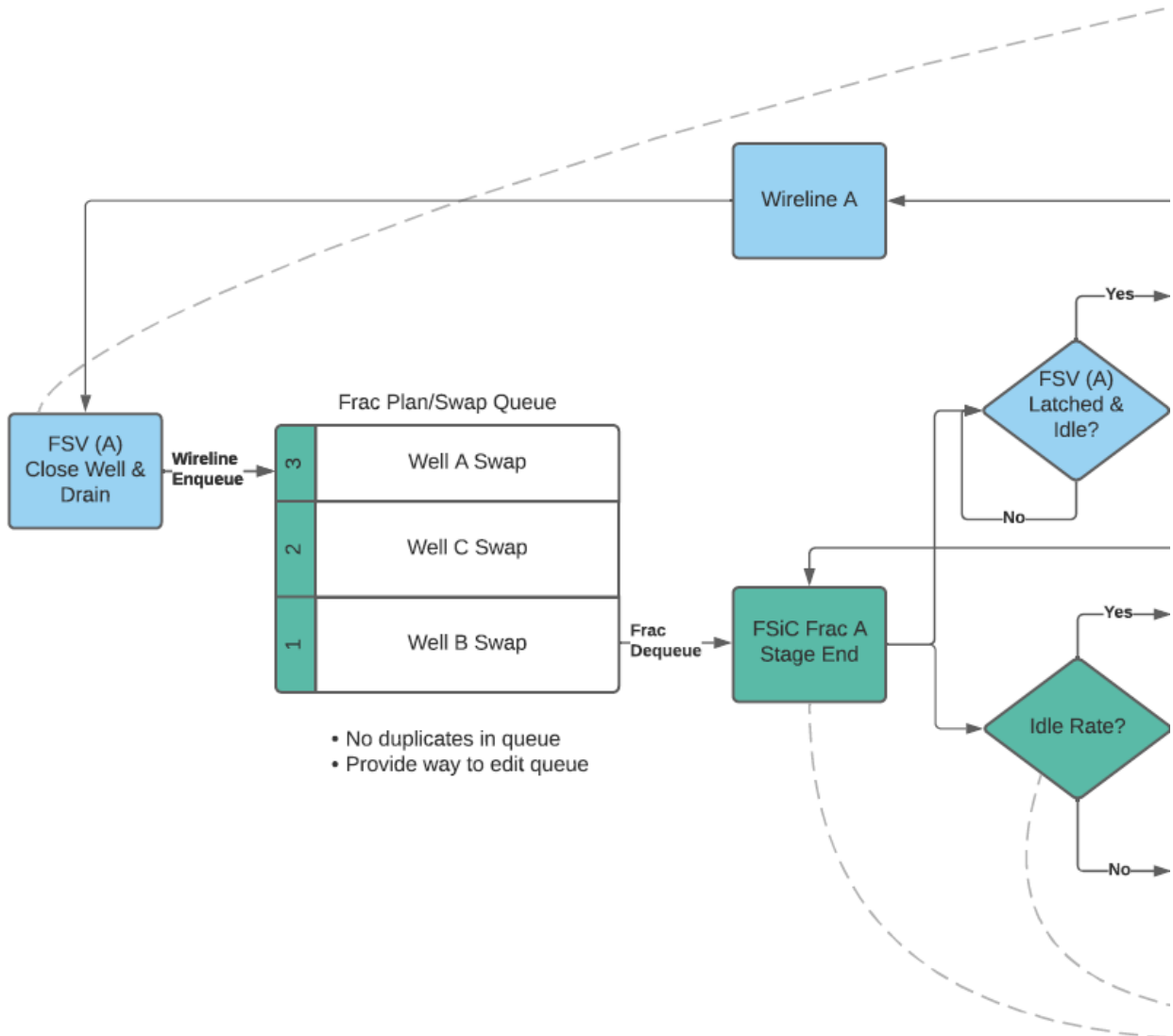
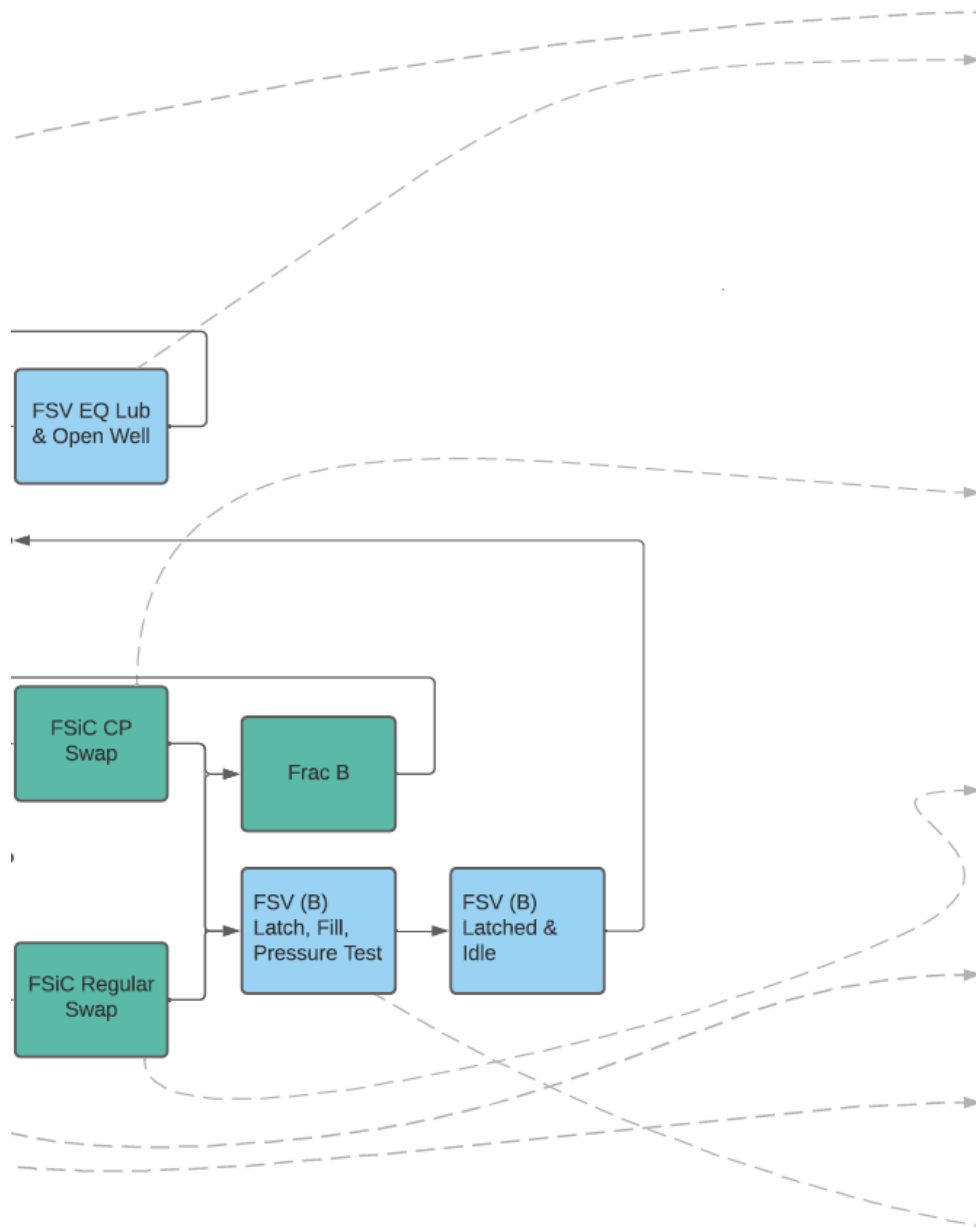
