Application Note:
ETC Controllers and SCADA

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Background

Many Production Engineers are making the decision to move away from standalone plunger lift controllers and make use of programmable logic controllers (PLCs) to operate their plunger wells. At first glance, this seems like the obvious choice. In most cases, there is already a PLC or flow computer on site that can be programmed to perform the basic valve operations that are required for plunger lift. The real advantage is that these systems incorporate a communication network that allows operators to remotely monitor and control the plunger lift system, greatly reducing the amount of travel time required.

The problem however is that most people don't realize that they are giving up some critical functionality and while going purely with a PLC looks like it is saving them money, quite the opposite is happening.

The controller and radio panel in a SCADA system is typically classified as Div 2/Zone 2, meaning that it has to be located away from the well head. The problem is that common pieces of a plunger system, such as the plunger arrival sensor and solenoid must be located in the Div 1/Zone 1 area. You are left with no choice but to either add an intrinsic safety (IS) barrier between the SCADA panel and these devices or go to explosion proof rated devices. In either case this adds thousands of dollars in equipment and installation costs.

Another drawback is the lack of programming space and the lack of advanced algorithms. Because of these limitations, often features that provide enhanced safety or greater gas production are left out. Even if some of the features can be added, often the system architect has to make choices about what features will be available at which sites. This leads to custom builds per site. Add this to the already cumbersome task of maintaining the current program, adding new device types, and adding new features and costs can spiral out of control without even realizing it.

One of the biggest inconveniences in going to a PLC based control system for plunger lift is the lack of a proper user interface. Many of these systems don't have a local display and when they do, it is hard to navigate and is often very limited. Operators and technicians are forced to either call a control room or connect over the cell network with a laptop in order to see what is happening with their system. Most companies don't allow field technicians to have access to the SCADA system because they don't want them having access to the production system. This just causes more delays which leads to higher service costs.

The answer is to combine the best of both worlds by connecting trusted ETC plunger lift controllers to existing and new SCADA installs. Often the radio network can be re-used, meaning that the only extra investment is in the controller package and IS barrier to safely connect across the divisions/zones. The controller resides in the Div 1/Zone 1 location, so intrinsically safe solenoids that come as part of the package are used instead of expensive explosion proof solenoids. In addition, now IS arrival sensors can be used without an IS barrier, saving even more money.

The local interface can be used by operators and technicians so that they can instantly see how the well is performing and make the necessary changes without having to wait on control room staff. At the same time, data is being brought back to the control room to provide remote operators historical logs, current operational information, and the ability to change settings without having to always visit the well site.

ETC controllers have all of the safety and optimization features that you need and can be easily reconfigured to enable the options you want to use on a given well. As well, ETC is actively maintaining the software so that you don't have to. We work with our customers to quickly resolve any issues, to implement new features, and to add support for new, leading edge devices. As new releases become available, they can easily be programmed into any controller. The headaches that come with maintain custom builds on your PLCs are a thing of the past.

So before making the decision to spend hundreds of thousands of dollars building a custom application, make sure you consider using ETC plunger lift controllers to simplify your operation, save you maintenance costs, and increase your production.

Configurations

Connected to a Shared Radio

This setup utilizes a Raven IS barrier to connect an existing radio to an ETC Plunger Lift Controller. The barrier ensures that the higher voltages and currents in the Div 2/Zone 2 area cannot be transmitted to the Div 1/Zone 1 area. A splitter may be required for some radios depending on the physical interface. Some interfaces, such as RS-485 are multi-drop, meaning that several pairs of wires can be run from the same connections.
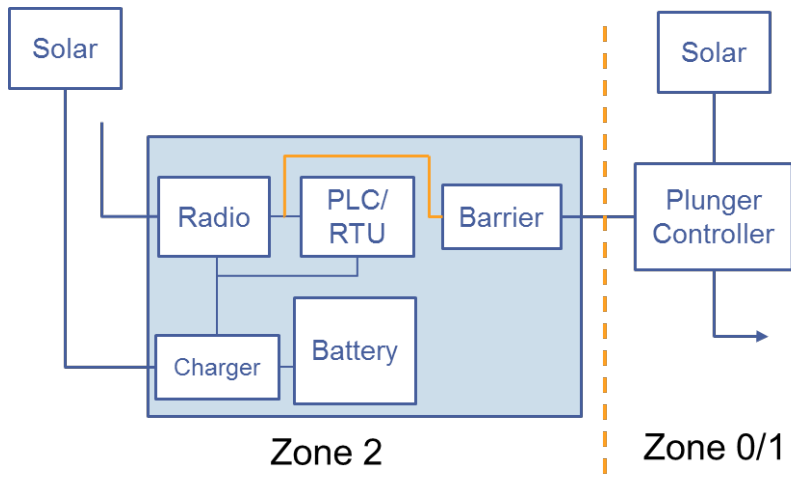
Figure 1 - Shared Communication Plunger Lift Controller Connection

In this setup, the host polls the plunger lift controller using an independent Modbus address. The appropriate registers to poll must be setup in the host system. The current values are , which are then used for display and trending on the client computers.

Connected to a PLC/RTU

Another configuration that is commonly used involves connecting the barrier to a spare COM port on the PLC/RTU. This eliminates the need for a splitter, but does require some additional programming.
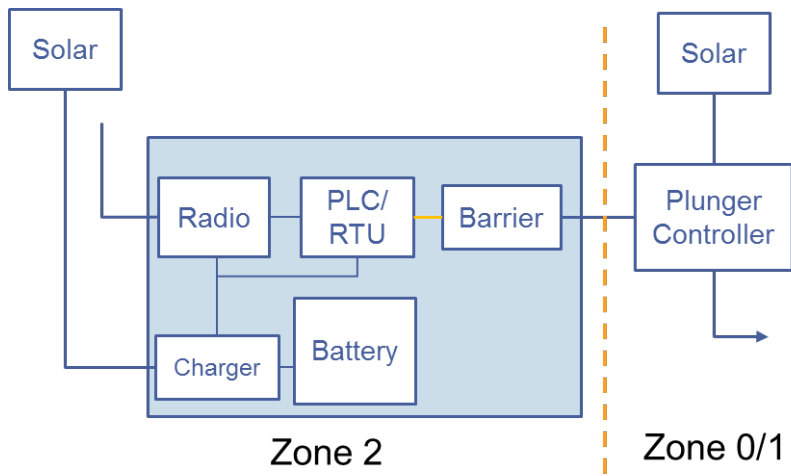

Figure 2 - Daisy Chain Plunger Lift Controller Connection

The PLC/RTU must either pass through communication from the SCADA host or must retrieve data from the plunger lift controller first before passing it on to the host.