. IGS generates an electronic thickness record on a defined reference grid across the clad area. This record is used for future inspection and verification of the internal cladding integrity. We have also developed inspection technologies for external, on-line verification of the cladding condition.