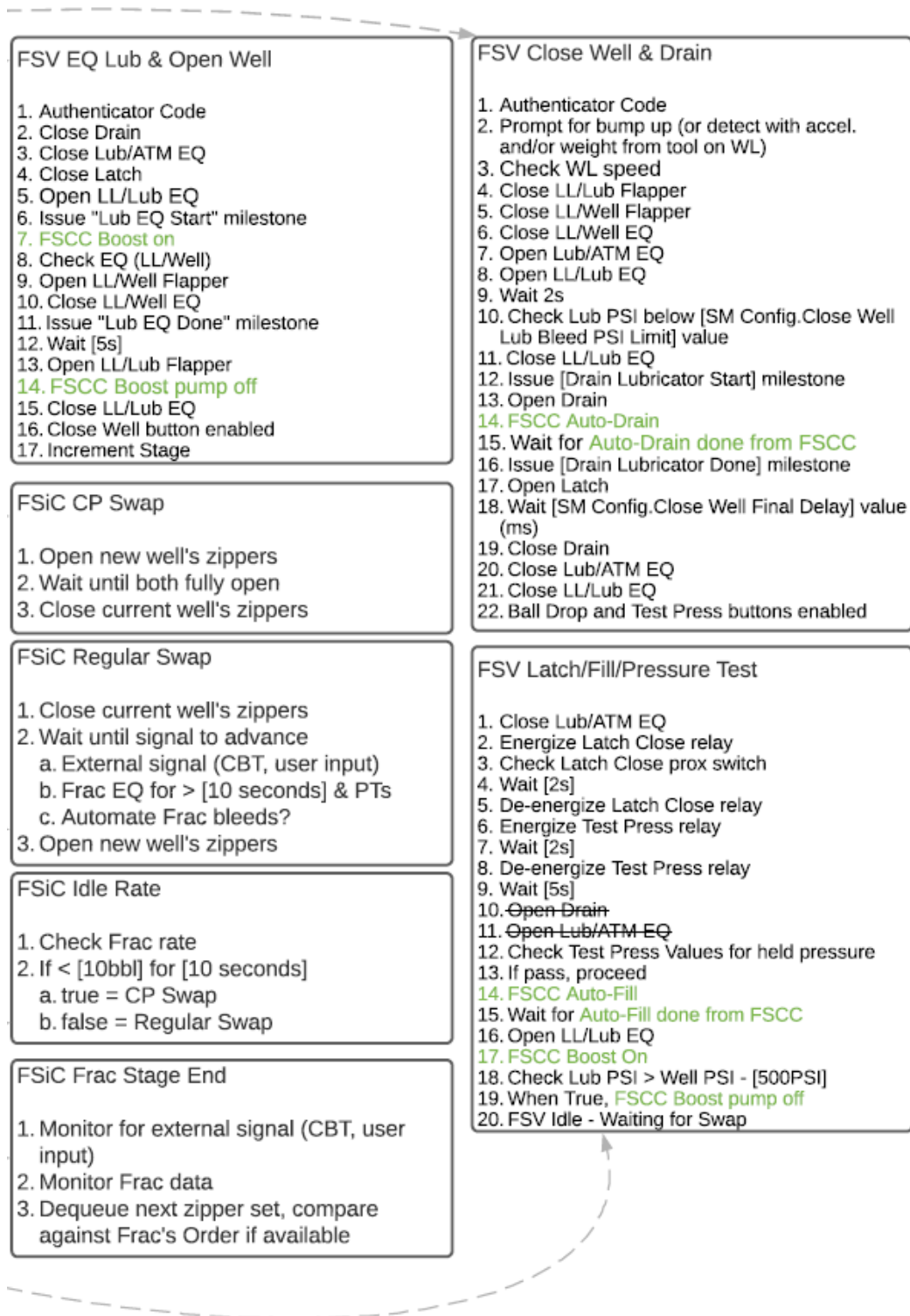


