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A PRINT & ONLINE PUBLICATION FOR OIL AND NATURAL GAS

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MARCH 2014

NEW TECHNOLOGY

ECONOMICS OF ELECTRONIC GAS MEASUREMENT

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"Civilization advances by extending the number of important operations which we can perform without thinking of them," Alfred North Whitehead, co-author of Principia Mathematica.

The purpose of incorporating automation whether wired or wireless remains the same, to deliver efficiencies that are not achievable without it.
The main reasons for automation:
- Increased productivity
- Reduced installation costs
- Improved quality or predictability of quality
- Improved robustness of process
- Reduced human labor costs and expenses
- Safety

These increasing justifications help build an economic case for wireless versus wired automation.

Increased Productivity
Conventional wired installations can require multiple crews with electricians running wire and conduit, technicians calibrating instruments, and roustabouts digging trenches. The logistics of this in an area where drilling activity is high can be a problem. All of the crews and contractors have a backlog of work and often the producer finds himself on multiple waiting lists because the different contractors cannot be on location on the same day. Many producers have come to accept one to two weeks as a normal timeline after completion to get all of the automation installed and reporting.

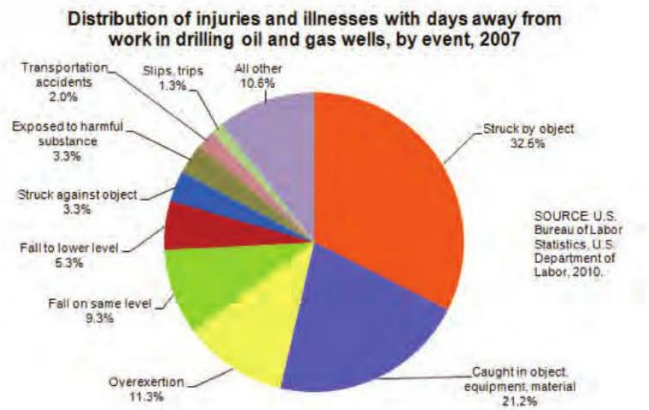
Contrast that, with a wireless installation. One man can install the entire system and have the project working in less than one day. This allows company technicians to be more productive and engineers/ managers to have access to data more quickly and focus on other tasks. Decreasing the installation time saves money by reducing labor, and increasing efficiency by providing accurate measurement data faster.

Increase Quality or Increase Predictability of Quality
With a wired system, there is no way to monitor the condition of the wire. Wire is susceptible to corrosion and damage from other crews adding to or working on a location. And, there is no warning signals that can predict failure. Wireless is not susceptible to any of these potential failures and has the ability to provide feedback on the health of the instruments, including signal strength between the radio and battery voltage of the instrument. By eliminating corrosion and mechanical damage, the quality of the product is much improved and by providing feedback on signal strength and battery voltage the predictability greatly improves.

Reduce Installation Costs
Labor is the largest cost of the installation. An example of this is the installation of tank level sensors requiring both supply voltage and signal wire run from the RTU or EFM to the top of the tank. One major producer in the Bakken recently shared two bids for the automation of a well pad with 5 tanks and data coming back to an EFM. The cost of installation with conventional wired solution was $35,125, while the cost of the same job with wireless solution was $22,418. The difference becomes even more dramatic when additional equipment is required as trenching or conduit must be replicated. This one tank monitoring application saved the producer $12,707. Therefore, if they have a program to drill 25 wells this year the difference in cost between wired and wireless would be $317,675 and will provide the same data.

Improve Robustness
The single most destructive force we deal with in Oil & Gas automation is lightning. An excellent example of this is a major producer in East Texas that had 850 wells. They had one man whose job was to repair lightning damage which was exceeding 30+ wells every month. They made a decision to go wireless and were able to reduce the amount of lightning damage to zero, saving them over a million dollars the first year.

Safety
The common worker accident claims are in either transportation to a location (2% of all O&G accidents) or slip and fall accidents (16% of all O&G accidents). On a typical wired site, crews of several people climb the stairs or use bucket trucks to install the wire and conduit on every tank. This means more opportunities for accidents. Additionally, there is higher voltage equipment being installed. Many tank gauges require AC power rather than the DC voltage used in a wireless application. Although the greatest risk is still from exposure to H2S (3.3 % of all accidents). While wireless must still be installed by humans in this potentially deadly environment often wearing oxygen packs, the amount of time they are in the high risk area can be reduced from days to hours. Clearly,



From OSHA 2010

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the less time we have people in a potentially dangerous environment the less the risk of accidents.

Profitability

Time and money are saved with wireless systems. The flow of information over communications systems improves the bottom line. Without an operational need for a technician or pumper on a site, they should not go there. Wireless systems are able to provide the key metrics for making decisions, such as routing away from unnecessary points while also supporting decisions to route resources where they are needed – even urgently.

Conclusion

Gas measurement and production optimization have been changing rapidly with creation of new technologies and electronic advancements. For as long as there are technology advances, there will always be changes in the Gas Measurement and production optimization industry. Wireless instrumentation technology is the latest technology shift for monitoring and controlling processes. It is a natural evolution of Oil & Gas industry powered by economics.