PRO Services Helps Refinery Meet EPA Emissions Standards

Minimizes Costs and "Downtime" during 9th Edition API Upgrades

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CUSTOMER PROBLEM:

A New Mexico, USA Refinery was mandated by the EPA, to reduce their pump emissions to 500 ppm or less. The current 1950's vintage NRC FCC pumps were Pacific Model SVE internally sealed pumps with no stuffing box covers. Not only was the mechanical seal technology obsolete, the pumps did not have conventional stuffing box covers. These pumps were also a high maintenance item. Every couple weeks one of the pumps in each set was failing.

Old Pumps were upgraded to meet emission standards.

All these circumstances resulted in a Leak Detection And Repair for High Reactive Volatile Compounds (LDAR-HRVOC) project, where reducing "Down-Time" to a minimum was critical for this customer. A Field Service ITT PRO Services® professional was sent to the customer's site to supervise pump removal and dimension taking, necessary to engineer new 9th Edition API retrofits. This enabled the pumps to go back into service while the engineering was completed and all custom and standard parts manufactured, before the pumps were pulled out of service for the final time.

After the engineering was complete and all parts were on hand, the customer pulled one unit of each pump set and sent them to ITT PRO Services Center in Houston. The service center had only 36 hours to turn around the work (receive the pumps, perform the API retrofit upgrade, and deliver the unit back to the customer). There were 8 pumps involved. All of the units were successfully upgraded and delivered on time.

Goulds API 9th edition bearing brackets were installed onto the pumps with conventional API 682 seal chambers which allowed tandem seals to be installed to meet the new EPA emissions requirements. An important requirement was that the Refiner did not want to move drivers. Goulds/PRO Services was able to meet this difficult challenge, as it offers 7 bearing frame sizes for OH2 pumps, while other OEM's bearing housing offering would have required moving drivers and enlarging the baseplates. This simply was not an option for the customer.

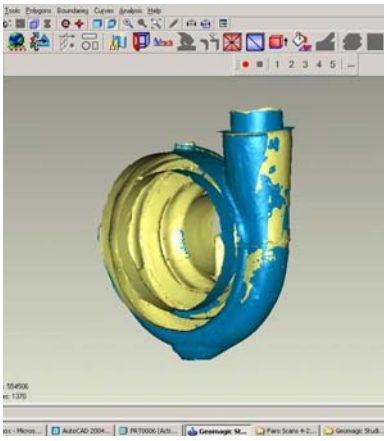
Custom drop-in pump matched hydraulics of the existing pumps.

ITT SOLUTION:

The 9th pump, on this LDAR-HRVOC project, required a hydraulically re-rated "Custom Drop In" pump to match the hydraulics of two existing pumps. The customer had two Pacific 4x10-1/2 SVE's and one smaller Pacific 4x7 SVE, but wanted all three pumps to perform the same service. This was not possible as the smaller Pacific SVE could not produce the same head and flow as the larger Pacific SVE's. This required the existing smaller Pacific SVE to be replaced with a complete custom designed pump unit that duplicated the performance of the larger SVE. Another requirement was that the replacement unit had to fit into the same "hole" where the existing smaller SVE was located. The intent was not to make piping or foundation modifications. To accomplish this task, the following steps were performed:

1. When the casing for the existing Pacific 4x10-1/2 SVE was received for a 9th Edition API retrofit, the casing was sent to the ITT ProCast® facility (foundry and re-engineering specialists), to be duplicated. The casing was then sent back to the Houston PRO Service center for completion of the retrofit.

2. An ITT PRO Services field service technician was sent to the customer's site to take dimensions on the existing smaller Pacific SVE so that the new custom "Drop-In" unit could be designed to fit into the same "hole."
3. Based on these dimensions, PRO's Upgrade Engineering team worked with ProCast to determine modifications required to make the larger SVE fit into the envelope of the smaller SVE. ProCast then proceeded to make a 3D design and model, generate a rapid pattern proto-type, pour and machine the new casing in a record time of 12 weeks.
4. A new impeller for the larger SVE was also re-engineered.
5. A new baseplate was custom designed and manufactured, so that the new pump would match the existing piping and the new baseplate would fit onto the existing foundation pad and bolting.
6. A new, back pull out 9th Edition API assembly was designed in the same manner as a power end retrofit.



Rapid pattern technology expedited the casing replacement.

7. To complete the new unit, a new motor, coupling and coupling guard were also provided.
8. The new custom "Drop-In" replacement pump was designed, manufactured and shipped within 16 weeks and on time.
9. Another advantage to this custom "Drop-In" replacement pump was that all the parts including the impeller, mechanical seal, power frame and coupling are interchangeable with the two existing larger Pacific SVE's, thus reducing the customer's spare parts inventory.

THE BOTTOM LINE:

The final results of this PRO Services project were lower overall cost, completed in less time and increased reliability of the processes.

The Refiner was able to reduce switch-over "Down Time" to 36 hrs, reducing expense versus new equipment, eliminating all field machining, and not having to move drivers.

This approach saved 60% over the cost of a new equipment. Moreover, "Down Time" has been reduced by 75% versus other alternatives.

Piping was not changed at all, thus making this custom "Drop-In" replacement pump a viable method to achieve the objectives while reducing total overall project costs with minimum "Down Time".

The PRO Services upgrade solution saved 60% over the cost of new equipment.

The 8 pumps with the retrofits have proved extremely reliable. They have been in service since August 2005 with zero failures. This is a tremendous improvement over the original 2 weeks between failures. The customer stated that they were extremely happy with the power end retrofits and look forward to other LDAR-HRVOC or plant turn-around projects.