Appendix A

FS Swap Queue Automation

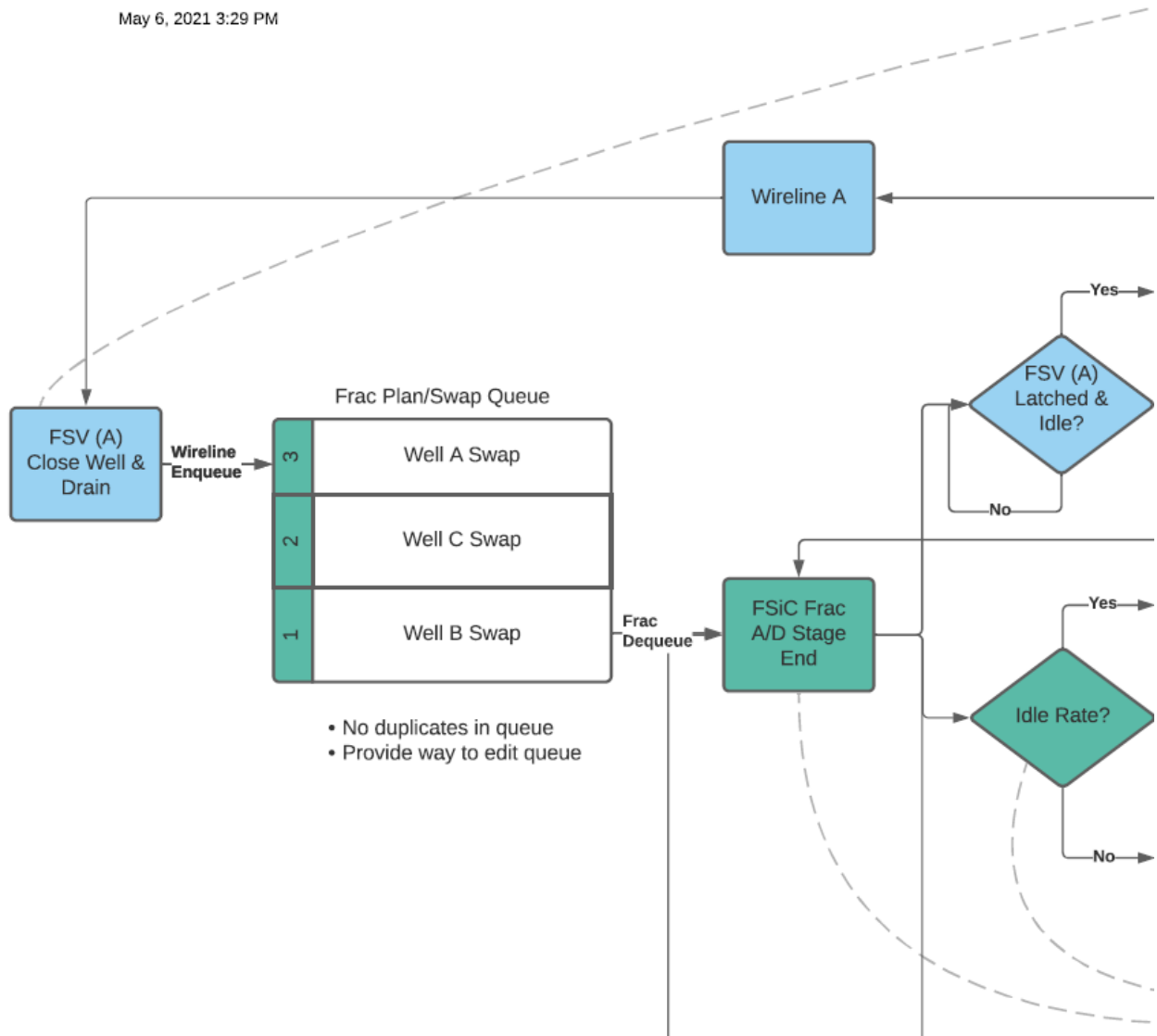


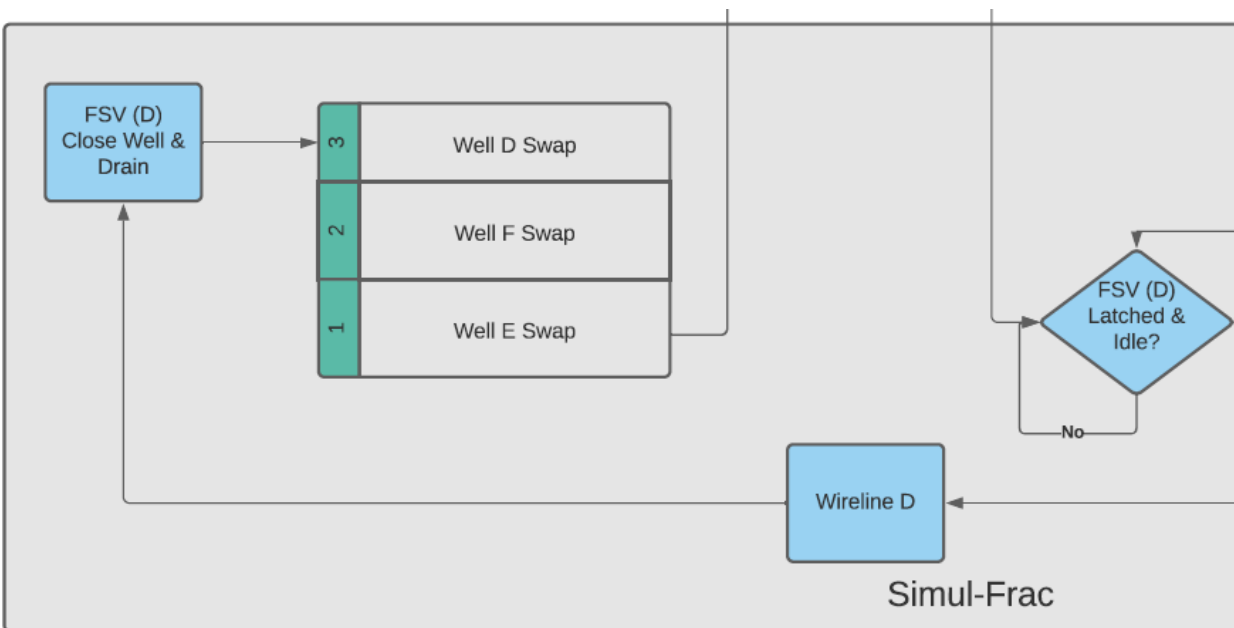


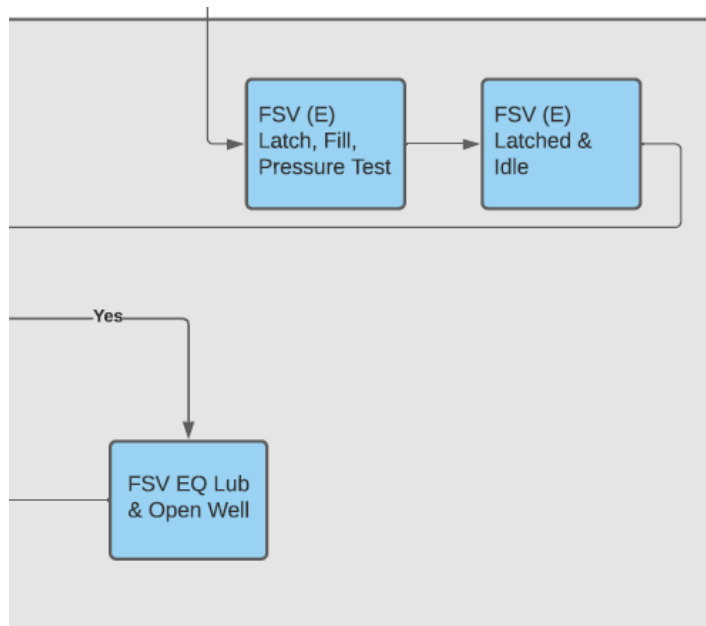


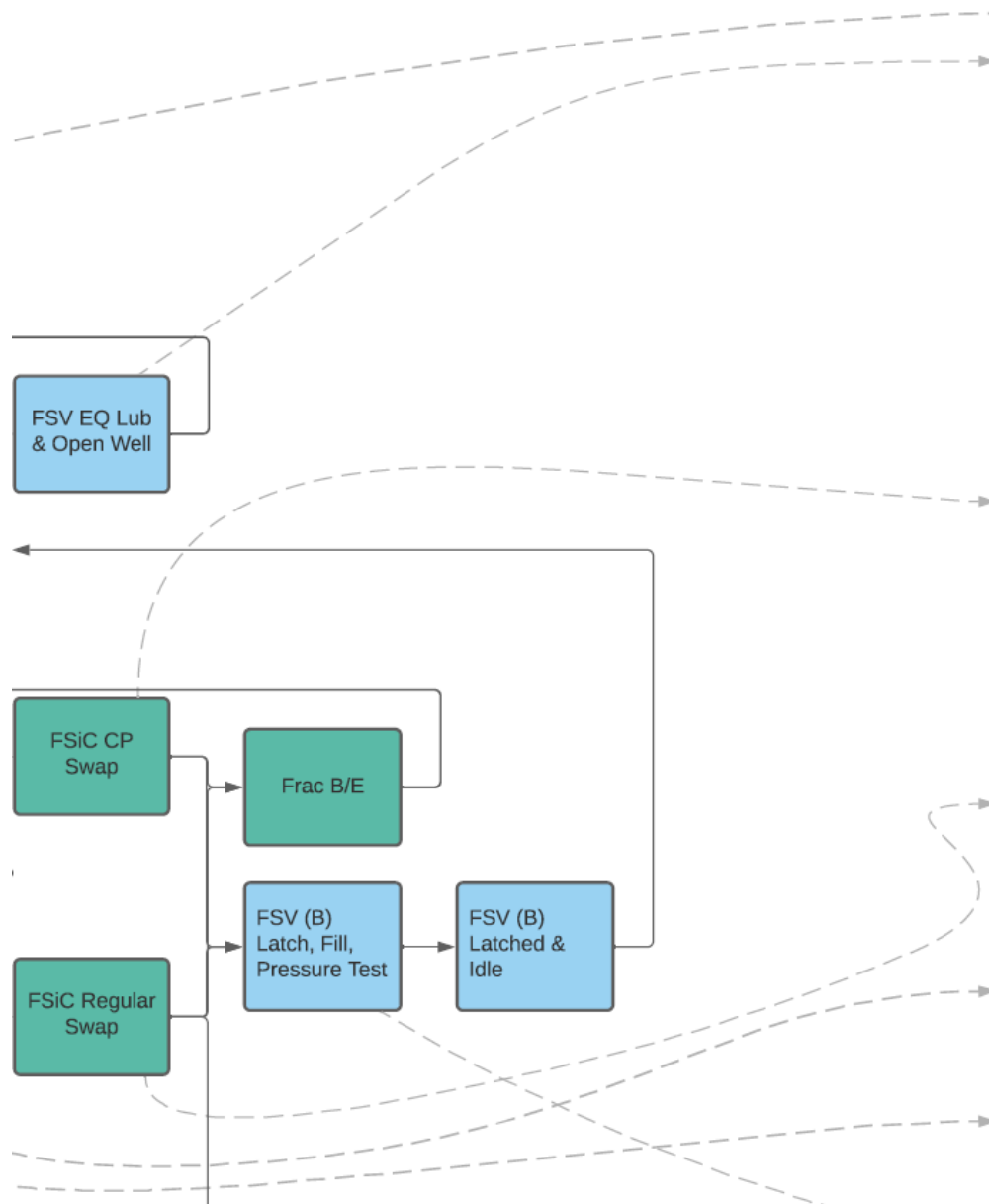
FS Swap Queue Automation

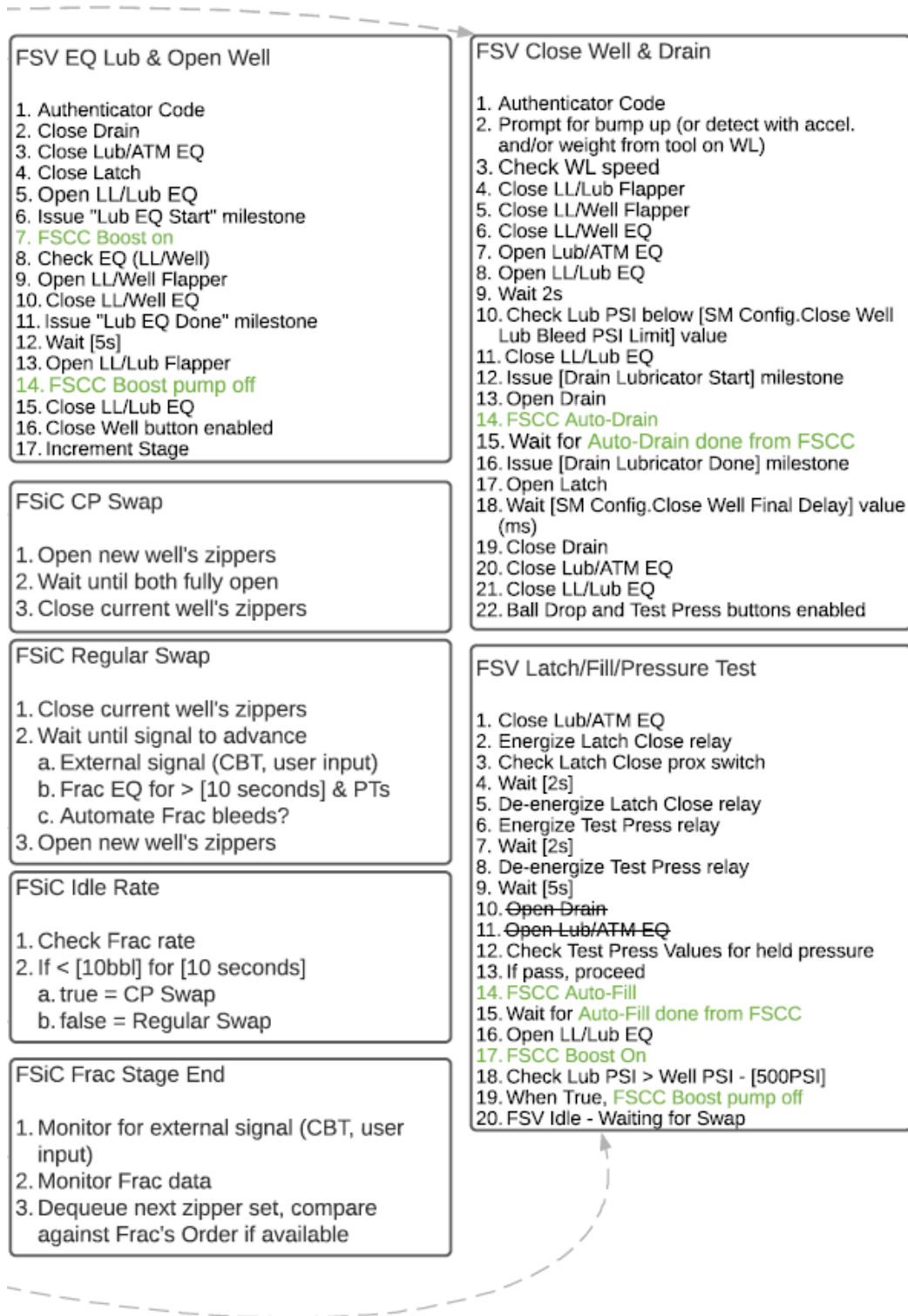
May 6, 2021 3:29 PM

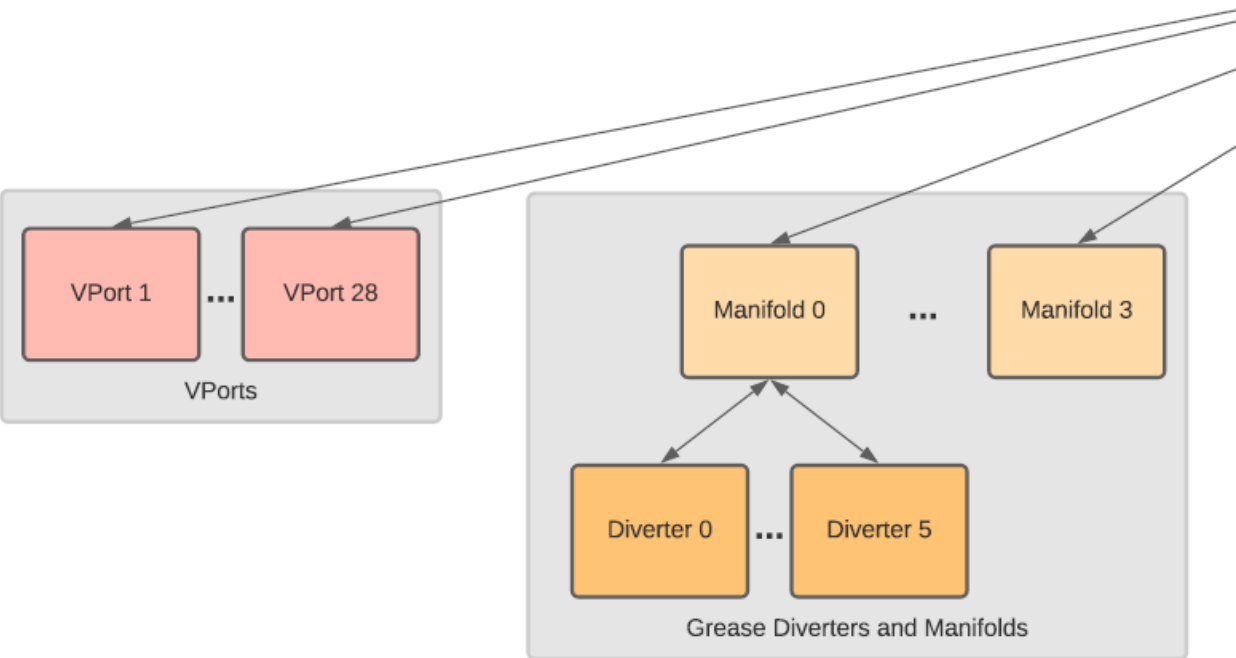


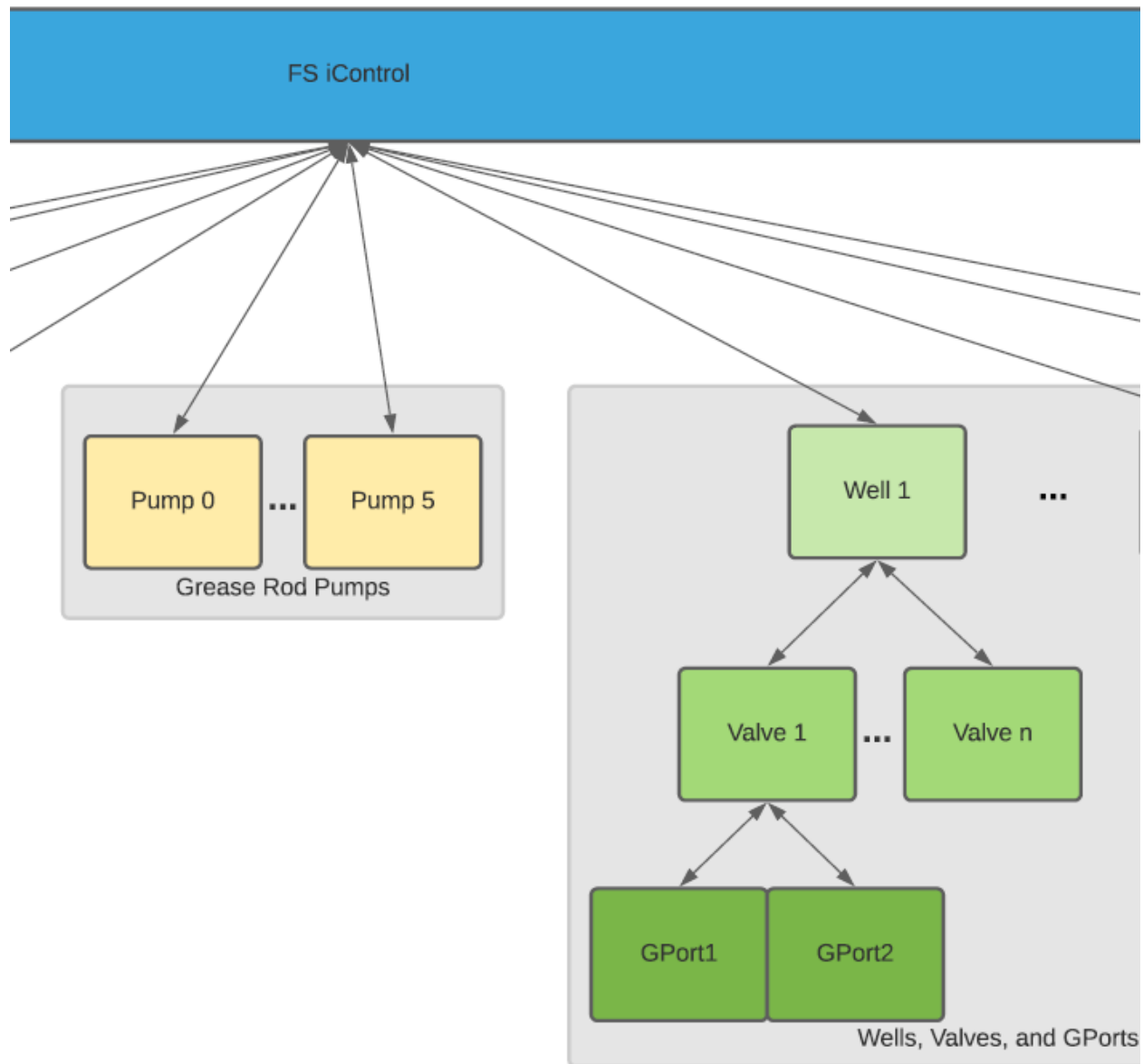


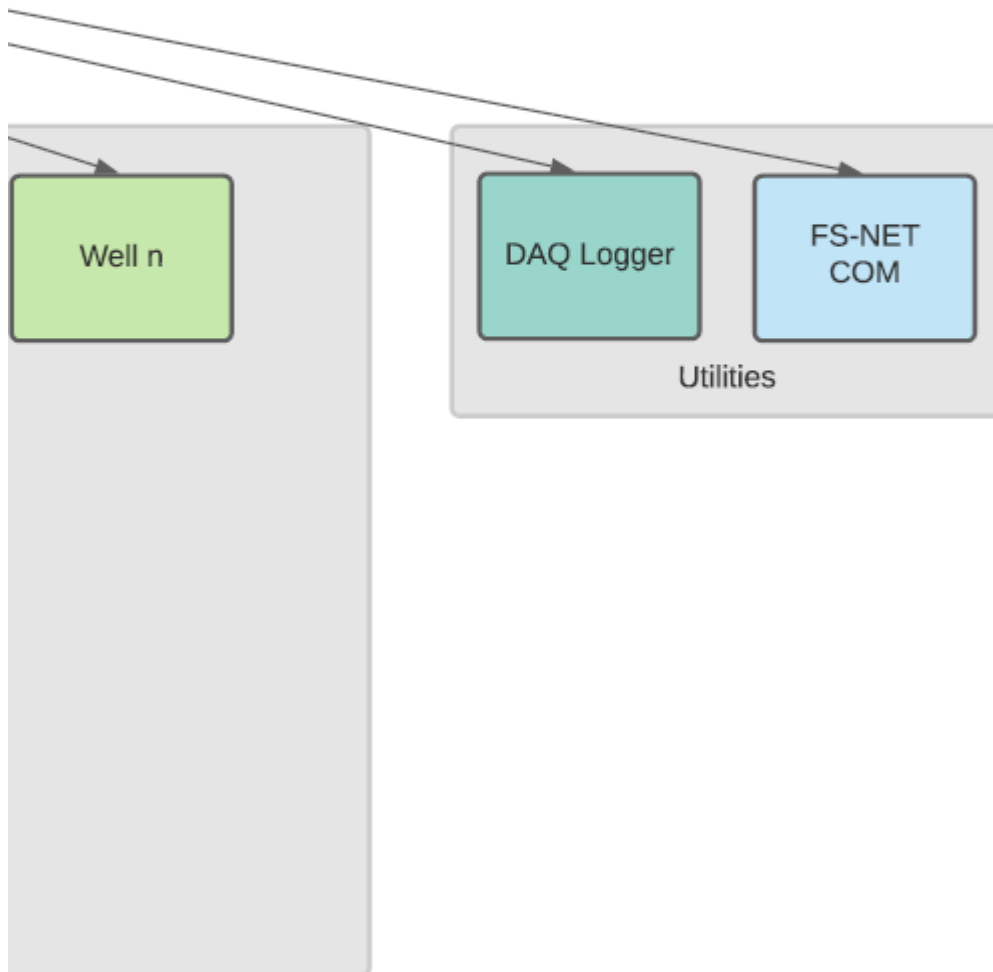


