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Abstract

Innovative Idea:

Gas flow calculation (GFC) is very essential activity for upstream gas producing sector in order to monitor the well performance and gas reservoir status. Moreover, GFC information helps to effectively operate the gas wells and decide on the future gas wells drilling activities to enhance and improve the well performance and production.

This is an IR4 innovative solution relating to comprehensive process for cloud-based centralized calculation of gas flow and condensate rate in gas wells. It solves problems associated with gas venturimeter in gas well real-time. It enhances and maintains the reliability and accuracy of gas flow venturimeters. Southern Area Gas Producing Facilities Department (SAGPF) were facing big challenge in handling the day to day requirements of resolving the gas flow meter (venturimeter) data reliability issues.

The challenges faced due to huge number of gas wells scattered across a very large geographical area which require frequent site visits to gas wells by maintenance personnel to rectify and update the PLC/RTU software for each of the gas well. This approach demanded dedicated teams from maintenance to work 7 days a week including weekends and also good number of process control and petroleum engineers to alter, update, and monitor the calculation equations and request the digital technicians to download the updated coded-equations on the PLC/RTUs of the gas wells.

The idea of IR4 Innovative Solution for Gas Flow Calculation (GFC) has been introduced to overcome the challenges above and to compute the gas flow calculation for SAGPF facilities at cloud-based centralized systems at the central control rooms (CCR) instead of performing the calculation at the gas wells. The gas flow data calculated at the GFC system is accurately updated in the plant information (PI) system to be shown to the other concerned and authorized organizations.

Method, Procedure, Process

This technology has been successfully implemented for all gas wells across SAGPD operational areas. All

gas flow calculations that were performed earlier by individual gas well RTU are now centralized at the Gas Flow Calculation (GFC) system which is located inside each gas plant CCR. The GFC provides individual gas rate, condensate and CGR (condensate gas ratio) per gas well along with totalizer, trends, reports and dashboard analysis. GFC system is directly interfaced to SCADA system via Fast/Tools designated communication protocols. Moreover, GFC system is acting in IR4.0 technology terms in order to automatically report any related field instrumentation failures to SCADA operators and then to the PI system to be shown by the concerned entities.

Results, Observations, Conclusion

Overall Safety got improved because it is required now to visit only four Gas plants CCR rather than visiting scattered gas wells. Hence, this resulted in reducing unneeded site visits by almost 95% which led to reduce associated driving risks as well.

Also, the new GFC system is considered as IR4.0 compliant system because it was designed in a smart way to automatically report any field instrumentation failures instead of visiting the well sites where human presence was required. Currently, this idea is under patent processing within U.S. Patent Office.

Some other significant benefits & observations:

The implementation of this IR4 innovative solution ensures gas flow calculation reliability, accuracy and safety enhancement to all related resources.

Also, it is enhancing and facilitating the mechanism of accessing huge gas wells and speed up detecting the falsity because of IR4.0 engineering design.