

Well Completion Analysis



OIL & GAS

Data Sources

- Process Data Historian: OSIsoft PI
- Asset Structure: OSIsoft Asset Framework

Data Cleansing

- Enables removal of invalid data points from communication dropouts.
- "Zipper" system wells are isolated so that analytics can be performed on each individual well.

Calculations & Conditions

- Availability of capsules for well stages and during the time immediately after well shut-in.
- ISIP is calculated based on the average pressure after the stage, while the "delta pressure" is the ISIP minus the settling pressure. This is calculated to provide the completion engineer with more comprehensive insight into how the well is behaving.

Challenge

Wells require a significant amount of engineering to prepare them for production. Optimizing well spacing and perforations down the pipe is a complex process for upstream oil & gas companies. Wells interact with the reservoir and each other, affecting how they will perform when put into production.

Oil & gas companies typically do calculations manually on paper to identify the potential behavior of the well. The calculation of Instantaneous Shut-In Pressure (ISIP) is particularly important in gauging which adjustments will result in a more productive well.

But doing these calculations manually is a drawn-out process subject to human error. Well completion analysis must be performed on hundreds to thousands of wells to ensure proper optimization, and in some cases, it does not get completed at all. A super major U.S. oil & gas company needed to improve and speed its well completion analysis. The company's production engineers were spending too much time doing well completion analysis on Excel spreadsheets.

Solution

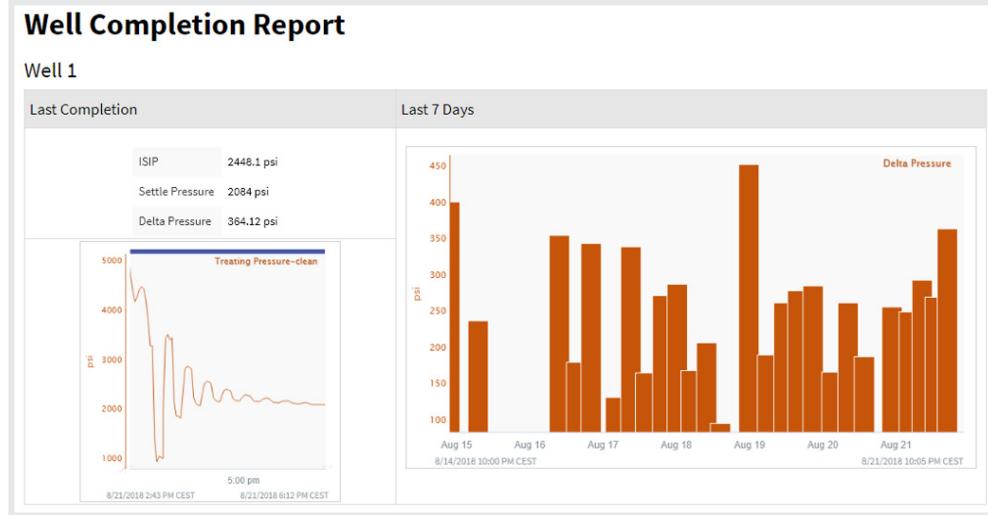
Using Seeq, the production engineers were able to the ISIP curves across multiple wells on the same completion system, enabling them to pinpoint needed process adjustments. Seeq enabled the production team to quickly and easily scale its analysis to hundreds of wells. For example, Seeq helps with the identification of these stages across multiple wells on the same completion or "zipper" systems – very difficult to do in a spreadsheet. Now, the company can do performance analysis, such as the delta between the ISIP and the settled pressure.

Results

Using Seeq eliminated manual data entry and dramatically shortened analysis times, increasing process efficiencies. Prior to using Seeq software, engineers performed this analysis by finding the time periods on a trend, printing out the paper, using a pencil or pen to manually draw a line, then calculate the ISIP. For one well, this process took 10 hours (one hour per ISIP calculation). Seeq software was able to complete the same calculation in 10 minutes! This solution scaled across all of the company's wells, saving months of engineering time.

Reporting & Collaboration

- For completion engineers performing well analysis, ensuring proper calculations with less manual effort helps improve efficiencies all around.



Part of a report created with Seeq Organizer highlighting the results for a single well.