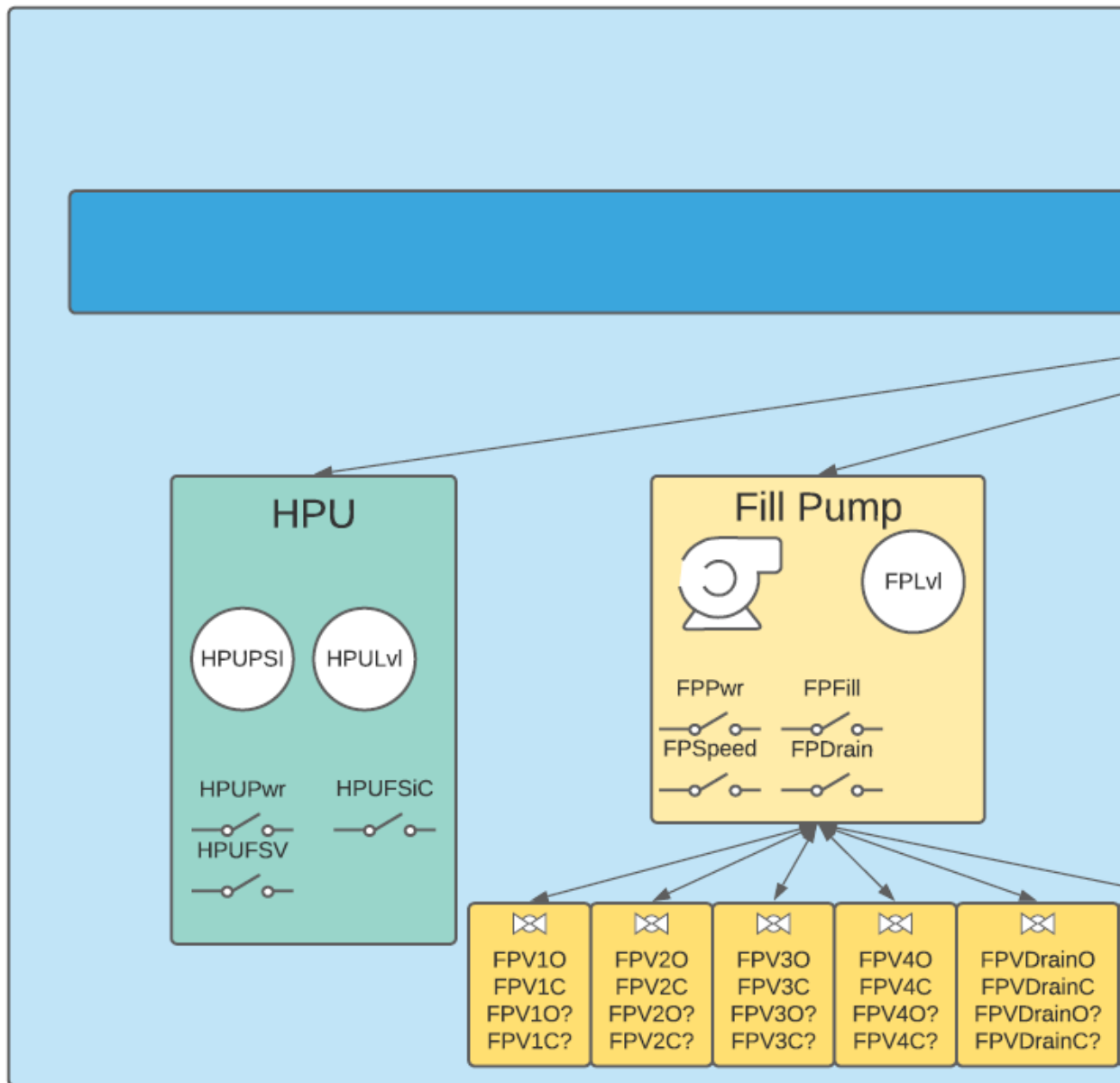




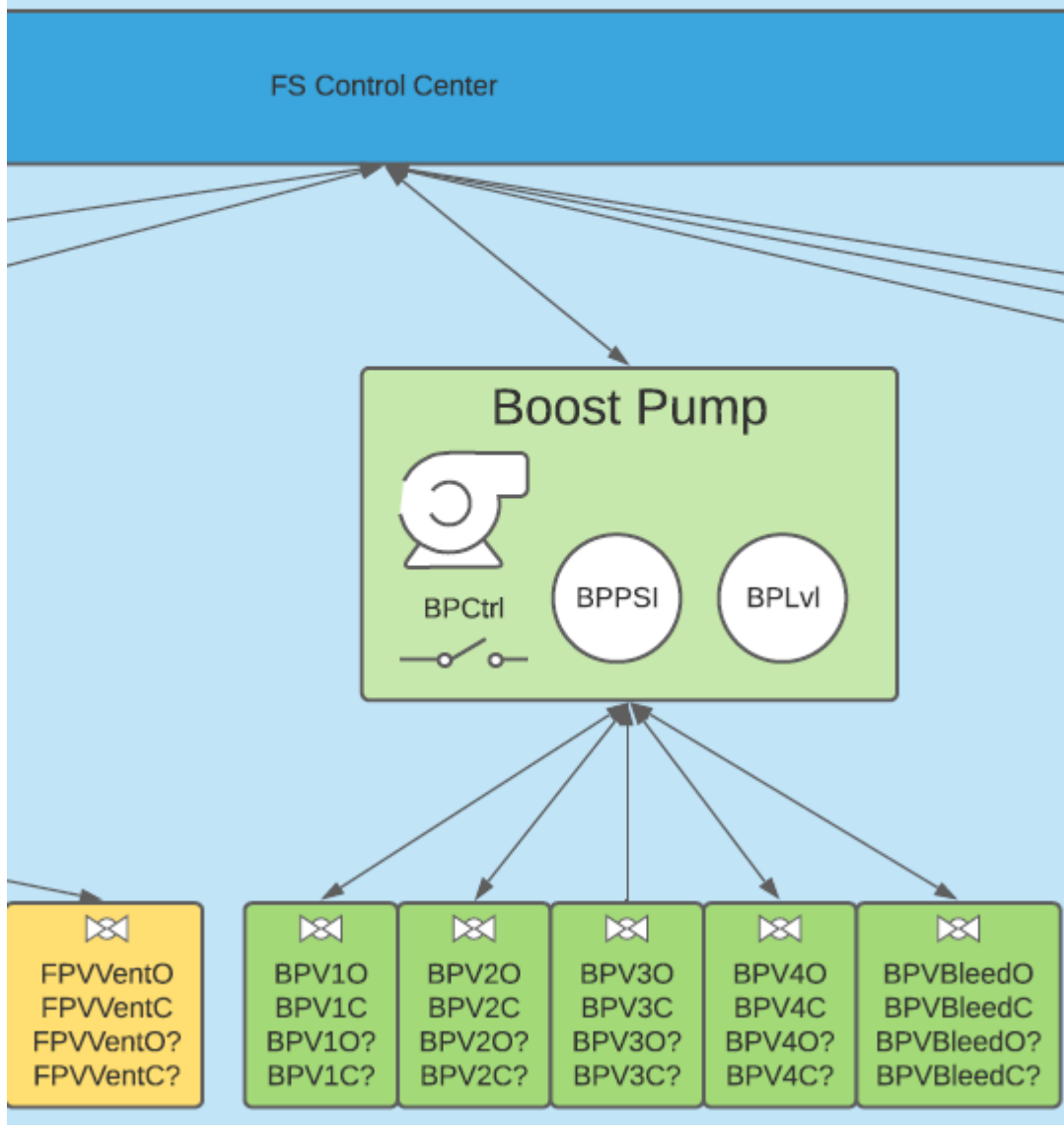


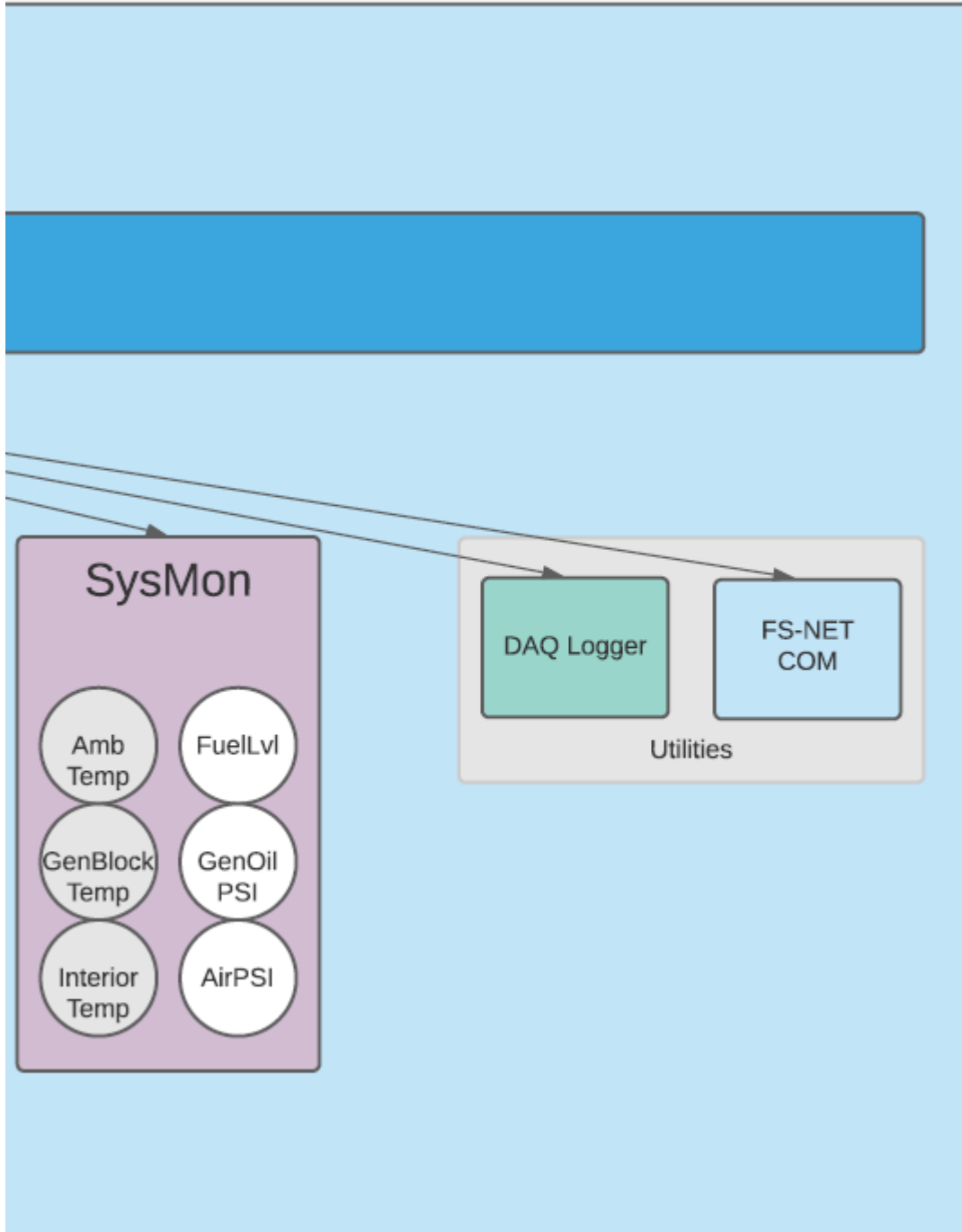






FSCC System Diagram







Introducing Continuous Pumping

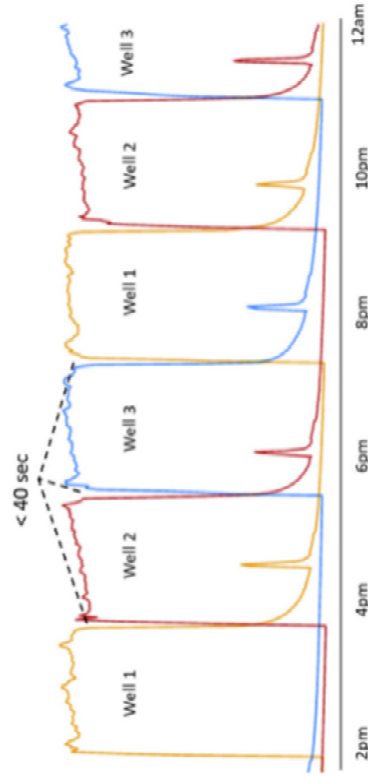
Instant Transitions. Pump continuously stage after stage.

Freedom Series iControl

The Freedom Series Completion System with FS iControl enables instant transitions between stages, allowing your pumps to run continuously, dramatically increasing completion rates and reducing cost per well. By automating the hydraulic gate valves and integrating automatic greasing, along with Downing's proprietary algorithms, FS iControl delivers unrivaled efficiency to your completion operation.

Goodbye Transition Time

FS iControl's proprietary algorithms integrated with the Freedom Series Completion System transition the zipper valves from one well to the other, opening the second well and subsequently shutting-in the first well, all while pumping. The transition is instantaneous and the total time between stages measured at treatment pressure is as fast as 40 seconds.





Instantaneous Transition Time

- Reduces transition time to zero
- Stage-to-stage time (measured at treatment pressure) in 40 seconds or less
- Wireline downhole immediately at end of stage



Automatic Greasing Every Time Valves are Actuated

- Reduces greasing costs by up to 90% with data to prove it
- Grease to valve manufacturer specifications
- Fills the grease cavity with exact amount of grease. No more, no less.
- Real-time data output: amount of grease, time-stamp, and valve greased
- Reduces NPT incidents by ensuring valves greased properly



