

Permian Basin, United States

Improve VSD performance in high temperature environments

Remote monitoring and transformer retapping eliminate temperature related shutdowns in extreme summer heat

CHALLENGE

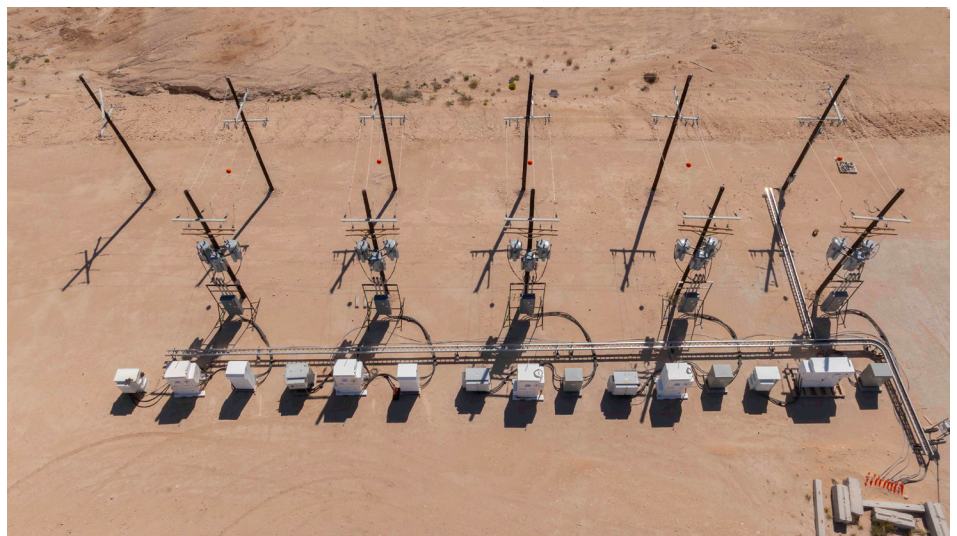
- Frequent VSD temperature faults
- Recurring shutdowns and cycling events
- Risk to ESP runlife
- Multi-day downtime to replace or upsize VSD

SOLUTION

- Remote VSD monitoring
- SUT retap optimization
- Drive configuration correction
- Analysis of surface equipment loading

RESULT

- Achieved zero downtime
- Reduced cycling events
- Increased ESP runlife support
- Avoided multi-day VSD replacements
- Improved drive and transformer sizing



Overview

An operator in the Permian Basin experienced recurring temperature-related shutdowns of its variable-speed drives (VSDs) during extreme summer heat. Although the systems were monitored with the Intelevate® platform, allowing remote restarts without sending a technician, each restart introduced a cycling event that increased thermal and mechanical stress on the electric submersible pump (ESP). These repeated cycles elevated the risk of premature equipment failure and reduced ESP runlife. The operator traditionally mitigated this issue by replacing and upsizing the VSD, a process that required 1–3 days of downtime and high operational cost. As temperatures rose each summer, the pattern repeated, which limited production reliability.



Challenge

The operator's VSDs consistently exceeded their thermal limits and initiated automatic shutdowns during peak heat periods. Remote restarts temporarily restored operation, but the resulting cycling created long-term equipment stress and reliability concerns. As shutdown frequency increased, the operator often resorted to full VSD replacements to manage the additional load, incurring days of lost production and added troubleshooting costs. The operator needed a reliable method to prevent heat-induced shutdowns without recurring equipment upgrades.

Solution

The Intelevate® platform team performed detailed remote monitoring to assess real-time trends in drive loading and identify underlying causes of the repeated temperature faults. Diagnostics revealed three issues: elevated loading on surface equipment, drive configurations not optimized for the operator's ESP systems, and missed opportunities for preventive maintenance. These findings pointed to improper SUT tap settings, which increased electrical burden on the VSD and contributed directly to heat buildup.

Summit ESP®, a Halliburton service, VSD engineers and field technicians worked with the team to recommend and execute a transformer retap to bring the VSD into a more efficient operating range. The retap reduced heat generation, stabilized drive performance, and eliminated the conditions that caused frequent cycling. With continuous insight from the Intelevate platform, the operator maintained visibility into drive loading and confirmed stable operation even as ambient temperatures climbed.

Result

After retapping the transformer and optimizing the drive configuration, the operator recorded zero VSD downtime, even as ambient temperatures reached levels equal to or higher than those present during prior failures. The stabilized operating conditions eliminated repeated cycling events, reducing wear on the ESP system and supporting longer runlife. The operator also gained improved awareness of proper drive sizing, tapping requirements, and the critical role of correct configuration in high-temperature environments.

In addition to preventing production interruptions, the optimized configuration reduced the need for costly VSD replacements and avoided multi-day shutdowns historically required to upsize the equipment. Remote monitoring allowed continuous verification of equipment health, creating a safer, more efficient, and less labor-intensive operating model for summer conditions.

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