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Proper remote monitoring and control can keep progressive cavity pumps from costly stop/startup cycles

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Progressive cavity pump problems

For pumping heavy oil loaded with sludge, sand and other thickening and abrasive contents, a progressive cavity pump is unparalleled for effectiveness. Almost no other pump design can survive even a few barrels of this kind of oil.

PC pumps allow for pump speed control—a vital option as production levels change over the life of a well.

The main drawback to PC pumps comes with restarting them if they have to be stopped for any reason, including overfilled storage tanks, pipeline back pressure or empty diesel fuel tanks. In my experience there is only about a 50-50 chance of getting a PC pump restarted without extended cleaning and servicing by a workover rig. This costs the producer in both service expenses and in lost production revenue.

In a field with multiple PC pumps the restart issue is magnified. One producer we interacted with had several work-over rigs on a constant tour restarting a large number of PC pumps. The cost in man-hours and downtime for that project was painful for the producer.

Remote monitor, control and field optimization

If a producer could remotely monitor all the factors that lead to a pump stop — for example pipeline pressures, tank levels and fuel supply (fuel gas or diesel), they would be alerted to approaching problems. And if they could control (specifically, reduce) the speed of the PC pump at the first warning of trouble, they could greatly reduce pump stoppage instances.

Current technology has provided so many cost-effective tools for doing just that. Increasingly, producers are finding that the investment in technology pays for itself quickly.

Monitoring solutions can indeed be implemented in all areas listed above, to give operators extensive visibility of conditions at the wellsite and facilities. Because this data is then hosted on the cloud it can be accessed by authorized personnel in the home office, a regional or field office, or from a mobile device at another wellsite.

With the added step of installing controls on pumps, valves or other equipment, this information can be used to quickly respond to problems and, in many cases, to prevent them altogether. Many issues can be resolved without the time and expense of sending anyone to the site.

Examples

Site data can be used to predict a situation that could result in the costly shutdown of a PC pump. Alarms can be set to warn personnel when pipeline back pressure is starting to approach a critical level, or when tank levels are getting more than 70-80- percent full (or whatever level a producer feels is nearing an overflow). The system can also warn when the PC pump's fuel supply is down to a critical level.

Personnel supplied with this data can, by remote control, begin slowing the PC pump or set up a system to perform a specific slowdown of the pump in predetermined situations. This buys the operator time to talk to the midstream company, to call the trucking company to schedule a trip to pump down the tanks or to communicate with the diesel supplier to refill the fuel tanks. Or, if there is a mechanical issue at the well, the operator can dispatch a service technician with the proper tools and parts to address the issue in a timely manner.

In addition, fuel tank monitoring can save producers as well. Since fuel jobbers typically have a trip charge no matter how much (or little) fuel they unload, the system can refuse a trip if the tanks are above a set level, perhaps 50 percent or more. This means there is only a trip charge when the tanks actually need to be refilled.

Big Data can help set these alarms. Observing the history of the storage tanks allows operators to determine the level at which a truck needs to be dispatched—or the pump slowed.

Similarly, the system can be configured for one to one single site monitoring and control or for whole field optimization if the client has multiple PC pumps in the same field. This allows for autonomous control of the pump speed, slowing it down when an alarm is triggered and speeding it up automatically when the alarm condition is cleared.

Whatever the source of the problem that requires the pump slowdown, getting it back to normal is a simple task. Once the issue is resolved—the tank pumped, fuel delivered, pipeline pressure reduced—, the system will automatically restore the PCP to its usual speed, bringing production back to the expected and budgeted-for rate.

Remote monitoring offers even more benefits

Sometimes what's referred to as Big Data can actually be very pinpoint focused. For example, each pump has a preventive maintenance cycle regarding oil changes, and other components that are subject to deterioration due to wear, heat or other factors.

By monitoring the run time of such equipment, the software system can send alerts when it's time for each type of PM. The system can be set to alert a certain number of hours early, allowing the producer time to add that location to service personnel's schedule.

Conclusion

Progressive cavity pumps are the perfect fit for wells producing thick, sludge-loaded oil, along with frac sand and other abrasives that would quickly destroy most other pump types. Its main challenge, however, is that it is difficult and costly to restart if it should ever need to be stopped, for any reason.

Remote monitoring and control allows operators to quickly spot issues that could create the need for pump stoppage and, instead, slow it down pending resolution of the issue.

An automated system can actually track warning signals and perform slowdowns without the need for human intervention—sending an alarm or report to appropriate personnel when the issue arises and when it is resolved.

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