Reduce Employee Exposure

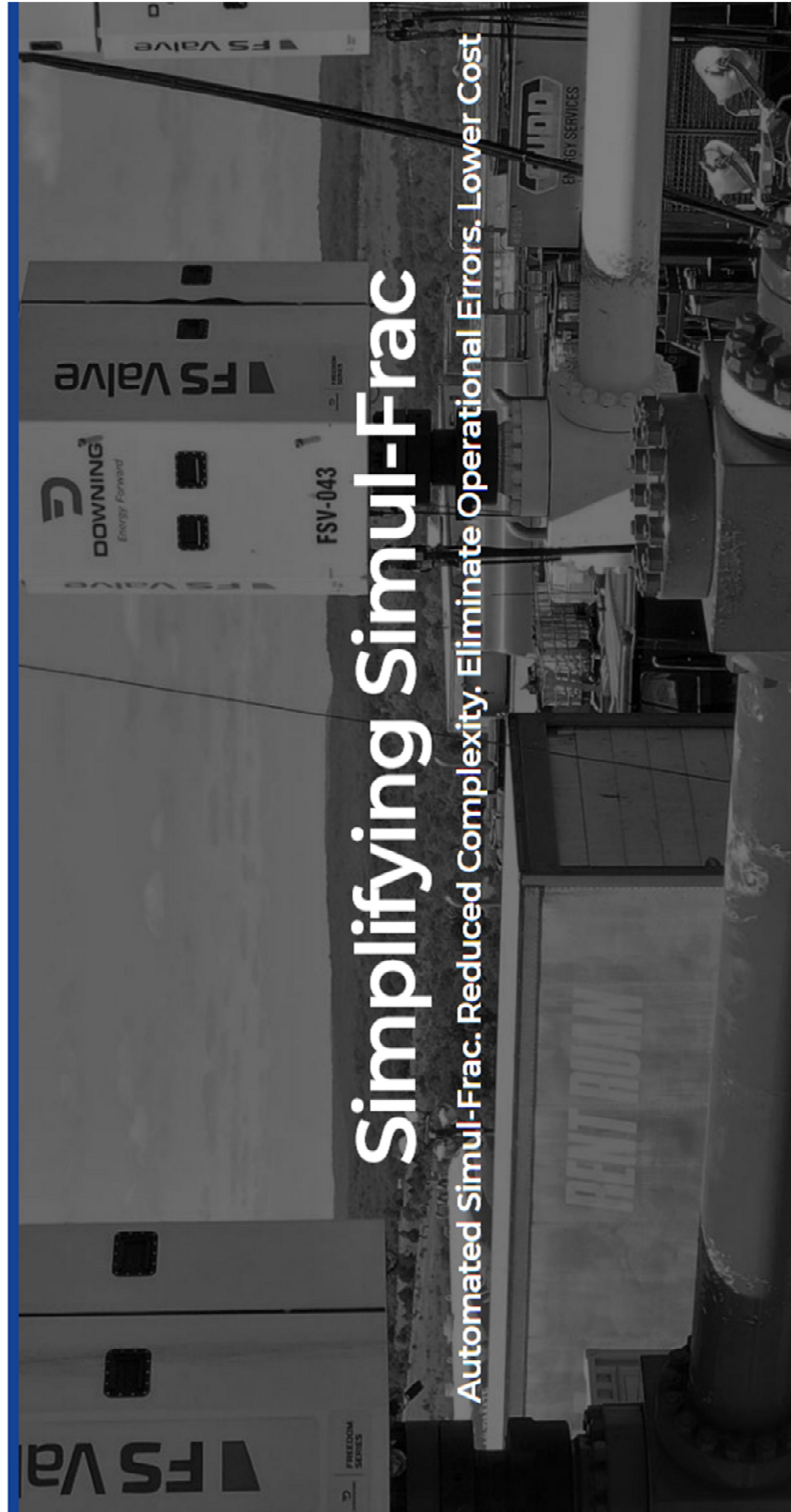
- Eliminates manual operation of valves
- Requires fewer personnel onsite

APPLICATION

- Multi-well zipper fracs using the [FS Completion System](#)

KEY FEATURES & BENEFITS

- Reduces overall cost per well
- Continuously pump stage to stage
- Automatically greases valves to manufacturer specifications
- Reduces personnel on the frac site



Simplifying Simul-Frac

Automated Simul-Frac. Reduced Complexity. Eliminate Operational Errors. Lower Cost

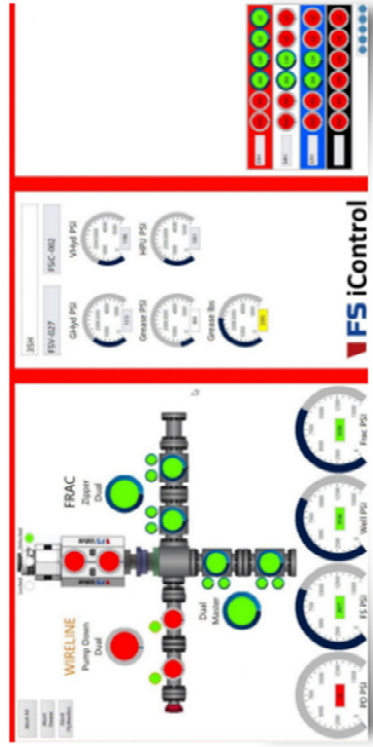
Let Freedom Series Simplify Your Simul-Frac

Frac'ing multiple wells is already a complex process. From logistics challenges, to valve actuation, to operational issues, to driving efficient operations, personnel are under immense pressure and pulled in multiple directions, requiring a special focus to ensure operational integrity. Add in Simul-frac operations and the complexity substantially increases....double the number of valves, actuations, greasing operations, wireline operations, etc. The traditional way to handle this added complexity is with additional personnel (and added cost).

Downing took a different road....we automated the entire surface system process, giving the operator complete control over their simul-frac operation while significantly reducing complexity. The Freedom Series Completion System integrates the surface systems into a single control system and automates the completion process. This provides an unparalleled view of all sub-systems, workflow-driven process steps, and mechanical and software interlocks to ensure a safe, efficient operation....all without the attendant costs associated with added complexity.

Simul-Frac Made Easy

Downing's Freedom Series Completion System integrates your surface systems into a single operational dashboard. The control system algorithms know the state of your surface equipment and the process sequence – so you can focus on what really matters, fracturing rock.





Simplified Operations

- Freedom Series simplifies and automates the simul-frac process, eliminating the potential for operational missteps and the attendant costs associated with added complexity.
- Simul-frac complexity can lead to longer transitions. Freedom Series eliminates complexity and enables instant transitions.
- Easily shut one well of a simul-frac and continue frac'ing another



Automated Control Reduces Additional Cost

- Move to simul-frac operations without adding additional personnel cost
- When a wireline mis-run occurs, the Freedom Series Completion System can recover lost time quickly and resynchronize with the planned operational sequence.



Reduce Employee Exposure

- Eliminates manual operation of valves
- Requires fewer personnel onsite

APPLICATION

- Simul-frac operations using the Freedom Series Completion System

KEY FEATURES & BENEFITS

- Reduces simul-frac complexity and errors
- Reduces personnel on the frac site
- Lower cost simul-frac operations



The Fastest Completions on the Market

The fully-automated FS Completion System (FSCS) is an integrated multi-chamber hydraulic valve with quick-connect latch system and optional ball dropper. Operated by an on-site control center or remotely, the system enables continuous frac operations by significantly reducing the time required to transition wireline-to-frac and frac-to-wireline. No other system on the market today, whether traditional latches or wellhead connection units, is as fast as the FS Completion System.

Maximize Pump Efficiency	Improved Safety and Environmental (ESG)	Lower Cost Per Well
- Automated pressure equalization enables any tool to enter a pressurized wellbore without pressuring down and re-pressurizing the flow iron - Near instantaneous transition times between wireline-to-frac and frac-to-wireline	- Eliminates sending personnel into the red zone - Remove personnel from frac site - Reduced carbon emissions - Automated workflows eliminate human error	- Eliminates unplanned costs like cut wireline and gate valve failures - Significantly reduces valve repairs & greasing costs