

Service Solutions

PRO Services™ Demonstrates The Power of One on API Upgrades in Venezuela

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The PRO Services Center in Puerto La Cruz, Venezuela received an order to perform 9th edition API upgrades on two 35 yr-old pumps at a large refinery. The pumps were single stage, between bearings, double suction, radial split design. The first was a Pacific HVC (8 x 10 -13B) and the second was a United DVSHF. This order presented a challenge for several reasons:

1. These were the most complex type of 9th Edition Upgrades: Between the Bearings-Double Suction.
2. Short lead time: 6 weeks after receiving the unit at the PRO Services facility.
3. Customer did not have a 2nd spare pump; therefore, there was anxiety over keeping their process working in case of failure.

The purpose of this upgrade was to modify the existing seal chambers to meet API 610 9th edition requirements, replace the existing bearing frames with updated Goulds bearing frames, and to reduce the L3/D4 ratio. The biggest challenge was that the existing seal chambers could not be machined to meet 9th edition requirements without breaking into the water jackets surrounding the seal chambers. This required us to machine and completely remove the water jacket; install/seal weld a plug into the case and head into which the new seal chamber could be machined. The next challenge was to adapt the new Goulds bearing frames to the original case and head. This required us to remove the existing bearing frame adapters, fabricate two new adapters, weld the new adapter to the case and head and machine the new adapters to accommodate the new Goulds bearing frames. The L3/D4 ratio was reduced from the original of approximately 220 to 120. This was achieved by a larger shaft diameter that also met 9th edition requirements.

During the first stage, the pump was inspected at the refinery in order to take some dimensions to start the engineering process at the PRO Services Upgrade Center in Houston.



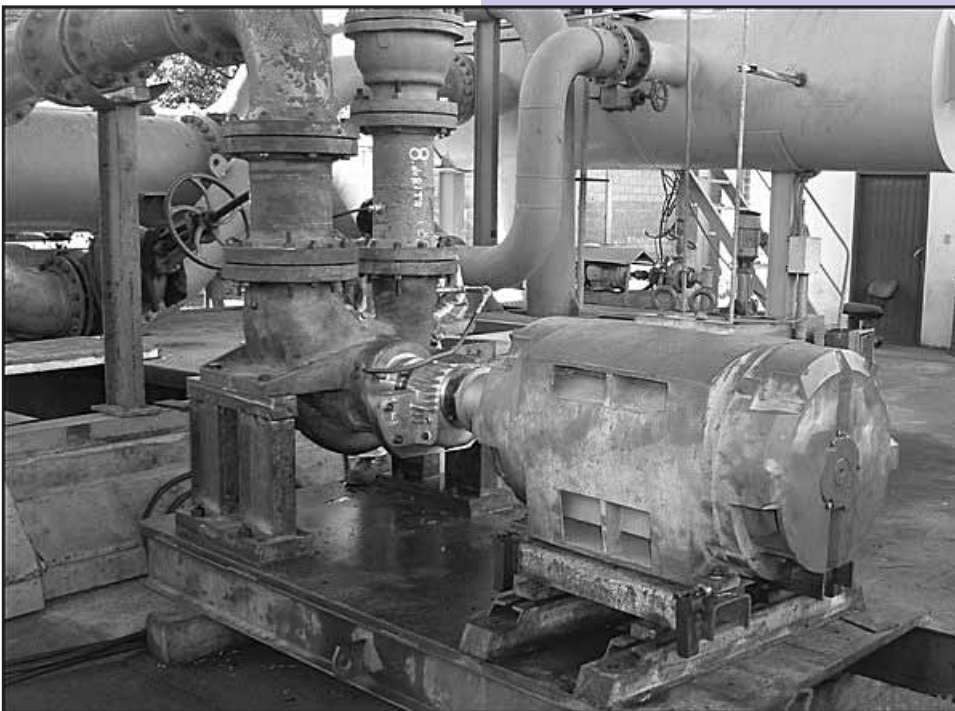
Extensive repair and upgrade were required on this API unit.

Then, the rough materials were ordered for fabrication of all major components. Parts like the shaft, bearing housings, seal chamber plug (piece to fabricate the stuffing box), bearings, Inpro seals, and wear rings were manufactured in advance. Six weeks into the job, when all engineered drawings and production parts were ready and inspected by the customer, the

HVC Pacific pump was sent to the Venezuelan PRO Services Center.

They were already on alert to meet the tight delivery schedule and provide continuous progress reports to the customer. The scene was reminiscent of an Emergency Room operation,

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Pump Being tested on Venezuelan PRO Services Center's world class test loop.

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where all mechanics, machine operators and engineers were working in synchronization to take care of this complex repair.

The “patient” was totally disassembled and inspected. Processes like cutting, machining, and welding were all simultaneously executed in the PRO Services Center. Meanwhile, as part of our ISO 9001:2000 processes, critical processes like welding of all critical fits (plug and adapters of case and head) and Heat Treatment were closely supervised and inspected.

Now, with all the components ready, it was time to perform a customer witnessed hydro test and a complete hydraulic performance validation. All API repairs at Goulds Venezuela get tested in its world class facility which is capable of testing both horizontal and vertical pumps up to 32,000 GPM. The test tank has

3 systems: a low pressure (<150 psi) and high flow (32,000 GPM), a closed loop for medium pressure (150-600 psi) and flow up to 8000 GPM w/ a vacuum pump for NPSH testing, and a third system for high pressure (600-2200 psi) and a flow up to 3,000 GPM.

The results were outstanding; exceeding the customer’s expectations. The discharge pressure was 5% better and the vibration levels (0.03 mils/sec Peak – Peak at 3600 rpm) were very low.

After the pump was received it took only 22 days and was completed ahead of schedule. It provided the customer essentially with a new API pump, which fit perfectly at the installation site without any piping or baseplate

modification. Another result was reduced downtime of the process, and a highly reliable new unit. Since this first Pacific pump modification, a second pump has also been completed. And now, Venezuela PRO Services is under contract to perform stuffing box modifications on four other API overhung pumps to accommodate updated mechanical seals.

The global resources of PRO Services worked seamlessly demonstrating the power of one by delivering world class service ahead of schedule and exceeding our customer’s expectations! ■



The ITT PRO Services team in Venezuela with the completed pump upgrade.