



Petropiar Mejorador, Barcelona, Venezuela
Plant of the Year 2008 Award Winner

One of Venezuela's major producing oil fields lies in its Orinoco River basin; however, crude from this field is extra heavy and must undergo upgrading in one of several plants before refining. One of those plants, the Petropiar Mejorador (upgrader) in the José Antonio Anzoátegui industrial complex near Barcelona, Anzoátegui, Venezuela, has been named the 2008 HART Plant of the Year.

PROJECT OBJECTIVES

- Improve reliability during start-up and operation
- Use technology to increase plant reliability by eliminating “bad actors” that cause repetitive problems
- Better predict unexpected instrument failure and associated down-time

SOLUTION

- Added an asset management system to their control system to improve reliability during start-up and operation
- HART-enabled instrumentation and actuators communicate intelligent device diagnostics to the system
- Instrumentation performance and configuration problems were identified, investigated and corrected before the plant start-up
- All new instruments and process analyzers must be HART compliant

RESULTS

- Optimized work process creating a reduction of maintenance costs which led to a 60% reduction of Lost Profit Opportunities (LPO) caused by instrumentation faults.
- Eliminating bad actors and having the ability to reduce random failure has resulted in a reported reduction of LPO on the order of **\$70 million in two years**.
- No failures attributed to instrumentation reported during start-up – eliminated 95% of related problems

- A new emphasis on predictive maintenance allows attention to devices really needing it and an increase of 10% in effective personnel “wrench time”
 - Now upgrading 400 valve positioners and using partial valve stroke – increasing the time between scheduled shut-downs
 - All systems being integrated into the asset management system is underway
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This facility is controlled by PdVSA (the Venezuelan national oil company) in a joint venture with Chevron. It begins with the tar-like feedstock at 7.5 °API, and turns it into 26 °API synthetic crude. The plant first started operation in 2003 as Petrolera Ameriven, and began delivering product in January, 2004. By the middle of that year, it achieved normal production, with capacity rated at 248,000 barrels per day with 1,500 employees.

As in any oil processing facility, reliability is paramount, and with 5,000 instruments communicating with the DCS, eliminating problems from erratic devices was key. To achieve that, Petropiar added Emerson’s AMS Device Manager platform to its Honeywell DCS. This system uses HART technology to communicate intelligent device diagnostic information from instruments and actuators throughout the plant.

Since the plant went on line in 2004, HART technology has opened a door of opportunity to the reliability community. They were able to optimize our work process creating a reduction of maintenance costs which led to a 60% reduction of lost profit opportunities (LPO) caused by instrumentation faults. Eliminating bad actors and having the ability to reduce random failure has resulted in a reported reduction of LPO on the order of \$70 million in two years.



Based on such successes, the HART Communication Foundation was happy to make its selection for 2008. “Petropiar is a perfect example of how the power of HART can be used to lower cost, improve plant availability and contribute to keeping your plant competitive,” says HCF executive director Ron Helson. “We congratulate Petropiar for their foresight, planning and vision in building a plant infrastructure that allowed the use of the intelligent capabilities of HART-enabled instrumentation,”

Petropiar’s maintenance group found that their efforts using HART made the plant startup go much smoother, as instrumentation performance and calibration problems had been sought out and corrected before it went on line. As a result, there were no failures attributed to instrumentation reported during the startup period. Their bad actors had already been identified and corrected, eliminating 95% of related problems.

Since startup, this preventive method has continued. Calibration tasks are thoroughly defined, with routes and schedules laid out for the entire universe of instrumentation. This emphasis on predictive maintenance allows them to attend to only the items that really need attention,

resulting in a 10% increase in effective personnel “wrench time.” This has allowed the plant to operate with a staff of only five reliability engineers and 12 instrument technicians and still stay ahead of most problems.

Replacing dumb sensors



These experiences have caused the reliability team to look for other opportunities where HART has not already been put to work. There are still a small population of installed devices that are not HART capable, but these will be upgraded. All new instruments and process analyzers must be HART compliant.

Moreover, all systems have not yet been integrated into the AMS, but this is also underway. Some parts of the safety instrumented system (SIS), some PLC driven subsystems, and the fire and gas (F&G) detection system are still being incorporated into the larger asset management network.

One example of this increased reliability relates to valve positioners. HART technology was used to pinpoint a bad valve positioner which provided the justification to change or add positioners to 400 valves. They also demonstrated the partial valve stroke application to management who then approved its use, significantly increasing the time between required shutdowns.

HART technology is also used at the oil production site that feeds Petropiar, and by the end of 2008 the two systems will be interconnected. This will allow the reliability engineers at the upgrader to analyze what’s happening upstream as well.