The world revolves around the well in the oil and gas industry, with few exceptions. Generating revenue requires that wells be operational, but from time-to-time even operational wells need to be brought offline for maintenance, simulations, or further completions.

One of the greatest challenges is knowing what already exists in the wellbore. This requires a great deal of trust in the wellbore schematic. Simply put, a wellbore schematic is a detailed drawing of what is in the well. This can include data such as name, API number, hole and casing size (at different depths), liners, packers, production tubing, cement, production intervals, etc. This information is important to engineers who make informed decisions about the well. If any work is attempted on the well without an accurate picture of the wellbore, weeks of production can be lost, and the costs can be in the millions.

Recently, Noah Consulting helped a supermajor establish a system of record (SOR) for wellbore schematics utilizing Peloton’s Wellview. Noah overcame the common problems associated with wellbore schematic records by using best practices and an innovative approach in implementing a sustainable solution.

When the engineer is faced with problems regarding existing wellbore schematics, there are two big issues: accuracy and standardization.

1. **Accuracy**
   Wellbore schematics are static documents generated during the completion of the well. Once the document is produced and stored, often there is no mechanism in place to update the document. Equipment might have been added to or removed from the wellbore in subsequent workover activities that are not currently reflected in the well file. Routine maintenance may have been performed that altered equipment down hole as well. An engineer looking for the latest schematic for a well that is scheduled for a workover might have outdated information that leads to added rig time, cost overruns, lost production, and, in some extreme cases, losing a producing well. These scenarios can be avoided by utilizing the correct information.

2. **Standardization**
   Large companies with multiple areas of operation often incorporate software that produces schematics in differing formats, each with their own varying degree of complexity. The problem can be compounded when these different schematics are stored in different locations that others might not have access to, such as:

   - well files;
   - company shared drives;
   - engineer’s file cabinets;
   - tech’s desks;
   - vendors;
   - offsite storage;
   - Excel spreadsheets; and
users’ hard drives.

So, how do you overcome these hurdles?

One approach to solving these issues is employing a central repository to manage complete, accurate, and up-to-date wellbore schematic information and a standard data entry processes for schematics. This allows operations engineers, asset development engineers, and field sites to have access to the same schematic in different locations. The basic requirements of this type of project at a high level are the following:

- data cleanup (ensure all data is and all well jobs are in one location);
- define processes for future state;
- build schematic templates;
- get buy-in from the engineering community;
- meet with regulatory agencies to ensure compliance;
- leadership approval;
- field implementation; and
- data governance and sustainability.

Many exploration and production companies already utilize Peloton’s WellView software to capture daily drilling activity, drilling costs, and the generation of morning drilling reports. Because WellView uses a centralized database and information will always be captured and stored in a single location, it is a logical application for a system of record for wellbore schematic solution.

As a best practice, Noah Consulting recommends starting with a pilot program. In our last wellbore schematic project, the field used for the pilot was one with producing wells, shut-in wells, and wells that were scheduled to be temporarily and/or permanently abandoned. These wells were already in the existing implementation of WellView, but had bad, incomplete, or in some cases, no data at all stored. There was also no process in place to ensure that when new data was entered for an existing schematic that it was complete and accurate.

To overcome these challenges, our client:

- established a new culture in regard to wellbore schematics, moving from one of “necessary evil” to one that identifies appropriate wellbore schematics as a critical success factor in the exploration and production process;
- created and implemented principles in support of a growing, dynamic workforce; and
- reinvented the entire interpretation progression (application, process, workflow, and data).

Once quality standards were established, there were three distinct tasks that had to be integrated:

1. bringing the wellbore schematics to a state where they could be used to make informed decisions by engineers;
2. providing the schematics to the field and office in a useable format; and
3. presenting a quality schematic to the various regulatory agencies.

The key to this is launching a sustainability plan and data governance to safeguard data quality and accuracy. Noah Consulting worked closely with the client’s leadership team to make this a reality. We
also worked with the engineers from asset development, operations, drilling, workovers, completions, and abandonment to develop execution excellence for information that needs to be represented on a schematic based upon a particular type of well work. Whether it was a new drill, a workover, routine maintenance, or abandonment, process maps with unique roles or responsibilities were created — not only for the engineering technician, but also for each engineer. Audit points and sign-off steps were included to document what information engineers approved on each schematic, as well as to ensure the data that the technician enters falls within defined parameters — all of which is fundamental to WellView. This process is critical to the sustainability and effectiveness of the WellView implementation.

Change management was an important aspect of success. The client’s engineering staff preferred Visio drawings and Word documents to construct wellbore schematics because they are familiar and friendly formats. Unfortunately, there is no easy way to update such documents and broadcast the updates throughout the organization. Ultimately, the engineers saw the value in using WellView, a product that they already were familiar with for the schematics. Because WellView is a database, the information in it can be easily updated and will always have the most up-to-date data to generate a current schematic. By working together, the engineers and Noah Consulting developed a base template for wellbore schematics. The templates helped ease the transition to WellView, which also gives engineers a similar “copy and paste” functionality. By using the same template, they will have consistency from well to well.

Currently, future-state-behavior annotated workflows have been created and accepted. The sustainability plans have been put in place, and all wells in the pilot program have been cleaned and signed-off by the engineers. From this point forward for those wells, the system of record for the schematics is WellView, and it is where everyone will go to get the most current schematic for the well.

The project is proving to be a great success in not only providing the engineers with a standard and accurate wellbore schematic, but also in working more efficiently with regulatory agencies. Recently, the client had a proposed workover. The project team used the new processes to create a proposed schematic to submit to Bureau of Safety and Environmental Enforcement. The workover was approved on the first try. Through extensive analysis, teamwork, and the implementation of sustainable processes and procedures, our client has achieved a successful system of record for wellbore schematics.